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Williamtown Sand Syndicate
PO Box 898
Newcastle, NSW 2300

Attention: Darren Williams
Delivered by email: darren@arbus.com.au

Subject: Water quality monitoring results at Cabbage Tree Road Sand Quarry – March 2019 monitoring

Please find enclosed the Water quality monitoring results at Cabbage Tree Road Sand Quarry for the March 2019 monitoring.

1. SCOPE OF SERVICE

The scope of work includes monthly surface and groundwater monitoring for a combined period of 12 months. **Figure 1** (attached) presents the surface water and groundwater sampling locations.

The March monitoring round was to include gauging of all available monitoring wells (a total of 14 wells) and sampling from 10 monitoring wells (Noting that MW239D, BH3, BH5 and BH12 were not required to be sampled) and sampling at four surface water locations.

2. SITE WORK

The monitoring round was conducted on 14 and 15 March 2019.

Each well location was gauged using a water level meter to determine groundwater depth (relative to the top of the well casing) and the total depth of the well, in order to calculate the volume of water in the well. Following the gauging a HydraSleeve was then placed into the well ensuring the top of the sleeve was located under the water and left in place while all remaining wells were gauged. Following the gauging each of the HydraSleeves were removed and samples taken.

The March 2019 monitoring round included:

- Gauging of all available monitoring wells (a total of 14 wells);

- Groundwater sampling from a total of 8 monitoring wells (note MW239D, BH3, BH5 and BH12 did not require sampling, BH9 and BH10 was dry); and
- Surface water sampling from 1 location (SW1, SW2 and SW4 were dry on the day of sampling).

Water samples were collected in laboratory supplied containers and placed in an ice chilled esky. The samples were then submitted to a NATA accredited laboratory under a chain of custody (COC) for the analytical schedule as per **Table 2-1**.

Table 2-1: Summary of initial Water Quality Analysis

Analysis	Number of Samples				
	Primary	Intra-lab (Duplicate)	Inter-lab (Triplicate)	Transport Blank	Rinsate Blank
General Water Suite*	9	0	0	0	0
Hydrocarbons**	9	1	1	2	1
Metals***	9	1	1	2	1
Iron (dissolved)	9	1	1	2	1
Total Dissolved Solids (TDS)	10	0	0	0	0
Total Suspended Solids (TSS)	10	0	0	0	0
PFAS (28 analytes, standard level)	4	1	1	2	1

* General Water Suite: Ca, Mg, Na, K, pH, EC, Cl, SO_4, Alkalinity, Fluoride, Hardness & TDS (Calc')
** TRH (C6 – C40), BTEXN (Silica Gel)
*** Metals Suite (dissolved) - Arsenic (As), Boron (B), Barium (Ba), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Selenium (Se), Vanadium (V), Zinc (Zn) - note sampling for Iron and no nickel

3. SAMPLING RESULTS

Table 3-2 provides a summary of the gauging data and **Table 3-3** provides a summary of the field parameters taken during sampling. The full set of gauging data and field parameters for each monitoring location are provided in the **Tables** section.

Table 3-2: Summary of gauging data

Borehole	Top of Casing (mAHD)	Depth to Water (mBTOC)	Groundwater Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Comment
BH1	8.64	6.145	2.495	8.12	Well recently reinstated. Strong acrylic odour when gauging. Light brown in colour.
BH2	7.79	5.184	2.606	8.93	Dark brown – No Odour.
BH3	7.57	6.146	1.544	8.75	No odour – No sample taken.
BH4	3.06	2.091	0.969	5.92	Light Brown – No Odour.

Borehole	Top of Casing (mAHD)	Depth to Water (mBTOC)	Groundwater Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Comment
BH5	7.36	6.146	1.214	8.63	Slight sulfur odour – No sample taken.
BH6	3.62	1.913	1.707	4.44	Brown – No Odour.
BH7	2.98	2.015	0.965	4.42	Slightly Cloudy, light brown, slight sulfur odour.
BH8	3.88	2.864	1.016	6.09	Sulfur smell - cloudy
BH9	17.75	Dry	-	16.01	Well was dry.
BH10	6.69	Dry	-	3.58	Well was dry.
BH11	6.63	3.181	3.02	5.21	Light Brown – Slight Odour.
BH12	8.67	6.924	1.746	8.03	40mm inner tube installed. No odour – No sample taken
MW239S	3.04	1.615	1.425	3.89	Dark Brown - Slight Sulfur odour.
MW239D	3.04	1.591	1.449	20.19	No odour – No sample taken
SW01*	2.5	Dry	-	N/A	Location was dry.
SW02*	3.3	Dry	-	N/A	Location was dry.
SW03*	2.1	1.1	1	N/A	Water was at a low level and was not seen to be flowing.
SW04*	2	Dry	-	N/A	Location was dry.

* Surface water levels measured from measuring tape installed

Table 3-3: Summary of field parameters

Sample ID	Time	Temp (°C)	EC (us/cm)	pH	Redox (mV)
BH01	0830	18.93	111	5.49	81
BH02	0915	19.35	101	4.49	264
BH04	0950	18.92	79	4.52	311
BH06	1415	23.17	159	4.74	178
BH07	1330	25	251	4.34	179
BH08	1300	21.54	307	4.96	176
BH11	0745	18.87	168	4.95	176
MW239S	1445	23.1	323	4.43	179
SW03	1515	25.87	342	6.08	10

Table 3.4 presents a summary of the water monitoring results and comparison with identified trigger values. Full results tables are provided in the Tables Section. Full Laboratory results, including copies for the COC are provided in **Attachment A**.

Table 3.4 Water screening levels

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring
Physical and Chemical Stressors	Sodium	0.01	9	9	64	No	Similar
	Sulphate	1	9	<1.0	44	No	Similar
	Chloride	1	9	18	126	No	Similar
	Fluoride	0.1	9	<0.1	<1.0	No	Similar
	Reactive Phosphorous	0.01	0	-	-	-	N/A
	Total Phosphorous	0.01	0	-	-	-	N/A
	Nitrite	0.01	0	-	-	-	N/A
	Nitrate	0.01	0	-	-	-	N/A
	Ammonia	0.01	0	-	-	-	N/A
	Total Nitrogen	0.1	0	-	-	-	N/A
	Total Hardness	1	9	5.0	40	No	Similar
	Total Dissolved Solids	1	9	50	266	No	Similar
	pH	0.01	9	4.71	5.67	All outside All above ANZECC 2000 Trigger range[1] and drinking water guidelines	Similar
Dissolved Metals	As	0.005-0.1	9	<0.001	0.006		
	B	0.005-0.1	9	<0.05	<0.05	No	Similar
	Ba	0.005-0.1	9	0.003	0.027	No	Similar
	Be	0.005-0.1	9	<0.001	<0.001	No	Similar
	Cd	0.005-0.1	9	<0.0001	<0.0001	No	Similar

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring
	Cr	0.005-0.1	9	<0.001	0.004	1 above ANZECC 2000 Trigger Values[2]	Similar – Note BH1 that exceeded the criteria was not previously sampled
	Co	0.005-0.1	9	<0.001	0.003	No	Similar
	Cu	0.005-0.1	9	<0.001	0.003	1 above ANZECC 2000 Trigger Values[2]	Similar
	Fe	0.005-0.1	9	0.06	13	7 above drinking water aesthetic criteria	Similar
	Mn	0.005-0.1	9	0.005	0.048	No	Similar
	Ni	0.005-0.1	9	<0.001	0.037	2 above ANZECC 2000 Trigger Values[2], and 2 above NHMRC ADWG 6	Similar
	Pb	0.005-0.1	9	<0.001	<0.001	No	Similar
	Se	0.005-0.1	9	<0.01	<0.01	No	Similar
	V	0.005-0.1	9	<0.01	<0.01	No	Similar
	Zn	0.005-0.1	9	<0.005	1.27	6 above ANZECC 2000 Trigger Values[2]	Similar
	Hg	0.0001	9	<0.0001	<0.0001	No	Similar
TRH – Silica Clean up	C_6-C_{10}	0.02	9	<0.02	1.69	No	Similar – Noting that BH1 was not sampled in the previous monitoring round and the well casing had recently been fixed using a volatile glue. Further consideration will be needed in the next monitoring event.
	>C_{10}-C_{16}	0.1	9	<0.1	<0.1	No	Similar
	>C_{16}-C_{34}	0.1	9	<0.1	<0.1	No	Similar
	>C_{34}-C_{40}	0.1	9	<0.1	<0.1	No	Similar

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring
	Total >C_{10}-C_{40}	0.1	9	<0.1	<0.1	No	Similar
	C_6-C_{10} minus BTEX (F1)	0.02	9	<0.02	1.69	No	Similar – Noting that BH1 was not sampled in the previous monitoring round and the well casing had recently been fixed using a volatile glue. Further consideration will be needed in the next monitoring event.
	>C_{10}-C_{16} minus Naphthalene (F2)	0.1	9	<0.1	<0.1	No	Similar
BTEX	Benzene	0.001-0.005	9	<0.001	<0.001	No	Similar
	Toluene	0.001-0.005	9	<0.002	<0.002	No	Similar
	Ethylbenzene	0.001-0.005	9	<0.002	<0.002	No	Similar
	Total Xylene	0.001-0.005	9	<0.002	<0.002	No	Similar
	Naphthalene	0.001	9	<0.005	<0.005	No	Similar
PFAS	PFOS	0.00001-0.0001	10	<0.00001	<0.00001	HEPA NEMP 2018*	Similar
	PFOA	0.00001-0.0001	10	<0.00001	<0.00001	No	Similar
	PFOS/PFHxS	0.00001-0.0001	10	<0.00001	<0.00001	No	Similar

* The LOR is above the Heads of EPA Australia and New Zealand – National Environmental Management Plan (HEPA NEMP) 2018 99% Level of protection in freshwater. No concentrations were found to be above the LOR.

[1]Australian and New Zealand Environmental Conservation Council (ANZECC) 2000 Trigger Values – Default trigger values for physical and chemical stressors, for slightly disturbed ecosystems in lowland rivers, Southeast Australia (value is for base flow and not storm event)

[2]ANZECC 2000 Trigger Values – 95% Level of protection in freshwater

National Health and Medical Research Council Australian Drinking Water Guidelines (NHMRC ADWG) 6 2011 Version 3.5 Updated August 2018

4. RAINWATER DATA

Table 4.5 presents the rainfall data from Williamtown RAAF base (Station Number: 061078, Latitude: 32.79°S; Longitude: 151.84°E; Elevation: 8 m). The mean monthly rainfall indicates that there was more rainfall in March than the mean.

Table 4.5 2019 Rainfall data

2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	2.0	0.8	0									
2nd	0	12.8	0									
3rd	0	0.4										
4th	0	0	0									
5th	0	0	0									
6th	0	0	0									
7th	5.0	0	8.2									
8th	0	0	0									
9th	0	6.6	0									
10th	0.2	0	12.0									
11th	0	0	0									
12th	3.0	0	0									
13th	0	0	0									
14th	0	0	0									
15th	0	0	0									
16th	0	0	4.8									
17th	0	0	59.4									
18th	0	0	2.6									
19th	0	0	2.2									
20th	2.4		0									
21st	1.0	1.4	0									
22nd	0	1.0	1.2									
23rd	0	1.4	0									
24th	0	9.2	5.4									
25th	0	0	5.2									
26th	0	0	0									
27th	0	0	0									
28th	1.0	0	0									
29th	0		0									
30th	0		38.2									
31st	0		6.6									
Monthly Total	**14.6**	**33.6**	**145.8**									
Mean	**98.7**	**117.0**	**120.5**	**111.6**	**109.6**	**124.7**	**70.9**	**72.9**	**60.4**	**73.9**	**82.3**	**78.6**

Despite the rainfall in March, based on the long term rainfall data, it is expected that the current groundwater and surface water levels would still be low.

5. THANKYOU

We trust the information presented is acceptable. If you have any questions, please do not hesitate in contacting the undersigned.

Sincerely,

Kleinfelder Australia Pty Ltd

Tom Overton MSc, BSc (Hons), Dip

Senior Project Manager
Contaminated Land Management
toverton@kleinfelder.com

Mobile: 0415 170 312

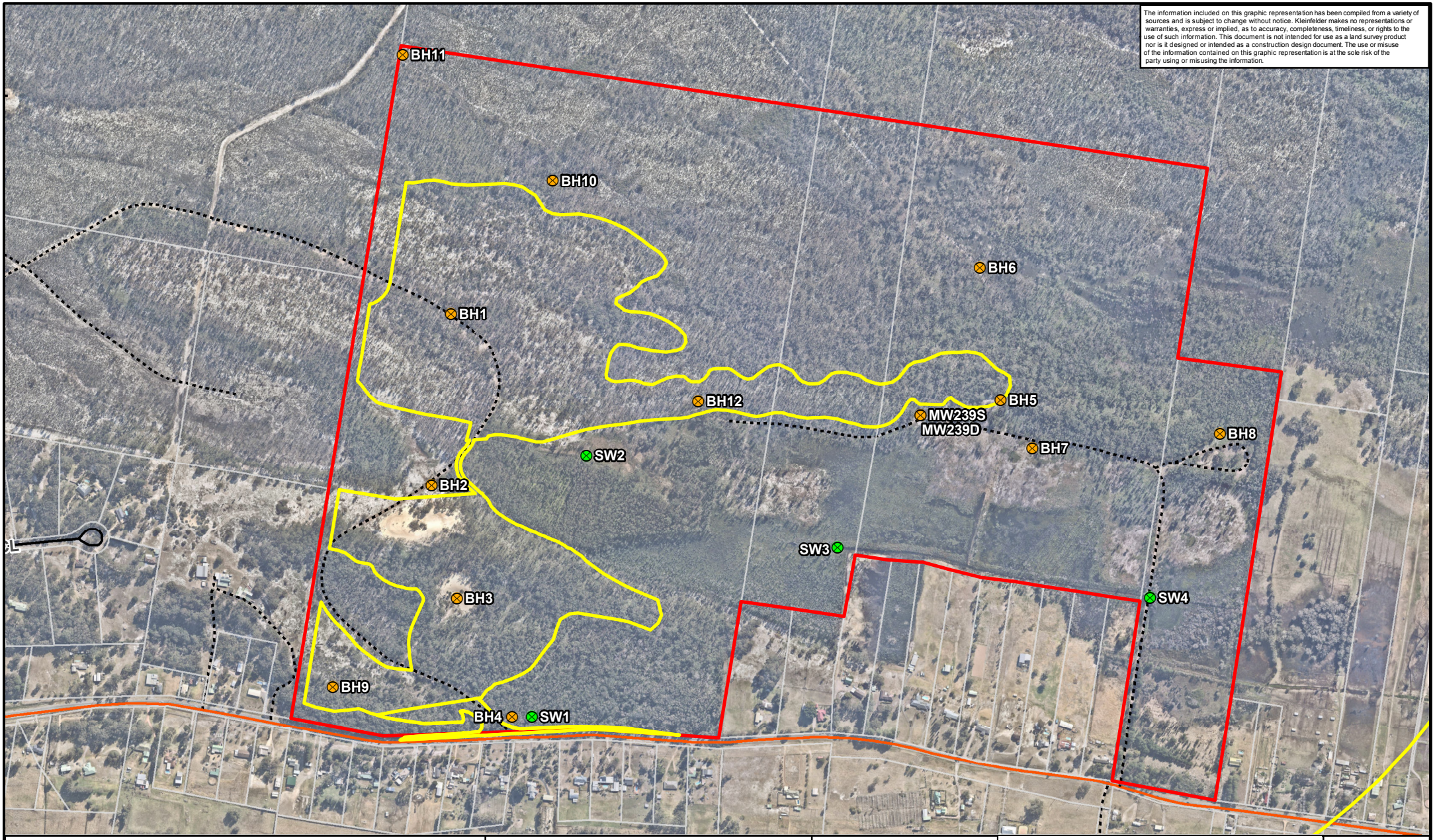
Attached:

Figure 1

Data Tables

Attachment A – Laboratory reports

FIGURE 1



- Groundwater Sample Site
- Surface Water Sample Site
- Subject Land Boundary
- Quarry Project Area
- Arterial Road
- Local Road
- Track

Metres
0 50 100 200 300 400 500
N

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PROJECT REFERENCE: 20170448
DATE DRAWN: 13/02/2019 09:48 Version 1
DRAWN BY: gjoyce

DATA SOURCE:
NSW DFSI - 2017
Nearmap - 2018

Water monitoring locations February 2019 Monitoring

Williamtown Sand Syndicate
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:
1

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DATA TABLES

Table BH01
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH1	387741.2	6369495.8	8.21	8.64	9.45	6.45	8.6	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	5.776	2.864	8.89	-0.25	-	-	-	-	No water sample taken due to top of well being melted
15/03/2019	6.145	2.495	8.12	0.52	18.93	111	5.49	81	Well recently reinstated. Strong acrylic odour when gauging. Light brown in colour.

Table BH02
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH2	387704.7	6369175.1	7.4	7.79	9.45	5.6	8.6	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	5.674	2.116	8.93	-1.14	22.7	124.1	4.29	111	Slightly Cloudy, light brown, slight sulfur odour
15/03/2019	5.184	2.606	8.93	-1.14	19.35	101	4.49	264	Dark brown – No Odour.

Table BH03
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH3	387751.7	6368964.3	7.03	7.57	9.45	5.45	8.45	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	6.026	1.544	8.94	-1.37	22.1	82.4	4.54	94	Light Brown - No Odour
14/03/2019	6.146	1.424	8.75	-1.18	-	-	-	-	No odour – No sample taken.

Table BH04
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH4	387854.9	6368742.8	2.81	3.06	6.45	2.65	5.65	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	1.994	1.066	5.92	-2.86	20.4	129.2	3.85	135	light discolouration - Brown
15/03/2019	2.091	0.969	5.92	-2.86	18.92	79	4.52	311	Light Brown – No Odour.

Table BH05
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH5	388768.5	6369334.7	6.76	7.36	9.28	8.1	5.1	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	6.063	1.297	8.63	-1.27	20.1	320	4.06	122	Roots evident. Brown slight sulfur odour
14/03/2019	6.146	1.214	8.63	-1.27	-	-	-	-	Slight sulfur odour – No sample taken.

Table BH06
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH6	388729.7	6369582.2	3.01	3.62	4.95	3.9	2.4	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	1.823	1.797	4.43	-0.81	23.1	228	4.28	111	Clear to slightly cloudy, sulfur odour
14/03/2019	1.913	1.707	4.44	-0.82	23.17	159	4.74	178	Brown – No Odour.

Table BH07
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH7*	388827.7	6369245.3	2.6	2.98	4.95	2.6	4.1	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	1.938	1.042	4.42	-1.44	23.7	283	4.04	125	Slightly Cloudy, light brown, slight sulfur odour
14/03/2019	2.015	0.965	4.42	-1.44	25	251	4.34	179	Slightly Cloudy, light brown, slight sulfur odour.

Table BH08
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH8	389178.2	6369271.6	3.28	3.88	6.28	3	5.5	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	2.78	1.1	6.08	-2.2	21.8	411	4.09	121	Sulfur smell - Dark Brown
14/03/2019	2.864	1.016	6.09	-2.21	21.54	307	4.96	176	Sulfur smell - cloudy

Table BH09
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH9	387520.4	6368798.8	17.07	17.75	18.18	14.6	17.6	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	Dry	-	15.82	1.93	-	-	-	-	Well was dry
14/03/2019	Dry	-	16.01	1.74	-	-	-	-	Well was dry

Table BH10
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH10	387931.2	6369744.4	6.09	6.69	5.45	2	5	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	Dry	-	3.58	3.11	-	-	-	-	Well was dry
14/03/2019	Dry	-	3.58	3.11	-	-	-	-	Well was dry

Table BH11
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH11	387650.6	6369979.7	6.02	6.63	5.95	1.6	4.6	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	3.02	3.61	5.21	1.42	22.3	402	3.78	136	Brown - No Odour
15/03/2019	3.181	3.449	5.21	1.42	18.87	168	4.95	176	Light Brown – Slight Odour.

Table BH12
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
BH12	388202.9	6369332.9	8.06	8.67	8.39	4.8	7.8	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	Dry	-	6.166	2.504	-	-	-	-	Well was dry
14/03/2019	6.924	1.746	8.03	0.64	-	-	-	-	40mm inner tube installed. No odour – No sample taken

Table BH239S
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
MW239S	388619.1	-	2.98	3.04	4	1	4	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	1.529	1.511	3.89	-0.85	21.7	526	4.09	121	Light Brown - Slight Sulfur odour
14/03/2019	1.615	1.425	3.89	-0.85	23.1	323	4.43	179	Dark Brown - Slight Sulfur odour.

Table BH239D
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Borehole	Easting (MGA)	Northing (MGA)	Ground Surface RL (mAHD)	Top of Casing (mAHD)	Bore Depth prior to monitoring (mBTOC)	Screen Top (mBG)	Screen Bottom (mBG)	Well Diameter (mm)
MW239D	388619.1	-	2.98	3.04	21	-	-	50

Date	Depth to Water (mBTOC)	Water Elevation (mAHD)	Well Total Depth at point of sampling (mBTOC)	Well Base Elevation (mAHD)	Description
21/02/2019	1.312	1.728	20.21	-17.17	
14/03/2019	1.591	1.449	20.19	-17.15	

Table SW01
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Location	Easting (MGA)	Northing (MGA)	Top of Measuring Tape (mAHD)
SW01	387886.7	6368734	2.5

Date	Water Lavel (Reading on tape)	Water Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	0	2.5	-	-	-	-	No water present
14/03/2019	0	2.5					No water present

Table SW02
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Location	Easting (MGA)	Northing (MGA)	Top of Measuring Tape (mAHD)
SW02	387988.3	6369234	3.3

Date	Water Lavel (Reading on tape)	Water Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	0	3.3	-	-	-	-	No water present
14/03/2019	0	3.3	-	-	-	-	No water present

Table SW03
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Location	Easting (MGA)	Northing (MGA)	Top of Measuring Tape (mAHD)
SW03	388464.6	6369057	2.1

Date	Water Level (Reading on tape)	Water Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	1.1	1	26	313	5.11	62	Water level low, slight sulfur odour
14/03/2019	1.1	1	25.87	342	6.08	10	Water was at a low level and was not seen to be flowing.

Table SW04
Groundwater gauging data and field parameters
Williamtown Sand Syndicate

Location	Easting (MGA)	Northing (MGA)	Top of Measuring Tape (mAHD)
SW04	389049	6368969	2

Date	Water Lavel (Reading on tape)	Water Elevation (mAHD)	Temp (°C)	EC (us/cm)	pH	Redox (mV)	Description
21/02/2019	0	2	-	-	-	-	No water present
14/03/2019	0	2	-	-	-	-	No water present

Table 1
Groundwater Analytical Data - BTEXN
Williamtown Sand Syndicate

Analyte		BTEXN								Total Petroleum Hydrocarbons	Total Petroleum Hydrocarbons - Silcia Clean up				Total Recoverable Hydrocarbons		Total Recoverable Hydrocarbons - Silcia Clean up				
		Benzene**	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene**	Total Xylenes	Naphthalene **	Sum of BTEX	C_6 - C_9	C_{10}-C_{14} - Silica Cleanup	C_{15}-C_{28} - Silica Cleanup	C_{29}-C_{36} - Silica Cleanup	C_{10}-C_{36} Sum - Silica Cleanup	C_6 - C_{10}	C_6 - C_{10} minus BTEX (F1)	>C_{10}-C_{16} - Silica Cleanup	F2 - Silica Cleanup	>C_{16}-C_{34} - Silica Cleanup	>C_{34}-C_{40} - Silica Cleanup	>C_{10}-C_{40} - Silica Cleanup
LOR		1	2	2	2	2	2	5	1	20	50	100	50	50	20	20	100	100	100	100	100
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANZECC 2000 Trigger Values		950	-	-	-	350		16													
NHMRC ADWG 6		1	800	300	-	350	600														
Sample Name	Sample Date																				
BH1	15-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	**1,710**	< 50	< 100	< 50	< 50	**1,690**	**1,690**	< 100	< 100	< 100	< 100	< 100
BH11	21-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH11	15-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH2	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH2	15-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH3	21-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH4	21-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH4	15-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH5	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH6	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH6	14-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH7	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH7	14-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH8	21-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
BH8	14-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
MW2395	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
MW239S	14-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
SW3	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
SW3	14-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100

Notes:
- - Not analysed
< - Less than laboratory limit of reporting
µg/L - Micrograms per litre
BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

** 95% Level of protection in freshwater

Table 2
Groundwater Analytical Data - Metals
Williamtown Sand Syndicate

Analyte		Metals															
		Arsenic**	Barium	Beryllium	Boron**	Cadmium**	Chromium**[1]	Cobalt	Copper**	Iron	Lead**	Manganese**	Mercury**[2]	Nickel**	Selenium**	Vanadium	Zinc**
LOR		0.001	0.001	0.001	0.05	0.0001	0.001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.01	0.01	0.005
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ANZECC 2000 Trigger Values		0.013		-	0.37	0.0002	0.001	-	0.0014	-	0.0034	1.9	0.0006	0.011	0.011	-	0.008
NHMRC ADWG 6		0.01		0.06	4	0.002	0.05	-	2	0.3[3]	0.01	0.5	0.001	0.02	0.01	-	3[3]
Sample Name	Sample Date																
BH1	15-Mar-19	< 0.001	**0.003**	< 0.001	< 0.05	< 0.0001	**0.004**	< 0.001	< 0.001	**13**	< 0.001	**0.014**	< 0.0001	< 0.001	< 0.01	< 0.01	**1.27**
BH11	21-Feb-19	< 0.001	**0.008**	< 0.001	< 0.05	< 0.0001	**0.002**	**0.001**	< 0.001	**0.26**	< 0.001	**0.003**	< 0.0001	**0.005**	< 0.01	< 0.01	**0.031**
BH11	15-Mar-19	< 0.001	**0.005**	< 0.001	< 0.05	< 0.0001	**0.001**	< 0.001	< 0.001	**1.49**	< 0.001	**0.007**	< 0.0001	**0.037**	< 0.01	< 0.01	**0.016**
BH2	22-Feb-19	< 0.001	**0.005**	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	**0.002**	**0.14**	< 0.001	**0.021**	< 0.0001	**0.015**	< 0.01	< 0.01	**0.006**
BH2	15-Mar-19	< 0.001	**0.004**	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	**0.003**	< 0.05	< 0.001	**0.02**	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
BH3	21-Feb-19	< 0.001	**0.003**	< 0.001	< 0.05	< 0.0001	**0.002**	< 0.001	< 0.001	**0.06**	< 0.001	**0.005**	< 0.0001	**0.053**	< 0.01	< 0.01	< 0.005
BH4	21-Feb-19	< 0.001	**0.014**	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	**0.002**	**0.16**	< 0.001	**0.039**	< 0.0001	**0.018**	< 0.01	< 0.01	**0.014**
BH4	15-Mar-19	< 0.001	**0.014**	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	**0.001**	< 0.05	< 0.001	**0.014**	< 0.0001	**0.022**	< 0.01	< 0.01	**0.043**
BH5	22-Feb-19	< 0.001	**0.01**	< 0.001	< 0.05	< 0.0001	**0.001**	< 0.001	< 0.001	**1.4**	< 0.001	**0.005**	< 0.0001	**0.003**	< 0.01	< 0.01	**0.008**
BH6	22-Feb-19	< 0.001	**0.03**	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	**1.03**	< 0.001	**0.014**	< 0.0001	**0.001**	< 0.01	< 0.01	**0.019**
BH6	14-Mar-19	< 0.001	**0.027**	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	**1.9**	< 0.001	**0.01**	< 0.0001	< 0.001	< 0.01	< 0.01	**0.012**
BH7	22-Feb-19	< 0.001	**0.004**	< 0.001	< 0.05	< 0.0001	**0.002**	**0.003**	< 0.001	**1.8**	< 0.001	**0.026**	< 0.0001	**0.004**	< 0.01	< 0.01	**0.019**
BH7	14-Mar-19	< 0.001	**0.01**	< 0.001	< 0.05	< 0.0001	**0.001**	**0.003**	< 0.001	**1.8**	< 0.001	**0.02**	< 0.0001	**0.004**	< 0.01	< 0.01	**0.009**
BH8	21-Feb-19	**0.001 ***	**0.011**	< 0.001	< 0.05	< 0.0001	**0.001**	< 0.001	< 0.001	**4.1**	< 0.001	**0.012**	< 0.0001	**0.002**	< 0.01	< 0.01	**0.006**
BH8	14-Mar-19	< 0.001	**0.006**	< 0.001	< 0.05	< 0.0001	**0.001**	< 0.001	< 0.001	**3.25**	< 0.001	**0.008**	< 0.0001	**0.002**	< 0.01	< 0.01	< 0.005
MW2395	22-Feb-19	< 0.001	**0.007**	< 0.001	< 0.05	< 0.0001	**0.002**	< 0.001	< 0.001	**1.11**	< 0.001	**0.003**	< 0.0001	**0.001**	< 0.01	< 0.01	**0.006**
MW239S	14-Mar-19	< 0.001	**0.008**	< 0.001	< 0.05	< 0.0001	**0.002**	< 0.001	< 0.001	**1.25**	< 0.001	**0.005**	< 0.0001	**0.005**	< 0.01	< 0.01	**0.008**
SW3	22-Feb-19	**0.003**	**0.075**	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	**4.84**	< 0.001	**0.033**	< 0.0001	**0.002**	< 0.01	< 0.01	**0.016**
SW3	14-Mar-19	**0.006**	**0.08**	< 0.001	< 0.05	< 0.0001	< 0.001	**0.003**	< 0.001	**9.26**	< 0.001	**0.048**	< 0.0001	**0.002**	< 0.01	< 0.01	**0.009**

Notes:
- - Not analysed
< - Less than laboratory limit of reporting
mg/L - Milligrams per litre
Bold indicates a detection above the laboratory limit of reporting
"*" denotes duplicate/triplicate sample result adopted for analytical use due to RPD >50%
RPD - Relative Percentage Difference

** 95% Level of protection in freshwater
[1] value for CR VI
[2] as inorganioc
[3] Aesthetic

Analyte		Perfluoroalkyl Sulfonic Acids					Perfluoroalkyl Carboxylic Acids											Perfluoroalkyl Sulfonamides							(n:2) Fluorotelomer Sulfonic Acids				Sum of PFAS		
		Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonate (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl-perfluorooctane sulfonamide (MeFOSA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS
LOR		0.02	0.02	0.02	0.02	0.01	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.05	0.05	0.05	0.05	0.02	0.05	0.05	0.05	0.05	0.01	0.01	0.01
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC ADWG 6											0.56																		0.07		
HEPA NEMP 2018***						0.00023					19																				
HEPA NEMP 2018[4]											5.6																		0.7		
Sample Name	Sample Date																														
BH11	21-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH2	22-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH3	21-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH4	21-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH4	15-Mar-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH5	22-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH6	22-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH6	14-Mar-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH7	22-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH7	14-Mar-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH8	21-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH8	14-Mar-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
MW2395	22-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
SW3	22-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01

Notes:
- - Not analysed
< - Less than laboratory limit of reporting
µg/L - Micrograms per litre

*** 99% Level of protection in freshwater
[4] Recreation water

Table 4
Groundwater Analytical Data - Inorganics
Williamtown Sand Syndicate

Analyte		Anions and Cations																	Alkalinity						Inorganics			
		Sodium	Calcium	Magnesium	Potassium	Sulphate	Chloride	Fluoride	Reactive phosphorus as P	Total Phosphorus	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Ammonia as N	Total Nitrogen as N	Total Kjeldahl Nitrogen as N	Total Cations	Total Anions	Ionic Balance	Sodium Adsorption Ratio	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hydroxide Alkalinity as CaCO3	Total Alkalinity as CaCO3	Total Hardness as CaCO3	Electrical Conductivity @ 25°C*	Total Dissolved Solids	Total Dissolved Solids	pH
LOR		1	1	1	1	1	1	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01		0.01	1	1	1	1	1	1	1	10	0.01
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	-	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	pH units
ANZECC 2000 Trigger Values									0.02*	0.025*		0.7**		0.9**	0.35*														6.5 - 8.0*
NHMRC ADWG 6		180[2]				250[3]	250[3]	1.5			3	50		0.5[2]											200[3]		600[2]		6.5-8.5[3]
Sample Name	Sample Date																												
BH1	15-Mar-19	**11**	**2.0**	**1.0**	< 1.0	< 1.0	**25**	< 0.1									**0.66**	**0.88**	-		**9.0**	< 1.0	< 1.0	**9.0**	**9.0**	**104**	**68**	**129**	**5.67**
BH11	21-Feb-19	**48**	< 1.0	**10**	< 1.0	**24**	**80**	**0.1**	< 0.01	**0.03**	< 0.01	**0.04**	**0.04**	**0.06**	**1.8**	**1.8**	**2.91**	**2.76**	-	**3.21**	< 1.0	< 1.0	< 1.0	< 1.0	**41**	**346**	**278**		**4.67**
BH11	15-Mar-19	**26**	< 1.0	**2.0**	< 1.0	**2.0**	**52**	< 0.1									**1.3**	**1.51**	-		< 1.0	< 1.0	< 1.0	< 1.0	**8.0**	**186**	**121**	**144**	**4.82**
BH2	22-Feb-19	**12**	**2.0**	**2.0**	< 1.0	**6.0**	**22**	**0.1**	< 0.01	**0.28**	< 0.01	**2.76**	**2.76**	**0.05**	**4.0**	**1.2**	**0.79**	**0.74**	-	**1.44**	< 1.0	< 1.0	< 1.0	< 1.0	**13**	**91**	**128**		**4.87**
BH2	15-Mar-19	**10**	**3.0**	**2.0**	< 1.0	**7.0**	**23**	< 0.1									**0.75**	**0.79**	-		< 1.0	< 1.0	< 1.0	< 1.0	**16**	**101**	**66**	**90**	**4.71**
BH3	21-Feb-19	**4.0**	**4.0**	**1.0**	< 1.0	**4.0**	**10**	< 0.1	< 0.01	**2.76**	< 0.01	**0.78**	**0.78**	**0.3**	**5.9**	**5.1**	**0.46**	**0.54**	-	**0.46**	**9.0**	< 1.0	< 1.0	**9.0**	**14**	**60**	**438**		**5.55**
BH4	21-Feb-19	**8.0**	**2.0**	**1.0**	**1.0**	**5.0**	**17**	< 0.1	< 0.01	**0.19**	< 0.01	**0.35**	**0.35**	**0.04**	**0.6**	**0.3**	**0.56**	**0.7**	-	**1.15**	**6.0**	< 1.0	< 1.0	**6.0**	**9.0**	**73**	**96**		**5.4**
BH4	15-Mar-19	**9.0**	**2.0**	< 1.0	< 1.0	**5.0**	**18**	< 0.1									**0.49**	**0.61**	-		< 1.0	< 1.0	< 1.0	< 1.0	**5.0**	**77**	**50**	**70**	**5.12**
BH5	22-Feb-19	**42**	< 1.0	**6.0**	**1.0**	**19**	**69**	**0.2**	< 0.01	**0.34**	< 0.01	< 0.01	< 0.01	**0.09**	**3.0**	**3.0**	**2.35**	**2.34**	-	**3.59**	< 1.0	< 1.0	< 1.0	< 1.0	**25**	**250**	**211**		**4.87**
BH6	22-Feb-19	**28**	**3.0**	**4.0**	**1.0**	**28**	**42**	< 0.1	< 0.01	**0.05**	< 0.01	**0.09**	**0.09**	**0.14**	**0.5**	**0.4**	**1.72**	**1.77**	-	**2.49**	< 1.0	< 1.0	< 1.0	< 1.0	**24**	**177**	**144**		**4.37**
BH6	14-Mar-19	**23**	**2.0**	**4.0**	**1.0**	**17**	**37**	< 0.1									**1.46**	**1.44**	-		**2.0**	< 1.0	< 1.0	**2.0**	**21**	**179**	**116**	**146**	**4.95**
BH7	22-Feb-19	**34**	< 1.0	**5.0**	**2.0**	**12**	**64**	**0.2**	< 0.01	**0.13**	< 0.01	**0.02**	**0.02**	**0.34**	**2.2**	**2.2**	**1.94**	**2.06**	-	**3.16**	< 1.0	< 1.0	< 1.0	< 1.0	**20**	**213**	**196**		**4.76**
BH7	14-Mar-19	**36**	< 1.0	**6.0**	**2.0**	**16**	**61**	< 0.1									**2.11**	**2.05**	**1.37**		< 1.0	< 1.0	< 1.0	< 1.0	**25**	**271**	**176**	**212**	**4.73**
BH8	21-Feb-19	**52**	< 1.0	**6.0**	< 1.0	**11**	**90**	< 0.1	< 0.01	**1.97**	< 0.01	< 0.01	< 0.01	**0.5**	**2.4**	**2.4**	**2.76**	**2.77**	-	**4.44**	< 1.0	< 1.0	< 1.0	< 1.0	**25**	**352**	**258**		**4.46**
BH8	14-Mar-19	**45**	< 1.0	**6.0**	< 1.0	**6.0**	**76**	< 0.1									**2.45**	**2.27**	-		< 1.0	< 1.0	< 1.0	< 1.0	**25**	**319**	**207**	**253**	**4.77**
MW2395	22-Feb-19	**61**	< 1.0	**6.0**	< 1.0	**6.0**	**104**	< 0.1	< 0.01	**0.56**	< 0.01	< 0.01	< 0.01	**0.18**	**3.9**	**3.9**	**3.15**	**3.06**	**1.43**	**5.21**	< 1.0	< 1.0	< 1.0	< 1.0	**25**	**329**	**234**		**4.89**
MW2395	14-Mar-19	**64**	< 1.0	**6.0**	< 1.0	**2.0**	**126**	< 0.1									**3.28**	**3.64**	**5.18**		**2.0**	< 1.0	< 1.0	**2.0**	**25**	**410**	**266**	**232**	**5.02**
SW3	22-Feb-19	**40**	**4.0**	**4.0**	**1.0**	**16**	**82**	< 0.1	< 0.01	**0.06**	< 0.01	< 0.01	< 0.01	**0.16**	**1.0**	**1.0**	**2.55**	**2.87**	-	**3.38**	**11**	< 1.0	< 1.0	**11**	**26**	**262**	**228**		**6.21**
SW3	14-Mar-19	**45**	**6.0**	**6.0**	**2.0**	**44**	**64**	< 0.1									**2.8**	**2.8**	-		**4.0**	< 1.0	< 1.0	**4.0**	**40**	**344**	**224**	**279**	**5.42**

Notes:
- - Not analysed
< - Less than laboratory limit of reporting
LOR - Laboratory limit of reporting
mg/L - Milligrams per litre
µS/cm - Microsiemens per centimeter
Bold indicates a detection above the laboratory limit of reporting

* Default trigger values for physical and chemical stressors, for slightly disturbed ecosystems in lowland rivers, Southeast Australia (value is for base flow and not storm event)
** 95% Level of protection in freshwater
[3] Aesthetic

Table 5
Quality Control Sample Analysis - BTEXN
Williamtown Sand Syndicate

Analyte			BTEXN								Total Petroleum Hydrocarbons						Total Petroleum Hydrocarbons - Silcia Clean up				Total Recoverable Hydrocarbons						Total Recoverable Hydrocarbons - Silcia Clean up				
			Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Naphthalene	Sum of BTEX	C_6 - C_9	C_{10} - C_{14}	C_{15} - C_{28}	C_{29} - C_{36}	C_{10} - C_{36} sum	C_{10}-C_{14} - Silica Cleanup	C_{15}-C_{28} - Silica Cleanup	C_{29}-C_{36} - Silica Cleanup	C_{10}-C_{36} Sum - Silica Cleanup	C_6 - C_{10}	C_6 - C_{10} minus BTEX (F1)	>C_{10} - C_{16}	>C_{16} - C_{34} minus Naphthalene (F2)	>C_{16} - C_{34}	>C_{34} - C_{40}	>C_{10}-C_{16} - Silica Cleanup	F2 - Silica Cleanup	>C_{16}-C_{34} - Silica Cleanup	>C_{34}-C_{40} - Silica Cleanup	>C_{10}-C_{40} - Silica Cleanup
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name	Sample Date	Sample Type																													
TRIP BLANK_13022019	13-Feb-19	Trip Blank	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	-	-	-	-	< 50	< 100	< 50	< 50	< 20	< 20	-	-	-	-	< 100	< 100	< 100	< 100	< 100
RINSATE01_21022019	21-Feb-19	Rinsate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	-	-	-	-	< 50	< 100	< 50	< 50	< 20	< 20	-	-	-	-	< 100	< 100	< 100	< 100	< 100
BH8_21022019	21-Feb-19	Primary	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	-	-	-	-	< 50	< 100	< 50	< 50	< 20	< 20	-	-	-	-	< 100	< 100	< 100	< 100	< 100
DUP01_21022019	21-Feb-19	Duplicate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	-	-	-	-	< 50	< 100	< 50	< 50	< 20	< 20	-	-	-	-	< 100	< 100	< 100	< 100	< 100
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
BH8_21022019	21-Feb-19	Primary	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	-	-	-	-	< 50	< 100	< 50	< 50	< 20	< 20	-	-	-	-	< 100	< 100	< 100	< 100	< 100
TRIP01_21022019	21-Feb-19	Triplicate	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 3.0	< 10	-	< 20	< 50	< 100	< 100	< 100	< 50	< 100	< 100	< 400	< 20	< 20	< 50	< 50	< 100	< 100	< 50	-	< 100	< 100	< 100
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TRIP BLANK_130319	13-Mar-19	Trip Blank	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20					-	-	-	-	< 20	< 20					-	-	-	-	-
RINSATE02_140319	14-Mar-19	Rinsate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20					< 50	< 100	< 50	< 50	< 20	< 20					< 100	< 100	< 100	< 100	< 100
BH7_140319	14-Mar-19	Primary	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20					< 50	< 100	< 50	< 50	< 20	< 20					< 100	< 100	< 100	< 100	< 100
DUP02_140319	14-Mar-19	Duplicate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20					< 50	< 100	< 50	< 50	< 20	< 20					< 100	< 100	< 100	< 100	< 100
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC					NC	NC	NC	NC	NC	NC					NC	NC	NC	NC	NC

Notes:
- - Not analysed
< - Less than laboratory limit of reporting
NC - Not calculated
µg/L - Micrograms per litre
BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

Table 6
Quality Control Sample Analysis - Metals
Williamtown Sand Syndicate

Analyte			Metals															
			Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Chromium VI	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium	Zinc
Units			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Name	Sample Date	Sample Type																	
TRIP BLANK_13022019	13-Feb-19	Trip Blank	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE01_21022019	21-Feb-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
BH8_21022019	21-Feb-19	Primary	< 0.001	0.011	< 0.001	< 0.05	< 0.0001	0.001	-	< 0.001	< 0.001	4.1	< 0.001	0.012	< 0.0001	0.002	< 0.01	< 0.01	0.005
DUP01_21022019	21-Feb-19	Duplicate	0.001	0.014	< 0.001	< 0.05	< 0.0001	0.001	-	< 0.001	< 0.001	4.09	< 0.001	0.012	< 0.0001	0.003	< 0.01	< 0.01	0.015
Relative Percentage Difference			**67%**	24%	NC	NC	NC	0%	NC	NC	NC	0%	NC	0%	NC	40%	NC	NC	**100%**
BH8_21022019	21-Feb-19	Primary	< 0.001	0.011	< 0.001	< 0.05	< 0.0001	0.001	-	< 0.001	< 0.001	4.1	< 0.001	0.012	< 0.0001	0.002	< 0.01	< 0.01	0.005
TRIP01_21022019	21-Feb-19	Triplicate	0.001	< 0.02	< 0.001	< 0.05	< 0.0002	< 0.005	< 0.005	< 0.001	< 0.001	4.5	< 0.001	0.012	< 0.0001	0.003	-	< 0.005	0.006
Relative Percentage Difference			**67%**	10%	NC	NC	NC	**86%**	NC	NC	NC	9%	NC	0%	NC	40%	NC	NC	18%
TRIP BLANK_130319	13-Mar-19	Trip Blank	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001		< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK02_150319	15-Mar-19	Trip Blank	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	< 0.001		< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE02_140319	14-Mar-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001		< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
BH7_140319	14-Mar-19	Primary	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001		0.003	< 0.001	1.8	< 0.001	0.02	< 0.0001	0.004	< 0.01	< 0.01	0.009
DUP02_140319	14-Mar-19	Duplicate	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001		0.002	< 0.001	2.51	< 0.001	0.021	< 0.0001	0.004	< 0.01	< 0.01	0.007
Relative Percentage Difference			NC	0%	NC	NC	NC	0%		**40%**	NC	33%	NC	5%	NC	0%	NC	NC	25%
BH7_140319	14-Mar-19	Primary	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001		0.003	< 0.001	1.8	< 0.001	0.02	< 0.0001	0.004	< 0.01	< 0.01	0.009
TRIP02_14032019	14-Mar-19	Triplicate	< 0.001	< 0.02	< 0.001	< 0.05	< 0.0002	0.001		0.002	< 0.001	1.7	< 0.001	0.019	< 0.0001	< 0.001	-	< 0.005	< 0.005
Relative Percentage Difference			NC	0%	NC	NC	NC	0%		**40%**	NC	6%	NC	5%	NC	**156%**	NC	NC	**113%**

Notes:
- - Not analysed
< - Less than laboratory limit of reporting
NC - Not calculated
mg/L - Milligrams per litre
Half the laboratory limit of reporting used when calculating RPD
RPD - Relative Percentage Difference

Table 7
Quality Control Sample Analysis - PFAS
Williamtown Sand Syndicate

Analyte			Perfluorosulfonyl Sulfonic Acids					Perfluoroalkyl Carboxylic Acids										Perfluoroalkyl Sulfonamides							(n:2) Fluorotelomer Sulfonic Acids				Sum of PFAS		
			Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonate (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl-perfluorooctane sulfonamide (MeFOSA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name	Sample Date	Sample Type																													
TRIP BLANK_130219	13-Feb-19	Trip Blank	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
RINSATE01_21022019	21-Feb-19	Rinsate	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH8_21022019	21-Feb-19	Primary	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
DUP01_21022019	21-Feb-19	Duplicate	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
BH8_21022019	21-Feb-19	Primary	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
TRIP01_21022019	21-Feb-19	Triplicate	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.05	< 0.1
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TRIP BLANK_150319	13-Mar-19	Trip Blank	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
TRIP BLANK02_150319	15-Mar-19	Trip Blank	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
RINSATE02_140319	14-Mar-19	Rinsate	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
BH7_140319	14-Mar-19	Primary	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
DUP02_140319	14-Mar-19	Duplicate	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
BH7_140319	14-Mar-19	Primary	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01
TRIP02_140319	14-Mar-19	Triplicate	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.05	< 0.1
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
< - Less than laboratory limit of reporting
NC - Not calculated
µg/L - Micrograms per litre

ATTACHMENT A: LABORATORY REPORTS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1907792**	Page	: 1 of 16
Client	: **KLEINFELDER AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Contact	: Shirley LeCornu
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20190803	Date Samples Received	: 14-Mar-2019 16:46
Order number	:	Date Analysis Commenced	: 15-Mar-2019
C-O-C number	: ----	Issue Date	: 20-Mar-2019 18:29
Sampler	: Dan Kousbroek		
Site	: WSS - Cabbage Tree Rd water monitoring		
Quote number	: ME/114/19		
No. of samples received	: 13		
No. of samples analysed	: 13		

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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

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

- EG020: Positive result for sample ES1907792 - #009 has been confirmed by redigestion and reanalysis.
- EG020: Filtered Iron Results for samples ES1907792-#005 and #008 have been confirmed by reanalysis.
- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Rinsate02	SW3	Trip Blank	MW239S	BH7
			Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	13-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00
Compound	CAS Number	LOR	Unit	ES1907792-001	ES1907792-002	ES1907792-003	ES1907792-004	ES1907792-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	----	5.42	----	5.02	4.73
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	344	----	410	271
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	----	279	----	232	212
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	----	224	----	266	176
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	34	----	504	149
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	----	40	----	25	25
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	----	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	----	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	4	----	2	<1
Total Alkalinity as CaCO3	----	1	mg/L	----	4	----	2	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	44	----	2	16
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	64	----	126	61
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	6	----	<1	<1
Magnesium	7439-95-4	1	mg/L	----	6	----	6	6
Sodium	7440-23-5	1	mg/L	----	45	----	64	36
Potassium	7440-09-7	1	mg/L	----	2	----	<1	2
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	----	0.006	----	<0.001	<0.001
Beryllium	7440-41-7	0.001	mg/L	----	<0.001	----	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L	----	0.080	----	0.008	0.010
Cadmium	7440-43-9	0.0001	mg/L	----	<0.0001	----	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	<0.001	----	0.002	0.001
Copper	7440-50-8	0.001	mg/L	----	<0.001	----	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L	----	0.003	----	<0.001	0.003

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate02	SW3	Trip Blank	MW239S	BH7
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	13-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-001	ES1907792-002	ES1907792-003	ES1907792-004	ES1907792-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		----	**0.002**	----	**0.005**	**0.004**
Lead	7439-92-1	0.001	mg/L		----	<0.001	----	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		----	**0.009**	----	**0.008**	**0.009**
Manganese	7439-96-5	0.001	mg/L		----	**0.048**	----	**0.005**	**0.020**
Selenium	7782-49-2	0.01	mg/L		----	<0.01	----	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L		----	<0.01	----	<0.01	<0.01
Boron	7440-42-8	0.05	mg/L		----	<0.05	----	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L		----	**9.26**	----	**1.25**	**1.80**
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	<0.001	----	----
Beryllium	7440-41-7	0.001	mg/L		<0.001	----	<0.001	----	----
Barium	7440-39-3	0.001	mg/L		<0.001	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	<0.001	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	<0.005	----	----
Manganese	7439-96-5	0.001	mg/L		<0.001	----	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	<0.01	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	<0.01	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	----	<0.05	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0001	----	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	<0.0001	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		----	<0.1	----	<0.1	<0.1
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		----	**2.80**	----	**3.64**	**2.05**
Total Cations	----	0.01	meq/L		----	**2.80**	----	**3.28**	**2.11**
Ionic Balance	----	0.01	%		----	----	----	**5.18**	**1.37**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate02	SW3	Trip Blank	MW239S	BH7
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	13-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-001	ES1907792-002	ES1907792-003	ES1907792-004	ES1907792-005
					Result	Result	Result	Result	Result
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	----	<50	<50
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	----	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	<100	<100
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
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		<0.02	----	<0.02	----	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	----	<0.02	----	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate02	SW3	Trip Blank	MW239S	BH7
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	13-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-001	ES1907792-002	ES1907792-003	ES1907792-004	ES1907792-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	----	<0.01	----	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	----	<0.02	----	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	----	<0.1	----	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	----	<0.01	----	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	----	<0.02	----	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	----	<0.05	----	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	----	<0.02	----	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	----	<0.05	----	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	----	<0.05	----	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	----	<0.05	----	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	----	<0.05	----	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	----	<0.02	----	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate02	SW3	Trip Blank	MW239S	BH7
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	13-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-001	ES1907792-002	ES1907792-003	ES1907792-004	ES1907792-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	----	<0.02	----	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	----	<0.05	----	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	----	<0.05	----	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	----	<0.05	----	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	----	<0.05	----	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	----	<0.01	----	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	----	<0.01	----	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	----	<0.01	----	<0.01
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**97.6**	**100**	**87.2**	**87.1**	**86.5**
Toluene-D8	2037-26-5	2	%		**105**	**104**	**101**	**98.4**	**92.1**
4-Bromofluorobenzene	460-00-4	2	%		**102**	**102**	**98.4**	**98.3**	**90.0**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**101**	----	**105**	----	**105**
13C8-PFOA	----	0.02	%		**91.1**	----	**97.3**	----	**92.1**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH6	BH8	Dup02	TRIP BLANK02	BH4
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-006	ES1907792-007	ES1907792-008	ES1907792-009	ES1907792-010
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		4.95	4.77	----	----	5.12
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		179	319	----	----	77
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		146	253	----	----	70
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L		116	207	----	----	50
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		144	138	----	----	45
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		21	25	----	----	5
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	----	----	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	----	----	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		2	<1	----	----	<1
Total Alkalinity as CaCO3	----	1	mg/L		2	<1	----	----	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		17	6	----	----	5
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		37	76	----	----	18
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		2	<1	----	----	2
Magnesium	7439-95-4	1	mg/L		4	6	----	----	<1
Sodium	7440-23-5	1	mg/L		23	45	----	----	9
Potassium	7440-09-7	1	mg/L		1	<1	----	----	<1
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	----	<0.001
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	----	<0.001
Barium	7440-39-3	0.001	mg/L		0.027	0.006	0.010	----	0.014
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	0.001	0.001	----	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	----	0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	0.002	----	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH6	BH8	Dup02	TRIP BLANK02	BH4
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-006	ES1907792-007	ES1907792-008	ES1907792-009	ES1907792-010
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.002**	**0.004**	----	**0.022**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.012**	<0.005	**0.007**	----	**0.043**
Manganese	7439-96-5	0.001	mg/L		**0.010**	**0.008**	**0.021**	----	**0.014**
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	----	<0.01
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	----	<0.01
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	----	<0.05
Iron	7439-89-6	0.05	mg/L		**1.90**	**3.25**	**2.51**	----	<0.05
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	----	----	<0.001	----
Beryllium	7440-41-7	0.001	mg/L		----	----	----	<0.001	----
Barium	7440-39-3	0.001	mg/L		----	----	----	**0.002**	----
Cadmium	7440-43-9	0.0001	mg/L		----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		----	----	----	<0.001	----
Cobalt	7440-48-4	0.001	mg/L		----	----	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L		----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	<0.005	----
Manganese	7439-96-5	0.001	mg/L		----	----	----	<0.001	----
Selenium	7782-49-2	0.01	mg/L		----	----	----	<0.01	----
Vanadium	7440-62-2	0.01	mg/L		----	----	----	<0.01	----
Boron	7440-42-8	0.05	mg/L		----	----	----	<0.05	----
Iron	7439-89-6	0.05	mg/L		----	----	----	<0.05	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	<0.0001	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	----	----	<0.1
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**1.44**	**2.27**	----	----	**0.61**
Total Cations	----	0.01	meq/L		**1.46**	**2.45**	----	----	**0.49**
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH6	BH8	Dup02	TRIP BLANK02	BH4
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-006	ES1907792-007	ES1907792-008	ES1907792-009	ES1907792-010
					Result	Result	Result	Result	Result
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup - Continued									
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	----	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	----	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	----	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	----	<50
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	----	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	----	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	----	<100
>C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	----	<100
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	----	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	----	<20
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	----	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	----	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	----	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	----	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	----	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	----	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	<5
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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH6	BH8	Dup02	TRIP BLANK02	BH4
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-006	ES1907792-007	ES1907792-008	ES1907792-009	ES1907792-010
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH6	BH8	Dup02	TRIP BLANK02	BH4
				Client sampling date / time	14-Mar-2019 00:00	14-Mar-2019 00:00	14-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1907792-006	ES1907792-007	ES1907792-008	ES1907792-009	ES1907792-010
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**90.7**	**103**	**95.6**	**----**	**95.5**
Toluene-D8	2037-26-5	2	%		**107**	**109**	**102**	**----**	**97.7**
4-Bromofluorobenzene	460-00-4	2	%		**104**	**106**	**99.2**	**----**	**95.4**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**106**	**118**	**107**	**87.4**	**84.5**
13C8-PFOA	----	0.02	%		**94.3**	**117**	**91.7**	**86.9**	**88.6**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	BH1	BH11	BH2	----	----
			Client sampling date / time	15-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1907792-011	ES1907792-012	ES1907792-013	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.67**	**4.82**	**4.71**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**104**	**186**	**101**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**129**	**144**	**90**	----	----
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	**68**	**121**	**66**	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**78**	**152**	**352**	----	----
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	**9**	**8**	**16**	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**9**	<1	<1	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**9**	<1	<1	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	**2**	**7**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**25**	**52**	**23**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	<1	**3**	----	----
Magnesium	7439-95-4	1	mg/L	**1**	**2**	**2**	----	----
Sodium	7440-23-5	1	mg/L	**11**	**26**	**10**	----	----
Potassium	7440-09-7	1	mg/L	<1	<1	<1	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Barium	7440-39-3	0.001	mg/L	**0.003**	**0.005**	**0.004**	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	**0.004**	**0.001**	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	**0.003**	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1	BH11	BH2	----	----
				Client sampling date / time	15-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1907792-011	ES1907792-012	ES1907792-013	--------	--------
					Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.037**	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		**1.27**	**0.016**	<0.005	----	----
Manganese	7439-96-5	0.001	mg/L		**0.014**	**0.007**	**0.020**	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
Iron	7439-89-6	0.05	mg/L		**12.5**	**1.49**	<0.05	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	<0.1	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**0.88**	**1.51**	**0.79**	----	----
Total Cations	----	0.01	meq/L		**0.66**	**1.30**	**0.75**	----	----
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	<50	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	----	----
>C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**1710**	<20	<20	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**1690**	<20	<20	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		**1690**	<20	<20	----	----
EP080: BTEXN									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1	BH11	BH2	----	----
				Client sampling date / time	15-Mar-2019 00:00	15-Mar-2019 00:00	15-Mar-2019 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1907792-011	ES1907792-012	ES1907792-013	--------	--------
					Result	Result	Result	----	----
EP080: BTEXN - Continued									
Benzene	71-43-2	1	µg/L		<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	----	----
^ **Total Xylenes**	----	2	µg/L		<2	<2	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**87.1**	**85.0**	**86.4**	----	----
Toluene-D8	2037-26-5	2	%		**99.8**	**103**	**102**	----	----
4-Bromofluorobenzene	460-00-4	2	%		**101**	**101**	**98.5**	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1907792**	Page	: 1 of 23
Client	: **KLEINFELDER AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Contact	: Shirley LeCornu
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20190803	Date Samples Received	: 14-Mar-2019
Order number	:	Date Analysis Commenced	: 15-Mar-2019
C-O-C number	: ----	Issue Date	: 20-Mar-2019
Sampler	: Dan Kousbroek		
Site	: WSS - Cabbage Tree Rd water monitoring		
Quote number	: ME/114/19		
No. of samples received	: 13		
No. of samples analysed	: 13		

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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 2237878)									
ES1907554-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.79	7.83	0.512	0% - 20%
ES1907792-005	BH7	EA005-P: pH Value	----	0.01	pH Unit	4.73	4.71	0.424	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 2240085)									
ES1907792-010	BH4	EA005-P: pH Value	----	0.01	pH Unit	5.12	4.92	3.98	0% - 20%
ES1907958-009	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.38	8.51	1.54	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 2237879)									
ES1907554-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	382	379	0.808	0% - 20%
ES1907792-005	BH7	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	271	270	0.381	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 2240084)									
ES1907903-006	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	147	147	0.00	0% - 20%
ES1907792-010	BH4	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	77	78	0.00	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 2238874)									
ES1907792-002	SW3	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	279	288	3.35	0% - 20%
ES1907850-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	427	411	3.82	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 2238875)									
ES1907792-002	SW3	EA025H: Suspended Solids (SS)	----	5	mg/L	34	37	9.25	No Limit
ES1907850-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	7	8	13.8	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 2237880)									
ES1907770-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	39	40	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	39	40	0.00	0% - 20%
ES1907554-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit

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 (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 2237880) - continued									
ES1907554-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	225	228	1.64	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	225	228	1.64	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 2237881)									
ES1907853-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	402	387	3.96	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	402	387	3.96	0% - 20%
ES1907792-005	BH7	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 2240087)									
ES1907903-006	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	29	30	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	29	30	0.00	0% - 20%
ES1907792-010	BH4	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 2238032)									
ES1906768-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	100	104	3.35	0% - 20%
ES1907792-004	MW239S	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	3	42.3	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 2239183)									
ES1907792-010	BH4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	5	5	0.00	No Limit
ES1907887-006	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<5	<5	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 2238033)									
ES1906768-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3	3	0.00	No Limit
ES1907792-004	MW239S	ED045G: Chloride	16887-00-6	1	mg/L	126	130	3.30	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 2239182)									
ES1907792-010	BH4	ED045G: Chloride	16887-00-6	1	mg/L	18	18	0.00	0% - 50%
ES1907887-006	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	55	49	11.3	0% - 50%
ED093F: Dissolved Major Cations (QC Lot: 2237747)									
ES1907567-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	2	2	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	306	307	0.346	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.00	No Limit
ES1907850-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	94	96	1.74	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	34	35	0.00	0% - 20%

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 (%)
ED093F: Dissolved Major Cations (QC Lot: 2237747) - continued									
ES1907850-001	Anonymous	ED093F: Sodium	7440-23-5	1	mg/L	6	6	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.00	No Limit
ED093F: Dissolved Major Cations (QC Lot: 2239711)									
ES1907524-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	29	29	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	12	12	0.00	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	23	23	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	7	0.00	No Limit
ES1907958-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	339	346	2.13	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	230	232	0.954	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	833	838	0.630	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	38	39	0.00	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2237745)									
ES1907496-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0002	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.032	0.032	0.00	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.014	0.013	0.00	0% - 50%
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	1.08	1.08	0.284	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.012	0.013	0.00	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.074	0.075	0.00	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.05	0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1907850-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.015	0.014	0.00	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2237745) - continued									
ES1907850-001	Anonymous	EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2239713)									
ES1907524-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.047	0.047	0.00	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.015	0.016	0.00	0% - 50%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.161	0.159	1.04	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.12	0.13	0.00	No Limit
ES1907958-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.178	0.183	2.56	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.481	0.491	1.92	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.008	0.009	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.07	0.07	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 2238334)									
ES1907779-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.017	0.018	0.00	0% - 50%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 2238334) - continued									
ES1907779-001	Anonymous	EG020A-T: Copper	7440-50-8	0.001	mg/L	0.012	0.011	0.00	0% - 50%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.006	0.006	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.10	<0.10	0.00	No Limit
ME1900358-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0001	0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.106	0.104	2.40	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	0.009	0.009	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.223	0.220	1.20	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.036	0.035	0.00	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.060	0.058	4.14	0% - 50%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.42	0.42	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 2239684)									
ES1906769-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<1 µg/L	<0.001	0.00	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<1 µg/L	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.156	0.162	3.90	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.068	0.072	4.98	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.196	0.200	2.32	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.08	0.08	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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 2239684) - continued									
ES1907548-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.007	0.008	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.042	0.042	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.33	0.33	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 2237744)									
ES1907496-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1907478-007	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.0001	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 2239712)									
ES1907792-008	Dup02	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2239914)									
ES1907554-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1907903-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 2237877)									
ES1907554-001	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.3	0.3	0.00	No Limit
ES1907792-005	BH7	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 2240086)									
ES1907903-006	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES1907792-010	BH4	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2239738)									
EB1906198-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1907792-010	BH4	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2239738)									
EB1906198-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1907792-010	BH4	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2239738)									
EB1906198-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	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 (%)*
EP080: BTEXN (QC Lot: 2239738) - continued									
EB1906198-001	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1907792-010	BH4	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 2238646)									
EM1903562-018	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
ES1907847-007	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: 2240355)									
EM1903562-007	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.05	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	<0.02	<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
ES1907991-009	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 2238646)									
EM1903562-018	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

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: 2238646) - continued									
EM1903562-018	Anonymous	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
ES1907847-007	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: 2240355)									
EM1903562-007	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
ES1907991-009	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

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: 2240355) - continued									
ES1907991-009	Anonymous	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: 2238646)									
EM1903562-018	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)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1907847-007	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)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 2240355)									
EM1903562-007	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

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: 2240355) - continued									
EM1903562-007	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1907991-009	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)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 2238646)									
EM1903562-018	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
ES1907847-007	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 2240355)									
EM1903562-007	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

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: 2240355) - continued									
EM1903562-007	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1907991-009	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: 2238646)									
EM1903562-018	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
ES1907847-007	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.01	0.01	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 2240355)									
EM1903562-007	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.05	0.05	0.00	No Limit
ES1907991-009	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 2237878)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98	102
				----	7 pH Unit	100	98	102
EA005P: pH by PC Titrator (QCLot: 2240085)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	98.8	98	102
				----	7 pH Unit	100	98	102
EA010P: Conductivity by PC Titrator (QCLot: 2237879)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2100 µS/cm	102	95	113
EA010P: Conductivity by PC Titrator (QCLot: 2240084)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2100 µS/cm	96.1	95	113
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 2238874)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	101	87	109
				<10	293 mg/L	118	66	126
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 2238875)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	109	83	129
				<5	1000 mg/L	96.6	82	110
ED037P: Alkalinity by PC Titrator (QCLot: 2237880)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	106	81	111
				----	50 mg/L	113	70	130
ED037P: Alkalinity by PC Titrator (QCLot: 2237881)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	101	81	111
				----	50 mg/L	107	70	130
ED037P: Alkalinity by PC Titrator (QCLot: 2240087)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	103	81	111
				----	50 mg/L	104	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2238032)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.2	82	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2239183)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.0	82	122
ED045G: Chloride by Discrete Analyser (QCLot: 2238033)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	94.0	81	127
				<1	1000 mg/L	102	81	127
ED045G: Chloride by Discrete Analyser (QCLot: 2239182)								

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
ED045G: Chloride by Discrete Analyser (QCLot: 2239182) - continued								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	117	81	127
				<1	1000 mg/L	101	81	127
ED093F: Dissolved Major Cations (QCLot: 2237747)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.2	80	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.7	90	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.5	82	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.3	85	113
ED093F: Dissolved Major Cations (QCLot: 2239711)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	113	80	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.8	90	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.3	82	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.3	85	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 2237745)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.1	85	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	94.7	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	96.3	82	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.4	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.2	85	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	94.2	82	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.5	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.8	83	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.0	82	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.9	82	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	86.3	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	98.8	83	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.2	81	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	95.0	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.9	82	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 2239713)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	100	85	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	85.8	85	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	99.7	82	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.7	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.7	85	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	90.7	82	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.8	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.5	83	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	91.7	82	110

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
EG020F: Dissolved Metals by ICP-MS (QCLot: 2239713) - continued								
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.9	82	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	100	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	90.8	83	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.7	81	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	86.0	85	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	92.5	82	112
EG020T: Total Metals by ICP-MS (QCLot: 2238334)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	82	114
EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	103	79	119
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	102	84	116
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	86	116
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	101	84	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	106	83	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.0	85	115
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	108	85	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.9	84	116
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	94.5	68	126
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	102	85	113
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	100	79	117
EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	104	75	129
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	85	117
EG020T: Total Metals by ICP-MS (QCLot: 2239684)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	105	82	114
EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	92.4	79	119
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	98.4	84	116
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.2	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.1	86	116
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	98.0	84	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.9	83	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.4	85	115
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	89.4	85	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	84	116
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	103	68	126
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	93.8	85	113
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.2	79	117
EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	93.0	75	129
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.4	85	117

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
EG035F: Dissolved Mercury by FIMS (QCLot: 2237744)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.2	83	105
EG035F: Dissolved Mercury by FIMS (QCLot: 2239712)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.5	83	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2239914)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	101	77	111
EK040P: Fluoride by PC Titrator (QCLot: 2237877)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	102	82	116
EK040P: Fluoride by PC Titrator (QCLot: 2240086)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	85.6	82	116
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 2237202)								
EP071SG: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	102	75	117
EP071SG: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	99.4	81	113
EP071SG: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	103	71	117
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 2239313)								
EP071SG: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	88.7	75	117
EP071SG: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	92.9	81	113
EP071SG: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	107	71	117
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 2237202)								
EP071SG: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	95.7	73	119
EP071SG: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	97.3	81	113
EP071SG: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	93.4	65	127
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 2239313)								
EP071SG: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	85.5	73	119
EP071SG: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	84.6	81	113
EP071SG: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	95.7	65	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2239738)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	89.8	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2239738)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	92.7	75	127
EP080: BTEXN (QCLot: 2239738)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	97.5	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	96.8	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	94.6	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	91.0	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	93.4	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	88.8	70	120

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: 2238646)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	92.4	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	98.8	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	100	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	100	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2240355)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	76.2	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	70.2	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	71.6	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	80.8	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	70.0	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	78.2	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2238646)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	106	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	111	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	112	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	113	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	111	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	105	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	123	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	126	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	105	70	150
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2240355)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	91.4	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	80.6	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	78.6	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	81.4	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	74.2	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	72.8	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	73.2	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	77.8	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	81.6	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	75.8	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	73.0	70	150
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2238646)								

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: 2238646) - continued								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	107	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	116	70	150
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	121	70	150
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	104	70	150
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	112	70	150
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	103	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2240355)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	77.6	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	82.8	70	150
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	75.6	70	150
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	75.4	70	150
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	83.1	70	150
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	75.8	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	77.8	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2238646)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	108	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	113	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	110	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2240355)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	73.8	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	75.8	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	87.2	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	85.6	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**

Matrix Spike (MS) Report

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
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2238032)							
ES1906768-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2239183)							
ES1907792-010	BH4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	110	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 2238033)							
ES1906768-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	112	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 2239182)							
ES1907792-010	BH4	ED045G: Chloride	16887-00-6	250 mg/L	126	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 2237745)							
ES1907567-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	99.8	70	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	130	70	130
		EG020A-F: Barium	7440-39-3	1 mg/L	92.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	86.3	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	123	70	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	97.9	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	98.8	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	109	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	92.2	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	94.9	70	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	124	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	77.1	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 2239713)							
ES1907792-008	Dup02	EG020A-F: Arsenic	7440-38-2	1 mg/L	125	70	130
		EG020A-F: Beryllium	7440-41-7	2 mg/L	87.6	70	130
		EG020A-F: Barium	7440-39-3	1 mg/L	128	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	130	70	130
		EG020A-F: Chromium	7440-47-3	2 mg/L	83.8	70	130
		EG020A-F: Cobalt	7440-48-4	2 mg/L	79.2	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	124	70	130
		EG020A-F: Lead	7439-92-1	2 mg/L	72.0	70	130
		EG020A-F: Manganese	7439-96-5	2 mg/L	81.6	70	130
		EG020A-F: Nickel	7440-02-0	2 mg/L	86.4	70	130
		EG020A-F: Vanadium	7440-62-2	2 mg/L	83.2	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	121	70	130
EG020T: Total Metals by ICP-MS (QCLot: 2238334)							
ES1907792-001	Rinsate02	EG020A-T: Arsenic	7440-38-2	1 mg/L	101	70	130
		EG020A-T: Beryllium	7440-41-7	1 mg/L	102	70	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
EG020T: Total Metals by ICP-MS (QCLot: 2238334) - continued							
ES1907792-001	Rinsate02	EG020A-T: Barium	7440-39-3	1 mg/L	103	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	102	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	105	70	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	111	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	109	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	113	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	108	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	70	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	102	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	104	70	130
EG020T: Total Metals by ICP-MS (QCLot: 2239684)							
ES1906769-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	106	70	130
		EG020A-T: Beryllium	7440-41-7	1 mg/L	129	70	130
		EG020A-T: Barium	7440-39-3	1 mg/L	100	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	100	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	127	70	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	130	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	101	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	105	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	126	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	106	70	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	130	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	96.7	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 2237744)							
ES1907478-007	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	94.1	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 2239712)							
ES1907524-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	102	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2239914)							
ES1907792-001	Rinsate02	EG035T: Mercury	7439-97-6	0.01 mg/L	119	70	130
EK040P: Fluoride by PC Titrator (QCLot: 2237877)							
ES1907554-001	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	94.4	70	130
EK040P: Fluoride by PC Titrator (QCLot: 2240086)							
ES1907792-010	BH4	EK040P: Fluoride	16984-48-8	5 mg/L	85.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2239738)							
EB1906198-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	102	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2239738)							

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2239738) - continued							
EB1906198-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	101	70	130
EP080: BTEXN (QCLot: 2239738)							
EB1906198-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	96.9	70	130
		EP080: Toluene	108-88-3	25 µg/L	95.5	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	94.6	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	91.2	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	93.5	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	86.7	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2238646)							
EM1903562-018	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	87.4	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	96.6	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	105	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	98.2	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	108	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2240355)							
EM1903562-007	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	71.0	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	68.2	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	80.6	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	92.6	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	78.8	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	91.2	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2238646)							
EM1903562-018	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	107	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	102	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	106	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	109	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	104	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	108	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	102	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	106	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	86.8	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	97.8	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	110	50	150
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2240355)							
EM1903562-007	Anonymous	EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	79.6	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	89.6	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*
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2240355) - continued							
EM1903562-007	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	81.8	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	76.4	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	78.6	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	85.6	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	97.2	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	85.4	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	70.4	50	150
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2238646)							
EM1903562-018	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	100	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	117	50	150
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	106	50	150
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	108	50	150
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	104	50	150
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	104	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	114	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2240355)							
EM1903562-007	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	84.2	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	95.8	50	150
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	86.8	50	150
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	77.0	50	150
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	93.8	50	150
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	87.6	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	82.4	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2238646)							
EM1903562-018	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	106	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	103	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	119	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	98.8	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: 2240355)							
EM1903562-007	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	71.8	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	80.6	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	105	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	100	50	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1907792**	Page	: 1 of 13
Client	: **KLEINFELDER AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Telephone	: +6138549 9630
Project	: 20190803	Date Samples Received	: 14-Mar-2019
Site	: WSS - Cabbage Tree Rd water monitoring	Issue Date	: 20-Mar-2019
Sampler	: Dan Kousbroek	No. of samples received	: 13
Order number	:	No. of samples analysed	: 13

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1906768--001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural SW3, MW239S, BH7, BH6, BH8	----	----	----	15-Mar-2019	14-Mar-2019	**1**
Clear Plastic Bottle - Natural BH4, BH1, BH11, BH2	----	----	----	18-Mar-2019	15-Mar-2019	**3**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
TRH - Total Recoverable Hydrocarbons - Silica Gel C	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Total Recoverable Hydrocarbons - Silica Gel C	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	14-Mar-2019	×
Clear Plastic Bottle - Natural (EA005-P)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	15-Mar-2019	×
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Natural (EA010-P)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	12-Apr-2019	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**16-Mar-2019**	21-Mar-2019	✓
Clear Plastic Bottle - Natural (EA015H)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**16-Mar-2019**	22-Mar-2019	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**16-Mar-2019**	21-Mar-2019	✓
Clear Plastic Bottle - Natural (EA025H)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**16-Mar-2019**	22-Mar-2019	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	12-Apr-2019	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	28-Mar-2019	✓
Clear Plastic Bottle - Natural (ED037-P) BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	29-Mar-2019	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Natural (ED041G) BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**16-Mar-2019**	12-Apr-2019	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Natural (ED045G) BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**16-Mar-2019**	12-Apr-2019	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	12-Apr-2019	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	10-Sep-2019	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) Dup02	**14-Mar-2019**	**----**	----	----	**18-Mar-2019**	10-Sep-2019	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	11-Sep-2019	✓

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
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
Trip Blank	**13-Mar-2019**	**15-Mar-2019**	09-Sep-2019	✓	**15-Mar-2019**	09-Sep-2019	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
Rinsate02	**14-Mar-2019**	**15-Mar-2019**	10-Sep-2019	✓	**15-Mar-2019**	10-Sep-2019	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
TRIP BLANK02	**15-Mar-2019**	**18-Mar-2019**	11-Sep-2019	✓	**18-Mar-2019**	11-Sep-2019	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
SW3, MW239S, BH7, BH6, BH8, Dup02	**14-Mar-2019**	**----**	----	----	**18-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	12-Apr-2019	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
Trip Blank	**13-Mar-2019**	**----**	----	----	**18-Mar-2019**	10-Apr-2019	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
Rinsate02	**14-Mar-2019**	**----**	----	----	**18-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
TRIP BLANK02	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	12-Apr-2019	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
SW3, MW239S, BH7, BH6, BH8	**14-Mar-2019**	**----**	----	----	**15-Mar-2019**	11-Apr-2019	✓
Clear Plastic Bottle - Natural (EK040P)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**----**	----	----	**18-Mar-2019**	12-Apr-2019	✓
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071SG)							
Rinsate02, SW3, MW239S, BH7, BH6, BH8, Dup02	**14-Mar-2019**	**15-Mar-2019**	21-Mar-2019	✓	**18-Mar-2019**	24-Apr-2019	✓
Amber Glass Bottle - Unpreserved (EP071SG)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**18-Mar-2019**	22-Mar-2019	✓	**20-Mar-2019**	27-Apr-2019	✓

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
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071SG)							
Rinsate02, SW3, MW239S, BH7, BH6, BH8, Dup02	**14-Mar-2019**	**15-Mar-2019**	21-Mar-2019	✓	**18-Mar-2019**	24-Apr-2019	✓
Amber Glass Bottle - Unpreserved (EP071SG)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**18-Mar-2019**	22-Mar-2019	✓	**20-Mar-2019**	27-Apr-2019	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip Blank	**13-Mar-2019**	**18-Mar-2019**	27-Mar-2019	✓	**18-Mar-2019**	27-Mar-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate02, SW3, MW239S, BH7, BH6, BH8, Dup02	**14-Mar-2019**	**18-Mar-2019**	28-Mar-2019	✓	**18-Mar-2019**	28-Mar-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**18-Mar-2019**	29-Mar-2019	✓	**18-Mar-2019**	29-Mar-2019	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip Blank	**13-Mar-2019**	**18-Mar-2019**	27-Mar-2019	✓	**18-Mar-2019**	27-Mar-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate02, SW3, MW239S, BH7, BH6, BH8, Dup02	**14-Mar-2019**	**18-Mar-2019**	28-Mar-2019	✓	**18-Mar-2019**	28-Mar-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**18-Mar-2019**	29-Mar-2019	✓	**18-Mar-2019**	29-Mar-2019	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip Blank	**13-Mar-2019**	**18-Mar-2019**	27-Mar-2019	✓	**18-Mar-2019**	27-Mar-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Rinsate02, SW3, MW239S, BH7, BH6, BH8, Dup02	**14-Mar-2019**	**18-Mar-2019**	28-Mar-2019	✓	**18-Mar-2019**	28-Mar-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH4, BH1, BH11, BH2	**15-Mar-2019**	**18-Mar-2019**	29-Mar-2019	✓	**18-Mar-2019**	29-Mar-2019	✓

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)								
Trip Blank		**13-Mar-2019**	**15-Mar-2019**	09-Sep-2019	✓	**18-Mar-2019**	09-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
Rinsate02, BH6, Dup02	BH7, BH8,	**14-Mar-2019**	**15-Mar-2019**	10-Sep-2019	✓	**18-Mar-2019**	10-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
TRIP BLANK02,	BH4	**15-Mar-2019**	**18-Mar-2019**	11-Sep-2019	✓	**18-Mar-2019**	11-Sep-2019	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)								
Trip Blank		**13-Mar-2019**	**15-Mar-2019**	09-Sep-2019	✓	**18-Mar-2019**	09-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
Rinsate02, BH6, Dup02	BH7, BH8,	**14-Mar-2019**	**15-Mar-2019**	10-Sep-2019	✓	**18-Mar-2019**	10-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
TRIP BLANK02,	BH4	**15-Mar-2019**	**18-Mar-2019**	11-Sep-2019	✓	**18-Mar-2019**	11-Sep-2019	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)								
Trip Blank		**13-Mar-2019**	**15-Mar-2019**	09-Sep-2019	✓	**18-Mar-2019**	09-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
Rinsate02, BH6, Dup02	BH7, BH8,	**14-Mar-2019**	**15-Mar-2019**	10-Sep-2019	✓	**18-Mar-2019**	10-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
TRIP BLANK02,	BH4	**15-Mar-2019**	**18-Mar-2019**	11-Sep-2019	✓	**18-Mar-2019**	11-Sep-2019	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
Trip Blank		**13-Mar-2019**	**15-Mar-2019**	09-Sep-2019	✓	**18-Mar-2019**	09-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
Rinsate02, BH6, Dup02	BH7, BH8,	**14-Mar-2019**	**15-Mar-2019**	10-Sep-2019	✓	**18-Mar-2019**	10-Sep-2019	✓
HDPE (no PTFE) (EP231X)								
TRIP BLANK02,	BH4	**15-Mar-2019**	**18-Mar-2019**	11-Sep-2019	✓	**18-Mar-2019**	11-Sep-2019	✓

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)							
Trip Blank	**13-Mar-2019**	**15-Mar-2019**	09-Sep-2019	✓	**18-Mar-2019**	09-Sep-2019	✓
HDPE (no PTFE) (EP231X)							
Rinsate02, BH7, BH6, BH8, Dup02	**14-Mar-2019**	**15-Mar-2019**	10-Sep-2019	✓	**18-Mar-2019**	10-Sep-2019	✓
HDPE (no PTFE) (EP231X)							
TRIP BLANK02, BH4	**15-Mar-2019**	**18-Mar-2019**	11-Sep-2019	✓	**18-Mar-2019**	11-Sep-2019	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	3	28	**10.71**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	32	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	38	**10.53**	**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
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	38	**5.26**	**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
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	2	13	**15.38**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Dissolved Mercury by FIMS	EG035F	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	38	**5.26**	**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
Total Dissolved Solids (High Level)	EA015H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	2	13	**15.38**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	0	13	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
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)
Calculated TDS (from Electrical Conductivity)	EA016	WATER	In house: Calculation from Electrical Conductivity (APHA 2510 B) using a conversion factor specified in the analytical report. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The 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 Mercury by FIMS	EG035T	WATER	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. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The 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)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Total Recoverable Hydrocarbons - Silica Gel C	EP071SG	WATER	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 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of 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. Where commercially available, isotopically labelled analogues of the target analytes are used as internal standards for quantification. Where a labelled analogue is not commercially available, the internal standard with similar chemistry and the closest retention time to the target is used for quantification. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. This method complies with the quality control definitions as stated in QSM 5.1. Data is reviewed in line with the DQOs as stated in QSM5.1

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Preparation for PFAS in water.	EP231-PR	WATER	Method presumes direct injection without workup. Preparation includes addition of internal standard and surrogate, and filtration prior to anaylsis.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

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COC number:

KLEINFELDER
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Please Refer to WO # ES1907792

Client:	SITE, COC AND CONTACT DATA				Laboratory:
Kleinfelder Australia Pty Ltd	Site Name:	WSS - Cabbage Tree Rd water monitoring	Sampler Name:	Dan Kousbroek	ALS
95 Mitchell Road	QUOTE NUMBER	ME/114/19	Contact Number:	045 8197 676	5/585 Maitland Rd
Cardiff,	Job No.:	20190803	Contact e-mail:	dkousbroek@kleinfelder.com	Mayfield West,
NSW 2285	Required TAT:	24 hrs 48 hrs 3 days **5 days** 7 days	PM name (if not sampler):	Tom Overton	Newcastle NSW 2304
Phone: 02 4949 5200	Data QA level:	LAB minimum unless specified:	PM e-mail:	toverton@kleinfelder.com	Phone: (02) 4014 2500

CHAIN OF CUSTODY								
Relinquished by (print): D. Kousbroek (Courier Dan)	Received by (print): C. Sullivan	Relinquished: C. Sullivan	Received by: AJ	Send Results to:
(sign)	(sign)	(sign) 15/3/19 5pm	(sign)	
Date / Time:	Date / Time: 15/3/19 11:05am	Date / Time:	Date / Time: 15/3/19 19:30	95 Mitchell Road
Notes:	Temp. (°C) 0.8 ICE.	Notes:	Temp. (°C)	Cardiff, NSW 2285
	Notes: ice present / no ice seals intact / no seal		Notes: ice present / no ice seals intact / no seal	newcastle@kleinfelder.com
				Phone: 02 4949 5200

Sample ID	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	Organic Analytes: W-05 SG	Metals: Additional Metals to make up NEPM 15	Metals: Iron (dissolved)	Other Analytes: General Water Suite	Other Analytes: Total Dissolved Solids (TDS)	Other Analytes: Total Suspended Solids (TSS)	Other Analytes: PFAS (28 analytes, standard level)	Comments
Trip Blank	9			15/3				4	X	X	X				X	
BH4	10			15/3				6	X	X	X	X	X	X	X	
~~BH~~ BH1	11			15/3				5	X	X	X	X	X	X		
BH11	12			15/3				5	X	X	X	X	X	X		
BH2	13			15/3				5	X	X	X	X	X	X		

Environmental Division
Sydney
Work Order Reference
ES1907792

Telephone : - 61-2-8784 8555

LAB OF ORIGIN: NEWCASTLE

E-MAILED

W-05 SG - TRH/BTEXN/ 8 Metals Silica Gel Clean Up
NT14 - Extended water suite B
Additional metals analysis to make up NEPM 15

Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Zinc (Zn)

Boron (B), Barium (Ba), Beryllium (Be), Cobalt (Co), Manganese (Mn), Selenium (Se), Vanadium (V)

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COC number: #645653

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Client:	SITE, COC AND CONTACT DATA				Laboratory:
Kleinfelder Australia Pty Ltd 95 Mitchell Road Cardiff, NSW 2285 Phone: 02 4949 5200	Site Name:	WSS - Cabbage Tree Rd water monitonng	Sampler Name:	Dan Kousbroek	ALS 5/585 Maitland Rd Mayfield West, Newcastle NSW 2304 Phone: (02) 4014 2500
	QUOTE NUMBER	ME/114/19	Contact Number:	045 8197 676	
	Job No.:	20190803	Contact e-mail:	dkousbroek@kleinfelder.com	
	Required TAT:	24 hrs 48 hrs 3 days 5 days 7 days	PM name (if not sampler):	Tom Overton	
	Data QA level:	LAB minimum unless specified:	PM e-mail:	toverton@kleinfelder.com	

CHAIN OF CUSTODY

Relinquished by (print) / (sign)	D. Kousbroek Cheques Ooi	Received by (print) / (sign)	4.45pm	Relinquished (sign)		Received by (sign)	
Date / Time:	14/3	Date / Time:	14/03/19	Date / Time:		Date / Time:	
Notes:		Temp (°C)		Notes:		Temp (°C)	
		Notes: 5.3 1Q	ice present / no ice seals intact / no seal			Notes:	ice present / no ice seals intact / no seal

Send Results to:

95 Mitchell Road
Cardiff, NSW 2285

newcastle@kleinfelder.com
Phone: 02 4949 5200

									Organic Analytes								Metals		Other Analytes					
Sample ID	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	W-05 SG								Additional Metals to make up NEPM 15	Iron (dissolved)	General Water Suite	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	PFAS (28 analytes, standard level)		Comments
1 Rinsate02			Water	14/3				5	X								X	X	*			X		
2 SW3			Water	14/3				5	X								X	X	X	X	X			
3 Trip Blank			Water	14/3				3	X								X	X				X		
4 MW23S			Water	14/3				5	X								X	X	X	X	X			
5 BH7			Water	14/3				6	X								X	X	X	X	X	X		
6 BH6			Water	14/3				6	X								X	X	X	X	X	X		
7 BH8			Water	14/3				6	X								X	X	X	X	X	X		
8 Dup02			Water	14/3				5	X								X	X				X		
9 Trip02			Water	14/3				5	X								X	X				X		Send to Eurofins

Subcon / Forward Lab / Split WO
Lab / Analysis: TRIP 2 / Eurofins
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

LAB OF ORIGIN: NEWCASTLE

Environmental Division
Sydney
Work Order Reference
ES1907792

Telephone : +61-2-8784 8555

W-05 SG - TRH/BTEXN/ 8 Metals Silica Gel Clean Up
NT14 - Extended water suite B
Additional metals analysis to make up NEPM 15

Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Zinc (Zn)

Boron (B), Barium (Ba), Beryllium (Be), Cobalt (Co), Manganese (Mn), Selenium (Se), Vanadium (V)

eurofins | mgt

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Site # 1254 & 14271

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**Kleinfelder Aust Pty Ltd (NEWCASTLE)**
Contact name:	Dan Kousbroek
Project name:	WSS - CABBAGE TREE RD WATER MONITORING
Project ID:	20190803
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Mar 15, 2019 3:48 PM
Eurofins | mgt reference:	**645653**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☑ Sample containers for volatile analysis received with zero headspace.

☒ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Andrew Black on Phone : (+61) 2 9900 8490 or by e.mail: AndrewBlack@eurofins.com

Results will be delivered electronically via e.mail to Dan Kousbroek - dkousbroek@kleinfelder.com.

eurofins | mgt

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Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name: Kleinfelder Aust Pty Ltd (NEWCASTLE)
Address: 95 Mitchell Rd
Cardiff
NSW 2285

Project Name: WSS - CABBAGE TREE RD WATER MONITORING
Project ID: 20190803

Order No.:
Report #: 645653
Phone: 02 4949 5200
Fax:

Received: Mar 15, 2019 3:48 PM
Due: Mar 22, 2019
Priority: 5 Day
Contact Name: Dan Kousbroek

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Iron (filtered)	NEPM 1999 Metals : Metals M15	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	
Brisbane Laboratory - NATA Site # 20794								X
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TRIP02	Mar 14, 2019		Water	S19-Ma19698	X	X	X
Test Counts						1	1	1

Kleinfelder Australia Pty Ltd (NEWC)
95 Mitchell Rd
Cardiff
NSW 2285

Attention: **Dan Kousbroek**

Report **645653-W**
Project name WSS - CABBAGE TREE RD WATER MONITORING
Project ID 20190803
Received Date Mar 15, 2019

Client Sample ID			**TRIP02**
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S19-Ma19698**
Date Sampled			**Mar 14, 2019**
Test/Reference	LOR	Unit	
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N15]	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	107
13C2-8:2 FTSA (surr.)	1	%	104
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)[N11]	0.05	ug/L	< 0.05
13C2-6:2 FTSA (surr.)	1	%	139
PFASs Summations			
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium (filtered)	0.02	mg/L	< 0.02
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron (filtered)	0.05	mg/L	< 0.05
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium (filtered)	0.001	mg/L	0.001
Cobalt (filtered)	0.001	mg/L	0.002
Copper (filtered)	0.001	mg/L	< 0.001
Iron (filtered)	0.05	mg/L	1.7
Lead (filtered)	0.001	mg/L	< 0.001
Manganese (filtered)	0.005	mg/L	0.019
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc (filtered)	0.005	mg/L	< 0.005

Client Sample ID			TRIP02
Sample Matrix			Water
Eurofins | mgt Sample No.			S19-Ma19698
Date Sampled			Mar 14, 2019
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	< 0.01
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	< 0.01
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	112
13C5-PFPeA (surr.)	1	%	141
13C5-PFHxA (surr.)	1	%	136
13C4-PFHpA (surr.)	1	%	115
13C8-PFOA (surr.)	1	%	119
13C5-PFNA (surr.)	1	%	96
13C6-PFDA (surr.)	1	%	132
13C2-PFUnDA (surr.)	1	%	102
13C2-PFDoDA (surr.)	1	%	134
13C2-PFTeDA (surr.)	1	%	188
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	106
D3-N-MeFOSA (surr.)	1	%	84
D5-N-EtFOSA (surr.)	1	%	90
D7-N-MeFOSE (surr.)	1	%	96
D9-N-EtFOSE (surr.)	1	%	128
D5-N-EtFOSAA (surr.)	1	%	56
D3-N-MeFOSAA (surr.)	1	%	78
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	< 0.01
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	156

Client Sample ID			TRIP02
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S19-Ma19698**
Date Sampled			**Mar 14, 2019**
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
18O2-PFHxS (surr.)	1	%	122
13C8-PFOS (surr.)	1	%	116

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Mar 21, 2019	14 Day
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl carboxylic acids (PFCAs)	Brisbane	Mar 21, 2019	14 Day
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Mar 21, 2019	14 Day
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Mar 21, 2019	14 Day
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
NEPM 1999 Metals : Metals M15 (Filtered)			
Heavy Metals (filtered)	Sydney	Mar 19, 2019	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Sydney	Mar 19, 2019	28 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Kleinfelder Aust Pty Ltd (NEWCASTLE)	**Order No.:**		**Received:**	Mar 15, 2019 3:48 PM
Address:	95 Mitchell Rd Cardiff NSW 2285	**Report #:**	645653	**Due:**	Mar 22, 2019
		Phone:	02 4949 5200	**Priority:**	5 Day
		Fax:		**Contact Name:**	Dan Kousbroek
Project Name:	WSS - CABBAGE TREE RD WATER MONITORING				
Project ID:	20190803				

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Iron (filtered)	NEPM 1999 Metals : Metals M15	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	
Brisbane Laboratory - NATA Site # 20794								X
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TRIP02	Mar 14, 2019		Water	S19-Ma19698	X	X	X
Test Counts						1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure, April 2011 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.2 2018
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.2 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Barium (filtered)	mg/L	< 0.02			0.02	Pass	
Beryllium (filtered)	mg/L	< 0.001			0.001	Pass	
Boron (filtered)	mg/L	< 0.05			0.05	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Cobalt (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese (filtered)	mg/L	< 0.005			0.005	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Vanadium (filtered)	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	78			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	95			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	102			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	%	87			50-150	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	96			70-130	Pass	
Barium (filtered)	%	93			70-130	Pass	
Beryllium (filtered)	%	81			70-130	Pass	
Boron (filtered)	%	89			70-130	Pass	
Cadmium (filtered)	%	94			70-130	Pass	
Chromium (filtered)	%	93			70-130	Pass	
Cobalt (filtered)	%	93			70-130	Pass	
Copper (filtered)	%	91			70-130	Pass	
Iron (filtered)	%	91			70-130	Pass	
Lead (filtered)	%	91			70-130	Pass	
Manganese (filtered)	%	90			70-130	Pass	
Mercury (filtered)	%	93			70-130	Pass	
Nickel (filtered)	%	90			70-130	Pass	
Vanadium (filtered)	%	95			70-130	Pass	
Zinc (filtered)	%	83			70-130	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	84			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	99			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	80			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	76			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	68			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	89			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	68			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	81			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	70			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	69			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	77			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	53			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	60			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	52			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	%	86			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	%	67			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	50			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	74			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	67			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	68			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	57			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoropentanesulfonic acid (PFPeS)			%	59			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	84			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	65			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	73			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	74			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	S19-Ma26190	NCP	%	71			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	S19-Ma26190	NCP	%	104			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S19-Ma26190	NCP	%	95			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	S19-Ma26190	NCP	%	84			50-150	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S19-Ma22192	NCP	%	103			70-130	Pass	
Barium (filtered)	S19-Ma22192	NCP	%	100			70-130	Pass	
Beryllium (filtered)	S19-Ma22192	NCP	%	85			70-130	Pass	
Boron (filtered)	S19-Ma22192	NCP	%	93			70-130	Pass	
Cadmium (filtered)	S19-Ma22192	NCP	%	96			70-130	Pass	
Chromium (filtered)	S19-Ma22192	NCP	%	94			70-130	Pass	
Cobalt (filtered)	S19-Ma22192	NCP	%	94			70-130	Pass	
Copper (filtered)	S19-Ma22192	NCP	%	92			70-130	Pass	
Iron (filtered)	S19-Ma22192	NCP	%	87			70-130	Pass	
Lead (filtered)	S19-Ma22192	NCP	%	91			70-130	Pass	
Manganese (filtered)	S19-Ma22192	NCP	%	92			70-130	Pass	
Mercury (filtered)	S19-Ma22192	NCP	%	88			70-130	Pass	
Nickel (filtered)	S19-Ma22192	NCP	%	89			70-130	Pass	
Vanadium (filtered)	S19-Ma22192	NCP	%	97			70-130	Pass	
Zinc (filtered)	S19-Ma22192	NCP	%	85			70-130	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	S19-Ma26190	NCP	%	82			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	S19-Ma26190	NCP	%	90			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	S19-Ma26190	NCP	%	76			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	S19-Ma26190	NCP	%	76			50-150	Pass	
Perfluorooctanoic acid (PFOA)	S19-Ma26190	NCP	%	68			50-150	Pass	
Perfluorononanoic acid (PFNA)	S19-Ma26190	NCP	%	83			50-150	Pass	
Perfluorodecanoic acid (PFDA)	S19-Ma26190	NCP	%	70			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	S19-Ma26190	NCP	%	81			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	S19-Ma26190	NCP	%	68			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	S19-Ma26190	NCP	%	73			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S19-Ma26190	NCP	%	72			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	S19-Ma26190	NCP	%	61			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S19-Ma26190	NCP	%	58			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S19-Ma26190	NCP	%	52			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	S19-Ma26190	NCP	%	111			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	S19-Ma26190	NCP	%	60			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	S19-Ma26190	NCP	%	56			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	S19-Ma26190	NCP	%	74			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	S19-Ma26190	NCP	%	64			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	S19-Ma26190	NCP	%	92			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	S19-Ma26190	NCP	%	58			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	S19-Ma26190	NCP	%	53			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S19-Ma26190	NCP	%	71			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	S19-Ma26190	NCP	%	54			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	S19-Ma26190	NCP	%	67			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	S19-Ma26190	NCP	%	63			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S19-Ma19698	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Barium (filtered)	S19-Ma19698	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Beryllium (filtered)	S19-Ma19698	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S19-Ma19698	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S19-Ma19698	CP	mg/L	0.001	0.001	3.0	30%	Pass	
Cobalt (filtered)	S19-Ma19698	CP	mg/L	0.002	0.002	4.0	30%	Pass	
Copper (filtered)	S19-Ma19698	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron (filtered)	S19-Ma19698	CP	mg/L	1.7	1.7	<1	30%	Pass	
Lead (filtered)	S19-Ma19698	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese (filtered)	S19-Ma19698	CP	mg/L	0.019	0.018	5.0	30%	Pass	
Nickel (filtered)	S19-Ma19698	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Vanadium (filtered)	S19-Ma19698	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc (filtered)	S19-Ma19698	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	S19-Ma26189	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	S19-Ma26189	NCP	ug/L	0.04	0.04	10	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	S19-Ma26189	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised By

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Gabriele Cordero	Senior Analyst-Inorganic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Jonathon Angell	Senior Analyst-Organic (QLD)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.