

Monthly water quality monitoring results

Cabbage Tree Road sand quarry

September 2020 monitoring event

NCA20R116839

27 October 2020



Williamtown Sand Syndicate
PO Box 898
Newcastle, NSW 2300

Attention: Darren Williams

Subject: Monthly water quality monitoring results
Cabbage Tree Road sand quarry
September 2020 monitoring event

Please find enclosed the monthly water quality monitoring results at Cabbage Tree Road Sand Quarry for the September 2020 monitoring event.

1 SCOPE OF SERVICE

The scope of work includes the monthly surface and groundwater monitoring as part of the monitoring requirements. **Figure 1 (Attachment: 1)** presents the surface water and groundwater sampling locations.

The scheduled September monitoring was a monthly monitoring event to include gauging of all available monitoring wells (a total of 14 wells) and sampling from eleven monitoring wells and four surface water locations.

2 SITE WORK

The monthly monitoring round was conducted on 16 September 2020.

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 gauging, each of the HydraSleeves were removed and samples taken.

The September 2020 monitoring round included:

- Gauging of 14 monitoring wells;
- Groundwater sampling from eleven monitoring wells (BH10 and BH9 were dry and MW239D did not require sampling); and
- Surface water sampling from three locations (SW2 was dry at the time 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 1**.

Table 1: Summary of Quarterly Water Quality Analysis

Analysis	Number of Samples				
	Primary	Intra-lab (Duplicate)	Inter-lab (Triplicate)	Transport Blank	Rinsate Blank
Hydrocarbons*	13	1	1	1	1
Metals**	12	1	1	1	1
Iron (dissolved)	12	1	1	1	1
Total Dissolved Solids (TDS)	12	0	0	0	0
Total Suspended Solids (TSS)	12	0	0	0	0
PFAS (28 analytes, standard level)	12	2	2	1	1

* TRH (C6 – C40), BTEXN (Silica Gel)



** NEPM Metals Suite (dissolved) - Arsenic (As), Barium (Ba), Beryllium (Be), Boron (B), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), Selenium (Se), Vanadium (V), Zinc (Zn).

3 SAMPLING RESULTS

Table 2 provides a summary of the gauging data. The full set of gauging data and field parameters for each monitoring location are provided in **Attachment 2**. Additionally, Watershed HydroGeo (2019) outlined a Trigger Action and Response Plan (TARP) to mitigate potential impacts to groundwater associated with quarry operations at Williamtown Sand. Based on these recommendations groundwater elevation has been shaded to correspond to triggers and actions outlined in **Table 3**.

Table 2: Summary of gauging data

Borehole	Top of Casing (mAHD)	Depth to Water (mBTOC)	Groundwater Elevation (mAHD)	Inferred Max GW Level (mAHD) ¹	Well Total Depth Current (mBTOC)	Well Total Depth 2014 (mBTOC)	Comments
BH1	8.64	6.216	2.424	4.5	8.22	9.45	Clear, no odour
BH2	7.79	5.462	2.328	3.8	8.46	9.45	Dark brown, no odour
BH3	-	-	-	3.4	-	-	Well Decommissioned
BH4	3.06	1.31	1.75	3.0	6.00	6.45	Clear, no odour
BH5	7.36	5.632	1.728	4.0	8.75	9.28	Light brown, no odour
BH6	3.62	1.544	2.076	4.4	4.50	4.95	Clear, sulphur odour
BH7	2.98	1.437	1.543	3.7	4.49	4.95	Light brown, sulphur odour.
BH8	3.88	1.156	2.724	4.0	6.14	6.28	Light brown, sulphur odour
BH9	17.75	15.951	1.799	3.0	16.20	18.8	Insufficient volume to sample
BH9A	10.25	8.903	1.347	-	16.16	16.16	Newly installed. Silty brown, no odour.
BH10	6.69	Dry	-	4.9	3.68	5.45	Well was dry. Approximately 1.8m of sediment deposited since 2014
BH11	6.63	3.658	2.972	5.5	5.82	5.95	Light Brown, no odour
BH12	8.67	6.629	2.041	4.0	8.17	8.39	Light Brown, no odour
MW239S	3.04	1.116	1.924	3.9	3.90	4.0	Light Brown, sulphur odour
MW239D	3.04	1.183	1.857	3.9	20.49	20.49-	No sample taken
SW01*	N/A	0.6	-	-	N/A	-	Light brown, no odour
SW02*	N/A	Dry	-	-	N/A	-	Location was dry
SW03*	N/A	0.39	-	-	N/A	-	Clear, no odour
SW04*	N/A	0.50	-	-	N/A	-	Clear, no odour

* Surface water levels measured from measuring tape installed (When dry number is ground elevation AHD).

1 – Sourced from Watershed HydroGeo ,2019, *Maximum Extraction Depth Management Plan, Cabbage Tree Road Sand Quarry*, May 2019.

2 – Monitoring well BH9a was installed in August 2020 to replace BH9.



Table 3: Groundwater level monitoring TARP rules (Watershed HydroGeo, 2019)

Level	Trigger	Action and Response	Report to
0	Groundwater levels more than 0.5 m below <i>inferred</i> maximum historical level at BH1 and BH10. (Table 2).	Standard operations – monthly dipping of operational on-site monitoring bores.	n/a
1	Groundwater levels within 0.5 m below <i>inferred</i> maximum historical level (Table 2) at any on-site bore.	Weekly (or more frequent) monitoring (gauging) of groundwater levels until water level declines to below high frequency level bores listed in Table 2 .	Internal and environmental consultant. Include note in Annual Report.
2	Groundwater levels within 0.25 m of <i>inferred</i> maximum historical level (Table 2) at any on-site bore.	Weekly (or more frequent) monitoring (gauging) of groundwater levels. Re-analysis and review of MEL.	WSS to issue letter to DPE, documenting groundwater level and rainfall trends, and review and recommendations regarding of Minimum Extraction Level (MEL) outlined in Watershed HydroGeo, 2019.
3	Groundwater levels within resource area rise above previously <i>inferred</i> maximum groundwater level (Table 2).	Analysis of recent data by hydrogeologist, including site data and data from local HWC wells and local Defence wells (if available). Revision of MEL. Remediation of earlier excavations to revised MEL if required by DPE.	WSS to issue letter to DPE, Dol Water and HWC, documenting groundwater level trends, and revision (if necessary) of MEL. Letter to outline remedial options, considering access, vegetation condition in previously rehabilitated areas. Re-grading of previously rehabilitated areas if required by DPE.

Table 4 provides a summary of the field parameters taken during the September monitoring event. All gauging data and field parameters for each monitoring location are provided in **Attachment 2**.

Table 4: Summary of Field Measurements

Borehole	Turbidity (NTU)	Temp (°C)	DO (mg/L)	EC (µc/cm)	TDS (mg/L)	pH	Redox (mV)
BH1	473	20.44	3.27	103	67.2	5.00	220
BH2	769	20.23	3.91	103	67	4.53	280
BH4	209.8	18.06	2.49	151	97.55	4.53	348.1
BH5	1647.7	18.87	1.23	254.16	182	4.25	71.0
BH6	156	20.02	1.92	269	176	4.48	62.5
BH7	1357	21.64	3.93	253	164	4.57	21.9
BH8	845	19.41	1.31	379	247	4.46	1.5
BH9A	3681	19.85	3.16	266	173	4.97	317
BH11	264.60	20.02	3.58	220.49	143.00	4.52	115.4
BH12	850.45	21.85	2.43	206.44	135.12	4.66	134
MW239S	1647.7	18.87	1.23	337.89	248.67	4.42	79.8
SW01	22.81	16.51	0.66	116	90.66	6.36	229.4
SW03	15.33	16.99	2.88	399	2.59	3.79	4.08
SW04	2.37	17.02	2.49	383	268	3.88	389



Table 5 and **Table 6** presents a summary of the water monitoring results that were found to be elevated above criteria adopted in the Baseline Water Quality Summary (BWQS) report developed by Kleinfelder (KLF 2020) and a comment comparing results with previous data. It should be noted that since undertaking the BWQS report increased rainfall has occurred in 2020 compared to previous years which may influence baseline concentrations across the site, most notably in metals.

Non detect for analytes BTEXN, TRH, TPH and PFAS were reported at all locations and are therefore not included in the below summary tables. BH9A required dilution for PFAS analysis prior to extraction due to matrix interferences, therefore the LOR values have been adjusted accordingly. A planned well development event at BH9A will take place later in the month to remove residual silts in the well. Full results tables are provided in the **Attachment 2**. Full Laboratory results, including copies for the COC are provided in **Attachment 3**. Data trends dating back to February 2019 are provided in **Attachment 4** and briefly summarised at the end of this report.



Table 5: Groundwater screening levels

Analyte	Metals							Relative to previous monitoring (details on specific data trends provided in Section 5 below)	
	Barium	Chromium** ¹	Copper**	Iron	Manganese**	Nickel	Zinc**		
LOR	0.001	0.001	0.001	0.05	0.001	0.001	0.005		
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
Baseline Trigger Values (KLF 2020)	0.035	0.004	0.013 (0.051 for BH4)	4.1 ² /1.0 ³	1.9	0.022 (0.037 for BH11)	0.085		
NHMRC ADWG (2018)	-	0.05	2	-	0.5	0.02	-		
Sample Name	Groundwater								
BH1	0.004	0.002	0.005	5.48	0.01	<0.001	0.016		
BH11	0.014	0.001	0.005	0.9	0.008	<0.001	0.009		
BH12	0.028	<0.001	0.004	0.14	0.076	<0.001	0.020	BH12 concentrations were generally consistent with historical data from surrounding wells and the previous month records.	
BH2	0.012	<0.001	0.026	0.07	0.016	<0.001	0.006	Generally metal concentrations were consistent with previous results. Copper concentrations remain elevated (0.026 mg/l) above Baseline Trigger Values, however concentrations have decreased since the previous months monitoring. Copper concentrations will continue to be closely monitored during subsequent monitoring rounds to confirm trends.	
BH4	0.013	<0.001	0.078	0.06	0.012	<0.001	0.006	Generally metal concentrations were consistent with previous results. Copper concentrations remain elevated (0.078 mg/l) above Baseline Trigger Values, however concentrations have decreased since the previous months monitoring. Copper concentrations will continue to be closely monitored during subsequent monitoring rounds to confirm trends.	
BH5	-	-	-	-	-	-	-	No sample taken during the monthly monitoring event.	
BH6	0.047	<0.001	0.002	1.78	0.010	<0.001	0.006	Generally metal concentrations were consistent with previous results. Barium concentrations remain marginally elevated (0.047 mg/L), however concentrations have	



								decreased from the previous month. Concentrations will continue to be closely monitored during subsequent monitoring rounds to confirm trends.
BH7	0.013	0.002	<0.001	1.67	0.021	0.003	0.006	Metal concentrations were generally consistent with historical results
BH8	0.014	0.001	0.035	3.35	0.009	0.009	0.039	Generally metal concentrations were consistent with previous results with the expectation of Copper concentration (0.035 mg/l), Copper concentrations were reported elevated above the baseline trigger values. Copper concentrations will continue to be closely monitored during subsequent monitoring rounds to confirm trends.
BH9	-	-	-	-	-	-	-	No sample taken during the monthly monitoring event, insufficient well volume.
BH9A	0.028	<0.001	0.004	0.14	0.076	0.002	0.020	BH9A has not previously been sampled, however concentrations were generally consistent with surrounding historical data.
MW239S	0.016	0.002	0.002	0.51	0.008	0.002	0.006	Metal concentrations were generally consistent with historical results.

Notes:

< - Less than laboratory limit of reporting

** 95% Level of protection in freshwater

¹ value for CR VI

² Northern half of site – BH5, BH6, BH7, BH8, BH11 & MW239S

³ Southern half of site - BH2, BH4 & BH9



Table 6: Surface water screening levels

Analyte	Metals							Relative to previous monitoring (details on specific data trends provided in Section 5 below)
	Barium	Chromium** ¹	Copper**	Iron	Manganese**	Nickel	Zinc**	
LOR	0.001	0.001	0.001	0.05	0.001	0.001	0.005	
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Baseline Trigger Values (KLF 2020)	0.08	0.002	0.013	9.26	0.841 (SW1)/0.048 (SW3 & SW4)	0.022	0.535 (SW1) / 0.085 (SW3 & SW4)	
NHMRC ADWG 6	-	0.05	2	-	0.5	0.02	-	
Sample Name	Surface Water Screening Levels							
SW1	0.021	0.001	0.005	0.87	0.096	0.002	0.061	Metal concentrations were generally consistent with historical results
SW3	0.034	<0.001	0.007	3.49	0.029	0.007	0.031	Metal concentrations were generally consistent with historical results
SW4	0.041	<0.001	0.005	0.97	0.053	0.005	0.02	Metal concentrations were generally consistent with historical results. Concentrations of Manganese remain elevated (0.053 mg/L), however concentrations have decreased since previous sampling event. Manganese concentrations will continue to be monitored closely during subsequent monitoring rounds to identify any further trends.

Notes:

< - Less than laboratory limit of reporting

** 95% Level of protection in freshwater

¹ value for CR VI



4 RAINWATER DATA

Table 7 presents the rainfall data from Williamtown RAAF base (Station Number: 061078, Latitude: 32.79°S; Longitude: 151.84°E; Elevation: 8 m) for the period 2020. The mean monthly rainfall for the month of Aug/Sep indicates that there was below average rainfall leading up to the September 16 sampling event. September rainfall is trending towards below average rainfall. Based on current rainfall data (mean and monthly totals) for September 2020 it is expected that surface and groundwater levels will remain stable.

Table 7: 2020 Rainfall data

2020	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	6.4	0	0	0	0			
2nd	0	0	0	0.2	0	0	0.2	0	0			
3rd	0	0.4	1.4	9.2	0	0.6	0	0	0			
4th	0	0.2	6.8	12.4	0	0.2	1.6	0	0			
5th	0	0	0.2	4.2	5.6	0	0	0	3			
6th	0	0.2	24.6	0	5.6	0	0	0	0			
7th	0	25	8.2	0	0.2	0	0	0	0			
8th	0.2	28	0.2	0	0	0.4	4	3	0			
9th	0.2	66.2	0	0.8	0	26.8	0	2.8	0			
10th	0	16.2	0	0	0	14	0	8.4	12.6			
11th	0.2	5.6	0.2	4	0	11.4	0.6	18.4	0			
12th	1.4	0.2	1.6	0	0	1.4	1.8	0	0			
13th	0.4	1.8	0.2	0	0	0.2	17	1.2	0			
14th	0	3.2	0	0	0.2	11.2	24.6	0	0			
15th	0	0	5.8	0	9.2	0	4	5	0			
16th	0	0.2	2.6	0	3.4	0	0	0	0			
17th	37.4	0.2	0	0	0	0	0	0	0			
18th	21.6	5.8	3.2	0	6.2	4.2	7.8	0				
19th	3.6	4.6	0	0	2.2	0	0	0	0			
20th	0.6	0.2	0	0	0.2	0	0	0				
21st	0.2	0	0	0	0.8	0.4	0	0				
22nd	0	0	0	0	12	10.2	0	0				
23rd	0	0.4	0.6	0	0.2	0.2	0	0	0			
24th	0	0.2	0.6	0	0.2	0	0	0				
25th	1	0	0	0	0	0	0	0				
26th	0.4	0	21.2	0	38.8	0	23.4	0				
27th	0	13	19.6	17.2	0	0.2	133	0				
28th	0	0	0	4.6	0	0	16.2	0				
29th		0	8.4	1	1.6	0	8.4	0				
30th	0	-	0	0	12.6	0.2	0	0				



2020	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
31st	0	-	0.8	-	0.2	-	0	0				
Total	67.2	171.6	106.2	53.6	105.6	70.4	242.6	38.8				
Mean	98.3	117.8	120.7	109.8	108.6	124.6	72.6	72.8	60.6	73.5	81.9	77.5

5 DATA TRENDS

Data trends, taken from analyses undertaken throughout the duration of the sampling program (January 2019 – current), are provided as **Appendix 4**. Generally, the trends indicate a slight increase in groundwater elevation across the across the site relative to an increase in rainfall over the preceding 6 months. Groundwater and surface water parameters have remained mostly stable including laboratory analytical results.

Notable changes in data trends were observed for the following analytes:

- Iron – slight increase in Iron concentration across majority of sampling locations including BH1, BH7, BH8, MW239S, SW1, and SW2 was observed following the September 2020 sampling event;
- Barium – notable increase in Barium concentrations were observed in BH2, BH4, BH12, SW1, and SW3, however levels reflect historical data;
- Cobalt – trending increase in Cobalt concentrations at SW3 were observed following the September 2020 sampling event. However a spike in Cobalt concentrations at SW4 in August 2020 have decreased during the September 2020 sampling event;
- Copper - Notable increases in copper concentrations were observed at BH4 following the April/May 2020 sampling event up until the most recent sampling event (September 2020), however Copper concentration levels have decrease in BH2 since spile in August 2020;
- Calcium – notable decrease in Calcium concentration levels to reflect historical concentration levels at BH7 and BH8 observed following September 2020 sampling event;
- Zinc – A spike in concentration was observed at SW4 following the May sampling event however subsequent sampling has shown continuation of stabilisation of concentrations at this location.

6 THANK YOU

Overall, the results suggest that since quarry operations began in August 2019 there has been no immediate change in analytical results.

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

Daniel Kousbroek

Environmental Consultant
Contaminated Land Management
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Attachments

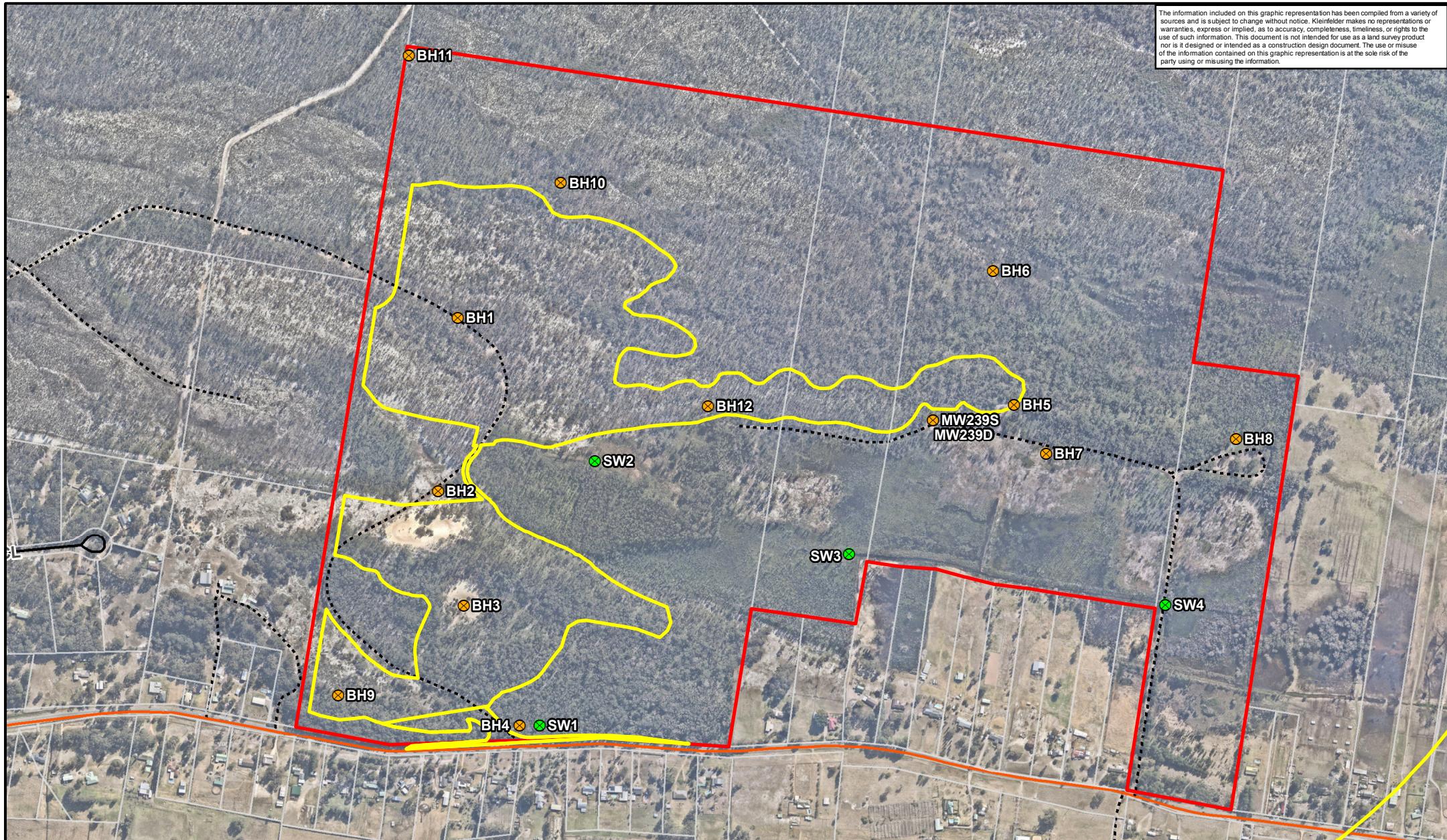
- Attachment 1 Figures
- Attachment 2 Results tables and field records
- Attachment 3 Lab results
- Attachment 4 Data Trends



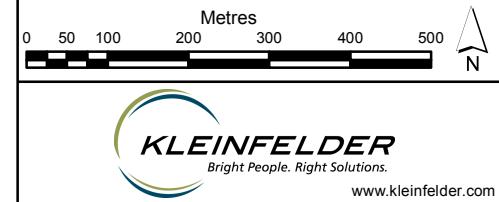
ATTACHMENT: 1 FIGURES



The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the information contained on this graphic representation. This graphic representation is not a product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.



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



Metres	0	50	100	200	300	400	500
N							
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

FIGURE:
1

Williamtown Sand Syndicate
Proposed Sand Quarry
Cabbage Tree Road, Williamtown



ATTACHMENT 2: RESULTS TABLES AND FIELD RECORDS



1

Notes:

— Not analysed

-- Not analysed
≤ - Less than laboratory limit of reporting

$\mu\text{g/l}$ - Micrograms per liter

BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

1- Baseline Water Quality Summary Report

Table GW2
Groundwater Analytical Data - Metals
Willitown Sand Syndicate



Analyte	Metals														
	Arsenic**	Barium	Beryllium	Boron**	Cadmium**	Chromium**	Cobalt	Copper**	Iron	Lead**	Manganese*	Mercury**	Nickel**	Selenium**	Vanadium
LOD	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
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
Baseline Trigger Values (KLF 2020)*	0.003	0.035	-	-	-	0.004	-	-	0.013 < 0.051 for 0.044	4.1 * 10 ⁻⁵	-	0.13*	-	-	0.085
NHPRC ADWG 2018	0.01	-	0.06	4	0.002	0.05	-	-	-	0.01	0.5	0.001	0.02	0.01	-
Sample Name	Sample Date														
	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	13	< 0.001	0.014	< 0.0001	0.014	< 0.001	< 0.001	< 0.001
	23-Aug-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	0.002	10*	< 0.001	0.015	< 0.0001	0.002	< 0.001
	16-May-19	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	0.003	< 0.001	8.33	< 0.001	0.009	< 0.0001	0.002	< 0.001	< 0.001
	14-Jun-19	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	6.31	< 0.001	0.019	< 0.0001	< 0.001	< 0.001	< 0.001
	15-Aug-19	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	7.56	< 0.001	0.008	< 0.0001	0.002	< 0.001	< 0.001
	16-Sep-19	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	0.001	8.84	< 0.001	0.009	< 0.0001	< 0.001	< 0.001
	15-Nov-19	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	1.22	< 0.001	0.001	< 0.0001	0.001	< 0.001	< 0.001
	16-Nov-19	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	11	< 0.001	0.008	< 0.0001	0.001	< 0.001	0.012
	17-Dec-19	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	0.003	< 0.001	8.46	< 0.001	0.009	< 0.0001	0.001	< 0.001	0.028
	15-Jan-20	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	4.63	< 0.001	0.011	< 0.0001	0.002	< 0.001	0.044
	16-Feb-20	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	4.1	< 0.001	0.009	< 0.0001	0.003	< 0.001	0.017
	26-Mar-20	< 0.001	0.006	< 0.001	< 0.05	< 0.0001	0.003	< 0.001	0.02	7.37	< 0.001	0.009	< 0.0001	0.005	< 0.001
	27-Apr-20	< 0.001	-	-	-	< 0.0001	0.001	< 0.001	0.02	0.22	< 0.001	0.009	< 0.0001	-	< 0.035
	15-May-20	< 0.001	0.006	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.002	0.12	< 0.001	0.008	< 0.0001	< 0.001	< 0.005
	16-Jun-20	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.006	5.24	< 0.001	0.001	< 0.0001	-	0.006
	16-Jul-20	< 0.001	-	-	-	< 0.0001	0.003	< 0.001	0.014	6.2	< 0.001	0.01	< 0.0001	-	0.008
	14-Aug-20	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.005	0.05	< 0.001	0.006	< 0.0001	< 0.001	< 0.025
	15-Sep-20	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.002	0.08	< 0.001	0.001	< 0.0001	< 0.001	< 0.011
	16-Oct-20	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.002	0.08	< 0.001	0.001	< 0.0001	< 0.001	< 0.011
	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	< 0.001
	15-Mar-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	1.49	< 0.001	0.007	< 0.0001	0.007	< 0.001	0.016
	16-Apr-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.5	< 0.001	0.006	< 0.0001	0.005	< 0.001
	16-May-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.97	< 0.001	0.006	< 0.0001	0.004	< 0.001
	14-Jun-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.05	< 0.001	0.005	< 0.0001	0.001	< 0.001
	16-Jul-19	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.01	< 0.001	0.001	< 0.0001	0.001	< 0.001
	15-Aug-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.07	< 0.001	0.002	< 0.0001	0.002	< 0.001
	16-Sep-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.04	< 0.001	0.001	< 0.0001	0.003	< 0.001
	17-Oct-19	< 0.001	0.004	< 0.001	0.005	< 0.0001	0.002	< 0.001	1	< 0.001	0.008	< 0.0001	0.003	< 0.001	0.006
	16-Jan-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.003	< 0.001
	27-Feb-20	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.002	< 0.001
	15-Mar-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.002	< 0.001
	16-Apr-20	< 0.001	0.007	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.002	< 0.001
	15-May-20	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.002	< 0.001
	16-Jun-20	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.017	< 0.001
	14-Aug-20	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.004	0.75	< 0.001	0.004	< 0.0001	< 0.001	< 0.017
	15-Sep-20	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.017	< 0.001
	16-Oct-20	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.017	< 0.001
	17-Nov-20	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.017	< 0.001
	16-Dec-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	27-Feb-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	15-Mar-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	16-Apr-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	15-May-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	16-Jun-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	14-Aug-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	15-Sep-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	16-Oct-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	17-Nov-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	16-Dec-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	27-Feb-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	15-Mar-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	16-Apr-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	15-May-20	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	0.08	< 0.001	0.001	< 0.0001	0.006	< 0.001
	16-Jun-20	< 0.001	0.005												

2

Notes:

< - Less than laboratory limit of detection

$\mu\text{g/L}$ - Micrograms per litre

*** 99% Level of protection in freshwater

¹ Baseline Summary

1

Notes:

-- Not analysed
 < - Less than laboratory limit

$\mu\text{g/L}$ - Micrograms per litre

*** 99% Level of protection in freshwater

¹ Baseline Summary Report.

Analyte	Anions and Cations														
	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	
LOR Units	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.1 mg/L	
Baseline Trigger Values (KLF 2020)*	-	-	-	-	-	-	-	-	2.0	-	-	-	0.5	3	
NHMRC ADWG 2018	-	-	-	-	-	-	1.5	-	-	3	50	-	-	-	
Sample Name	Sample Date														
BH1	15-Mar-19	11	2.0	1.0	< 1.0	25	< 0.1	-	-	-	-	-	-	-	
	23-Apr-19	14	1.0	2.0	< 1.0	4.0	25	< 0.1	-	-	-	-	-	-	
	16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	0.11	0.3	
	14-Jun-19	10	< 1.0	2.0	< 1.0	3.0	24	< 0.1	-	-	-	-	-	-	
	16-Jul-19	15	< 1.0	2.0	< 1.0	4.0	25	< 0.1	-	-	-	-	-	-	
	15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	21	< 0.1	-	-	-	-	-	-	
	16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	< 0.01	0.12	0.3
	15-Oct-19	13	< 1.0	2.0	< 1.0	2.0	21	< 0.1	-	-	-	-	-	-	
	18-Nov-19	16	< 1.0	2.0	< 1.0	3.0	23	0.1	< 0.01	< 0.01	0.01	0.01	0.13	0.3	
	17-Dec-19	14	< 1	2	< 1	5	23	< 0.1	-	-	-	-	-	-	
	16-Jan-20	16	< 1	3	< 1	3	25	< 0.1	-	-	-	-	-	-	
	27-Feb-20	14	< 1	2	< 1	4	24	< 0.1	< 0.01	0.02	< 0.01	0.02	0.02	0.22	0.4
	26-Mar-20	12	< 1	2	< 1	1	24	< 0.1	-	-	-	-	-	-	
	27-Apr-20	14	< 1	2	< 1	2	24	< 0.1	-	-	-	-	-	-	
	15-May-20	15	< 1	2	< 1	3	27	< 0.1	< 0.01	0.06	< 0.01	0.04	0.04	0.1	1
	19-Jun-20	16	< 1	2	< 1	2	27	0.2	-	-	-	-	-	-	
	16-Jul-20	17	< 1	2	< 1	3	24	< 0.1	-	-	-	-	-	-	
	14-Aug-20	15	< 1	2	< 1	2	26	< 0.1	< 0.01	0.03	< 0.1	0.06	0.06	0.09	0.6
	16-Sep-20	13	< 1.0	2.0	< 1.0	2.0	21	< 0.1	-	-	-	-	-	-	
	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
	15-Mar-19	26	< 1.0	2.0	< 1.0	2.0	52	< 0.1	-	-	-	-	-	-	
	23-Apr-19	32	< 1.0	5.0	< 1.0	2.0	57	< 0.1	-	-	-	-	-	-	
	16-May-19	29	< 1.0	4.0	< 1.0	2.0	55	< 0.1	< 0.01	0.01	< 0.01	< 0.01	0.12	0.4	
	14-Jun-19	26	< 1.0	4.0	< 1.0	1.0	53	< 0.1	-	-	-	-	-	-	
	16-Jul-19	19	< 1.0	8.0	< 1.0	8.0	73	0.2	-	-	-	-	-	-	
	15-Aug-19	28	< 1.0	3.0	< 1.0	4.0	47	< 0.1	-	-	-	-	-	-	
	16-Sep-19	27	< 1.0	3.0	< 1.0	5.0	46	< 0.1	< 0.01	0.12	< 0.01	< 0.01	< 0.01	0.15	0.7
	15-Oct-19	28	< 1.0	3.0	< 1.0	3.0	44	< 0.1	-	-	-	-	-	-	
	18-Nov-19	28	< 1.0	3.0	< 1.0	1.0	53	< 0.1	< 0.01	2.11	< 0.01	0.06	0.06	0.18	5.9
	17-Dec-19	26	< 1	4	< 1	48	0.1	-	-	-	-	-	-	-	
	16-Jan-20	25	< 1	3	< 1	1	46	< 0.1	-	-	-	-	-	-	
	27-Feb-20	20	< 1	3	< 1	41	49	< 0.1	< 0.01	1.09	< 0.01	0.02	0.02	0.16	3.3
	25-Mar-20	20	< 1	2	< 1	1	49	< 0.1	-	-	-	-	-	-	
	27-Apr-20	18	< 1	2	< 1	1	36	< 0.1	-	-	-	-	-	-	
	15-May-20	21	< 1	2	< 1	2	39	< 0.1	< 0.01	31.8	< 0.01	0.21	0.21	0.72	85.5
	19-Jun-20	22	< 1	2	< 1	1	42	< 0.1	-	-	-	-	-	-	
	16-Jul-20	24	< 1	3	< 1	2	41	< 0.1	-	-	-	-	-	-	
	14-Aug-20	22	< 1	4	< 1	6	43	< 0.1	< 0.01	0.05	< 0.01	0.06	0.06	0.07	0.6
	16-Sep-20	29	< 1.0	5.0	< 1.0	1.0	60	48	< 0.1	-	-	-	-	-	
	14-Aug-20	20	4	4	< 1	14	36	< 0.1	< 0.01	0.75	0.01	0.01	0.02	< 0.01	3.9
	16-Sep-20	24	< 1.0	7.0	< 1.0	2.0	38	< 0.1	-	-	-	-	-	-	
	22-Feb-19	12	< 1.0	2.0	< 1.0	6.0	22	0.2	< 0.01	0.28	< 0.01	2.76	2.76	0.05	4.0
	15-Mar-19	10	< 1.0	2.0	< 1.0	6.0	23	< 0.1	-	-	-	-	-	-	
	23-Apr-19	14	2.0	2.0	< 1.0	6.0	23	< 0.1	-	-	-	-	-	-	
	16-May-19	12	2.0	2.0	< 1.0	2.1	22	< 0.1	< 0.01	0.26	< 0.01	0.38	0.38	0.01	1.3
	14-Jun-19	11	1.0	2.0	< 1.0	5.0	23	< 0.1	-	-	-	-	-	-	
	16-Jul-19	13	2.0	2.0	< 1.0	9.0	20	< 0.1	-	-	-	-	-	-	
	15-Aug-19	12	1.0	2.0	< 1.0	8.0	20	< 0.1	-	-	-	-	-	-	
	16-Sep-19	11	2.0	2.0	< 1.0	8.0	18	< 0.1	< 0.01	0.28	< 0.01	1.07	1.07	0.04	2.7
	15-Oct-19	12	2.0	2.0	< 1.0	5.0	20	< 0.1	-	-	-	-	-	-	
	18-Nov-19	14	2.0	1.0	< 1.0	7.0	19	< 0.1	< 0.01	0.21	< 0.01	1.01	1.01	0.05	2.1
	17-Dec-19	13	2	2	< 1	6	17	< 0.1	-	-	-	-	-	-	
	16-Jan-20	13	2	2	< 1	6	17	< 0.1	-	-	-	-	-	-	
	27-Feb-20	11	2	2	< 1	6	16	0.1	< 0.01	0.09	< 0.01	2.18	2.18	0.04	2.8
	26-Mar-20	12	2	1	< 1	7	23	< 0.1	-	-	-	-	-	-	
	27-Apr-20	12	2	1	< 1	7	19	< 0.1	-	-	-	-	-	-	
	15-May-20	13	2	1	< 1	3	27	< 0.1	< 0.01	0.13	< 0.01	2.1	2.1	0.01	3.2
	19-Jun-20	12	2	2	< 1	6	18	< 0.1	-	-	-	-	-	-	
	16-Jul-20	11	2	1	< 1	6	16	< 0.1	-	-	-	-	-	-	
	14-Aug-20	10	2	1	< 1	5	15	< 0.1	< 0.01	0.21	< 0.01	2.31	2.31	0.02	3.9
	16-Sep-20	14	2	2	< 1.0	7.0	17	< 0.1	-	-	-	-	-	-	
	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
	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
	15-Mar-19	9.0	2.0	< 1.0	< 1.0	5.0	18	< 0.1	-	-	-	-	-	-	
	23-Apr-19	10	2.0	1.0	1.0	3.0	19	< 0.1	-	-	-	-	-	-	
	16-May-19	9.0	2.0	1.0	1.0	22	19	< 0.1	< 0.01	0.97	< 0.01	0.29	0.29	< 0.01	1.0
	14-Jun-19	6.0	1.0	1.0	< 1.0	4.0	18	< 0.1	-	-	-	-	-	-	
	16-Jul-19	10	2.0	2.0	< 1.0	6.0	18	< 0.1	-	-	-	-	-	-	
	15-Aug-19	8.0	2.0	1.0	1.0	5.0	16	< 0.1	-	-	-	-	-	-	
	16-Sep-19	11	1.0	1.0	< 1.0	4.0	16	< 0.1	< 0.01	0.4	< 0.01	0.24	0.24	0.02	0.6
	15-Oct-19	10	1.0	1.0	< 1.0	4.0	16	< 0.1	< 0.01	0.05	< 0.01	0.29	0.29	< 0.01	0.3
	18-Nov-19	11	1.0	1.0	< 1.0	4.0	18	< 0.1	< 0.01	0.08	< 0.01	0.29	0.29	< 0.01	0.3
	17-Dec-19	9	1	1	1	6	16	< 0.1	< 0.01	0.01	< 0.01	0.24	0.24	0.02	0.6
	16-Jan-20	13	2	2	< 1	6	18	< 0.1	-	-	-	-	-	-	
	27-Feb-20	14	2	2	< 1	9	26	< 0.1	< 0.01	0.18	< 0.01	0.41	0.41	0.01	0.7
	26-Mar-20	12	2	1	< 1	10	27	< 0.1	-	-	-	-	-	-	
	27-Apr-20	16	1	2	< 1	10	25	< 0.1	-	-	-	-	-	-	
	15-May-20	21	1	3	< 1	12	37	< 0.1	< 0.01	0.09	< 0.01	0.12	0.12	< 0.01	0.6
	19-Jun-20	23	1	2	< 1	13	35	< 0.1	-	-	-	-	-	-	
	16-Jul-20	35	< 1	6	< 1	21	50	< 0.1	-	-	-	-	-	-	
	14-Aug-20	18	< 1	2	< 1	10	34	< 0.1	< 0.01	0.24	< 0.01	0.16	0.16	0.02	0.8
	16-Sep-20	20	< 1.0	2.0	< 1.0	1.0	11	31	< 0.1	-	-	-	-	-	
	22-Feb-19	42	< 1.0	6.0	< 1.0	1.0	69	0.2							

Analyte	Total Kjeldahl Nitrogen as N
LOR	0.1
Units	mg/L
Baseline Trigger Values (KLF 2020)*	-
NHMRC ADWG 2018	-
Sample Name	Sample Date
BH1	15-Mar-19 - 23-Apr-19 - 16-May-19 0.3 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 0.3 15-Oct-19 - 18-Nov-19 0.3 17-Dec-19 - 16-Jan-20 - 27-Feb-20 0.4 26-Mar-20 - 27-Apr-20 - 15-May-20 1 19-Jun-20 - 16-Jul-20 - 14-Aug-20 0.5 16-Sep-20 -
BH11	21-Feb-19 1.8 15-Mar-19 - 23-Apr-19 - 16-May-19 0.4 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 0.7 15-Oct-19 - 18-Nov-19 5.8 17-Dec-19 - 16-Jan-20 - 27-Feb-20 3.3 26-Mar-20 - 27-Apr-20 - 15-May-20 85.3 19-Jun-20 - 16-Jul-20 - 14-Aug-20 0.5 16-Sep-20 -
BH12	14-Aug-20 3.9 16-Sep-20 -
BH2	22-Feb-19 1.2 15-Mar-19 - 23-Apr-19 - 16-May-19 0.9 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 1.6 15-Oct-19 - 18-Nov-19 1.1 17-Dec-19 - 16-Jan-20 - 27-Feb-20 0.6 26-Mar-20 - 27-Apr-20 - 15-May-20 1.1 19-Jun-20 - 16-Jul-20 - 14-Aug-20 1.6 16-Sep-20 -
BH3	21-Feb-19 5.1 21-Feb-19 0.3 15-Mar-19 - 23-Apr-19 - 16-May-19 0.7 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 0.4 15-Oct-19 - 18-Nov-19 < 0.1 17-Dec-19 - 16-Jan-20 - 27-Feb-20 0.3 26-Mar-20 - 27-Apr-20 - 15-May-20 0.5 19-Jun-20 - 16-Jul-20 - 14-Aug-20 0.6 16-Sep-20 -
BH4	22-Feb-19 3.0 14-Aug-20 0.8
BH5	22-Feb-19 0.4 14-Mar-19 - 23-Apr-19 - 16-May-19 0.6 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 0.7 15-Oct-19 - 18-Nov-19 0.4 17-Dec-19 - 16-Jan-20 - 27-Feb-20 1 26-Mar-20 - 27-Apr-20 - 15-May-20 1.8 19-Jun-20 - 16-Jul-20 - 14-Aug-20 1.2 16-Sep-20 -
BH6	22-Feb-19 2.2 14-Mar-19 - 23-Apr-19 - 16-May-19 0.9 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 1.1 15-Oct-19 - 18-Nov-19 0.5 17-Dec-19 - 16-Jan-20 - 27-Feb-20 0.8 26-Mar-20 - 27-Apr-20 - 15-May-20 1.1 19-Jun-20 - 16-Jul-20 - 14-Aug-20 1.2 16-Sep-20 -
BH7	22-Feb-19 2.4 14-Mar-19 - 23-Apr-19 - 16-May-19 0.4 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 1.1 15-Oct-19 - 18-Nov-19 1.3 17-Dec-19 - 16-Jan-20 - 27-Feb-20 0.6 26-Mar-20 - 27-Apr-20 - 15-May-20 0.8 19-Jun-20 -
BH8	21-Feb-19 2.4 14-Mar-19 - 23-Apr-19 - 16-May-19 0.4 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 1.1 15-Oct-19 - 18-Nov-19 1.3 17-Dec-19 - 16-Jan-20 - 27-Feb-20 0.6 26-Mar-20 - 27-Apr-20 - 15-May-20 0.8 19-Jun-20 -

Analyte		Alkalinity										Inorganics			pH
		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		
LOR Units	meq/L	meq/L	%	0.01	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	µS/cm	mg/L	mg/L	pH units	
Baseline Trigger Values (XL F 2020)*															
NHMRC ADWG 2018															
Sample Name	Sample Date														
BH1	15-Mar-19	0.66	0.88	-	-	9.0	< 1.0	< 1.0	9.0	9.0	104	68	129	5.67	
	23-Apr-19	0.82	0.99	-	-	10	< 1.0	< 1.0	10	11	84	55	97	5.83	
	16-May-19	0.69	1.01	-	1.7	10	< 1.0	< 1.0	10	8.0	105	68	164	5.82	
	14-Jun-19	0.6	0.94	-	-	10	< 1.0	< 1.0	10	8.0	99	64	72	5.52	
	16-Jul-19	0.62	0.95	-	-	11	< 1.0	< 1.0	11	8.0	102	66	84	5.62	
	15-Aug-19	0.77	0.61	-	-	14	< 1.0	< 1.0	14	8.0	128	83	82	6.22	
	16-Sep-19	0.72	0.76	-	1.84	8.0	< 1.0	< 1.0	8.0	8.0	103	66	88	5.44	
	15-Oct-19	0.73	0.71	-	-	4.0	< 1.0	< 1.0	4.0	8.0	98	64	55	-	
	18-Nov-19	0.86	1.19	-	2.26	24	< 1.0	< 1.0	24	8.0	126	82	-	6.29	
	17-Dec-19	0.77	1.05	-	-	15	< 1	< 1	15	8	118	77	-	6.05	
	16-Jan-20	0.94	1.21	-	-	22	< 1	< 1	22	12	112	73	-	6.23	
	27-Feb-20	0.77	0.94	-	1.98	9	< 1	< 1	9	8	103	67	-	6.2	
	26-Mar-20	0.69	0.88	-	-	10	< 1	< 1	10	8	108	77	-	5.61	
	27-Apr-20	0.64	0.92	-	-	11	< 1	< 1	12	8	131	85	-	5.7	
	15-May-20	0.86	1.06	-	2.26	12	< 1	< 1	12	8	137	89	-	6.12	
	19-Jun-20	1.04	1.14	-	-	17	< 1.0	< 1.0	17	8	140	91	-	5.91	
	16-Jul-20	0.96	1.26	-	-	26	< 1.0	< 1.0	26	8	135	88	-	5.91	
	14-Aug-20	0.82	0.95	-	2.12	9	< 1	< 1	9	8	113	73	100	5.76	
	16-Sep-20	0.73	0.81	-	9.0	< 1.0	< 1.0	9.0	8.0	95	62	81	5.87		
BH11	21-Feb-19	2.91	2.76	-	3.21	< 1.0	< 1.0	< 1.0	41	41	346	278	-	4.67	
	15-Mar-19	1.3	1.51	-	-	< 1.0	< 1.0	< 1.0	8.0	8.0	186	121	144	4.82	
	23-Apr-19	1.8	1.65	-	-	< 1.0	< 1.0	< 1.0	20	20	150	98	135	4.99	
	16-May-19	1.59	1.59	-	3.0	< 1.0	< 1.0	< 1.0	16	16	188	122	216	4.91	
	14-Jun-19	1.58	1.5	-	-	< 1.0	< 1.0	< 1.0	15	15	114	104	124	4.84	
	16-Jul-19	2.29	2.22	-	-	< 1.0	< 1.0	< 1.0	22	22	218	207	192	4.68	
	15-Aug-19	1.46	1.41	-	-	< 1.0	< 1.0	< 1.0	12	12	197	128	135	4.88	
	15-Oct-19	1.46	1.3	-	-	< 1.0	< 1.0	< 1.0	12	12	194	126	-	4.92	
	18-Nov-19	1.46	1.5	-	3.3	< 1.0	< 1.0	< 1.0	12	12	193	125	-	5.12	
	17-Dec-19	1.46	1.39	-	-	2	< 1	< 1	2	16	196	127	-	5.03	
	16-Jan-20	1.33	1.34	-	-	2	< 1	< 1	2	12	168	109	-	5.09	
	27-Feb-20	1.12	1.18	-	2.36	< 1	< 1	< 1	12	12	165	107	-	4.35	
	26-Mar-20	1.08	1.13	-	-	< 1	< 1	< 1	11	11	166	101	-	5.14	
	22-Apr-20	1.13	1.24	-	-	10	< 1	< 1	10	16	151	98	-	5.14	
	15-May-20	1.08	1.2	-	-	10	< 1	< 1	10	16	151	98	-	6.14	
	19-Jun-20	1.12	1.2	-	-	< 1	< 1	< 1	8	8	168	109	-	4.9	
	16-Jul-20	1.29	1.32	-	-	6	< 1	< 1	6	12	184	120	-	4.91	
	14-Aug-20	1.29	1.38	-	2.27	2	< 1	< 1	2	16	172	112	119	4.89	
	16-Sep-20	1.67	1.48	-	-	< 1.0	< 1.0	< 1.0	20	20	223	145	111	4.61	
BH12	14-Aug-20	1.4	1.35	-	1.69	2	< 1	< 1	2	26	170	110	139	5.26	
	16-Sep-20	1.64	1.57	-	-	2.0	< 1.0	< 1.0	2.0	29	206	134	118	5.37	
	22-Feb-19	0.79	0.74	-	1.44	< 1.0	< 1.0	< 1.0	13	91	128	-	4.87		
	15-Mar-19	0.75	0.75	-	-	< 1.0	< 1.0	< 1.0	15	15	116	96	99	5.1	
	23-Apr-19	0.87	0.77	-	-	< 1.0	< 1.0	< 1.0	13	70	46	84	482	-	
	16-May-19	0.79	1.06	-	1.44	< 1.0	< 1.0	< 1.0	13	94	61	144	4.85		
	14-Jun-19	0.69	0.75	-	-	< 1.0	< 1.0	< 1.0	11	91	59	51	4.76		
	16-Jul-19	0.83	0.75	-	-	< 1.0	< 1.0	< 1.0	13	90	58	63	4.84		
	15-Aug-19	0.74	0.73	-	-	< 1.0	< 1.0	< 1.0	11	110	72	61	5.2		
	16-Sep-19	0.74	0.67	-	1.32	< 1.0	< 1.0	< 1.0	13	96	62	60	4.72		
	15-Oct-19	0.79	0.68	-	2.02	< 1.0	< 1.0	< 1.0	9.0	102	66	-	5.06		
	18-Nov-19	0.79	0.68	-	-	2	< 1	< 1	15	15	116	93	-	5.47	
	16-Jan-20	0.83	0.69	-	-	6	< 1	< 1	6	13	102	66	-	5.61	
	27-Feb-20	0.74	0.60	-	1.32	1	< 1	< 1	1	13	98	64	-	5.23	
	26-Mar-20	0.7	0.79	-	-	10	< 1	< 1	10	9	113	73	-	5.18	
	27-Apr-20	0.7	0.72	-	-	2	< 1	< 1	2	9	109	71	-	5.25	
	15-May-20	0.75	0.72	-	1.87	3	< 1	< 1	3	9	108	70	-	5.31	
	19-Jun-20	0.79	0.64	-	-	2	< 1	< 1	2	13	107	70	-	5.13	
	16-Jul-20	0.66	0.78	-	-	10	< 1	< 1	10	9	101	66	-	5.34	
	14-Aug-20	0.62	0.63	-	1.44	3	< 1	< 1	9	9	92	60	120	5.22	
	16-Sep-20	0.64	0.62	-	-	1.5	< 1.0	< 1.0	1.5	15	116	93	-	5.47	
BH13	21-Feb-19	0.46	0.54	-	0.46	9.0	< 1.0	< 1.0	9.0	14	60	438	-	5.25	
	15-Mar-19	0.56	0.7	-	1.15	6.0	< 1.0	< 1.0	6.0	9.0	73	96	-	5.4	
	23-Apr-19	0.49	0.61	-	-	< 1.0	< 1.0	< 1.0	5.0	5.0	77	50	70	5.12	
	16-May-19	0.64	0.6	-	-	< 1.0	< 1.0	< 1.0	9.0	9.0	54	35	61	5.05	
	14-Jun-19	0.6	0.99	-	1.3	< 1.0	< 1.0	< 1.0	10.0	10.0	73	47	100	4.99	
	16-Jul-19	0.72	0.59	-	-	< 1.0	< 1.0	< 1.0	7.0	7.0	69	45	36	4.84	
	15-Aug-19	0.56	0.56	-	-	< 1.0	< 1.0	< 1.0	9.0	9.0	85	55	58	5.01	
	16-Sep-19	0.56	0.59	-	1.32	3	< 1	< 1	3	7	85	55	-	4.93	
	17-Dec-19	0.55	0.64	-	-	4	< 1	< 1	4	13	86	56	-	5.34	
	16-Jan-20	0.88	0.71	-	-	2	< 1	< 1	2	13	85	55	-	5.5	
	27-Feb-20	0.87	0.96	-	1.67	2	< 1	< 1	2	13	123	80	-	5.57	
	26-Mar-20	0.79	1.01	-	-	2	< 1	< 1	2	13	126	82	-	5.36	
	27-Apr-20	0.94	0.99	-	-	4	< 1	< 1	4	11	130	84	-	5.68	
	15-May-20	1.21	1.33	-	2.97	3	< 1	< 1	3	8	438	101	-	5.04	
	16-Jun-20	1.24	1.32	-	-	5	< 1	< 1	5	13	112	-	-	5.07	
	16-Jul-20	1.23	1.4	-	-	5	< 1	< 1	5	14	111	93	-	5.12	
	15-Aug-19	1.37	1.51	-	-	< 1.0	< 1.0	< 1.0	17	17	201	131	104	4.97	
	16-Sep-19	1.51	1.55	-	2.44	2.0	< 1.0	< 1.0	2.0	20	197	128	124	4.68	
BH16	15-Oct-19	1.54	1.43	-	-	< 1.0	< 1.0	< 1.0	21	21	202	131	-	5.17	
	18-Nov-19	1													

Analyte	Anions and Cations												
	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
LOR Units	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	0.1 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.1 mg/L
Baseline Trigger Values (KLF 2020) ¹	-	-	-	-	-	-	-	-	2.0	-	-	-	0.5 mg/L
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	-	3	50	-	-
16-Jul-20	50	<1	5	<1	10	76	<0.1	-	-	-	-	-	-
14-Aug-20	55	<1	4	<1	9	102	<0.1	<>0.01	0.1	<>0.01	0.01	0.01	0.14
16-Sep-20	58	<1.0	4.0	<1.0	9.0	109	<0.1	-	-	-	-	-	0.7
BH9	14-Aug-20	10	1	<1	7	17	<0.1	<>0.01	0.07	<>0.01	0.21	0.21	<>0.01
BH9A	16-Sep-20	35	5.0	5.0	1.0	41	38	<0.1	-	-	-	-	-
MW239S	22-Feb-19	61	<1.0	6.0	6.0	104	<0.1	<>0.01	0.56	<>0.01	<>0.01	<>0.01	0.18
14-Mar-19	64	<1.0	6.0	<1.0	2.0	126	<0.1	-	-	-	-	-	-
22-Apr-19	64	<1.0	7.0	1.0	9.0	91	<0.1	-	-	-	-	-	-
16-May-19	52	<1.0	6.0	<1.0	13	88	<0.1	<>0.01	0.43	<>0.01	<>0.01	<>0.01	0.09
14-Jun-19	50	<1.0	6.0	<1.0	13	87	<0.1	-	-	-	-	-	1.7
16-Jul-19	52	<1.0	7.0	1.0	16	73	<0.1	-	-	-	-	-	-
15-Aug-19	54	<1.0	7.0	<1.0	11	88	<0.1	-	-	-	-	-	-
16-Sep-19	55	<1.0	6.0	1.0	14	85	<0.1	<>0.01	0.32	<>0.01	<>0.01	<>0.01	0.1
15-Oct-19	58	<1.0	6.0	<1.0	8.0	108	<0.1	-	-	-	-	-	-
18-Nov-19	63	<1.0	6.0	1.0	8.0	118	<0.1	<>0.01	0.23	<>0.01	<>0.01	<>0.01	0.17
17-Dec-19	65	<1	8	<1	6	127	<0.1	-	-	-	-	-	-
15-Jan-20	67	<1	6	<1	7	120	<0.1	-	-	-	-	-	-
27-Feb-20	64	<1	7	<1	11	126	<0.1	<>0.01	1.05	<>0.01	0.02	0.02	0.14
26-Mar-20	66	<1	6	<1	5	133	<0.1	-	-	-	-	-	4.5
27-Apr-20	64	<1	6	<1	7	119	<0.1	-	-	-	-	-	-
15-May-20	67	<1	6	<1	2	39	<0.1	<>0.01	0.57	<>0.01	<>0.01	<>0.01	0.15
19-Jun-20	70	<1	8	1	22	125	<0.1	-	-	-	-	-	-
16-Jul-20	65	<1	9	1	27	110	<0.1	-	-	-	-	-	-
14-Aug-20	62	<1	9	1	33	102	<0.1	<>0.01	0.38	0.01	<>0.01	0.01	0.04
16-Sep-20	53	<1.0	8.0	1.0	36	86	0.1	-	-	-	-	-	0.6

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

¹ Baseline Water Quality Summary Report, September 2020 (KLF 2020)

Analyte	Total Kjeldahl Nitrogen as N
LOR	0.1
Units	mg/L
Baseline Trigger Values (KLF 2020) ¹	-
NHMRC ADWG 2018	-
16-Jul-20	-
14-Aug-20	0.7
16-Sep-20	-
BH9	14-Aug-20 0.8
BH9A	16-Sep-20 -
MW2395	22-Feb-19 3.9 14-Mar-19 - 23-Apr-19 - 16-May-19 1.7 14-Jun-19 - 16-Jul-19 - 15-Aug-19 - 16-Sep-19 1.4 15-Oct-19 - 18-Nov-19 1.2 17-Dec-19 - 15-Jan-20 - 27-Feb-20 4.5 26-Mar-20 - 27-Apr-20 - 15-May-20 3 19-Jun-20 - 16-Jul-20 - 14-Aug-20 2.2 16-Sep-20 -

Notes:

- Not analysed
< - Less than laboratory limit of report
LOR - Laboratory limit of reporting
mg/L - Milligrams per litre
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Bold Indicates a detection above the I

¹ Baseline Water Quality Summary Rep.

Analyte	Alkalinity										Inorganics			pH
	Total Cations	Total Anions	Ionic Balance	Sodium Adsorption Ratio	Bicarbonate Alkalinity as CaCO ₃	Carbonate Alkalinity as CaCO ₃	Hydroxide Alkalinity as CaCO ₃	Total Alkalinity as CaCO ₃	Total Hardness as CaCO ₃	Electrical Conductivity @ 25°C*	Total Dissolved Solids	Total Dissolved Solids		
	Units	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	pH units	
Baseline Trigger Values (NL F 2020) ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Jul-20	2.59	2.49	-	-	7	<1	<1	7	20	342	222	-	5.03	
14-Aug-20	2.89	3.1	3.58	5.68	2	<1	<1	2	16	367	238	236	5.16	
16-Sep-20	3.1	3.26	2.57	-	<1.0	<1.0	<1.0	<1.0	16	391	254	216	4.79	
BH9	14-Aug-20	0.57	0.66	-	1.69	2	<1	2	7	80	52	63	5.17	
BH9A	16-Sep-20	2.21	2.06	-	-	7.0	<1.0	<1.0	7.0	33	276	179	310	5.78
MW2395	22-Feb-19	3.15	3.06	1.43	5.21	<1.0	<1.0	<1.0	<1.0	25	329	234	-	4.89
	14-Mar-19	3.28	3.04	5.68	-	2.0	<1.0	<1.0	2.0	25	310	266	232	5.02
	23-Apr-19	3.48	2.92	7.32	-	4.0	<1.0	<1.0	4.0	29	294	101	208	4.92
	16-May-19	2.76	2.75	-	4.44	<1.0	<1.0	<1.0	<1.0	25	327	212	320	4.87
	14-Jun-19	2.67	2.86	-	-	7.0	<1.0	<1.0	7.0	25	334	217	220	5.39
	16-Jul-19	2.86	2.39	-	-	<1.0	<1.0	<1.0	<1.0	29	353	229	188	4.85
	15-Aug-19	2.92	2.71	-	-	<1.0	<1.0	<1.0	<1.0	29	359	233	195	4.83
	16-Sep-19	2.91	2.69	-	4.7	<1.0	<1.0	<1.0	<1.0	25	373	242	224	4.66
	15-Oct-19	3.02	3.21	3.15	-	<1.0	<1.0	<1.0	<1.0	25	404	263	-	4.86
	18-Nov-19	3.26	3.5	3.48	5.38	<1.0	<1.0	<1.0	<1.0	25	419	272	-	4.76
	17-Dec-19	3.48	3.75	3.62	-	2	<1	<1	2	33	439	285	-	5.01
	16-Jan-20	3.57	3.57	3.53	-	2	<1	<1	2	33	453	275	-	5.2
	27-Feb-20	3.36	3.78	5.93	5.08	<1.0	<1.0	<1.0	<1.0	29	475	309	-	4.45
	26-Mar-20	3.36	3.86	6.8	-	<1.0	<1.0	<1.0	<1.0	30	420	273	-	4.98
	27-Apr-20	3.28	3.56	4.16	-	3	<1	<1	3	25	453	294	-	5.13
	15-May-20	3.41	3.89	6.58	5.64	2	<1	<1	2	25	438	285	-	4.92
	19-Jun-20	3.73	3.98	3.31	-	<1.0	<1	<1	<1.0	33	456	296	-	4.76
	16-Jul-20	3.59	3.8	2.86	-	7	<1	<1	7	37	451	293	-	5.32
	14-Aug-20	3.46	3.56	1.44	4.36	<1	<1	<1	<1	37	455	296	276	4.71
	16-Sep-20	2.99	3.24	3.95	-	3.0	<1.0	<1.0	3.0	33	390	254	244	5.2

Notes:
 - Not analyzed
 < - Less than laboratory limit of report
 LOR - Laboratory limit of reporting
 mg/L - Milligrams per liter
 µS/cm - Microsiemens per centimeter
Bold indicates a detection above the I
¹ Baseline Water Quality Summary Rep

Table SW1
Surface Water Analytical Data - BTEXN
Williamstown Sand Syndicate



Analyte	BTEXN								Total Petroleum Hydrocarbons	Total Petroleum Hydrocarbon Clean up		
	Benzene **	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene* *	Total Xylenes	Naphthalene**	Sum of BTEX		C ₁₀ -C ₁₄ - Silica Cleanup	C ₁₅ -C ₂₈ - Silica Cleanup	C ₂₉ -C ₃₆ - Silica Cleanup
LOR	1	2	2	2	2	2	5	1	20	50	100	50
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
Baseline Trigger Values (KLF, 2020)	-	-	-	-	-	-	-	-	-	-	-	-
NHMRC ADWG 2018	1	800	300	-	350	600	-	-	-	-	-	-
Sample Name	Sample Date											
SW1	23-Apr-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-May-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	14-Jun-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Jul-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-Aug-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Sep-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-Oct-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	18-Nov-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	27-Feb-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	26-Mar-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	27-Apr-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-May-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	19-Jun-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Jul-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	14-Aug-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Sep-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
SW3	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	14-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	23-Apr-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-May-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	14-Jun-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Jul-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-Aug-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Sep-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-Oct-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	18-Nov-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	17-Dec-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	27-Feb-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	26-Mar-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	27-Apr-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-May-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	19-Jun-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Jul-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	14-Aug-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Sep-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
SW4	23-Apr-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-May-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	14-Jun-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Jul-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-Aug-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Sep-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-Oct-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	18-Nov-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	27-Feb-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	26-Mar-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	27-Apr-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	15-May-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	19-Jun-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Jul-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	14-Aug-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50
	16-Sep-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50

Notes:

-- Not analysed

< - Less than laboratory limit of reporting

µg/L - Micrograms per litre

BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

1- Baseline Water Quality Summary Report, September 2020 (KLF 2020)

** 95% Level of protection in freshwater

Table SW1
Surface Water Analytical Data - BTEXN
Williamstown Sand Syndicate



Table SW2
Surface Water Analytical Data - Metals
Williamtown Sand Syndicate

Analyte		Metals																
		Arsenic* * 0.001	Barium	Berylliu m	Boron**	Cadmiu m**	Chromiu m** ¹	Cobalt	Copper* * 0.001	Iron	Lead**	Manganese**	Mercury* * ²	Nickel**	Seleniu m**	Vanadiu m	Zinc**	
LOR	0.001	0.001	0.001	0.05	0.0001	0.001	0.001	0.05	0.001	0.001	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	mg/L	
Baseline Trigger Values (KLF 2020) ³	0.001	0.08	-	0.14 (SW1)/ 0.05 (SW3 & SW4)	-	0.002	0.017	0.013	9.26	-	0.841 (SW1)/0.048 (SW3 & SW4)	-	0.022	-	-	0.535 (SW1) / 0.085 (SW3 & SW4)		
NHMRC ADWG 2018	0.01	-	0.06	4	0.002	0.05	-	2	-	0.01	0.5	0.001	0.02	0.01	-	-		
Sample Name	Sample Date																	
SW1	23-Apr-19	< 0.001	0.043	< 0.001	0.14	< 0.0001	< 0.001	0.017	0.002	4.16	< 0.001	0.841	< 0.0001	0.02	< 0.01	< 0.01	0.356	
	16-May-19	< 0.001	0.029	< 0.001	0.1	< 0.0001	< 0.001	0.003	7.25	< 0.001	0.666	< 0.0001	0.012	< 0.01	< 0.01	0.077		
	14-Jun-19	< 0.001	0.029	< 0.001	0.09	0.0002	< 0.001	0.009	0.006	2.75	< 0.001	0.595	< 0.0001	0.011	< 0.01	< 0.01	0.535	
	16-Jul-19	< 0.001	0.032	< 0.001	0.08	0.0001	< 0.001	0.007	0.003	1.86	< 0.001	0.59	< 0.0001	0.008	< 0.01	< 0.01	0.239	
	15-Aug-19	< 0.001	0.027	< 0.001	0.09	< 0.0001	< 0.001	0.005	0.003	2.15	< 0.001	0.482	< 0.0001	0.005	< 0.01	< 0.01	0.075	
	16-Sep-19	< 0.001	0.056	< 0.001	0.09	0.0002	0.001	0.008	0.012	2.45	0.001	0.587	< 0.0001	0.014	< 0.01	< 0.01	0.282	
	15-Oct-19	< 0.001	0.036	< 0.001	0.07	< 0.0001	< 0.0001	0.005	0.003	1.61	< 0.001	0.383	< 0.0001	0.005	< 0.01	< 0.01	0.055	
	18-Nov-19	< 0.001	0.042	< 0.001	0.11	< 0.0001	0.001	0.003	< 0.001	1.14	< 0.001	0.366	< 0.0001	0.003	< 0.01	< 0.01	0.026	
	27-Feb-20	0.002	0.029	< 0.001	0.06	< 0.0001	0.006	0.002	0.026	1.67	0.002	0.211	< 0.0001	0.009	< 0.01	< 0.01	0.061	
	26-Mar-20	0.002	0.013	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.011	0.1	0.001	0.018	< 0.0001	0.005	< 0.01	< 0.01	0.028	
	27-Apr-20	< 0.001	-	-	-	< 0.0001	0.004	-	0.016	0.2	0.003	-	< 0.0001	-	-	0.041		
	15-May-20	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.014	0.15	0.001	0.014	< 0.0001	0.005	< 0.01	< 0.01	0.031	
	19-Jun-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	0.01	0.17	0.001	0.011	< 0.0001	-	-	0.042		
	16-Jul-20	< 0.001	-	-	-	< 0.0001	-	-	0.002	< 0.5	< 0.001	0.003	< 0.0001	-	-	< 0.005		
	14-Aug-20	< 0.001	0.016	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	0.006	0.18	< 0.001	0.01	< 0.0001	< 0.001	< 0.01	< 0.01	0.063	
	16-Sep-20	< 0.001	0.021	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.005	0.87	0.001	0.096	< 0.0001	0.002	< 0.01	< 0.01	0.061	
SW3	22-Feb-19	0.003	0.075	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	4.84	< 0.001	0.033	< 0.0001	0.002	< 0.01	< 0.01	0.016		
	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	
	23-Apr-19	< 0.001	0.043	< 0.001	< 0.05	< 0.0001	< 0.001	0.003	0.001	2.01	< 0.001	0.046	< 0.0001	0.004	< 0.01	< 0.01	0.016	
	16-May-19	< 0.001	0.034	< 0.001	< 0.05	< 0.0001	< 0.001	0.002	< 0.001	1.78	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.012	
	14-Jun-19	< 0.001	0.035	< 0.001	< 0.05	< 0.0001	0.001	*0.001	0.003	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.016
	16-Jul-19	< 0.001	0.055	< 0.001	< 0.05	< 0.0001	< 0.001	0.007	0.002	1.25	< 0.001	0.043	< 0.0001	0.006	< 0.01	< 0.01	0.029	
	15-Aug-19	< 0.001	0.035	< 0.001	< 0.05	< 0.0001	< 0.001	0.003	0.002	1.16	< 0.001	0.036	< 0.0001	0.003	< 0.01	< 0.01	0.013	
	16-Sep-19	< 0.001	0.045	< 0.001	< 0.05	< 0.0001	0.004	0.02	0.69	0.001	0.036	< 0.0001	0.017	< 0.01	< 0.01	0.094		
	15-Oct-19	< 0.001	0.034	< 0.001	< 0.05	< 0.0001	< 0.001	0.005	0.002	1.7	< 0.001	0.027	< 0.0001	0.005	< 0.01	< 0.01	0.022	
	18-Nov-19	< 0.001	0.031	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	2.6	< 0.001	0.026	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005		
	17-Dec-19	< 0.001	0.041	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.003	1.42	< 0.001	0.026	< 0.0001	0.001	< 0.01	< 0.01	< 0.005	
	27-Feb-20	0.002	0.051	< 0.001	< 0.05	< 0.0001	< 0.001	0.006	0.008	6	< 0.001	0.054	< 0.0001	0.01	< 0.01	< 0.01	0.049	
	26-Mar-20	0.001	0.041	< 0.001	< 0.05	< 0.0001	< 0.001	0.013	4.01	< 0.001	0.035	< 0.0001	0.006	< 0.01	< 0.01	< 0.01	0.033	
	27-Apr-20	0.001	-	-	-	< 0.0001	< 0.001	-	0.006	4.01	0.003	-	< 0.0001	-	-	0.031		
	15-May-20	< 0.001	0.039	< 0.001	< 0.05	< 0.0001	< 0.001	0.001	0.02	0.87	< 0.001	0.036	< 0.0001	0.007	< 0.01	< 0.01	0.037	
	19-Jun-20	< 0.001	-	-	-	0.0001	< 0.001	-	0.015	2.9	0.001	0.04	< 0.0001	-	-	0.092		
	16-Jul-20	< 0.001	-	-	-	0.0001	0.001	-	0.006	1.6	< 0.001	0.036	< 0.0001	-	-	0.043		
	14-Aug-20	< 0.001	0.024	< 0.001	< 0.05	< 0.0001	< 0.001	0.004	0.001	4.28	< 0.001	0.034	< 0.0001	0.005	< 0.01	< 0.01	0.025	
	16-Sep-20	< 0.001	0.034	< 0.001	< 0.05	< 0.0001	< 0.001	0.007	0.007	3.49	< 0.001	0.029	< 0.0001	0.007	< 0.01	< 0.01	0.031	
SW4	23-Apr-19	< 0.001	0.059	< 0.001	< 0.05	< 0.0001	0.003	0.003	2.09	< 0.001	0.037	< 0.0001	0.005	< 0.01	< 0.01	0.03		
	16-May-19	< 0.001	0.047	< 0.001	< 0.05	< 0.0001	< 0.001	0.002	< 0.001	1.12	< 0.001	0.03	< 0.0001	0.003	< 0.01	< 0.01	0.019	
	14-Jun-19	< 0.001	0.041	< 0.001	< 0.05	< 0.0001	< 0.001	0.002	0.003	0.79	< 0.001	0.034	< 0.0001	0.003	< 0.01	< 0.01	0.014	
	16-Jul-19	< 0.001	0.044	< 0.001	< 0.05	< 0.0001	< 0.001	0.002	0.002	0.96	< 0.001	0.043	< 0.0001	0.003	< 0.01	< 0.01	0.014	
	15-Aug-19	< 0.001	0.04	< 0.001	< 0.05	< 0.0001	< 0.001	0.001	0.001	0.57	< 0.001	0.032	< 0.0001	0.002	< 0.01	< 0.01	0.009	
	16-Sep-19	< 0.001	0.046	< 0.001	< 0.05	< 0.0001	< 0.001	0.002	0.02	0.7	0.001	0.039	< 0.0001	0.017	< 0.01			

Table SW2
Surface Water Analytical Data - Metals
Williamtown Sand Syndicate



"" 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 inorganic

³ Aesthetic

Analyte	Perfluoroalkyl Sulfonic Acids						Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHxA)
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonate (PFHps)	Perfluoroctane sulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)				
LOR	0.02	0.02	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	-	-
HEPA NEMP 2018***	-	-	-	-	0.01 ¹	-	-	-	-	-
HEPA NEMP 2018 ⁴	-	-	-	-	-	-	-	-	-	-
Sample Name	Sample Date									
SW1	16-May-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	16-Sep-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	18-Nov-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	27-Jan-20	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.1	< 0.02	< 0.02
	15-May-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	19-Jun-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	16-Jul-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	14-Aug-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
SW3	16-Sep-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	22-Feb-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	16-May-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	16-Sep-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	18-Nov-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	27-Feb-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	15-May-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	19-Jun-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
SW4	16-Jul-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	14-Aug-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	16-Sep-20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	16-May-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	16-Sep-19	< 0.02	< 0.02	< 0.02	< 0.02	0.03 *	< 0.02	< 0.1	< 0.02	< 0.02
	25-Sep-19	< 0.02	< 0.02	< 0.02	< 0.02	0.05	< 0.02	< 0.1	< 0.02	< 0.02
	18-Nov-19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.1	< 0.02	< 0.02
	27-Feb-20	< 0.02	< 0.02	< 0.02	< 0.02	0.01	< 0.02	< 0.1	< 0.02	< 0.02

Notes:

-- Not analysed

< - Less than laboratory limit of reporting

µg/L - Micrograms per litre

*** 99% Level of protection in freshwater

¹ Criteria is LOR

⁴ Recreation water

Table SW4
Groundwater Analytical Data - Inorganics
Williamstown 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	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			
LOR	1	1	1	1	1	0.1	0.01	0.01	0.01	0.01	-	-	-	0.01	0.1	0.1	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	mg/L	meq/L	%	-	mg/L	mg/L	mg/L	mg/L	mg/L	μS/cm	mg/L	mg/L	pH		
Baseline Trigger Values (KLF 2020) ¹	-	-	-	-	-	-	-	-	-	0.13	-	-	-	0.25	1.8	-	-	-	-	-	-	-	-	-	125-2200	-	-	4.7		
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	-	1.5	-	-	3	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sample Name	Sample Date																													
SW1	23-Apr-19	94	34	52	6.0	310	95	0.5	-	-	-	-	-	-	-	-	10	9.13	5.6	-	< 1.0	< 1.0	< 1.0	< 1.0	299	893	580	707	4.01	
	16-May-19	86	24	42	6.0	324	112	0.3	< 0.01	0.13	< 0.01	< 0.01	< 0.01	< 0.01	1.8	1.8	8.94	9.9	5.13	2.45	< 1.0	< 1.0	< 1.0	< 1.0	233	947	616	715	4.6	
	14-Jun-19	77	20	34	5.0	182	112	0.4	-	-	-	-	-	-	-	-	7.27	6.95	2.28	-	< 1.0	< 1.0	< 1.0	< 1.0	190	847	550	512	4.5	
	16-Jul-19	90	20	35	4.0	240	130	0.4	-	-	-	-	-	-	-	-	7.9	8.66	4.64	-	< 1.0	< 1.0	< 1.0	< 1.0	194	876	569	568	4.42	
	15-Aug-19	97	18	32	4.0	212	134	0.4	-	-	-	-	-	-	-	-	7.85	8.19	2.12	-	< 1.0	< 1.0	< 1.0	< 1.0	177	813	528	548	4.53	
	16-Sep-19	117	21	39	4.0	244	193	0.7	< 0.01	0.05	< 0.01	0.02	0.02	< 0.01	1.2	1.2	9.45	11	5.38	3.49	< 1.0	< 1.0	< 1.0	< 1.0	213	1,080	702	689	4.32	
	15-Oct-19	124	16	31	3.0	127	191	0.6	-	-	-	-	-	-	-	-	8.82	8.03	4.68	-	< 1.0	< 1.0	< 1.0	< 1.0	168	1,050	682	-	5.32	
	18-Nov-19	142	14	30	4.0	165	234	0.5	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.03	1.1	1.1	9.45	10	3.03	4.91	< 1.0	< 1.0	< 1.0	< 1.0	158	1,090	708	-	5.06	
	27-Feb-20	56	34	10	8.0	73	64	0.4	< 0.01	0.17	< 0.05	< 0.05	< 0.05	0.16	2.4	2.4	5.16	4.58	5.91	2.17	63	< 1.0	< 1.0	< 1.0	< 1.0	126	550	358	-	6.83
	26-Mar-20	12	27	2	4.0	6.0	11	< 0.1	-	-	-	-	-	-	-	-	2.14	1.45	-	-	51	< 1.0	< 1.0	< 1.0	< 1.0	51	76	234	152	-
	27-Apr-20	12	13	1	5.0	18	12	0.3	-	-	-	-	-	-	-	-	1.38	1.51	-	-	40	< 1.0	< 1.0	< 1.0	< 1.0	36	163	106	-	6.94
	15-May-20	9.0	18	1.0	3.0	29	8.0	< 0.1	0.05	0.17	0.02	0.33	0.35	0.07	1.4	1.0	1.45	1.63	0.56	40	-	-	-	-	40	49	178	116	7.06	
	19-Jun-20	7.0	21	1.0	2.0	8.0	7.0	< 0.1	-	-	-	-	-	-	-	-	1.48	1.52	-	-	58	< 1.0	< 1.0	< 1.0	< 1.0	58	56	159	103	-
	16-Jul-20	7.0	16	1.0	2.0	6.0	7.0	< 0.1	-	-	-	-	-	-	-	-	1.24	1.34	-	-	51	< 1.0	< 1.0	< 1.0	< 1.0	44	133	86	-	6.89
	14-Aug-20	6.0	8.0	2.0	2.0	< 10	8.0	< 0.1	< 0.01	0.04	0.01	0.01	0.02	< 0.1	0.7	0.7	0.88	0.64	0.49	21	< 1	< 1	< 1	< 1	21	28	82	53	98	
	16-Sep-20	9.0	16	3.0	3.0	< 1.0	< 1.0	0.1	-	-	-	-	-	-	-	-	1.51	1.1	-	-	55	< 1.0	< 1.0	< 1.0	< 1.0	55	52	137	89	152
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	< 1.0	< 1.0	11	26	262	228	-
	14-Mar-19	45	6.0	6.0	2.0	44	64	< 0.1	-	-	-	-	-	-	-	-	2.8	2.8	-	-	4.0	< 1.0	< 1.0	< 1.0	< 1.0	40	344	224	279	5.42
	23-Apr-19	37	8.0	6.0	1.0	42	53	< 0.1	-	-	-	-	-	-	-	-	2.53	2.37	-	-	< 1.0	< 1.0	< 1.0	< 1.0	45	220	143	190	5.2	
	16-May-19	35	7.0	5.0	< 1.0	34	54	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.1	0.1	0.1	2.28	2.25	-	2.47	1.0	< 1.0	< 1.0	< 1.0	< 1.0	38	271	176	300	5.24
	14-Jun-19	32	7.0	6.0	< 1.0	41	55	< 0.1	-	-	-	-	-	-	-	-	2.24	2.4	-	-	< 1.0	< 1.0	< 1.0	< 1.0	42	300	195	170	4.58	
	16-Jul-19	46	8.0	12	< 1.0	104	57	0.2	-	-	-	-	-	-	-	-	3.39	3.77	5.38	-	< 1.0	< 1.0	< 1.0	< 1.0	69	451	293	246	4.47	
	15-Aug-19	38	6.0	7.0	< 1.0	54	56	0.1	-	-	-	-	-	-	-	-	2.53	2.7	-	-	< 1.0	< 1.0	< 1.0	< 1.0	44	338	220	192	4.47	
	16-Sep-19	42	7.0	8.0	< 1.0	48	57	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.1	0.1	2.83	2.61	-	2.57	< 1.0	< 1.0	< 1.0	< 1.0	50	374	243	201	4.3	
	15-Oct-19	40	5.0	7.0	< 1.0	42	57	0.2	-	-	-	-	-	-	-	-	2.56	2.48	-	-	< 1.0	< 1.0	< 1.0	< 1.0	41	383	249	-	4.75	
	18-Nov-19	36	5.0	5.0	< 1.0	29	56	< 0.1	< 0.01	0.04	< 0.01	0.01	0.01	0.03	0.6	0.6	2.23	2.18	-	2.72	< 1.0	< 1.0	< 1.0	< 1.0	33	278	181	-	5.39	
	17-Dec-19	40	4	7	1	25	57	< 0.1	-	-	-	-	-	-	-	-	2.54	2.25	-	6	< 1	< 1	6	39	301	201	196	5.75		
	27-Feb-20	38	8	8	< 1.0	73	56	< 0.1	< 0.01	0.01	< 0.01	0.1	0.1	0.02	0.3	0.2	2.71	3.1	-	2.27	< 1.0	< 1.0	< 1.0	< 1.0	53	437	284	-	4.6	
	26-Mar-20	34	4	6	< 1.0	50	49	< 0.1	-	-	-	-	-	-	-	-	2.39	2.42	-	-	< 1.0	< 1.0	< 1.0	< 1.0	35	326	212	-	4.87	
	27-Apr-20	35	4	5	1	38	47	0.2	-	-	-	-	-	-	-	-	2.16	2.12	-	-	< 1.0	< 1.0	< 1.0	< 1.0	30	321	209	-	4.87	
	15-May-20	33	6	5	1	35	54	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.2	0.2	2.17	2.31	-	2.41	3	< 1.0	< 1.0	< 1.0	< 1.0	36	294	191	-	5.12
	19-Jun-20	64	9	18	< 1.0	132	76	0.3	-	-	-	-	-	-	-	-	4.71	4.89	1.85	-	< 1.0	< 1.0	< 1.0	< 1.0	96	573	372	-	4.56	
	16-Jul-20	52	5	14	< 1.0	110	63	0.2	-	-	-	-	-	-	-	-	3.75	4.07	4.15	-	< 1.0	< 1.0	< 1.0	< 1.0	70	509	331	-	4.56	
	14-Aug-20	50	< 1	11	< 1	67	76	< 0.1	< 0.01	< 0.01	< 0.01	0.07	0.07	0.01	0.3	0.2	3.08	3.54	6.93	3.19	< 1	< 1	< 1	< 1	45	469	305	255	4.46	
	16-Sep-20	39	3.0	8.0	< 1.0	65	55	0.1	-	-	-	-	-	-	-	-	3.12	2.9	3.5	-	< 1.0	< 1.0	< 1.0	< 1.0	40	402	261	224	4.41	
SW4	23-Apr-19	39	5.0	5.0	< 1.0	60	64	0.1	-	-	-	-	-	-	-	-	2.36	3.05	13	-	< 1.0	< 1.0	< 1.0	< 1.0	33	293	190	198	4.0	
	16-May-19	41	5.0	5.0	< 1.0	41	59	< 0.1	0.01	< 0.01	0.05	0.05	< 0.01	0.2	0.2</															

Notes:

-- Not analysed
* Less than detection limit of sequencing

< - Less than laboratory limit of report
NC - Not calculated

NC - Not calculated
µg/L - Micrograms per litre

BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

Analyte	Metals															
	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	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
Sample ID	Sample Date	Sample Type														
TRIP BLANK_13020219	1-Mar-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.01	< 0.005
RINSATE01_21022019	21-Feb-19	Rinsate	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.01	< 0.005
BH8_21022019	21-Feb-19	Primary	< 0.001	0.011	< 0.05	< 0.0001	< 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	< 0.05	< 0.0001	0.001	< 0.001	4.09	< 0.001	0.012	< 0.0001	0.003	< 0.01	< 0.01	0.015
Relative Percentage Difference																100%
BH8_21022019	21-Feb-19	Primary	< 0.001	0.011	< 0.05	< 0.0001	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	< 0.05	< 0.0002	< 0.005	< 0.001	4.5	< 0.001	0.012	< 0.0001	0.003	< 0.005	0.006	0.005
Relative Percentage Difference																100%
TRIP BLANK_130319	13-Mar-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	-	< 0.001	< 0.0001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK02_150319	15-Mar-19	Trip Blank	< 0.001	0.002	< 0.05	< 0.0001	< 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	< 0.05	< 0.0001	< 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	0.001	< 0.05	< 0.0001	< 0.001	< 0.001	4.0	< 0.001	0.012	< 0.0001	0.002	< 0.01	< 0.01	0.005
DUP02_140319	14-Mar-19	Duplicate	0.001	0.014	< 0.05	< 0.0001	0.001	< 0.001	2.51	< 0.001	0.021	< 0.0001	0.004	< 0.01	< 0.01	0.007
Relative Percentage Difference																100%
TRIP BLANK03_150319	15-Mar-19	Trip Blank	< 0.001	0.002	< 0.05	< 0.0001	< 0.001	< 0.001	-	< 0.001	< 0.0001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE03_23-Apr-19	23-Apr-19	Rinsate	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK_04	16-May-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE_04	16-May-19	Rinsate	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK_05	14-Jun-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE5_14-Jun-19	14-Jun-19	Primary	< 0.001	0.035	< 0.05	< 0.0001	< 0.001	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.016
DUP05_14-Jun-19	14-Jun-19	Duplicate	< 0.001	0.035	< 0.05	< 0.0001	< 0.001	< 0.001	1.63	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.013
Relative Percentage Difference																21%
SW3_14-Jun-19	14-Jun-19	Primary	< 0.001	0.035	< 0.05	< 0.0001	< 0.001	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.016
TRIP05_14-Jun-19	14-Jun-19	TriPLICATE	< 0.001	< 0.02	< 0.05	< 0.0002	< 0.001	< 0.001	1.7	< 0.001	0.019	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
Relative Percentage Difference																113%
TRIP BLANK_06	17-Apr-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE6_23-Apr-19	23-Apr-19	Rinsate	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK_07	15-Aug-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE7_15-Aug-19	15-Aug-19	Primary	< 0.001	0.001	< 0.05	< 0.0001	< 0.001	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.016
DUP08_15-Aug-19	15-Aug-19	Duplicate	< 0.001	0.001	< 0.05	< 0.0001	< 0.001	< 0.001	1.63	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.013
Relative Percentage Difference																21%
SW3_15-Aug-19	15-Aug-19	Primary	< 0.001	0.035	< 0.05	< 0.0001	< 0.001	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.016
TRIP08_16-Sep-19	16-Sep-19	TriPLICATE	< 0.001	< 0.02	< 0.05	< 0.0002	< 0.001	< 0.001	0.69	< 0.001	0.037	< 0.0001	0.003	< 0.005	0.012	0.012
Relative Percentage Difference																151%
TRIP BLANK_15102019	15-Oct-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE9_15102019	15-Oct-19	Rinsate	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK_10_171219	17-Dec-19	Trip Blank	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE10_171219	17-Dec-19	Rinsate	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE10_171219	17-Dec-19	Primary	< 0.001	0.001	< 0.05	< 0.0001	< 0.001	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	< 0.005
RINSATE10_171219	17-Dec-19	Duplicate	< 0.001	0.001	< 0.05	< 0.0001	< 0.001	< 0.001	1.63	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	< 0.005
Relative Percentage Difference																151%
SW4_181119	18-Nov-19	Primary	< 0.001	0.035	< 0.05	< 0.0001	< 0.001	< 0.001	2.18	< 0.001	0.009	< 0.0001	0.001	< 0.01	< 0.01	< 0.005
DUP09_181119	18-Nov-19	Duplicate	< 0.001	0.034	< 0.05	< 0.0001	< 0.001	< 0.001	2.18	< 0.001	0.009	< 0.0001	0.001	< 0.01	< 0.01	< 0.005
Relative Percentage Difference																100%
SW4_181119	18-Nov-19	TriPLICATE	< 0.001	0.04	< 0.05	< 0.0001	< 0.001	< 0.001	2.18	< 0.001	0.009	< 0.0001	0.001	< 0.01	< 0.01	< 0.005
Relative Percentage Difference																100%
BH6_200133004	16-Jan-20	Primary	< 0.001	0.032	< 0.05	< 0.0001	< 0.001	< 0.001	2.15	< 0.001	0.009	< 0.0001	0.001	< 0.01	< 0.01	< 0.005
QW11_13-Apr-20	16-Jan-20	TriPLICATE	< 0.001	0.03	< 0.05	< 0.0002	< 0.001	< 0.001	2.04	< 0.001	0.009	< 0.0001	0.001	< 0.01	< 0.01	0.002
Relative Percentage Difference																100%
TRIPBLANK(QW15)	15-Mar-20	Trip Blank	< 0.001	0.01	< 0.05	< 0.0001	< 0.001	< 0.001	2.05	< 0.005	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	0.012
BH4_ES2014254004	15-Mar-20	Primary	< 0.001	0.012	< 0.05	< 0.0001	< 0.001	< 0.001	1.3	< 0.001	0.019	< 0.0001	0.004	< 0.01	< 0.01	0.008
QW12_ES2014254005	15-Mar-20	Duplicate	< 0.001	0.011	< 0.05	< 0.0001	< 0.001	< 0.001	0.054	0.16	<					

Notes:
< - Less than laboratory limit of reporting
NC - Not calculated

QW29 16092020 16-Sep-2020

Notes:

L - Less than laboratory
NC - Not calculated

GAUGING LOG

Project Number:	Site Name:	Site Address:
20210699	WSS	

Date: 16-09 Field Manager: Dan + Tonja

Time	Monitoring Well ID	Well Diameter (mm)	PID Reading (ppm)	Depth to PSH* (mBTOC)	Depth to Water (mBTOC)	PSH Thickness (m)	Well Total Depth (mBTOC)	Detailed Description of Well Condition & Any Repairs Required	Comments: HC Sheen, PSH Appearance & Thickness, Odour, Water Appearance
0820	BH4	50	-	-	1.321	-	-	Good condition	
0840	BH9A	50	-	-	8.903	-	16.16	Newly installed well	
0900	BH9	50	-	-	15.951	-	-	Very limited water	
0910	BH2	50	-	-	5.462	-	-	Good condition	
0920	BH1	50	-	-	6.216	-	-	Good condition	
0930	BH11	50	-	-	3.658	-	-	Good condition	
0940	BH10	50	-	-	Dry	-	-	Dry	
0945	BH12	50/40	-	-	6.624	-	-	Struggle to get hydroseal down	
0950	SW2	-	-	-	Dry	-	-	Dry	
1010	MW2396B	50	-	-	1.183	-	-	Good condition	
1015	MW2396S	50	-	-	1.116	-	-	Good condition	
1045	BH5	50	-	-	5.632	-	-	Good condition	
1050	BH6	50	-	-	1.544	-	-	Good condition	
1055	BH7	50	-	-	1.437	-	-	Good condition	
1100	BH8	50	-	-	1.156	-	-	Good condition	
1115	SW1	-	-	-	0.6	-	-		
1120	SW4	-	-	-	0.5	-	-		
1200	SW3	-	-	-	0.39	-	-		

COMMENTS:



NOTES:
 TOC = Top of PVC Casing
 mBTOC = Metres Below Top of PVC Casing
 * If PSH is gauged as present, visually confirm presence and thickness using a borer. Record detailed description of the PSH.

QA/QC SAMPLE REGISTER

Project Number:	Site Name:
	WSS - September Sampling
Date:	Site Address:
16/9	
Field Manager:	

COMMENTS:

Date Sampled	Field Staff	OC Sample ID	OC Sample Type	Primary Sample	Rinsate Item (Hand auger, low flow pump etc.)	Rinsate Water Batch	Analysing Lab	Analysis Requested
16/5		QW28	Water	SW4	Dip	A/S	Methyl PFAS	PFAS BTXN/PAH
		QW25	water	SW4	Trip.	Eurofins	PFAS	PFAS Only
		QW30	Water	SW1	Dip	ALS	Eurofins	PFAS Only.
		QW31	Water	SW1	Trip	ALS	PFAS	PFAS Only.
		QW32	Water	—	TR Probe	ALS	AII	AII
		QW33	Water	—	TR Blank	ALS	AII	AII



ATTACHMENT 3: LAB RESULTS



CERTIFICATE OF ANALYSIS

Work Order	ES2032668	Page	: 1 of 22
Client	KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	DANIEL KOUSBROEK	Contact	: Shirley LeCornu
Address	: 95 Mitchell Rd Cardiff 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Sep-2020 16:38
Order number	: ----	Date Analysis Commenced	: 17-Sep-2020
C-O-C number	: ----	Issue Date	: 23-Sep-2020 14:50
Sampler	: Dan Kousbroek		
Site	: WSS - Cabbage Tree Rd watr monitoring		
Quote number	: ME/114/19 ALS Compass		
No. of samples received	: 19		
No. of samples analysed	: 16		

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.

Signatures

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
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



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

General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

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

∅ = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ED041G: LOR raised for Sulfate on sample 8 due to sample matrix.
- ED045G: LOR raised for Chloride on sample 8 due to sample matrix.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP231X: PFOS result for sample #12 confirmed by re-extraction and re-analysis.
- 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.
- EN055: Ionic Balance out of acceptable limits for sample ES2032668-#008 due to analytes not quantified in this report.
- 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.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH1	BH2	BH4	BH6	BH7
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	---	0.01	pH Unit	5.87	4.85	4.66	4.98	4.81
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	95	99	148	273	248
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	---	10	mg/L	81	76	74	121	140
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	---	1	mg/L	62	64	96	177	161
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	---	5	mg/L	58	356	24	49	24
EA065: Total Hardness as CaCO₃								
Total Hardness as CaCO ₃	---	1	mg/L	8	13	8	21	20
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	9	<1	<1	1	<1
Total Alkalinity as CaCO ₃	---	1	mg/L	9	<1	<1	1	<1
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	2	7	11	16	12
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	21	17	31	55	62
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	2	<1	2	<1
Magnesium	7439-95-4	1	mg/L	2	2	2	4	5
Sodium	7440-23-5	1	mg/L	13	11	20	36	33
Potassium	7440-09-7	1	mg/L	<1	<1	<1	1	2
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	7440-39-3	0.001	mg/L	0.004	0.012	0.013	0.047	0.013
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.002
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	<0.001	<0.001	0.002

Analytical Results

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH1	BH2	BH4	BH6	BH7
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
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	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	---	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDsDA)	307-55-1	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH1	BH2	BH4	BH6	BH7
		Client sampling date / time		16-Sep-2020 00:00				
Compound	CAS Number	LOR	Unit	ES2032668-001	ES2032668-002	ES2032668-003	ES2032668-004	ES2032668-005
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluoroctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	---	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	88.3	88.9	88.3	88.6	88.0
Toluene-D8	2037-26-5	2	%	111	109	110	113	114

Analytical Results

Client sample ID				BH1	BH2	BH4	BH6	BH7
Client sampling date / time				16-Sep-2020 00:00				
Compound	CAS Number	LOR	Unit	ES2032668-001	ES2032668-002	ES2032668-003	ES2032668-004	ES2032668-005
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	2	%	109	108	106	110	111
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	---	101	114	103	95.4
13C8-PFOA	---	0.02	%	---	98.3	101	98.1	101

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH8	BH11	SW1	SW3	SW4
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	---	0.01	pH Unit	4.79	4.61	6.50	4.41	4.16
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	391	223	137	402	421
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	---	10	mg/L	216	111	152	224	228
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	---	1	mg/L	254	145	89	261	274
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	---	5	mg/L	34	136	8	6	<5
EA065: Total Hardness as CaCO₃								
Total Hardness as CaCO ₃	---	1	mg/L	16	20	52	40	44
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	<1	<1	55	<1	<1
Total Alkalinity as CaCO ₃	---	1	mg/L	<1	<1	55	<1	<1
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	9	6	<10	65	58
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	109	48	<10	55	59
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	<1	16	3	6
Magnesium	7439-95-4	1	mg/L	4	5	3	8	7
Sodium	7440-23-5	1	mg/L	58	29	9	39	45
Potassium	7440-09-7	1	mg/L	<1	<1	3	<1	<1
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	7440-39-3	0.001	mg/L	0.014	0.014	0.021	0.034	0.041
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	0.007	0.004
Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH8	BH11	SW1	SW3	SW4
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Copper	7440-50-8	0.001	mg/L	0.035	0.005	0.005	0.007	0.005
Manganese	7439-96-5	0.001	mg/L	0.009	0.008	0.096	0.029	0.053
Nickel	7440-02-0	0.001	mg/L	0.009	<0.001	0.002	0.007	0.005
Lead	7439-92-1	0.001	mg/L	0.001	<0.001	0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.039	0.009	0.061	0.031	0.020
Iron	7439-89-6	0.05	mg/L	3.35	0.90	0.87	3.49	0.97
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<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	0.1	0.1
EN055: Ionic Balance								
ø Total Anions	---	0.01	meq/L	3.26	1.48	1.10	2.90	2.87
ø Total Cations	---	0.01	meq/L	3.10	---	---	3.12	---
ø Total Cations	---	0.01	meq/L	---	1.67	1.51	---	2.83
ø Ionic Balance	---	0.01	%	2.57	---	---	3.50	---
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
C10 - C14 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	<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	<100
>C16 - C34 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	<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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH8	BH11	SW1	SW3	SW4
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
[^] C6 - C10 Fraction minus BTEX	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	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroctanoic 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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH8	BH11	SW1	SW3	SW4
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
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 (FOUSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOUSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOUSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH8	BH11	SW1	SW3	SW4
		Client sampling date / time		16-Sep-2020 00:00				
Compound	CAS Number	LOR	Unit	ES2032668-006	ES2032668-007	ES2032668-008	ES2032668-009	ES2032668-010
				Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued								
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	88.9	89.0	94.0	91.1	91.8
Toluene-D8	2037-26-5	2	%	112	114	114	109	106
4-Bromofluorobenzene	460-00-4	2	%	108	107	111	109	108
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	101	105	96.0	104	99.2
13C8-PFOA	----	0.02	%	101	98.5	95.0	95.9	86.8

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		MW239S	QW28	QW32	BH12	BH9A
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	---	0.01	pH Unit	5.20	---	---	5.37	5.78
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	390	---	---	206	276
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	---	10	mg/L	244	---	---	118	310
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	---	1	mg/L	254	---	---	134	179
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	---	5	mg/L	350	---	---	446	1060
EA065: Total Hardness as CaCO₃								
Total Hardness as CaCO ₃	---	1	mg/L	33	---	---	29	33
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	---	---	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	---	---	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	3	---	---	2	7
Total Alkalinity as CaCO ₃	---	1	mg/L	3	---	---	2	7
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	36	---	---	22	41
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	86	---	---	38	38
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	---	---	<1	5
Magnesium	7439-95-4	1	mg/L	8	---	---	7	5
Sodium	7440-23-5	1	mg/L	53	---	---	24	35
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
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	---	<0.05
Barium	7440-39-3	0.001	mg/L	0.016	0.042	<0.001	---	0.028
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	---	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	---	<0.0001
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.004	<0.001	---	0.002
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	<0.001	---	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			MW239S	QW28	QW32	BH12	BH9A
Client sampling date / time				16-Sep-2020 00:00				
Compound	CAS Number	LOR	Unit	ES2032668-011	ES2032668-012	ES2032668-015	ES2032668-017	ES2032668-018
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Copper	7440-50-8	0.001	mg/L	0.002	0.006	<0.001	---	0.004
Manganese	7439-96-5	0.001	mg/L	0.008	0.054	<0.001	---	0.076
Nickel	7440-02-0	0.001	mg/L	0.002	0.005	<0.001	---	0.002
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	---	<0.001
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
Zinc	7440-66-6	0.005	mg/L	0.006	0.024	<0.005	---	0.020
Iron	7439-89-6	0.05	mg/L	0.51	0.97	<0.05	---	0.14
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<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								
ø Total Anions	---	0.01	meq/L	3.24	---	---	1.57	2.06
ø Total Cations	---	0.01	meq/L	2.99	---	---	1.64	2.21
ø Ionic Balance	---	0.01	%	3.95	---	---	---	---
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
C10 - C14 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	<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	<100
>C16 - C34 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	<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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		MW239S	QW28	QW32	BH12	BH9A
Compound	CAS Number	LOR	Unit	16-Sep-2020 00:00				
				Result	Result	Result	Result	Result
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	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.02	<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 (PFDaD)	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	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		MW239S	QW28	QW32	BH12	BH9A
		Client sampling date / time		16-Sep-2020 00:00				
Compound	CAS Number	LOR	Unit	ES2032668-011	ES2032668-012	ES2032668-015	ES2032668-017	ES2032668-018
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	---	---
EP231C: Perfluoroalkyl Sulfonamides								
Perfluoroctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	---	---
N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	---	---
N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	---	---
N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	---	---
N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	---	---
N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	---	---
N-Ethyl perfluoroctane 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	0.02	<0.01	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.02	<0.01	---	---
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	0.02	<0.01	---	---
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	92.2	90.1	96.4	88.1	87.1
Toluene-D8	2037-26-5	2	%	110	108	106	113	107

Analytical Results

Client sample ID				MW239S	QW28	QW32	BH12	BH9A
Client sampling date / time				16-Sep-2020 00:00				
Compound	CAS Number	LOR	Unit	ES2032668-011	ES2032668-012	ES2032668-015	ES2032668-017	ES2032668-018
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	2	%	109	108	110	107	105
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	103	104	109	---	---
13C8-PFOA	---	0.02	%	104	82.6	106	---	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		QW33	---	---	---	---	---
		Client sampling date / time		16-Sep-2020 00:00	---	---	---	---	---
Compound	CAS Number	LOR	Unit	ES2032668-019	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L	<0.001	---	---	---	---	---
Boron	7440-42-8	0.05	mg/L	<0.05	---	---	---	---	---
Barium	7440-39-3	0.001	mg/L	<0.001	---	---	---	---	---
Beryllium	7440-41-7	0.001	mg/L	<0.001	---	---	---	---	---
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	---	---	---	---	---
Cobalt	7440-48-4	0.001	mg/L	<0.001	---	---	---	---	---
Chromium	7440-47-3	0.001	mg/L	<0.001	---	---	---	---	---
Copper	7440-50-8	0.001	mg/L	<0.001	---	---	---	---	---
Manganese	7439-96-5	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	---	---	---	---	---
Selenium	7782-49-2	0.01	mg/L	<0.01	---	---	---	---	---
Vanadium	7440-62-2	0.01	mg/L	<0.01	---	---	---	---	---
Zinc	7440-66-6	0.005	mg/L	<0.005	---	---	---	---	---
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	---	---	---	---	---
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									
C10 - C14 Fraction	---	50	µg/L	<50	---	---	---	---	---
C15 - C28 Fraction	---	100	µg/L	<100	---	---	---	---	---
C29 - C36 Fraction	---	50	µg/L	<50	---	---	---	---	---
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	---	---	---	---	---
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C16 Fraction	---	100	µg/L	<100	---	---	---	---	---
>C16 - C34 Fraction	---	100	µg/L	<100	---	---	---	---	---
>C34 - C40 Fraction	---	100	µg/L	<100	---	---	---	---	---
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	---	---	---	---	---
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	---	---	---	---	---
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	---	20	µg/L	<20	---	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	---	---	---	---	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		QW33	---	---	---	---	---
		Client sampling date / time		16-Sep-2020 00:00	---	---	---	---	---
Compound	CAS Number	LOR	Unit	ES2032668-019	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	---	---	---	---	---
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	---	---	---	---	---
Toluene	108-88-3	2	µg/L	<2	---	---	---	---	---
Ethylbenzene	100-41-4	2	µg/L	<2	---	---	---	---	---
meta- & para-Xylene	108-38-3	106-42-3	2	µg/L	<2	---	---	---	---
ortho-Xylene		95-47-6	2	µg/L	<2	---	---	---	---
^ Total Xylenes		----	2	µg/L	<2	---	---	---	---
^ Sum of BTEX		----	1	µg/L	<1	---	---	---	---
Naphthalene	91-20-3	5	µg/L	<5	---	---	---	---	---
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	---	---	---	---	---
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	---	---	---	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	---	---	---	---	---
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	---	---	---	---	---
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	---	---	---	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	---	---	---	---	---
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	---	---	---	---	---
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	---	---	---	---	---
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	---	---	---	---	---
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	---	---	---	---	---
Perfluoroctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	---	---	---	---	---
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	---	---	---	---	---
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	---	---	---	---	---
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	---	---	---	---	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		QW33	---	---	---	---	---
		Client sampling date / time		16-Sep-2020 00:00	---	---	---	---	---
Compound	CAS Number	LOR	Unit	ES2032668-019	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	---	---	---	---	---
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	---	---	---	---	---
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	---	---	---	---	---
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOUSA)	754-91-6	0.02	µg/L	<0.02	---	---	---	---	---
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	---	---	---	---	---
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	---	---	---	---	---
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	---	---	---	---	---
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	---	---	---	---	---
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	---	---	---	---	---
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	---	---	---	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	---	---	---	---	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	---	---	---	---	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	---	---	---	---	---
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	---	---	---	---	---
EP231P: PFAS Sums									
Sum of PFAS	---	0.01	µg/L	<0.01	---	---	---	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	---	---	---	---	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		QW33	---	---	---	---	---
		Client sampling date / time		16-Sep-2020 00:00	---	---	---	---	---
Compound		CAS Number	LOR	Unit	ES2032668-019	-----	-----	-----	-----
EP231P: PFAS Sums - Continued									
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	---	---	---	---	---
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	89.4	---	---	---	---	---
Toluene-D8	2037-26-5	2	%	106	---	---	---	---	---
4-Bromofluorobenzene	460-00-4	2	%	105	---	---	---	---	---
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	117	---	---	---	---	---
13C8-PFOA	---	0.02	%	100	---	---	---	---	---

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

QUALITY CONTROL REPORT

Work Order	: ES2032668	Page	: 1 of 12
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DANIEL KOUSBROEK	Contact	: Shirley LeCornu
Address	: 95 Mitchell Rd Cardiff 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Sep-2020
Order number	: ----	Date Analysis Commenced	: 17-Sep-2020
C-O-C number	: ----	Issue Date	: 23-Sep-2020
Sampler	: Dan Kousbroek		
Site	: WSS - Cabbage Tree Rd watr monitoring		
Quote number	: ME/114/19 ALS Compass		
No. of samples received	: 19		
No. of samples analysed	: 16		



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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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER

Laboratory Duplicate (DUP) Report									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 3262368)									
ES2032641-001	Anonymous	EA005-P: pH Value	---	0.01	pH Unit	5.53	6.00	8.15	0% - 20%
ES2032668-011	MW239S	EA005-P: pH Value	---	0.01	pH Unit	5.20	5.00	3.92	0% - 20%
EA1010P: Conductivity by PC Titrator (QC Lot: 3262369)									
ES2032641-001	Anonymous	EA1010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	2	2	0.00	No Limit
ES2032668-011	MW239S	EA1010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	390	391	0.259	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3265894)									
ES2032668-001	BH1	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	81	70	14.3	No Limit
ES2032668-011	MW239S	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	244	248	1.42	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3265895)									
ES2032668-001	BH1	EA025H: Suspended Solids (SS)	---	5	mg/L	58	56	2.19	0% - 50%
ES2032668-011	MW239S	EA025H: Suspended Solids (SS)	---	5	mg/L	350	328	6.78	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3262367)									
ES2032625-007	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	14	12	14.7	0% - 50%
		ED037-P: Total Alkalinity as CaCO ₃	---	1	mg/L	14	12	14.7	0% - 50%
ES2032628-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	21	18	17.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO ₃	---	1	mg/L	21	18	17.2	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3262371)									
ES2032668-011	MW239S	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	3	1	88.4	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: 3262371) - continued									
ES2032668-011	MW239S	ED037-P: Total Alkalinity as CaCO ₃	----	1	mg/L	3	1	88.4	No Limit
ES2032682-007	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	619	585	5.60	0% - 20%
		ED037-P: Total Alkalinity as CaCO ₃	----	1	mg/L	619	585	5.60	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA (QC Lot: 3262932)									
ES2032668-010	SW4	ED041G: Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	58	58	0.00	0% - 20%
ES2032668-001	BH1	ED041G: Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	2	2	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3262931)									
ES2032530-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	14	14	0.00	0% - 50%
ES2032668-001	BH1	ED045G: Chloride	16887-00-6	1	mg/L	21	21	0.00	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 3262933)									
ES2032682-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	49	50	0.00	0% - 20%
ES2032682-008	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	50	50	0.00	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3263840)									
ES2032668-004	BH6	ED093F: Calcium	7440-70-2	1	mg/L	2	2	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	4	4	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	36	36	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.00	No Limit
ES2032263-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	81	80	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	88	88	0.00	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	280	280	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	18	18	0.00	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3263844)									
ES2032629-015	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	0.069	0.067	3.90	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	<0.001	<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	0.173	0.166	4.00	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	0.34	0.35	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.18	0.18	0.00	No Limit

Sub-Matrix: WATER

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: 3263844) - continued									
ES2032668-004	BH6	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	0.048	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	0.002	0.002	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	0.010	0.009	0.00	0% - 50%
		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	0.006	0.006	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	1.78	1.79	0.00	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3265587)									
ES2032668-012	QW28	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	0.042	0.041	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	0.004	0.004	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.006	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	0.054	0.054	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.024	0.024	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	0.97	0.97	0.00	0% - 50%
EW2004176-001	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	0.066	0.067	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	<0.001	<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	0.576	0.578	0.259	0% - 20%

Sub-Matrix: WATER

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: 3265587) - continued									
EW2004176-001	Anonymous	EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.014	0.015	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	0.26	0.27	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.40	0.40	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3263845)									
ES2032668-002	BH2	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES2032668-010	SW4	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3265585)									
ES2032429-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES2032617-004	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: 3265588)									
ES2032682-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ME2001455-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3262366)									
ES2032625-007	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES2032628-002	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3262370)									
ES2032668-011	MW239S	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.1	<0.1	0.00	No Limit
ES2032682-007	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.6	0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3261702)									
ES2032635-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES2032668-008	SW1	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3261702)									
ES2032635-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES2032668-008	SW1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 3261702)									
ES2032635-001	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
		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
ES2032668-008	SW1	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

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Work Order : ES2032668
Client : KLEINFELDER AUSTRALIA PTY LTD
Project : 20193820



Sub-Matrix: WATER

Laboratory Duplicate (DUP) Report

Laboratory Duplicate (DUP) Report									
EP080: BTEXN (QC Lot: 3261702) - continued									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES2032668-008	SW1	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

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: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
							Low	High
EA005P: pH by PC Titrator (QCLot: 3262368)								
EA005-P: pH Value	---	---	pH Unit	---	4 pH Unit 7 pH Unit	100 99.7	98.0	102
EA010P: Conductivity by PC Titrator (QCLot: 3262369)								
EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	<1	2100 µS/cm	99.4	95.0	113
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3265894)								
EA015H: Total Dissolved Solids @180°C	---	10	mg/L	<10 <10	2000 mg/L 293 mg/L	97.5 101	87.0	109
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3265895)								
EA025H: Suspended Solids (SS)	---	5	mg/L	<5 <5	150 mg/L 1000 mg/L	118 93.9	83.0	129
ED037P: Alkalinity by PC Titrator (QCLot: 3262367)								
ED037-P: Total Alkalinity as CaCO ₃	---	---	mg/L	---	200 mg/L 50 mg/L	91.9 120	81.0	111
ED037P: Alkalinity by PC Titrator (QCLot: 3262371)								
ED037-P: Total Alkalinity as CaCO ₃	---	---	mg/L	---	200 mg/L 50 mg/L	103 110	81.0	111
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA (QCLot: 3262932)								
ED041G: Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	<1 <1	25 mg/L 500 mg/L	102 99.4	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 3262931)								
ED045G: Chloride	16887-00-6	1	mg/L	<1 <1	10 mg/L 1000 mg/L	94.5 95.7	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 3262933)								
ED045G: Chloride	16887-00-6	1	mg/L	<1 <1	10 mg/L 1000 mg/L	96.0 96.2	80.9	127
ED093F: Dissolved Major Cations (QCLot: 3263840)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.4	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	100	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 3263844)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.8	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	89.5	85.0	115



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					LCS	Low	High	
EK040P: Fluoride by PC Titrator (QCLot: 3262370) - continued								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	101	82.0	116
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 3260669)								
EP071SG: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	78.1	55.8	112
EP071SG: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	98.1	71.6	113
EP071SG: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	76.6	56.0	121
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 3260669)								
EP071SG: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	71.4	57.9	119
EP071SG: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	80.0	62.5	110
EP071SG: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	75.3	61.5	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3261702)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	95.5	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3261702)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	97.1	75.0	127
EP080: BTEXN (QCLot: 3261702)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	104	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	108	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	108	70.0	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	107	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	113	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	92.4	70.0	120
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3263157)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	119	72.0	130
EP231X: Perfluoropentane sulfonic acid (PPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	109	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	117	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	125	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	124	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	125	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3263157)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	108	73.0	129
EP231X: Perfluoropentanoic acid (PPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	126	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	117	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	119	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	125	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	122	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	119	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	123	72.0	134

Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3263157) - continued								
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	109	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	110	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3263157)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	117	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	105	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	104	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	108	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	109	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	108	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	124	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3263157)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	117	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	118	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	124	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	93.0	71.4	144

Matrix Spike (MS) Report

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

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	Spike Recovery(%)	Recovery Limits (%)	MS
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3262932)							
ES2032668-001	BH1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3262931)							
ES2032668-001	BH1	ED045G: Chloride	16887-00-6	50 mg/L	73.0	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3262933)							
ES2032682-008	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	126	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3263844)							
ES2032629-016	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	94.6	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	93.4	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	94.2	70.0	130

Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	Spike Recovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3263844) - continued							
ES2032629-016	Anonymous	EG020A-F: Cadmium	7440-43-9	0.25 mg/L	91.1	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	90.6	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	91.4	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	90.4	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	91.9	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	89.6	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.1	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	93.6	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	91.8	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3265587)							
ES2032668-015	QW32	EG020A-F: Arsenic	7440-38-2	1 mg/L	113	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	126	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	118	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	123	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	128	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	115	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	116	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	116	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	122	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	116	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	124	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	117	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3263845)							
ES2032668-001	BH1	EG035F: Mercury	7439-97-6	0.01 mg/L	74.9	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3265585)							
ES2032429-002	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	73.7	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3265588)							
ES2032668-019	QW33	EG035F: Mercury	7439-97-6	0.01 mg/L	71.6	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3262366)							
ES2032620-001	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	99.8	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3262370)							
ES2032668-010	SW4	EK040P: Fluoride	16984-48-8	5 mg/L	84.6	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3261702)							
ES2032635-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	114	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3261702)							
ES2032635-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	114	70.0	130

Sub-Matrix: WATER

				<i>Matrix Spike (MS) Report</i>			
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Spike</i>	<i>Spike Recovery(%)</i>	<i>Recovery Limits (%)</i>	
				<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080: BTEXN (QCLot: 3261702)							
ES2032635-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	98.7	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	105	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	109	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	108	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	109	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	106	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2032668	Page	: 1 of 12
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DANIEL KOUSBROEK	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Sep-2020
Site	: WSS - Cabbage Tree Rd watr monitoring	Issue Date	: 23-Sep-2020
Sampler	: Dan Kousbroek	No. of samples received	: 19
Order number	: ----	No. of samples analysed	: 16

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

- 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 : Analysis Holding Time Compliance

Matrix: WATER

Method	Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
BH1,	BH2,	----	----	----	17-Sep-2020	16-Sep-2020	1
BH4,	BH6,						
BH7,	BH8,						
BH11,	SW1,						
SW3,	SW4,						
MW239S,	BH12,						
BH9A							

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	19	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	19	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: WATER

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time

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

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)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	17-Sep-2020	16-Sep-2020	✗
EA010P: Conductivity by PC Titrator									
Clear Plastic Bottle - Natural (EA010-P)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	17-Sep-2020	14-Oct-2020	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Clear Plastic Bottle - Natural (EA015H)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	21-Sep-2020	23-Sep-2020	✓
EA025: Total Suspended Solids dried at 104 ± 2°C									
Clear Plastic Bottle - Natural (EA025H)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	21-Sep-2020	23-Sep-2020	✓

Matrix: WATER		Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.							
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA065: Total Hardness as CaCO₃									
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	18-Sep-2020	14-Oct-2020	✓
ED037P: Alkalinity by PC Titrator									
Clear Plastic Bottle - Natural (ED037-P)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	17-Sep-2020	30-Sep-2020	✓
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Clear Plastic Bottle - Natural (ED041G)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	17-Sep-2020	14-Oct-2020	✓
ED045G: Chloride by Discrete Analyser									
Clear Plastic Bottle - Natural (ED045G)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	17-Sep-2020	14-Oct-2020	✓

Matrix: WATER									Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.					
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis								
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation						
ED093F: Dissolved Major Cations														
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	18-Sep-2020	14-Oct-2020	✓					
EG020F: Dissolved Metals by ICP-MS														
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)	BH1, BH4, BH7, BH11, SW3, MW239S,	BH2, BH6, BH8, SW1, SW4, BH9A	16-Sep-2020	----	----	---	18-Sep-2020	15-Mar-2021	✓					
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)	QW28, QW33	QW32,	16-Sep-2020	----	----	---	19-Sep-2020	15-Mar-2021	✓					
EG035F: Dissolved Mercury by FIMS														
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)	BH1, BH4, BH7, BH11, SW3, MW239S, QW32, QW33	BH2, BH6, BH8, SW1, SW4, QW28, BH9A,	16-Sep-2020	----	----	---	21-Sep-2020	14-Oct-2020	✓					
EK040P: Fluoride by PC Titrator														
Clear Plastic Bottle - Natural (EK040P)	BH1, BH4, BH7, BH11, SW3, MW239S, BH9A	BH2, BH6, BH8, SW1, SW4, BH12,	16-Sep-2020	----	----	---	17-Sep-2020	14-Oct-2020	✓					

Matrix: WATER		Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.						
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
Amber Glass Bottle - Unpreserved (EP071SG)	BH1, BH4, BH7, BH11, SW3, MW239S, QW32, BH9A,	BH2, BH6, BH8, SW1, SW4, QW28, BH12, QW33	16-Sep-2020	21-Sep-2020	23-Sep-2020	✓	22-Sep-2020	31-Oct-2020
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
Amber Glass Bottle - Unpreserved (EP071SG)	BH1, BH4, BH7, BH11, SW3, MW239S, QW32, BH9A,	BH2, BH6, BH8, SW1, SW4, QW28, BH12, QW33	16-Sep-2020	21-Sep-2020	23-Sep-2020	✓	22-Sep-2020	31-Oct-2020
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)	BH1, BH4, BH7, BH11, SW3, MW239S, QW32, BH9A,	BH2, BH6, BH8, SW1, SW4, QW28, BH12, QW33	16-Sep-2020	22-Sep-2020	30-Sep-2020	✓	22-Sep-2020	30-Sep-2020
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber VOC Vial - Sulfuric Acid (EP080)	BH1, BH4, BH7, BH11, SW3, MW239S, QW32, BH9A,	BH2, BH6, BH8, SW1, SW4, QW28, BH12, QW33	16-Sep-2020	22-Sep-2020	30-Sep-2020	✓	22-Sep-2020	30-Sep-2020

Matrix: WATER									Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.					
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis								
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation						
EP080: BTEXN														
Amber VOC Vial - Sulfuric Acid (EP080)	BH1, BH4, BH7, BH11, SW3, MW239S, QW32, BH9A,	BH2, BH6, BH8, SW1, SW4, QW28, BH12, QW33	16-Sep-2020	22-Sep-2020	30-Sep-2020	✓	22-Sep-2020	30-Sep-2020	✓					
EP231A: Perfluoroalkyl Sulfonic Acids														
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, SW1, SW4, QW28, QW33	BH4, BH7, BH11, SW3, MW239S, QW32,	16-Sep-2020	18-Sep-2020	15-Mar-2021	✓	18-Sep-2020	15-Mar-2021	✓					
EP231B: Perfluoroalkyl Carboxylic Acids														
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, SW1, SW4, QW28, QW33	BH4, BH7, BH11, SW3, MW239S, QW32,	16-Sep-2020	18-Sep-2020	15-Mar-2021	✓	18-Sep-2020	15-Mar-2021	✓					
EP231C: Perfluoroalkyl Sulfonamides														
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, SW1, SW4, QW28, QW33	BH4, BH7, BH11, SW3, MW239S, QW32,	16-Sep-2020	18-Sep-2020	15-Mar-2021	✓	18-Sep-2020	15-Mar-2021	✓					

Matrix: WATER			Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.					
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, SW1, SW4, QW28, QW33	BH4, BH7, BH11, SW3, MW239S, QW32,	16-Sep-2020	18-Sep-2020	15-Mar-2021	✓	18-Sep-2020	15-Mar-2021
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, SW1, SW4, QW28, QW33	BH4, BH7, BH11, SW3, MW239S, QW32,	16-Sep-2020	18-Sep-2020	15-Mar-2021	✓	18-Sep-2020	15-Mar-2021

Quality Control Parameter Frequency Compliance

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

Matrix: WATER

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

Quality Control Sample Type	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator		ED037-P	4	38	10.53	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	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	6	42	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved		ED093F	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	0	19	0.00	10.00	✗ NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator		EA005-P	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
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
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	0	16	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	4	38	10.53	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	1	20	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	3	42	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved		ED093F	1	20	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	19	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator		EA005-P	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
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
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	1	16	6.25	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	1	20	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	3	42	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	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	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
Method Blanks (MB) - Continued							
Fluoride by PC Titrator		EK040P	2	39	5.13	5.00	✓
Major Cations - Dissolved		ED093F	1	20	5.00	5.00	✓
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	19	5.26	5.00	✓
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	20	5.00	5.00	✓
Suspended Solids (High Level)		EA025H	1	20	5.00	5.00	✓
Total Dissolved Solids (High Level)		EA015H	1	20	5.00	5.00	✓
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	1	16	6.25	5.00	✓
TRH Volatiles/BTEX		EP080	1	20	5.00	5.00	✓
Matrix Spikes (MS)							
Chloride by Discrete Analyser		ED045G	2	39	5.13	5.00	✓
Dissolved Mercury by FIMS		EG035F	3	42	7.14	5.00	✓
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	39	5.13	5.00	✓
Fluoride by PC Titrator		EK040P	2	39	5.13	5.00	✓
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	0	19	0.00	5.00	✗
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	20	5.00	5.00	✓
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	0	16	0.00	5.00	✗
TRH Volatiles/BTEX		EP080	1	20	5.00	5.00	✓

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 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 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 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 Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(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 SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	EP071SG	WATER	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 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 Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 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 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.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Client:		Site, COC and Contact Data:		Lab of Origin:	
Kleinfelder Australia Pty Ltd 95 Mitchell Road Cardiff, NSW 2285	Site Name: WSS - Cabbage Tree Rd water monitoring QUOTE NUMBER ME114/19	Sampler Name: Dan Kousbroek	LAB	Laboratory: AU.S	
Job No.: 20193820	Required TAT: 24 hrs	Contact Number: 045 8197 676	NEWCASTLE	51555 Maitland Rd	
Data QA level: Data minimum unless specified:	48 hrs	Contact e-mail: dkousbroek@kleinfelder.com		Mayfield West, Newcastle NSW 2304	
Phone: 02 4949 5200	3 days	PM name (if not sampler): Tom Overton		Phone: (02) 4949 5200	
	5 days	PM e-mail: toverton@kleinfelder.com			

Chain of Custody		Received by (print): (sign)		Received by: (sign)	
Date / Time:	16/9	Date / Time: <i>16/09/2020</i>		Date / Time: <i>16/09/2020</i>	
Notes:	-1.6	Temp. (°C) <i>24.38</i>		Temp. (°C) <i>24.38</i>	
		Notes: <i>ice present / no ice seals intact / no seal</i>		Notes: <i>ice present / no ice seals intact / no seal</i>	
Sample ID		Sample Point		Organic Analytes	
Lab ID		Sample Type		Metals	
Sample Point		Date		Other Analyses	
		Start Depth		Comments	
		End Depth			
		Units			
		# Containers			
BH1		<i>Water</i>		W-05 SG TRH/BTEXN	
BH2		16/09/2020		W-03 Metals - NEPM 15	
BH4		16/09/2020		Iron (dissolved)	
BH6		16/09/2020		NT 12 - General Water Suite	
BH7		16/09/2020		Total Dissolved Solids (TDS)	
BH8		16/09/2020		Total Suspended Solids (TSS)	
BH11		16/09/2020		EP231X PFAS (28 analytes, standard level)	
SW1		16/09/2020		Hold PFAS.B4	
SW3		16/09/2020			
SW4		16/09/2020			
MM239S		16/09/2020			
QW28		16/09/2020			
QW29		16/09/2020			
QW30		16/09/2020			
QW31		16/09/2020			
QW32		16/09/2020			
BH5		16/09/2020			

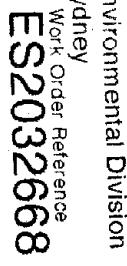
WHS-SG - TRH/BTEXN/8 Metals Silica Gel Clean Up

Additional metals analysis to make up NEPM 15

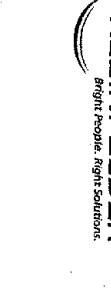
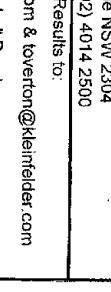
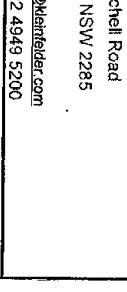
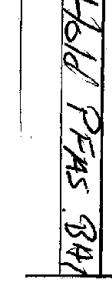
MM 16/09/20 5pm



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Send to Envirofit
Hold.

Send to Envirofit Hold

Hold All Sample Analysis

CERTIFICATE OF ANALYSIS

Work Order	ES2034087	Page	: 1 of 5
Client	KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	TOM OVERTON	Contact	: Shirley LeCornu
Address	95 Mitchell Rd Cardiff 2285	Address	277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	20193820	Date Samples Received	: 16-Sep-2020 19:30
Order number	: ----	Date Analysis Commenced	: 30-Sep-2020
C-O-C number	: ----	Issue Date	: 01-Oct-2020 13:06
Sampler	DANIEL KOUSBROEK		
Site	WSS - Cabbage Tree Rd water monitoring		
Quote number	ME/114/19 ALS Compass		
No. of samples received	1		
No. of samples analysed	1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

Signatures

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
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW



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

General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

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

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231X; Sample ES2034087_001 required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Client sample ID				BH9A	---	---	---	---	---
Compound	CAS Number	LOR	Unit	Client sampling date / time	16-Sep-2020 00:00	---	---	---	---
				Result	ES2034087-001	-----	-----	-----	-----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.05	---	---	---	---	---
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.05	---	---	---	---	---
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.05	---	---	---	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.05	---	---	---	---	---
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.2	---	---	---	---	---
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.05	---	---	---	---	---
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.05	---	---	---	---	---
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.05	---	---	---	---	---
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorododecanoic acid (PFDsDA)	307-55-1	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorotridecanoic acid (PFTsDA)	72629-94-8	0.02	µg/L	<0.05	---	---	---	---	---
Perfluorotetradecanoic acid (PFTsDA)	376-06-7	0.05	µg/L	<0.12	---	---	---	---	---
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.05	---	---	---	---	---
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.12	---	---	---	---	---
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.12	---	---	---	---	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH9A	---	---	---	---	---
		Client sampling date / time		16-Sep-2020 00:00	---	---	---	---	---
Compound	CAS Number	LOR	Unit	ES2034087-001	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.12	---	---	---	---	---
N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.12	---	---	---	---	---
N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.05	---	---	---	---	---
N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.05	---	---	---	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	---	---	---	---	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	---	---	---	---	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	---	---	---	---	---
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	---	---	---	---	---
EP231P: PFAS Sums									
Sum of PFAS	---	0.01	µg/L	<0.05	---	---	---	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.05	---	---	---	---	---
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.05	---	---	---	---	---
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	100	---	---	---	---	---
13C8-PFOA	---	0.02	%	106	---	---	---	---	---

Surrogate Control Limits

Sub-Matrix: WATER

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	---	60	120
13C8-PFOA	---	60	120

QUALITY CONTROL REPORT

Work Order	: ES2034087	Page	: 1 of 6
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Contact	: Shirley LeCornu
Address	: 95 Mitchell Rd Cardiff 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Sep-2020
Order number	: ----	Date Analysis Commenced	: 30-Sep-2020
C-O-C number	: ----	Issue Date	: 01-Oct-2020
Sampler	: DANIEL KOUSBROEK		
Site	: WSS - Cabbage Tree Rd water monitoring		
Quote number	: ME/114/19 ALS Compass		
No. of samples received	: 1		
No. of samples analysed	: 1		



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

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

This Quality Control Report contains the following information:

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

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: WATER

Laboratory Duplicate (DUP) Report									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3282874)									
ES2034087-001	BH9A	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	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.05	<0.05	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3282874)									
ES2034087-001	BH9A	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.12	<0.12	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.2	<0.2	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3282874)									
ES2034087-001	BH9A	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3282874) - continued									
ES2034087-001	BH9A	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.12	<0.12	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.12	<0.12	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.12	<0.12	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.12	<0.12	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3282874)									
ES2034087-001	BH9A	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: 3282874)									
ES2034087-001	BH9A	EP231X: Sum of PFAS	---	0.01	µg/L	<0.05	<0.05	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: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
							LCS	Low
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3282874)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	124	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	117	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	118	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	111	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	104	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3282874)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	93.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	113	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	114	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	122	72.0	130
EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	113	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	116	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	113	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	97.6	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3282874)								
EP231X: Perfluoroctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	115	67.0	137
EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	88.1	68.0	141
EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	88.2	62.6	147
EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	103	66.0	145
EP231X: N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	105	57.6	145
EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	115	65.0	136
EP231X: N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	110	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3282874)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	110	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	111	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	112	67.0	138

Sub-Matrix: WATER

<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Method Blank (MB) Report</i>	<i>Laboratory Control Spike (LCS) Report</i>		
					<i>Spike Concentration</i>	<i>Spike Recovery (%) LCS</i>	<i>Recovery Limits (%) Low High</i>	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3282874) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	102	71.4	144

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

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Matrix Spike (MS) Report</i>			
				<i>Spike Concentration</i>	<i>MS</i>	<i>Recovery Limits (%) Low High</i>	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3282874)							
ES2034087-001	BH9A	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	108	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	122	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	118	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	116	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	123	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	123	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3282874)							
ES2034087-001	BH9A	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	82.4	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	119	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	126	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	115	72.0	130
		EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.25 µg/L	129	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	122	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	109	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	124	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	124	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	118	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	97.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3282874)							
ES2034087-001	BH9A	EP231X: Perfluoroctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	103	67.0	137
		EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	124	68.0	141
		EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	97.8	62.6	147
		EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	66.0	145
		EP231X: N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	88.0	57.6	145
		EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	114	65.0	136

Sub-Matrix: WATER

				<i>Matrix Spike (MS) Report</i>				
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Spike</i>	<i>Spike Recovery(%)</i>	<i>Recovery Limits (%)</i>		
						<i>MS</i>	<i>Low</i>	<i>High</i>
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3282874) - continued								
ES2034087-001	BH9A	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	106	61.0	135	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3282874)								
ES2034087-001	BH9A	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	110	63.0	143	
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	112	64.0	140	
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	113	67.0	138	
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	78.4	71.4	144	

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2034087	Page	: 1 of 4
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Sep-2020
Site	: WSS - Cabbage Tree Rd water monitoring	Issue Date	: 01-Oct-2020
Sampler	: DANIEL KOUSBROEK	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	14	7.14	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: WATER

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

Method	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) BH9A		16-Sep-2020	30-Sep-2020	15-Mar-2021	✓	30-Sep-2020	15-Mar-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) BH9A		16-Sep-2020	30-Sep-2020	15-Mar-2021	✓	30-Sep-2020	15-Mar-2021	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) BH9A		16-Sep-2020	30-Sep-2020	15-Mar-2021	✓	30-Sep-2020	15-Mar-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) BH9A		16-Sep-2020	30-Sep-2020	15-Mar-2021	✓	30-Sep-2020	15-Mar-2021	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) BH9A		16-Sep-2020	30-Sep-2020	15-Mar-2021	✓	30-Sep-2020	15-Mar-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: WATER

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

Quality Control Sample Type	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	14	7.14	10.00	✖ NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	14	7.14	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.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

Fadi Soro

From: Daniel Kousbroek <DKousbroek@kleinfelder.com>
Sent: Monday, 28 September 2020 3:26 PM
To: Samples Sydney
Subject: [EXTERNAL] - FW: RESULTS & EDD for ALS Workorder : ES2032668 | Your Reference: 20193820
Attachments: 20193820.ESDAT_ES2032668_0.Header.XML; 20193820.ESDAT_ES2032668_0.Sample2e.CSV; ES2032668_0_COA.pdf; ES2032668_COC.pdf; ES2032668_0_QC.pdf; ES2032668_0_XTAB.XLS; ES2032668_0_ENMRG.CSV

CAUTION: This email originated from outside of A.S. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

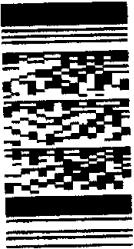
Hi Guys,

Could we please have analysed for PFAS hold sample BH9A.

①

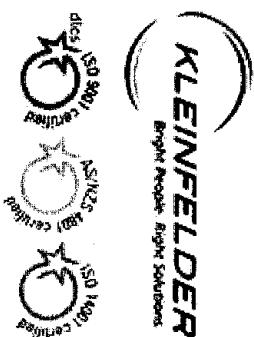
✓
JCS

Environmental Division
Sydney
Work Order Reference
ES2034087



Telephone: +61 2 8794 8555

Daniel Kousbroek B.Env.Sc (Hons)
Environmental Scientist - Contaminated Lands
95 Mitchell Road
Cardiff, NSW 2285
01: +61 2 4949 5200
m: +61 (0) 458 197 676
Email: DKousbroek@Kleinfelder.com



From: angel-no-reply@alsglobal.com <angel-no-reply@alsglobal.com>

Sent: Wednesday, 23 September 2020 2:52 PM

To: Daniel Kousbroek <DKousbroek@kleinfelder.com>

Subject: RESULTS & EDD for ALS Workorder : ES2032668 | Your Reference: 20193820

External Email.



Deliverables for ALS Workorder

ES2032668

Project: 20193820

Dear DANIEL KOUSBROEK,

Please find enclosed the following deliverables for ES2032668:

- 20193820_ESDAT_ES2032668_0.Chemistry2e.CSV
- 20193820_ESDAT_ES2032668_0.Header.XML
- 20193820_ESDAT_ES2032668_0.Sample2e.CSV
- ES2032668_0_COA.pdf
- ES2032668_0_XTAB.XLS
- ES2032668_0_ENMRG.CSV
- ES2032668_0_QC.pdf
- ES2032668_0_QCI.pdf
- ES2032668_COC.pdf

Report Recipients

- INVOICES
 - ES2032668_COA.pdf (Email)
- DANIEL KOUSBROEK
 - 20193820_ESDAT_ES2032668_0.Chemistry2e.CSV (Email)
 - 20193820_ESDAT_ES2032668_0.Header.XML (Email)
 - 20193820_ESDAT_ES2032668_0.Sample2e.CSV (Email)
 - ES2032668_0_COA.pdf (Email)
 - ES2032668_0_XTAB.XLS (Email)
 - ES2032668_0_ENMRG.CSV (Email)
 - ES2032668_0_QC.pdf (Email)
 - ES2032668_0_QCI.pdf (Email)
 - ES2032668_COC.pdf (Email)
- TOM OVERTON
 - ES2032668_0_COA.pdf (Email)
 - ES2032668_0_ENMRG.CSV (Email)
 - 20193820_ESDAT_ES2032668_0.Chemistry2e.CSV (Email)
 - 20193820_ESDAT_ES2032668_0.Header.XML (Email)
 - 20193820_ESDAT_ES2032668_0.Sample2e.CSV (Email)
 - ES2032668_0_XTAB.XLS (Email)
 - ES2032668_0_QC.pdf (Email)
 - ES2032668_0_QCI.pdf (Email)
 - ES2032668_COC.pdf (Email)

www.alsglobal.com

Australia

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Dandenong South VIC 3175	16 Mars Road	Murarrie QLD 4172	K
Phone : +61 3 8564 5000	Lane Cove West NSW 2066	Phone : +61 7 3902 4600	P
NATA # 1261	Phone : +61 2 9900 8400	NATA # 1261 Site # 20794	N
Site # 1254 & 14271	NATA # 1261 Site # 18217		

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
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New Zealand

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Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Kleinfelder Aust Pty Ltd (NEWCASTLE) **Order No.:** **Received:** Sep 17, 2020 4:16 PM
Address: 95 Mitchell Rd **Report #:** 744971 **Due:** Sep 24, 2020
Cardiff **Phone:** 02 4949 5200 **Priority:** 5 Day
NSW 2285 **Fax:** **Contact Name:** ALL INVOICES

Project Name: WSS - CABBAGE TREE RD WATER MONITORING
Project ID: 20193820

Sample Detail

Melbourne Laboratory - NATA Site # 1254 & 14271	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217									
Brisbane Laboratory - NATA Site # 20794									X
Perth Laboratory - NATA Site # 23736									
Newcastle Laboratory									
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	QW29	Sep 16, 2020		Water	S20-Se32234	X	X	X	X
Test Counts						1	1	1	1

Environment Testing

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



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
 The results of the tests, calibrations and/or
 measurements included in this document are traceable
 to Australian/national standards.

Attention: Tom Overton

Report 744971-W
Project name WSS - CABBAGE TREE RD WATER MONITORING
Project ID 20193820
Received Date Sep 17, 2020

Client Sample ID			QW29
Sample Matrix			Water
Eurofins Sample No.			S20-Se32234
Date Sampled			Sep 16, 2020
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium (filtered)	0.02	mg/L	0.04
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron (filtered)	0.05	mg/L	0.09
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	0.004
Copper (filtered)	0.001	mg/L	0.001
Iron (filtered)	0.05	mg/L	0.93
Lead (filtered)	0.001	mg/L	< 0.001
Manganese (filtered)	0.005	mg/L	0.053
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel (filtered)	0.001	mg/L	0.003
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc (filtered)	0.005	mg/L	0.017
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	%	81
13C5-PFPeA (surr.)	1	%	96
13C5-PFHxA (surr.)	1	%	92
13C4-PFHpA (surr.)	1	%	102
13C8-PFOA (surr.)	1	%	99
13C5-PFNA (surr.)	1	%	108
13C6-PFDA (surr.)	1	%	90

Client Sample ID			QW29
Sample Matrix			Water
Eurofins Sample No.			S20-Se32234
Date Sampled			Sep 16, 2020
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs)			
13C2-PFUnDA (surr.)	1	%	82
13C2-PFDsDA (surr.)	1	%	83
13C2-PFTeDA (surr.)	1	%	74
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	%	60
D3-N-MeFOSA (surr.)	1	%	74
D5-N-EtFOSA (surr.)	1	%	92
D7-N-MeFOSE (surr.)	1	%	92
D9-N-EtFOSE (surr.)	1	%	99
D5-N-EtFOSAA (surr.)	1	%	80
D3-N-MeFOSAA (surr.)	1	%	59
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	%	99
18O2-PFHxS (surr.)	1	%	111
13C8-PFOS (surr.)	1	%	110
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-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	79
13C2-6:2 FTSA (surr.)	1	%	73
13C2-8:2 FTSA (surr.)	1	%	59
13C2-10:2 FTSA (surr.)	1	%	57

Client Sample ID			QW29
Sample Matrix			Water
Eurofins Sample No.			S20-Se32234
Date Sampled			Sep 16, 2020
Test/Reference	LOR	Unit	
PFASs Summations			
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 WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1

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.

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
Metals M8 filtered	Melbourne	Sep 21, 2020	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Sep 21, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Brisbane	Sep 22, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Sep 22, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Sep 22, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Sep 22, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Australia

Melbourne	Sydney	Brisbane	Perth
6 Monterey Road	Unit F3, Building F	1/21 Smallwood Place	2/91 Leach Highway
Dandenong South VIC 3175	16 Mars Road	Murarrie QLD 4172	Kewdale WA 6105
Phone : +61 3 8564 5000	Lane Cove West NSW 2026	Phone : +61 7 3902 4600	Phone : +61 8 9251 9
NATA # 1261	Phone : +61 2 9900 8400	NATA # 1261 Site # 20794	NATA # 1261
Site # 1254 & 14271	NATA # 1261 Site # 18217		Site # 23736

New Zealand

Auckland	Christchurch
35 O'Rourke Road	43 Detroit Drive
Penrose, Auckland 1061	Rolleston, Christchurch 7675
Phone : +64 9 526 45 51	Phone : 0800 856 450
IANZ # 1327	IANZ # 1290

Company Name:	Kleinfelder Aust Pty Ltd (NEWCASTLE)	Order No.:		Received:	Sep 17, 2020 4:16 PM							
Address:	95 Mitchell Rd Cardiff NSW 2285	Report #:	744971	Due:	Sep 24, 2020							
Project Name:	WSS - CABBAGE TREE RD WATER MONITORING	Phone:	02 4949 5200	Priority:	5 Day							
Project ID:	20193820	Fax:		Contact Name:	ALL INVOICES							
Eurofins Analytical Services Manager : Andrew Black												
Sample Detail												
Melbourne Laboratory - NATA Site # 1254 & 14271	X	X	X	X	X							
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794					X							
Perth Laboratory - NATA Site # 23736												
Newcastle Laboratory												
External Laboratory												
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID							
1	QW29	Sep 16, 2020		Water	S20-Se32234	X	X	X	X	X	X	X
						1	1	1	1	1	1	1
Test Counts												
Per- and Polyfluoroalkyl Substances (PFASs)						Metals M8 filtered						
Vanadium (filtered)						Selenium (filtered)						
Manganese (filtered)						Iron (filtered)						
Cobalt (filtered)						Boron (filtered)						
Beryllium (filtered)						Barium (filtered)						

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

****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 5.3
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 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 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							
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	
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	
Selenium (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	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass		
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA)	ug/L	< 0.05			0.05	Pass		
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass		
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass		
LCS - % Recovery								
Perfluoroalkyl carboxylic acids (PFCAs)								
Perfluorobutanoic acid (PFBA)	%	109			50-150	Pass		
Perfluoropentanoic acid (PFPeA)	%	128			50-150	Pass		
Perfluorohexanoic acid (PFHxA)	%	101			50-150	Pass		
Perfluoroheptanoic acid (PFHpA)	%	122			50-150	Pass		
Perfluoroctanoic acid (PFOA)	%	136			50-150	Pass		
Perfluorononanoic acid (PFNA)	%	131			50-150	Pass		
Perfluorodecanoic acid (PFDA)	%	112			50-150	Pass		
Perfluoroundecanoic acid (PFUnDA)	%	100			50-150	Pass		
Perfluorododecanoic acid (PFDDoDA)	%	134			50-150	Pass		
Perfluorotridecanoic acid (PFTrDA)	%	133			50-150	Pass		
Perfluorotetradecanoic acid (PFTeDA)	%	148			50-150	Pass		
LCS - % Recovery								
Perfluoroalkyl sulfonamido substances								
Perfluoroctane sulfonamide (FOSA)	%	138			50-150	Pass		
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	102			50-150	Pass		
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	129			50-150	Pass		
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	%	105			50-150	Pass		
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	%	120			50-150	Pass		
N-ethyl-perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)	%	101			50-150	Pass		
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	%	108			50-150	Pass		
LCS - % Recovery								
Perfluoroalkyl sulfonic acids (PFSAs)								
Perfluorobutanesulfonic acid (PFBS)	%	96			50-150	Pass		
Perfluorononanesulfonic acid (PFNS)	%	96			50-150	Pass		
Perfluoropropanesulfonic acid (PPPrS)	%	100			50-150	Pass		
Perfluoropentanesulfonic acid (PFPeS)	%	114			50-150	Pass		
Perfluorohexanesulfonic acid (PFHxS)	%	105			50-150	Pass		
Perfluoroheptanesulfonic acid (PFHpS)	%	99			50-150	Pass		
Perfluoroctanesulfonic acid (PFOS)	%	125			50-150	Pass		
Perfluorodecanesulfonic acid (PFDS)	%	80			50-150	Pass		
LCS - % Recovery								
n:2 Fluorotelomer sulfonic acids (n:2 FTsAs)								
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	127			50-150	Pass		
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA)	%	103			50-150	Pass		
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	145			50-150	Pass		
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	82			50-150	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Heavy Metals								
Arsenic (filtered)	S20-Se32234	CP	%	91			75-125	Pass
Barium (filtered)	S20-Se32234	CP	%	90			75-125	Pass
Beryllium (filtered)	S20-Se32234	CP	%	84			75-125	Pass
Cadmium (filtered)	S20-Se32234	CP	%	88			75-125	Pass
Chromium (filtered)	S20-Se32234	CP	%	84			75-125	Pass
Cobalt (filtered)	S20-Se32234	CP	%	90			75-125	Pass
Copper (filtered)	S20-Se32234	CP	%	87			75-125	Pass
Iron (filtered)	S20-Se32234	CP	%	81			75-125	Pass

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead (filtered)	S20-Se32234	CP	%	88			75-125	Pass	
Manganese (filtered)	S20-Se32234	CP	%	88			75-125	Pass	
Mercury (filtered)	S20-Se32234	CP	%	77			75-125	Pass	
Nickel (filtered)	S20-Se32234	CP	%	85			75-125	Pass	
Selenium (filtered)	S20-Se32234	CP	%	94			75-125	Pass	
Vanadium (filtered)	S20-Se32234	CP	%	90			75-125	Pass	
Zinc (filtered)	S20-Se32234	CP	%	91			75-125	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)					Result 1				
Perfluorobutanoic acid (PFBA)	P20-Se31427	NCP	%	112			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	P20-Se31427	NCP	%	116			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	P20-Se31427	NCP	%	111			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	P20-Se31427	NCP	%	116			50-150	Pass	
Perfluoroctanoic acid (PFOA)	P20-Se31427	NCP	%	142			50-150	Pass	
Perfluorononanoic acid (PFNA)	P20-Se31427	NCP	%	123			50-150	Pass	
Perfluorodecanoic acid (PFDA)	P20-Se31427	NCP	%	118			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	P20-Se31427	NCP	%	117			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	P20-Se31427	NCP	%	127			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	P20-Se31427	NCP	%	130			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	P20-Se31427	NCP	%	138			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances					Result 1				
Perfluorooctane sulfonamide (FOSA)	P20-Se31427	NCP	%	128			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	P20-Se31427	NCP	%	117			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	P20-Se31427	NCP	%	128			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	P20-Se31427	NCP	%	116			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	P20-Se31427	NCP	%	115			50-150	Pass	
N-ethyl-perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)	P20-Se31427	NCP	%	109			50-150	Pass	
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	P20-Se31427	NCP	%	111			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)					Result 1				
Perfluorobutanesulfonic acid (PFBS)	P20-Se31427	NCP	%	105			50-150	Pass	
Perfluoronananesulfonic acid (PFNS)	P20-Se31427	NCP	%	92			50-150	Pass	
Perfluoropropanesulfonic acid (PFPoS)	P20-Se31427	NCP	%	113			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	P20-Se31427	NCP	%	119			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	P20-Se31427	NCP	%	106			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	P20-Se31427	NCP	%	96			50-150	Pass	
Perfluoroctanesulfonic acid (PFOS)	P20-Se31427	NCP	%	103			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	P20-Se31427	NCP	%	78			50-150	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	P20-Se31427	NCP	%	125			50-150	Pass	
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA)	P20-Se31427	NCP	%	129			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	P20-Se31427	NCP	%	125			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	P20-Se31427	NCP	%	88			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S20-Se32234	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Barium (filtered)	S20-Se32234	CP	mg/L	0.04	0.04	1.0	30%	Pass	
Beryllium (filtered)	S20-Se32234	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S20-Se32234	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S20-Se32234	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt (filtered)	S20-Se32234	CP	mg/L	0.004	0.004	<1	30%	Pass	
Copper (filtered)	S20-Se32234	CP	mg/L	0.001	0.002	6.0	30%	Pass	
Iron (filtered)	S20-Se32234	CP	mg/L	0.93	0.93	1.0	30%	Pass	
Lead (filtered)	S20-Se32234	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese (filtered)	S20-Se32234	CP	mg/L	0.053	0.054	<1	30%	Pass	
Mercury (filtered)	S20-Se32234	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S20-Se32234	CP	mg/L	0.003	0.003	6.0	30%	Pass	
Selenium (filtered)	S20-Se32234	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Vanadium (filtered)	S20-Se32234	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc (filtered)	S20-Se32234	CP	mg/L	0.017	0.017	1.0	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroctanoic acid (PFOA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluoroctane sulfonamide (FOSA)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFASs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexamenesulfonic acid (PFHxS)	P20-Se31426	NCP	ug/L	0.03	0.04	10	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroctanesulfonic acid (PFOS)	P20-Se31426	NCP	ug/L	0.06	0.06	6.0	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTsAs)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexamenesulfonic acid (4:2 FTSA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA)	P20-Se31426	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	P20-Se31426	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	P20-Se31426	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

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Sarah McCallion	Senior Analyst-PFAS (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](#).

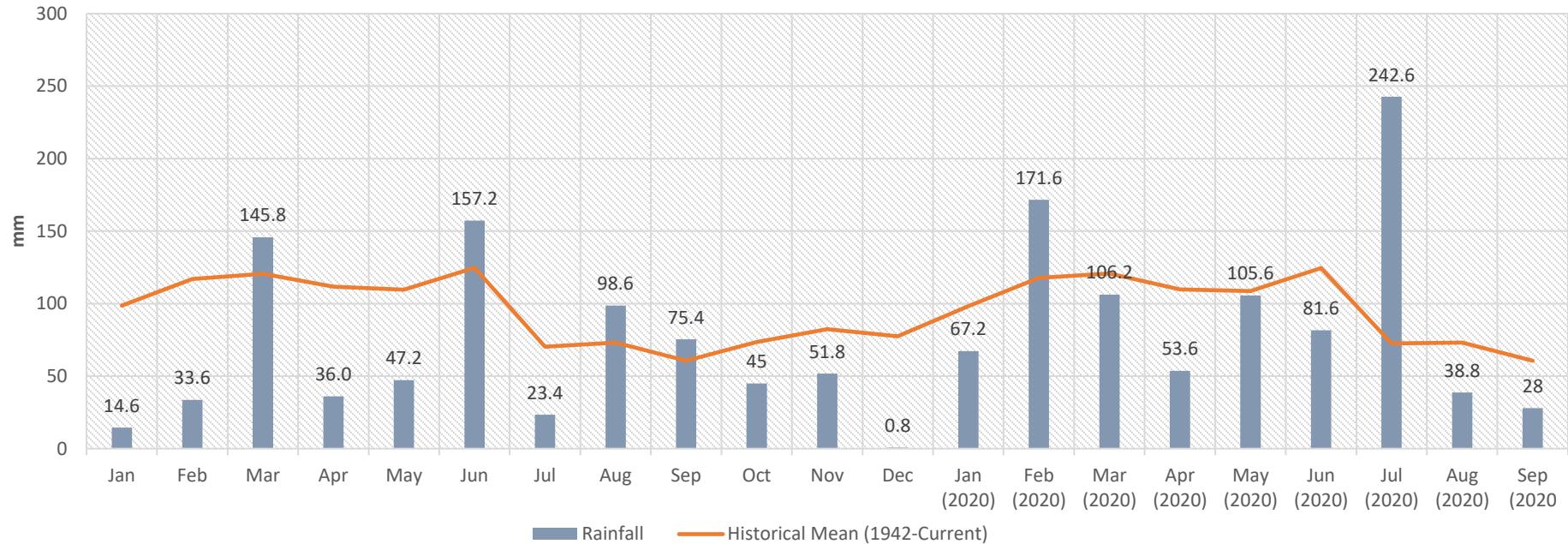
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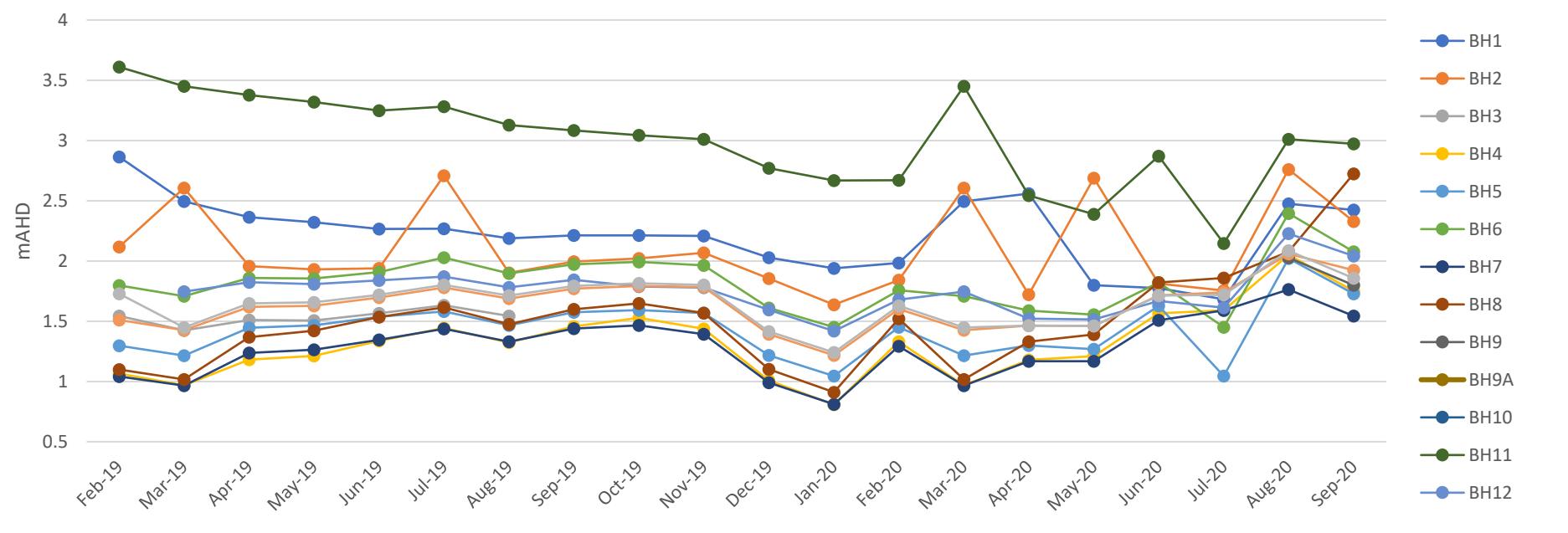
ATTACHMENT 4: DATA TRENDS



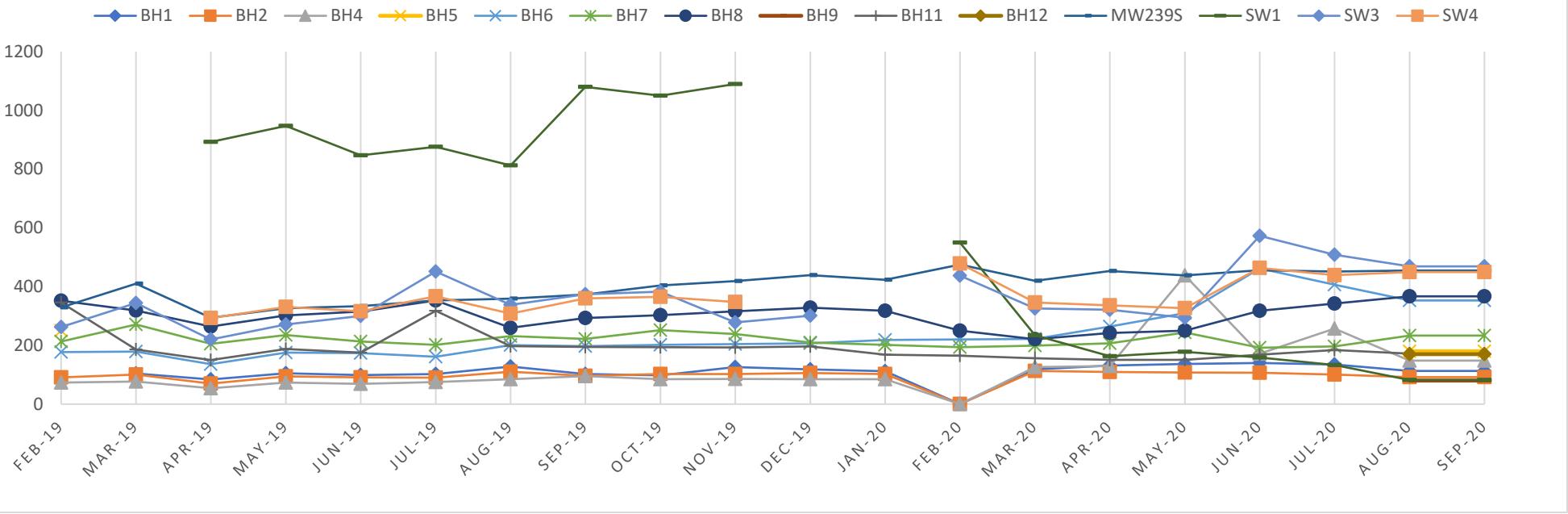
Monthly Rainfall Totals 2019 (mm)



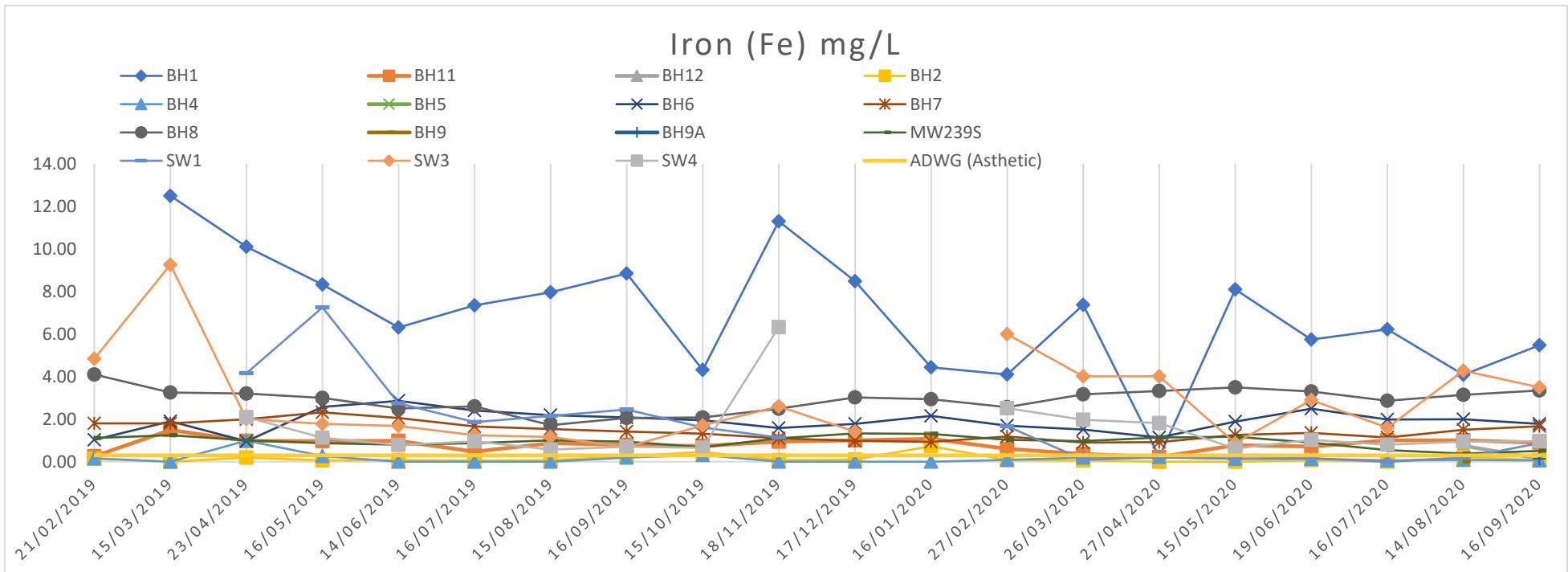
Groundwater Elevation (mAHD)



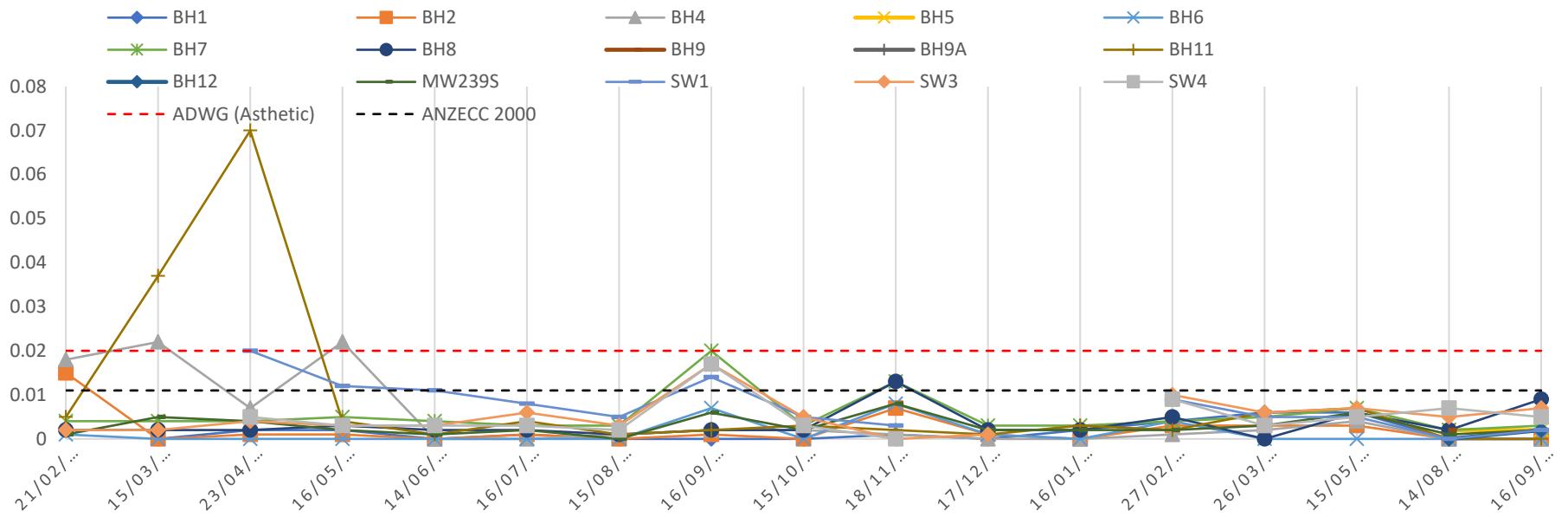
Laboratory EC ($\mu\text{S}/\text{cm}$)



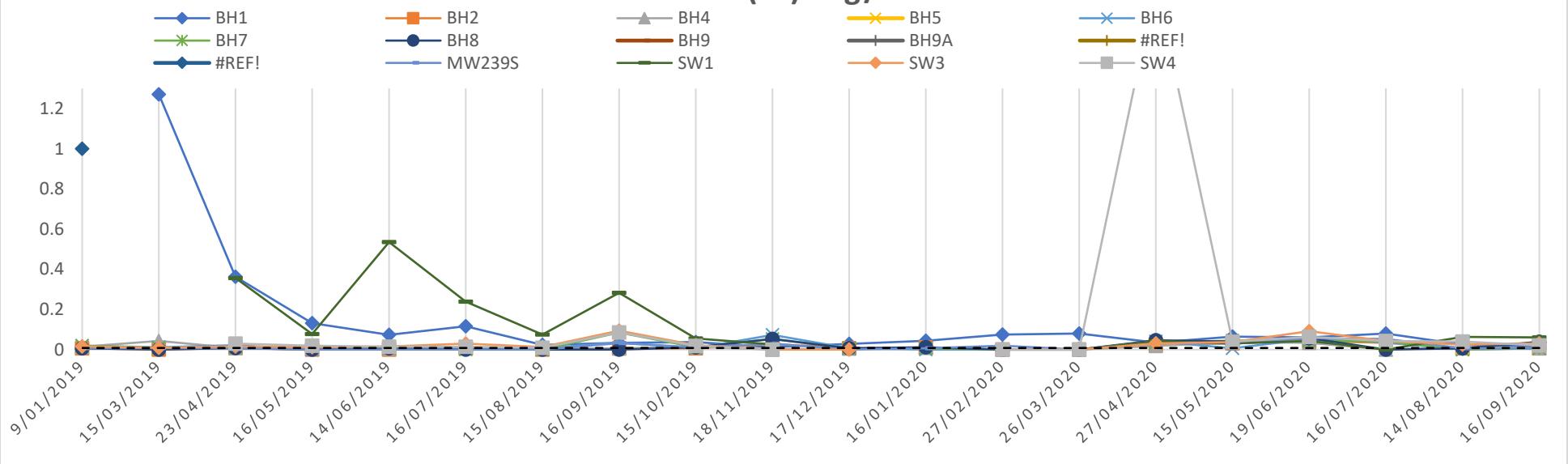
Iron (Fe) mg/L

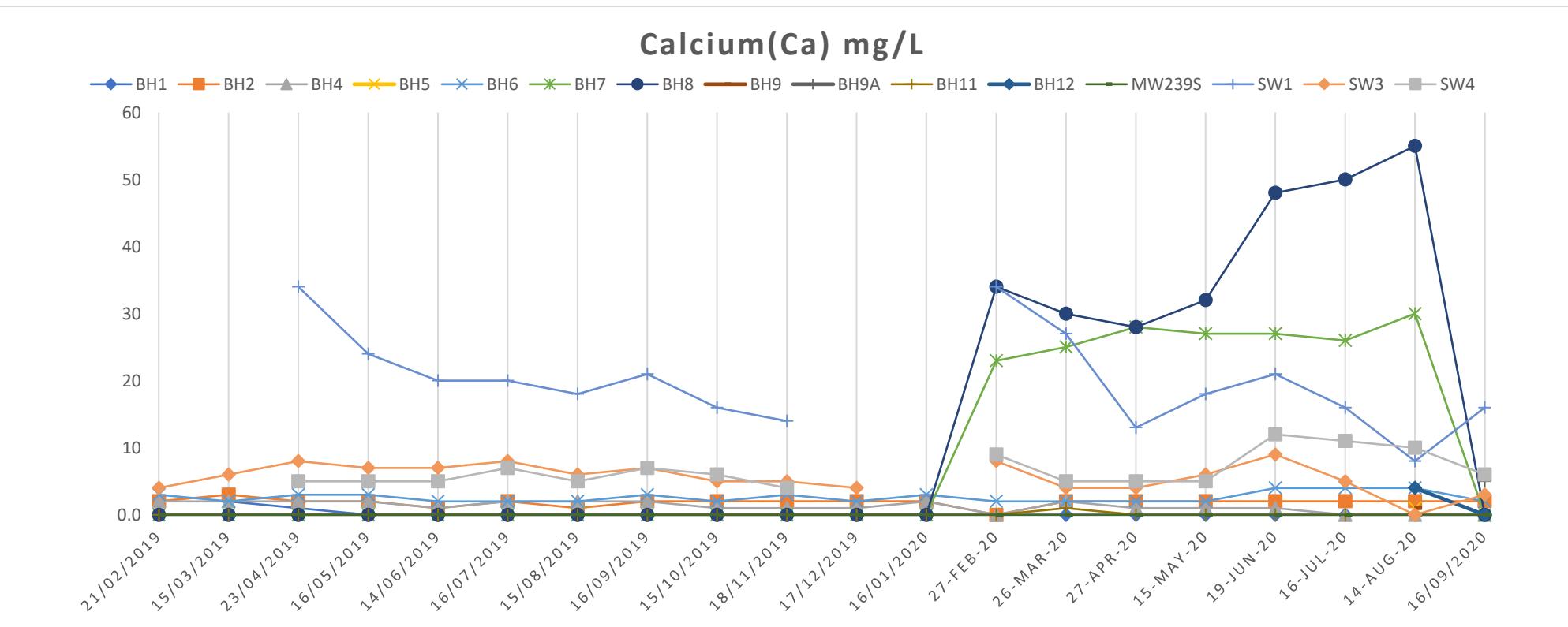
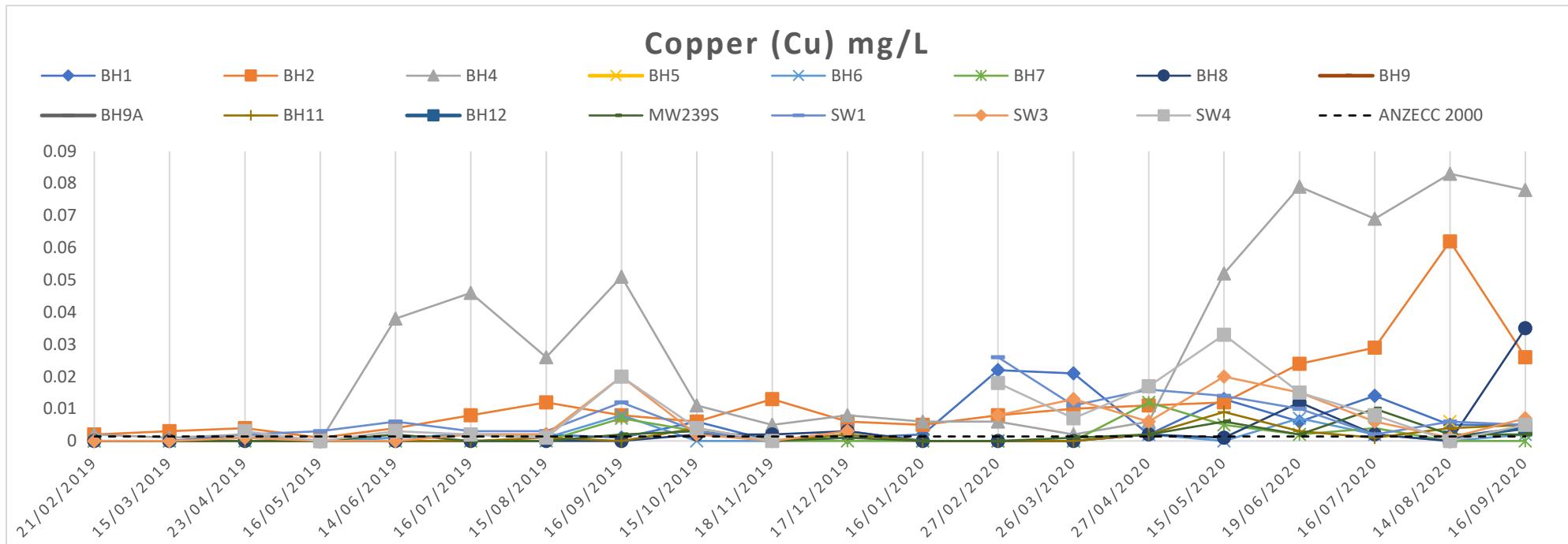


Nickel (Ni) mg/L



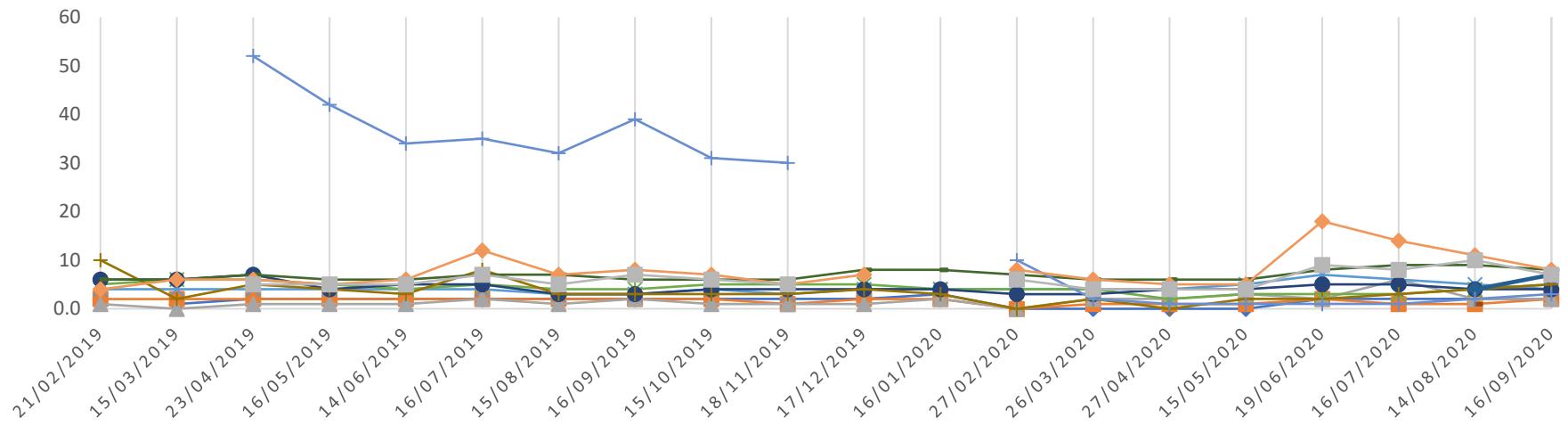
Zinc (Zi) mg/L





Magnesium(Mg) mg/L

Legend: BH1 (blue diamond), BH2 (orange square), BH4 (grey triangle), BH5 (yellow cross), BH6 (light blue asterisk), BH7 (green asterisk), BH8 (dark blue circle), BH9 (brown line), BH9A (black plus), BH11 (gold plus), BH12 (dark blue diamond), MW239S (green line), SW1 (light blue line), SW3 (orange diamond), SW4 (grey square)



Potassium(K) mg/L

Legend: BH1 (blue diamond), BH2 (orange square), BH4 (grey triangle), BH5 (yellow cross), BH6 (light blue asterisk), BH7 (green asterisk), BH8 (dark blue circle), BH9 (brown line)

