Helping You Protect Your Environment

ENVIRONMENTAL MONITORING REPORT

NARRABRI LANDFILL

March & July 2023

for Narrabri Shire Council

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1. INTRODUCTION

This report concerns the March and July 2023 environmental assessment monitoring conducted at the Narrabri Landfill.

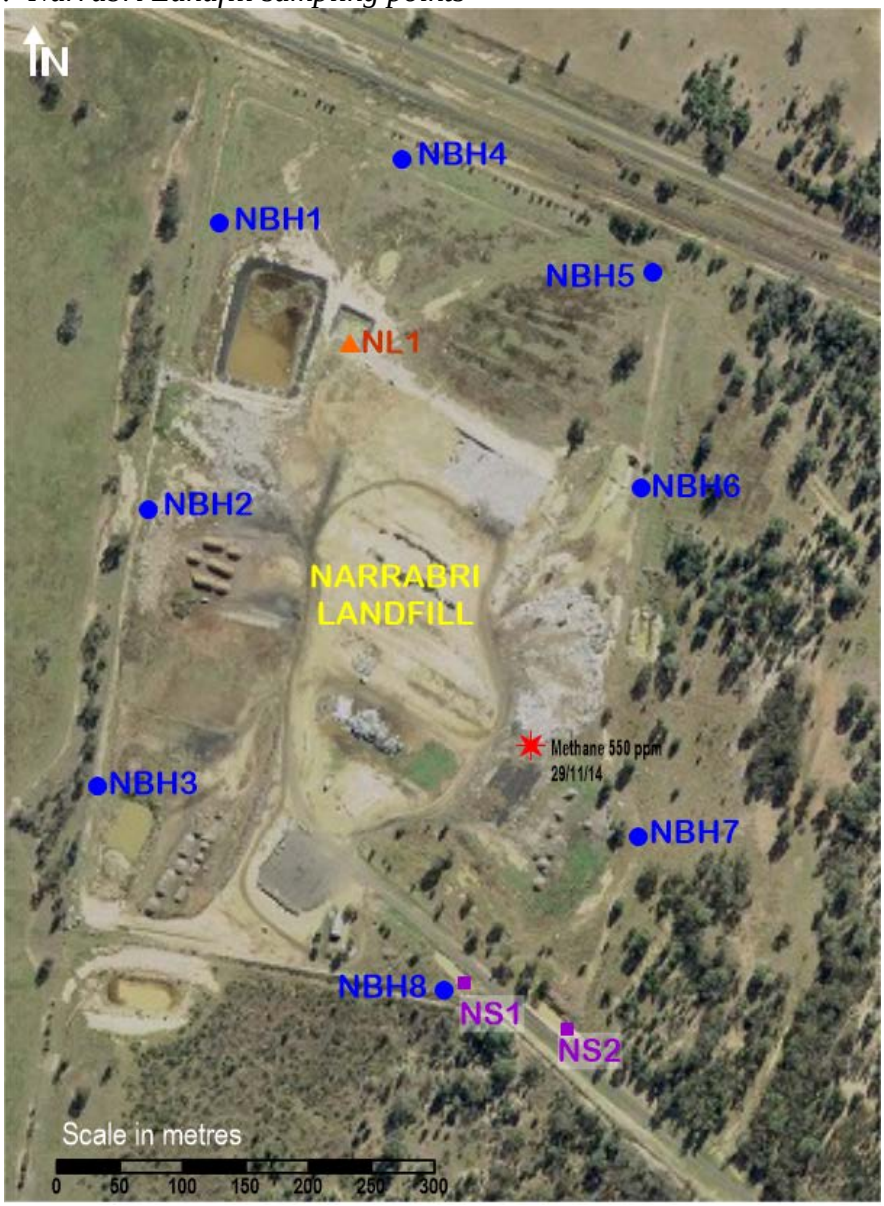
Under Environment Protection Licence (EPL) No. 12193 the following is required:

A. Quarterly groundwater sampling of well NBH7 and methane monitoring
B. Six-monthly groundwater sampling at wells NBH1, NBH2, NBH3, NBH4, NBH5, NBH6, NBH8
C. Annual sampling of leachate
D. Sampling of the two sedimentation dams (NS1 & NS2) if they overflow.
   [If there are no overflows during the annual reporting year, then internal water samples are taken if possible on at least one occasion annually to review the water quality and for historical reference.]

This report includes inputs and review of a quarterly round in March 2023 and a six-monthly round in July 2023.

2. SAMPLING LOCATIONS

Figure 1: Narrabri Landfill sampling points



Base map provided by Narrabri Shire Council 2012

3. METHANE MONITORING

Quarterly surface monitoring for methane is being conducted at the Narrabri Landfill as a precautionary measure against the environmental and occupational health and safety problems that may occur at landfills due to the methane component of landfill gas. Methane is a colourless, odourless gas that is flammable and explosive.

Methane monitoring was conducted as outlined in the NSW EPA *Environmental Guidelines: Solid Waste Landfill Environmental Guidelines: Solid Waste Landfills*, 2nd edition 2016: Section 5.2 *Landfill gas surface emissions monitoring*, p.33; and Section 5.3 *Landfill gas sub-surface monitoring*, p. 34. The surface methane monitoring is undertaken to demonstrate that the cover material is controlling the emission of landfill gas. Methane accumulation monitoring is undertaken in the Council buildings to assure health and safety against asphyxiation and explosion.

CodyHart uses a Year 2010 model RKI Eagle™ II portable gas meter. Its methane recalibration date is shown on the display screen and CodyHart conducts the gas recalibration when required. It is also sent to the supplier annually for a service check and calibration. The methane channel is zero calibrated in fresh air by CodyHart before the start of sampling at each site.

3.1 Archived historical methane results

Historical results from 2006 to 2017 for both surface and building methane testing are provided in Appendix D. The more current results are provided in the following sections.

3.2 Surface methane monitoring results

Methane sampling was conducted on 19 March 2023 and 19 and 20 July 2023. The maximum wind gusts measured at ground level over five minutes at the time of each methane sampling survey were 1.98 m/s (7.13 km/hr) and 1.04 m/s (3.74 km/hr) for the respective dates. The average wind speeds were 0.81 m/s (2.92 km/hr) and 0.37 m/s (1.33 km/hr) for the respective dates. Surface methane was tested on a grid pattern across the covered area of the landfill and its boundary where permitted. On both dates, nil methane was emitting at the base of the leachate sump pipe in the main cell. No other surface methane was detected.

Methane was also tested at the head of the leachate sump pipe from an occupational health and safety (OHS) perspective. In March nil methane was detected, but in July ≥50,000 ppm was detected. 50,000 ppm is 100% the lower explosive limit (LEL). Hence the requirement for there to be no smoking at landfills.

Table 1: Surface methane detections to date – Narrabri Landfill

Date	Sampling location	ppm by vol in air	% CH_4 by volume in air	% LEL (Lower Explosive Limit)
	Note:	500ppm CH_4 by vol in air	= 0.05% = CH_4 by vol in air	1% LEL
28/03/18	Nil detects. OHS – internal leachate vent 0 ppm			
10/08/18	Nil detects. OHS – internal leachate vent ≥50,000 ppm			
14/09/18	Nil detects. OHS – internal leachate vent 0 ppm			
06/12/18	Nil detects. Leachate vent – no access due to asbestos			
05/03/19	Nil detects. OHS – internal leachate vent ≥50,000 ppm			
23/06/19	Nil detects. OHS – internal leachate vent 0 ppm			
30/09/19	Nil detects. OHS – internal leachate vent 14,250 ppm			
22/11/19	Nil detects. OHS – internal leachate vent 0 ppm			
13/02/20	Nil detects. OHS – internal leachate vent 16,450 ppm			
30/05/20	Nil detects. OHS – internal leachate vent 0 ppm			
02/10/20	Nil detects. OHS – internal leachate vent 15,215 ppm			
09/12/20	Nil detects. OHS – internal leachate vent 650 ppm			
21/02/21	Nil detects. OHS – internal leachate vent ≥50,000 ppm			
18/08/21	Nil detects. OHS – internal leachate vent ≥50,000 ppm			
20/09/21	3,000 ppm base of leachate pipe – internal leachate vent ≥50,000 ppm	3,000	0.3%	6.0%
11/12/21	Nil detects. OHS – internal leachate vent ≥50,000 ppm			
20/03/22	Nil detects. OHS – internal leachate vent ≤500 ppm			
14&15/07/22	Nil detects. OHS – internal leachate vent ≤500 ppm			
28/09/22	Nil detects. OHS – internal leachate vent ≥50,000 ppm			
08/12/22	Nil detects. OHS – internal leachate vent 29,850 ppm			
19/03/23	Nil detects. OHS – internal leachate vent ≤500 ppm			
19&20/07/23	Nil detects. OHS – internal leachate vent ≥50,000 ppm			

Notes:

1. 100% LEL for methane (CH_4) = 5% CH_4 by volume in air (50,000 ppm by volume in air). Methane may explode in confined spaces or ignite in open spaces if ignited when CH_4 is 5% to 15% by volume in air. Oxygen levels should never fall below 18% by volume in air (180,000 ppm by volume in air) and carbon dioxide levels should not exceed 0.5% by volume in air (5000 ppm by volume in air) for an 8 hour working day (Gendebien et al., 1992, p. 282-284).
2. NSW EPA (2016, p.33) surface methane monitoring threshold for investigation & corrective action = 0.05% CH_4 by volume in air = 500 ppm by volume in air = 1% LEL.
3 NSW EPA (2016, p.35) surface methane monitoring notification promptly to EPA if concentration ≥ 1 % CH_4 by volume in air = 10,000 ppm by volume in air = 20% LEL. Plan for further investigation or remediation to EPA within 14 days.

3.3 Building methane monitoring results

Both high and low level sections of the Council office building and shed were tested to demonstrate that methane was not accumulating in the buildings. All methane readings were zero (Table 2).

Table 2: Council buildings methane detections to date – Narrabri Landfill

Date	Sampling location	ppm by vol in air	% CH_4 by volume in air	% LEL (Lower Explosive Limit)
	Note:	12,500ppm CH_4 by vol in air	= 1.25% = CH_4 by vol in air	25% LEL
28/03/18	Nil methane detected in Council shed & amenities.			
10/08/18	Nil methane detected in Council shed & amenities.			
14/09/18	Nil methane detected in Council shed & amenities.			
06/12/18	Nil methane detected in Council buildings.			
05/03/19	Nil methane detected in Council buildings.			
23/06/19	Nil methane detected in Council buildings.			
30/09/19	Nil methane detected in Council buildings.			
22/11/19	Nil methane detected in Council buildings.			
13/02/20	Nil methane detected in Council buildings.			
30/05/20	Nil methane detected in Council buildings.			
02/10/20	Nil methane detected in Council buildings.			
09/12/20	Nil methane detected in Council buildings.			
21/02/21	Nil methane detected in Council buildings.			
18/08/21	Nil methane detected in Council buildings.			
20/09/21	Nil methane detected in Council buildings.			
11/12/21	Nil methane detected in Council buildings.			
20/03/22	Nil methane detected in Council buildings.			
14/07/22	Nil methane detected in Council buildings.			
28/09/22	Nil methane detected in Council buildings.			
08/12/22	Nil methane detected in Council buildings.			
19/03/23	Nil methane detected in Council buildings.			

Note: EPA NSW (2016, p.35) notification level for surface, subsurface and building methane monitoring is 1% methane by volume in air, that is, 10,000 ppm.

Low sections of the buildings were tested because traces of methane may be trapped amongst high proportions of carbon dioxide that is denser than air and therefore heavier. High sections of the buildings were tested because methane is less dense and therefore lighter than air. Enclosed areas under equipment etc, the external perimeter of the buildings, the oil dump, and storm water drains surrounding the buildings were also tested.

4. WATER SAMPLING FIELD WORK

Groundwater sampling was conducted at NBH7 on 19 March 2023, and at all groundwater monitoring wells (NBH1, NBH2, NBH3, NBH4, NBH5, NBH6, NBH7, NBH8) on 19 and 20 July 2023.

The field lab used by CodyHart Environmental to take field temperature, pH, electrical conductivity (EC), redox potential (Eh) and dissolved oxygen (DO) readings was calibrated within 48 hours of sampling.

For groundwater sampling, the water level was measured at each well using an electronic dip meter and noted on the field parameter form (Appendix A).

In the March and July, a double bailer was used to sample NBH7. The first bailer of water was used for laboratory sample bottles due to its low turbidity.

For the deeper wells, a decontaminated, stainless steel, bladder pump attached to ¼ inch OD LDPE tubing for compressed air and ¼ inch OD LDPE tubing for water, is used to pump groundwater to the surface. A set pump position and purge volume are used each sampling round to suit each well's hydraulic characteristics. The aim is to minimise water level drawdown in a method called 'low-flow' groundwater sampling. Minimal drawdown means that the groundwater is less disturbed, and samples are more likely to be representative of true groundwater quality. A flow-through cell is used to house field probes for measuring the values of field analytes (DO, EC, pH, Eh and Temp) (Appendix A).

All groundwater samples are collected from within the monitoring well screens.

When purging was complete, sample containers were filled generally from the most volatile analyte to be sampled to the least.

The NBH7 metals samples on both sampling occasions were not filtered and were tested for total metals due to their greater turbidity. In addition, metals samples from the NBH1 and NBH5 wells were filtered due to their greater turbidity and tested for dissolved metals.

The leachate sample was collected using a bailer through the top of the leachate tank.

After collection, the samples were immediately put in the CodyHart mobile refrigerator. They were transported in iced eskies to reach the ALS laboratory well within holding times.

An anemometer, thermometer and compass were used to determine air temperature, wind speed and wind direction. Their values were noted on the final page of the field parameter forms (Appendix A).

5. QUALITY ASSURANCE

- A number of techniques are used in an effort to maintain a high quality of sampling and analyses.
- Sampling procedures documented by CodyHart Environmental are followed. These included a test of deionised water and a field blank to assure proper decontamination of equipment.
- Relative percentage differences (RPDs) of field analytes were noted on the field parameter form (Appendix A). In July, there were RPD exceedances for dissolved oxygen (DO) at NBH1, NBH2, NBH3 and NBH8. (DO and redox potential (Eh) RPDs are common because their results vary more when they are extracted from their low oxygen, groundwater environment.)
- Chain of custody forms were completed to document the lack of tampering with sample containers and for the ALS laboratory to advise of sample receipt (Appendix B).
- Calibration of the field lab was documented. A certificate is provided in Appendix B.
- Australian Laboratory Services (ALS), Stafford, Brisbane, conducted the majority of laboratory analyses. They are a global, Australian company who analyses a broad range

of analytes and provides good service. In addition to the certificate of analysis and analytical results, ALS provide quality control reports for laboratory duplicates, method blank and laboratory control samples, matrix spikes, and an interpretive quality control report (QCI) that summarises the quality assurance findings (Appendix C). In March, the NBH7 major cations analyses were two days overdue. In July, recoveries were less than the lab lower control limit for the monocyclic aromatic hydrocarbons, that is, volatile organic compounds. There were no other untoward quality control issues.

- CodyHart conducted laboratory analyses (base of field parameter forms, Appendix A) that are best conducted on fresh samples – for alkalinity using the EPA approved method, and for free CO_2 using the APHA 4500-CO_2 C titration method.
- A duplicate sample (NBHD) was taken at well NBH8 as a split sample in July 2023, that is, both samples were taken from a clean zip lock plastic bag in which the groundwater was collected as it discharged from the groundwater hose. Laboratory tests were conducted for the full suite of inorganic tests conducted for each well. The laboratory was not given the time of sampling or the duplicate sampling point name. This assists impartial analysis because laboratory personnel do not know the duplicate's sampling point origin. The results were within the ALS quality control duplicate criteria:

  Result < 10 times LOR: No Value;
  Result between 10 and 20 times LOR: 0% - 50%;
  Result > 20 times LOR: 0% - 20%. (LOR = Value of reporting).

6. WATER QUALITY RESULTS TO DATE

To facilitate comparisons over time, results are tabled so that many rounds of results for a sampling point can be tabled on one page. Maximum historical piezometric levels expressed as relative levels (RLs) are coloured red and highlighted yellow; and minimum historical levels are green and underlined.

Appendix C has a copy of the detailed laboratory results for both March and July monitoring round from Australian Laboratory Services (ALS) laboratory, Brisbane. CodyHart field alkalinity and free CO_2 results are provided in Appendix C.

6.1 Groundwater quality results

Table 3: Field analytes, water level, nutrients, carbon, pesticides, phenols – Well NBH1

NBH1	*Field analytes*					*Water levels*		*Carbon*				*Nutrients*				*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.05	0.0005 – 0.002
08/09/06	1.13	1257	7.62	+212	19.0	10.34	204.16	606	29	127	<1	0.031	0.252	0.8	1.1		ND
11/01/07	1.11	1280	7.44	+217	32.5	10.35	204.15	593	15	121	<1	0.030	0.020	<0.1	<0.1		ND
16/04/07	0.40	1336	7.37	+75	26.5	10.69	203.81	597	9	126	17	0.036	0.031	0.2	0.2	<0.05	ND
28/07/07	0.38	1285	8.18	+69	17.8	10.26	204.24	560	29	118	2	0.027	0.086	<0.1	<0.1	NR	ND
16/02/08	1.14	1348	7.22	+95	22.1	10.35	204.15	600	35	128	1	<0.010	0.016	<0.1	<0.1	NR	NR
12/07/08	0.30	1253	7.51	+100	21.6	10.27	204.23	607	26	127	<1	0.065	0.050	<0.1	<0.1	<0.05	ND
03/02/09	1.72	1383	7.67	+101	23.6	10.23	204.27	581	29	122	3	<0.010	<0.01	0.7	0.7	<0.05	ND
10/04/09	0.75	1405	7.40	+67	23.2	10.29	204.21	607	35	129	<1	<0.01	0.22	0.2	0.4	NR	NR
28/10/09	4.28	1369	7.75	+125	22.1	10.27	204.23	590	29	124	16	0.02	0.04	<0.1	<0.1	NR	NR
26/11/09	1.63	1418	7.58	+74	24.3	10.18	204.32	600	35	128	10	0.03	0.04	<0.1	<0.1	NR	NR
23/03/10	1.32	1358	7.50	+63	22.9	10.21	204.29	567	29	119	14	<0.01	0.08	0.1	0.2	<0.05	ND
21/08/10	4.28	1412	7.79	+109	20.5	10.18	204.32	587	29	123	14	0.05	0.04	<0.1	<0.1	NR	NR
05/11/10	4.74	1381	7.61	+109	21.9	10.47	204.03	600	29	126	1	0.03	0.03	<0.1	<0.1	NR	NR
02/03/11	3.32	1423	7.57	+110	21.8	10.17	204.33	613	3	121	<1	0.05	0.04	<0.1	<0.1	NR	NR
10/06/11	0.67	1456	7.19	+64	21.7	10.18	204.32	587	38	126	39	0.14	0.08	0.2	0.3	<0.05	ND
20/09/11	2.05	1440	7.67	+61	21.8	10.08	204.42	587	38	126	6	<0.01	0.04	0.5	0.5	NR	NR
05/01/12	2.64	1433	7.75	+142	22.1	10.16	204.34	580	29	122	68	0.04	0.02	<0.1	<0.1	NR	NR
22/04/12	2.81	1482	7.89	+32	23.5	10.11	204.39	587	29	123	8	0.04	0.02	<0.1	<0.1	NR	NR
16/08/12	6.96	1438	7.96	+105	21.4	10.08	204.42	600	29	126	<1	<0.01	0.03	0.2	0.2	<0.05	ND
09/12/12	4.63	1458	7.96	+80	22.4	10.11	204.39	580	29	122	<1	0.02	0.05	<0.1	<0.1	<0.05	ND
21/06/13	1.29	1405	7.55	+488	20.1	10.03	204.47	600	35	128	52	0.05	0.03	<0.1	<0.1	NR	NR
28/11/13	2.14	1513	7.60	+19	22.7	10.00	204.50	620	35	132	20	0.04	0.03	<0.1	<0.1	<0.05	ND
11/07/14	5.29	1450	7.55	+74	22.2	9.96	204.54	573	29	121	7	0.03	0.03	<0.1	<0.1	NR	NR
28/11/14	3.35	1461	7.58	+23	24.3	9.92	204.58	613	35	130	6	0.04	0.11	0.5	0.6	<0.05	ND
17/08/15	1.47	1495	7.58	+196	21.2	9.86	204.64	613	35	130	<5	<0.01	0.04	<0.1	<0.1	NR	NR
08/12/15	2.23	1511	7.61	-66	25.0	9.89	204.61	600	32	127	<1	0.02	0.02	<0.1	<0.1	<0.05	ND
26/10/16	2.22	1522	7.69	+93	21.5	9.83	204.67	667	35	141	<1	0.01	0.02	<0.1	<0.1	NR	NR
09/12/16	2.37	1503	7.93	+73	22.6	9.81	204.69	620	41	133	<1	0.02	0.02	<0.1	<0.1	<0.05	ND
23/05/17	3.96	1544	7.71	+81	22.8	9.77	204.73	588	41	127	5	0.01	0.02	<0.1	<0.1	<0.05	ND
09/12/17	3.80	1513	7.95	+41	23.43	9.77	204.73	607	38	130	5	0.02	0.02	0.1	0.1	NR	NR
10/08/18	1.12	1500	7.51	+38	22.0	9.72	204.78	633	47	137	6	<0.01	0.04	<0.1	<0.1	<0.05	ND
05/12/18	2.59	1587	7.80	+292	24.0	9.73	204.77	580	38	124	2	0.02	0.04	0.2	0.2	NR	NR
22/06/19	1.09	1501	7.32	+120	21.5	9.37	204.88	600	35	128	5	<0.01	0.02	<0.1	<0.1	<0.05	ND
21/11/19	2.12	1515	7.76	+117	25.6	9.34	204.91	600	38	128	5	<0.01	0.02	0.2	0.2	NR	NR
29/05/20	1.18	1567	7.66	+115	22.5	9.33	204.92	613	35	130	8	0.04	0.04	0.1	0.1	<0.05	ND
08/12/20	2.41	1431	7.76	+68	22.6	9.33	204.92	607	47	132	10	<0.01	0.03	0.1	0.1	NR	NR
30/06/21	1.04	1441	7.44	+89	22.3	9.37	204.88	615	35	131	3	0.01	<0.01	<0.1	<0.1	<0.05	ND
11/12/21	1.80	1487	7.50	+84	22.4	9.31	204.94	627	29	131	6	0.01	0.04	<0.1	<0.1	NR	NR
14/07/22	0.94	1481	7.41	+62	21.7	9.27	204.98	633	29	133	13	<0.01	0.02	<0.1	<0.1	<0.05	ND
08/12/22	2.75	1415	7.61	+137	22.5	9.23	205.02	583	35	124	3	<0.01	0.08	<0.1	<0.1	NR	NR
20/07/23	3.86	1454	7.61	+115	22.1	9.19	205.06	650	32	137	3	<0.01	0.19	<0.1	0.2	<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.

(Original – Coordinates GPS 1m: E761785, N6641464; RL top of PVC casing = 214.504 m use 214.50; RL ground level = 213.542 m; Depth of well from top of PVC = 15.80 m.
23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E761786.240, N6641464.447; RL from top of PVC casing = 214.250 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

Table 4: Laboratory analytes – geochemical, metals, BTEX – Well NBH1

NBH1	*Laboratory analytes – geochemical and metals*																*BTEX*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	yearly
Measure	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
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.001	0.001 or 0.002
08/09/06	<1	88	<1	<1	318	10	0.006	0.0002	0.001			0.002	0.054	0.020	0.23		ND
11/01/07	2	89	<1	<1	345	10	0.006	<0.0001	0.006			<0.001	<0.005	0.040	0.33		ND
16/04/07	<1	85	<1	<1	312	11	0.004	<0.0001	<0.001			0.003	0.023	0.050	0.70		ND
28/07/07	<1	91	<1	<1	347	9	0.006	<0.0001	<0.001			0.003	0.007	0.030	2.76		ND
16/02/08	<1	87	<1	<1	326	9	0.006	<0.0001	<0.001			0.003	0.014	0.020	0.17		NR
12/07/08	<1	93	<1	<1	302	8	0.008	0.0002	<0.001	0.007	0.007	0.003	0.025	0.040	0.42		ND
03/02/09	<1	93	<1	<1	339	10	0.007	<0.0001	0.012	0.005	0.003	0.002	0.014	0.020	0.35		ND
10/04/09	2	100	1	2	297	11	0.007	0.0002	<0.001	0.008	0.004	0.003	0.023	0.030	0.69		NR
28/10/09	2	99	5	17	399	14	0.007	<0.0001	0.001	0.002	0.003	<0.001	0.005	<0.001	0.07	<0.002	NR
26/11/09	<1	100	<1	<1	334	12	0.006	<0.0001	0.007	0.013	0.004	0.003	0.022	0.016	0.17		NR
23/03/10	<1	105	<1	<1	336	9	0.007	<0.0001	0.001	0.008	0.005	0.004	0.018	0.012	0.14		ND
21/08/10	<1	108	<1	<1	329	10	0.006	<0.0001	0.003	0.008	0.004	0.003	0.023	0.027	0.28		NR
05/11/10	<1	107	<1	<1	341	10	0.006	0.0001	0.003	0.006	0.005	0.002	0.016	0.031	0.20		NR
02/03/11	<1	114	<1	<1	342	8	0.005	<0.0001	0.001	0.005	0.003	0.003	0.012	0.019	0.20		NR
10/06/11	<1	114	<1	<1	342	11	0.007	<0.0001	0.002	0.009	0.005	0.002	0.026	0.017	0.46		ND
20/09/11	<1	113	<1	<1	387	10	0.006	<0.0001	0.002	<0.001	<0.001	0.002	0.006	0.020	0.17		NR
05/01/12	<1	122	<1	<1	312	11	0.006	<0.0001	0.004	0.006	0.004	0.002	0.022	0.028	0.34		NR
22/04/12	<1	115	<1	<1	329	11	0.007	<0.0001	<0.001	0.010	0.004	0.003	0.022	0.013	0.17		NR
16/08/12	<1	122	<1	<1	311	10	0.006	<0.0001	0.001	0.008	0.002	0.004	0.015	0.020	0.22		ND
09/12/12	1	134	<1	<1	348	9	0.006	<0.0001	0.001	0.004	0.003	0.002	0.012	0.024	0.26		ND
21/06/13	<1	126	<1	<1	341	10	0.007	<0.0001	0.002	0.011	0.002	0.002	0.019	0.019	0.29		NR
28/11/13	<1	122	<1	1	377	11	0.006	<0.0001	0.005	0.006	0.002	0.003	0.018	0.035	1.95		ND
11/07/14	<1	132	<1	1	410	12	0.005	<0.0001	0.001	0.005	0.002	0.003	0.011	0.025	0.22		NR
28/11/14	<1	137	<1	1	373	10	0.006	<0.0001	0.004	0.005	0.002	0.002	0.019	0.022	1.28		ND
17/08/15	<1	132	<1	<1	311	10	0.006	<0.0001	<0.001	0.002	0.005	<0.001	0.006	<0.001	<0.05		NR
08/12/15	<1	129	<1	1	354	11	0.006	<0.0001	<0.001	0.004	0.006	<0.001	0.014	<0.001	<0.05		ND
26/10/16	<1	131	<1	<1	383	11	0.007	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05		NR
09/12/16	<1	141	<1	1	358	11	0.006	<0.0001	<0.001	0.006	0.004	<0.001	0.011	<0.001	<0.05		ND
23/05/17	<1	150	<1	<1	354	10	0.006	<0.0001	<0.001	0.004	0.005	<0.001	0.016	<0.001	<0.05		ND
09/12/17	<1	138	<1	<1	349	10	0.006	<0.0001	<0.001	0.005	0.002	<0.001	0.010	<0.001	<0.05		NR
10/08/18	<1	129	<1	2	345	10	0.007	<0.0001	<0.001	0.006	0.002	<0.001	0.008	<0.001	<0.05		ND
05/12/18	<1	134	<1	1	361	10	0.007	<0.0001	<0.001	0.002	0.004	<0.001	<0.005	<0.001	<0.05		NR
22/06/19	<1	140	<1	<1	416	12	0.006	<0.0001	<0.001	0.001	0.004	<0.001	0.010	<0.001	<0.05		ND
21/11/19	1	144	<1	1	373	11	0.008	<0.0001	<0.001	0.003	0.002	<0.001	<0.005	<0.001	<0.05		NR
29/05/20	<1	107	<1	1	366	11	0.006	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005	<0.001	<0.05		ND
08/12/20	<1	149	<1	<1	362	11	0.006	<0.0001	<0.001	0.004	0.001	<0.001	0.011	<0.001	<0.05		NR
30/06/21	<1	144	<1	1	365	11	0.006	<0.0001	0.001	0.006	0.002	0.001	0.024	0.002	<0.05		ND
11/12/21	<1	135	<1	<1	362	10	0.006	<0.0001	<0.001	0.002	0.001	<0.001	<0.005	<0.001	<0.05		NR
14/07/22	<1	143	<1	1	348	10	0.006	<0.0001	<0.001	0.002	0.001	0.001	0.021	0.001	<0.05		ND
08/12/22	<1	127	<1	1	377	12	0.006	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005	<0.001	<0.05		NR
20/07/23	1	134	<1	1	343	10	0.006	<0.0001	<0.001	0.004	<0.001	<0.001	0.008	<0.001	<0.05		ND

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; Bold = unfiltered; NR = Not required; ND = Nil detected.

Table 5: Field analytes, water level, nutrients, carbon, phenols, pesticides –Well NBH2

NBH2	*Field analytes*					*Water levels*		*Carbon*				*Nutrients*				*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.05	0.0005 – 0.002
09/09/06	3.14	29600	8.03	+98	22.4	10.19	205.75	3900	147	807	8	<0.010	5.65	0.3	5.9		ND
12/01/07	3.78	30100	8.06	+137	27.3	10.18	205.76	4500	50	899	5	0.050	4.80	0.1	4.9		ND
15/04/07	3.86	25982	8.09	+58	26.4	10.30	205.64	4500	67	904	35	0.062	5.42	0.3	5.7	<0.05	ND
29/07/07	4.08	28440	8.05	+81	19.5	10.21	205.73	4565	44	910	5	0.039	4.76	<0.1	4.8	NR	ND
18/11/07	2.92	27100	7.95	+93	28.3	10.27	205.67	4554	59	912	6	<0.010	4.44	0.3	4.8	NR	NR
17/02/08	4.25	29300	7.98	+60	19.3	10.33	205.61	4334	88	877	13	<0.010	4.40	0.6	5.0	NR	NR
06/04/08	3.42	30000	8.07	+41	24.2	10.40	205.54	4708	59	942	8	<0.010	4.24	0.2	4.5	NR	NR
14/07/08	3.12	29150	8.00	+88	21.5	10.32	205.62	4540	73	913	141	0.062	4.37	0.5	4.9	<0.05	ND
04/02/09	3.70	29475	8.03	+73	24.9	10.28	205.66	4500	73	905	<1	0.05	3.24	0.9	4.1	<0.05	ND
28/10/09	3.45	29450	7.94	+101	24.2	10.37	205.57	4540	147	933	16	0.03	4.28	0.3	4.6	NR	NR
24/03/10	3.45	28750	7.88	+70	24.5	10.38	205.56	4500	101	913	70	0.05	4.64	0.8	5.4	0.16	ND
06/11/10	4.91	28875	7.93	+62	23.8	10.34	205.60	4854	103	983	<1	0.02	1.34	0.4	1.7	NR	NR
11/06/11	2.67	27525	7.86	+67	23.4	10.24	205.70	4600	220	965	114	0.94	33.7	0.9	34.6	<0.05	ND
05/01/12	3.21	28400	7.86	+89	24.4	10.16	205.78	4500	176	933	8	0.03	17.5	0.9	18.4	NR	NR
25/04/12	1.80	28700	7.78	+58	23.0	10.10	205.84	4500	176	933	14	0.05	24.4	0.2	24.6	NR	NR
17/08/12	0.25	27875	7.77	+57	16.9	9.98	205.96	2167	191	478	19	0.05	43.2	0.8	44.0	<0.05	ND
09/12/12	0.99	27525	7.80	+94	25.0	9.98	205.96	4700	176	973	<1	0.06	15.1	2.6	17.7	<0.05	ND
12/04/13	0.32	25571	7.70	+39	23.4	10.07	205.87	4700	176	973	<1	0.07	11.3	2.4	13.7	NR	NR
20/06/13	0.39	25053	7.69	+333	21.0	9.99	205.95	4400	205	922	189	0.07	11.6	3.0	14.6	NR	NR
28/11/13	4.13	23923	7.87	+51	24.8	9.92	206.02	4600	73	925	70	0.09	9.32	0.6	9.9	<0.05	ND
12/07/14	0.48	23063	7.78	+101	22.4	9.78	206.16	4700	191	977	109	0.03	9.27	2.7	12.0	NR	NR
29/11/14	7.42	23070	7.96	+22	25.1	9.76	206.18	4600	132	941	95	0.04	7.14	3.1	10.2	<0.05	ND
18/08/15	0.80	23105	7.86	+73	22.2	9.82	206.12	4400	191	918	58	0.01	6.26	3.3	9.6	NR	NR
08/12/15	0.82	21944	8.04	+38	26.2	9.86	206.08	4700	147	965	135	0.08	5.60	2.4	8.0	<0.05	ND
27/10/16	4.22	21850	8.13	+61	23.9	9.35	206.04	4600	132	941	81	0.05	4.44	2.8	7.2	NR	NR
09/12/16	0.50	21980	8.08	+49	24.6	9.38	206.01	4800	205	1000	27	0.01	4.55	2.9	7.4	<0.05	ND
23/05/17	0.86	21165	7.89	+37	23.9	9.38	206.01	4600	161	949	136	<0.01	4.57	3.6	8.2	<0.05	ND
09/12/17	4.82	20908	8.05	+27	24.8	9.40	205.99	4530	161	935	100	0.02	4.22	3.6	7.8	NR	NR
11/08/18	0.36	20165	7.70	+21	24.4	9.32	206.07	4700	176	973	104	<0.01	3.59	2.9	6.5	<0.05	ND
05/12/18	0.42	20243	8.07	+129	24.7	9.50	205.89	4100	117	839	67	0.01	2.87	3.0	5.9	NR	NR
21/06/19	1.99	16898	7.52	+137	22.6	9.51	205.92	4500	205	941	121	<0.01	2.74	3.1	5.8	<0.05	ND
21/11/19	0.62	20305	7.93	+121	26.3	9.54	205.89	4600	176	953	69	<0.01	2.28	2.9	5.2	NR	NR
29/05/20	8.21	18900	8.59	+66	23.6	9.62	205.81	4100	0	807	92	0.06	2.41	2.9	5.3	<0.05	ND
09/12/20	0.45	19468	8.03	+77	24.3	9.69	205.74	4400	155	908	95	<0.01	1.86	2.6	4.5	NR	NR
18/08/21	0.73	19018	7.90	+23	21.1	9.71	205.72	4650	158	958	73	<0.01	1.59	2.6	4.2	<0.05	ND
11/12/21	0.50	18748	7.86	-2	23.9	9.70	205.73	4600	176	953	98	0.02	1.66	1.8	3.5	NR	NR
14/07/22	0.68	18525	7.97	+58	22.1	9.65	205.78	4600	205	961	107	<0.01	1.51	2.7	4.2	<0.05	ND
08/12/22	5.58	17203	7.97	+77	24.8	9.48	205.95	4200	117	858	64	<0.01	2.26	3.0	5.3	NR	NR
20/07/23	1.12	18248	7.82	+74	21.9	9.37	206.06	3900	132	803	78	<0.01	48.3	5.4	53.7	<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.

(Original – Coordinates GPS 1m: E761733, N6641261; RL from top of PVC casing = 215.386 m use 215.39 (revised when 55cm sawn off 2016-10-27 due to target practice holes); RL ground level = 214.939 m; Depth of well from top of PVC = 16.42 m.

23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E761732.594, N6641261.448; RL from top of PVC casing = 215.431 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

Table 6: Laboratory analytes – geochemical, metals –Well NBH2

NBH2	*Laboratory analytes – geochemical and metals*															
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}
Measure	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
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01
09/09/06	389	9250	1	118	6570	231	<0.050	<0.0005	0.056			<0.005	<0.050	0.01	<0.05	
12/01/07	389	7720	2	114	7670	207	<0.05	<0.0001	0.070			<0.001	<0.005	<0.01	<0.05	
15/04/07	364	7600	2	110	6430	208	0.017	<0.0001	0.004			0.003	<0.005	<0.01	0.36	<0.01
29/07/07	399	7850	2	116	5650	222	0.021	<0.0001	0.021			<0.001	<0.005	<0.01	0.42	
18/11/07	394	8820	2	115	5590	222	0.020	<0.0001	0.021			<0.001	<0.005	<0.01	<0.05	
17/02/08	389	9060	2	115	5510	218	0.024	0.0001	0.031			0.011	0.026	0.01	<0.05	
06/04/08	390	7900	2	117	5420	230	0.014	0.0004	0.019			0.002	0.018	<0.01	<0.05	
14/07/08	342	7260	2	129	6010	233	0.026	0.0002	0.009	0.012	0.024	<0.001	0.013	<0.01	<0.05	
04/02/09	431	7880	2	121	5220	244	0.019	<0.0001	0.018	0.017	0.024	0.002	<0.005	<0.01	0.06	
28/10/09	366	6940	1	98	4050	211	0.018	<0.0001	0.009	0.016	0.023	0.002	0.014	0.004	0.14	0.027
24/03/10	470	8810	2	134	6420	225	0.025	0.0003	<0.001	0.016	0.022	<0.001	0.010	0.001	<0.05	
06/11/10	452	7620	2	117	5610	182	0.018	0.0001	0.014	0.013	0.030	<0.001	0.009	0.002	<0.05	
11/06/11	401	6960	2	96	4710	186	0.010	<0.0001	0.006	0.002	0.010	<0.001	<0.005	0.003	<0.05	<0.005
05/01/12	804	7530	2	125	5800	205	0.028	0.0001	<0.001	0.024	0.026	<0.001	0.016	0.003	0.11	
25/04/12	884	7260	2	126	6900	197	0.021	<0.0001	0.012	0.010	0.014	<0.001	0.008	<0.001	<0.05	
17/08/12	1990	9600	9	479	7300	146	0.004	0.0002	0.004	0.019	0.004	0.002	0.023	0.002	0.08	
09/12/12	658	7430	1	75	3260	116	0.017	<0.0005	0.012	0.020	0.025	<0.005	0.032	0.007	<0.25	
12/04/13	673	6460	<1	56	2860	92	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	
20/06/13	642	6630	2	121	6330	198	0.018	<0.0005	0.006	0.020	0.312	<0.005	<0.025	0.010	<0.25	
28/11/13	601	6320	<1	44	2280	70	0.020	<0.0001	0.005	0.022	0.022	<0.001	0.015	0.010	<0.05	
12/07/14	622	6640	2	116	6700	191	0.017	<0.0001	0.004	0.029	0.023	0.001	0.020	0.009	<0.05	
29/11/14	652	5850	2	100	4680	151	0.018	<0.0001	0.004	0.013	0.023	<0.001	0.013	0.008	<0.05	
10/08/15	838	6010	6	88	4940	126	0.017	<0.0001	0.002	0.042	0.040	0.003	0.020	0.009	<0.05	
08/12/15	830	5570	4	100	5630	157	0.020	<0.0001	0.003	0.028	0.050	0.002	0.012	0.01	<0.05	
27/10/16	828	5090	4	92	5540	146	0.023	<0.0001	0.003	0.049	0.044	0.006	0.020	0.012	<0.05	
09/12/16	802	5070	5	99	5770	155	0.022	<0.0001	0.003	0.010	0.030	0.004	<0.005	0.012	<0.05	
23/05/17	813	4780	4	83	5140	138	0.018	<0.0001	0.002	0.025	0.034	0.005	0.028	0.016	<0.05	
09/12/17	786	4830	5	85	5200	144	0.025	<0.0001	0.003	0.033	0.034	0.027	0.019	0.015	<0.05	
11/08/18	808	4080	2	90	5630	150	0.020	<0.0005	<0.005	0.027	0.039	0.007	0.032	0.021	<0.05	
05/12/18	795	4540	4	80	5100	138	0.021	<0.0001	0.002	0.040	0.042	0.006	0.029	0.018	<0.05	
21/06/19	715	4640	4	84	5230	142	0.018	<0.0005	<0.005	0.027	0.037	0.052	0.025	0.016	<0.05	
21/11/19	741	4850	2	86	5540	153	0.023	<0.0005	<0.005	0.024	0.049	0.009	<0.025	0.015	<0.05	
29/05/20	722	4320	2	75	5090	137	0.020	<0.0005	<0.005	0.047	0.039	0.047	<0.025	0.022	<0.05	
09/12/20	753	5030	<1	83	5220	140	0.022	<0.0005	<0.005	0.025	0.045	0.008	<0.025	0.019	<0.05	
18/08/21	736	4780	<1	74	4660	132	0.022	<0.0001	0.002	0.014	0.041	0.005	0.019	0.018	<0.05	
11/12/21	690	4530	<1	77	4930	128	0.016	<0.0005	<0.005	0.005	0.035	<0.005	<0.025	0.008	<0.05	
14/07/22	797	4320	1	77	4950	132	0.023	<0.0001	<0.005	0.018	0.044	0.006	<0.025	0.016	<0.05	
08/12/22	797	3900	1	75	5010	130	0.024	<0.0001	<0.001	0.016	0.040	0.002	0.008	0.012	<0.05	
20/07/23	1170	4330	<1	76	4740	129	0.019	<0.0001	0.002	0.014	0.022	0.001	0.006	0.023	<0.05	

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; ND = Nil detected; Bold = unfiltered; NR = Not required.

Table 7: Laboratory analytes – BTEX/VOCs –Well NBH2

NBH2	*BTEX/VOCs* yearly
Measure	mg/L
Reporting Limit	0.001 to 0.05
09/09/06	BTEX –ND
12/01/07	BTEX– ND
15/04/07	VOCs – 0.010 Tetrachloroethene
29/07/07	BTEX – ND
18/11/07	VOCs – 0.010 Tetrachloroethene
17/02/08	VOCs – 0.017 Tetrachloroethene
06/04/08	VOCs – 0.030 Tetrachloroethene
14/07/08	VOCs – 0.032 Tetrachloroethene
04/02/09	VOCs – 0.015 Tetrachloroethene
28/10/09	VOCs – 0.029 Tetrachloroethene
24/03/10	VOCs – 0.023 Tetrachloroethene
06/11/10	VOCs – 0.026 Tetrachloroethene
11/06/11	VOCs – 0.017 Tetrachloroethene
05/01/12	VOCs– ND
25/04/12	NR
17/08/12	VOCs– ND
09/12/12	VOCs – 0.010 Tetrachloroethene 0.013 cis-1.2-Dichloroethene
12/04/13	VOCs – 0.010 Tetrachloroethene 0.011 cis-1.2-Dichloroethene
20/06/13	VOCs – 0.010 Tetrachloroethene 0.012 cis-1.2-Dichloroethene
28/11/13	VOCs – 0.006Tetrachloroethene 0.008 cis-1.2-Dichloroethene
12/07/14	VOCs – 0.010 Tetrachloroethene 0.013 cis-1.2-Dichloroethene
29/11/14	VOCs – 0.011 cis-1.2-Dichloroethene
10/08/15	VOCs – 0.007 Tetrachloroethene 0.013 cis-1.2-Dichloroethene
08/12/15	VOCs – 0.012 Tetrachloroethene 0.015cis-1.2-Dichloroethene
27/10/16	VOCs – 0.007 Tetrachloroethene 0.011 cis-1.2-Dichloroethene
09/12/16	VOCs – ND
23/05/17	VOCs – 0.009 Tetrachloroethene 0.013 cis-1.2-Dichloroethene
09/12/17	VOCs – 0.005 Tetrachloroethene 0.010 cis-1.2-Dichloroethene
11/08/18	VOCs – 0.007 Tetrachloroethene 0.008 cis-1.2-Dichloroethene
05/12/18	VOCs – 0.007 Tetrachloroethene 0.008 cis-1.2-Dichloroethene
21/06/19	VOCs – 0.009 Tetrachloroethene 0.007 cis-1.2-Dichloroethene
22/11/19	VOCs – 0.009 Tetrachloroethene 0.007 cis-1.2-Dichloroethene
29/05/20	VOCs– ND
09/12/20	VOCs – 0.008 Tetrachloroethene 0.005 cis-1.2-Dichloroethene
18/08/21	VOCs– ND
11/12/21	VOCs – 0.006 Tetrachloroethene
14/07/22	VOCs– ND
08/12/22	VOCs– ND
20/07/23	VOCs– ND

Abbreviations: BTEX = Benzene, Toluene, Ethylbenzene, Xylene; VOCs = Volatile organic compounds; NR = Not required; ND = Nil detected.

Table 8: Field analytes, water level, nutrients, carbon, pesticides, phenols – Well NBH3

NBH3	*Field analytes*					*Water levels*		*Carbon*				*Nutrients*				*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.05	0.0005 – 0.002
09/09/06	2.79	6880	6.84	+126	21.4	10.68	205.17	827	150	204	1	0.028	0.505	0.1	0.6		ND
12/01/07	6.04	7540	7.13	+138	33.6	10.63	205.22	883	73	194	<1	0.029	0.243	<0.1	0.2		ND
15/04/07	4.20	8182	6.93	+116	28.4	10.69	205.16	944	141	224	22	0.012	0.284	7.0	7.3	<0.05	ND
29/07/07	4.43	7843	7.19	+101	20.5	10.61	205.24	890	103	203	1	0.015	0.279	<0.1	0.3	NR	ND
17/02/08	3.19	8270	6.83	+79	22.9	10.73	205.12	945	125	220	2	<0.010	0.279	<0.1	0.3	NR	NR
13/07/08	3.02	7970	7.26	+36	21.3	10.67	205.18	960	117	221	<1	0.065	0.269	<0.1	0.3	<0.05	ND
04/02/09	3.86	8118	7.03	+85	24.3	10.64	205.21	947	117	218	21	0.190	0.17	0.3	0.4	<0.05	ND
28/10/09	3.74	7688	7.05	+124	23.4	10.65	205.20	940	147	225	27	0.030	0.26	<0.1	0.2	NR	NR
24/03/10	3.27	8725	6.96	+90	22.1	10.68	205.17	1133	110	253	20	<0.010	0.36	0.2	0.6	<0.05	ND
06/11/10	4.55	8138	6.99	+89	22.9	10.64	205.21	1286	139	291	1	0.02	0.22	<0.1	0.2	NR	NR
11/06/11	3.06	18808	7.21	+94	21.4	10.61	205.24	1553	176	353	34	0.12	7.85	0.3	8.2	<0.05	ND
05/01/12	4.07	21653	7.20	+138	24.4	10.53	205.32	1667	161	372	66	0.04	12.4	0.1	12.5	NR	NR
25/04/12	3.80	33900	7.43	+120	21.4	10.46	205.39	2133	147	460	11	0.02	40.5	0.8	41.3	NR	NR
17/08/12	3.60	33200	7.38	+93	15.8	10.36	205.49	4700	191	977	33	0.08	15.2	2.1	17.3	<0.05	ND
18/10/12	3.66	31450	7.36	+112	22.3	10.36	205.49	2083	147	450	20	0.04	54.8	1.3	56.1	NR	NR
09/12/12	3.33	34125	7.39	+120	23.8	10.34	205.51	2320	176	504	<1	0.03	59.8	1.0	60.8	<0.05	ND
12/04/13	4.02	32330	7.35	+244	23.0	10.40	205.45	2400	176	520	5	0.04	62.9	1.6	64.5	NR	NR
20/06/13	7.35	31133	7.48	+402	20.8	10.33	205.52	2300	161	496	224	0.04	59.9	1.3	61.2	NR	NR
28/11/13	4.18	27550	7.44	+60	25.4	10.25	205.60	2100	147	453	128	0.06	53.4	2.2	55.6	<0.05	ND
12/07/14	5.88	25850	7.50	+165	19.6	10.30	205.55	2100	132	449	12	0.05	55.3	3.8	59.1	NR	NR
29/11/14	6.30	28432	7.76	+39	23.9	10.28	205.57	2100	117	445	<1	0.03	46.9	9.2	56.1	<0.05	ND
18/08/15	5.32	25923	7.39	+118	20.9	10.30	205.55	1964	205	442	16	0.02	55.9	5.7	61.6	NR	NR
08/12/15	4.37	25653	7.58	+91	25.6	10.30	205.55	2060	176	453	19	0.04	47.9	0.5	48.4	<0.05	ND
27/10/16	4.75	22060	7.66	+93	23.9	10.25	205.60	2200	176	481	10	<0.01	71.0	8.0	79.0	NR	NR
09/12/16	3.84	36120	7.66	+90	24.0	10.26	205.59	2400	176	520	28	0.01	77.8	6.6	84.4	<0.05	ND
23/05/17	4.42	36300	7.32	+87	22.7	10.26	205.59	1950	147	424	136	0.02	84.5	5.2	89.7	<0.05	ND
09/12/17	5.28	36300	7.31	+85	23.3	10.26	205.59	1800	161	398	35	<0.01	107.0	2.9	110.0	NR	NR
11/08/18	4.53	23745	6.95	+84	22.9	10.22	205.63	1820	167	404	18	0.04	101.0	4.4	105.0	<0.05	ND
05/12/18	5.82	21350	7.50	+136	24.4	10.29	205.56	1680	147	370	9	0.03	60.9	5.8	66.7	NR	NR
21/06/19	4.66	16850	6.63	+154	21.5	9.92	205.63	1340	205	320	27	<0.01	20.6	1.7	22.3	<0.05	ND
21/11/19	5.23	14553	7.20	+147	24.9	9.94	205.61	1350	150	306	2	0.04	17.8	2.0	19.8	NR	NR
29/05/20	4.38	14280	7.19	+101	22.5	10.02	205.53	1364	147	308	12	<0.01	17.0	2.0	19.0	<0.05	ND
09/12/20	5.17	12690	7.29	+93	22.7	10.05	205.50	1260	94	273	10	<0.01	12.3	1.4	13.7	NR	NR
18/08/21	4.75	12458	7.14	+66	19.4	10.08	205.47	1278	155	294	4	<0.01	10.5	1.2	11.7	<0.05	ND
10/12/21	4.67	11450	7.22	+96	22.9	10.05	205.50	1180	117	264	13	<0.01	8.79	0.4	9.2	NR	NR
14/07/22	3.97	15368	7.11	+115	20.6	10.05	205.50	1400	176	323	27	<0.01	20.0	1.4	21.4	<0.05	ND
08/12/22	3.78	31000	7.34	+121	25.2	9.85	205.70	1780	117	382	20	<0.01	286.0	2.5	288.0	NR	NR
20/07/23	3.72	23950	7.27	+109	22.7	9.81	205.74	1640	117	355	39	<0.01	436.0	59.3	495.0	<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.

(Original – Coordinates GPS 1m: E761701, N664061; RL from top of PVC casing = 215.845 m use 215.85 m; RL ground level = 214.932 m; Depth of well from top of PVC = 16.36 m.

23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E761698.812, N6641059.513; RL from top of PVC casing = 215.547 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

Table 9: Laboratory analytes – geochemical, metals, BTEX – Well NBH3

NBH3	*Laboratory analytes – geochemical and metals*																*BTEX/VOCs*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	yearly
Measure	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
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	0.001 or 0.002
09/09/06	54	2350	6	32	1470	46	0.002	<0.0001	0.009			<0.001	0.012	0.01	<0.05		BTEX- ND
12/01/07	64	2000	6	36	1570	43	<0.001	<0.0001	0.013			<0.001	<0.005	0.02	<0.05		BTEX- ND
15/04/07	77	2190	7	44	1760	59	<0.001	<0.0001	<0.001			<0.001	<0.005	<0.01	<0.05	<0.01	BTEX- ND
29/07/07	73	2110	6	36	1640	42	<0.001	<0.0001	0.003			0.002	0.008	<0.01	<0.05		BTEX- ND
17/02/08	82	2980	7	40	1690	48	0.001	<0.0001	0.004			0.006	0.053	<0.01	<0.05		NR
13/07/08	80	2200	6	39	1690	41	0.003	0.0001	<0.001	0.030	0.008	0.002	0.043	<0.01	<0.05		BTEX- ND
04/02/09	89	1870	6	39	1750	48	0.002	<0.0001	0.006	0.017	0.005	0.001	0.044	<0.01	<0.05		BTEX- ND
28/10/09	83	1560	6	37	1660	48	0.002	<0.0001	0.002	0.014	0.005	0.002	0.041	0.002	0.12		NR
24/03/10	99	2700	7	45	1770	55	<0.001	0.0002	0.002	0.040	0.006	0.003	0.060	0.002	<0.05		BTEX- ND
06/11/10	88	2300	6	38	1710	47	0.002	<0.0001	0.012	0.012	0.004	<0.001	0.026	0.002	<0.05		NR
11/06/11	629	5640	12	205	3850	108	0.004	<0.0001	0.005	0.003	0.001	<0.001	0.009	0.002	0.07		BTEX- ND
05/01/12	890	6890	12	258	4380	143	<0.001	<0.0001	0.013	0.036	0.004	0.002	0.057	0.003	0.11		NR
25/04/12	2050	9920	9	458	7820	152	0.006	<0.0001	0.006	0.027	0.004	0.002	0.042	0.004	0.09		NR
17/08/12	578	7220	2	124	6290	190	0.018	0.0001	0.006	0.012	0.016	<0.001	0.006	0.001	<0.05		VOCs–ND
18/10/12	1680	9130	8	414	7080	140	<0.005	<0.0005	<0.005	0.008	<0.005	<0.005	<0.025	<0.005	<0.25		NR
09/12/12	2110	10100	8	415	7220	134	<0.005	<0.0005	0.010	0.021	0.007	<0.005	0.042	<0.005	<0.25		VOCs–ND
12/04/13	2200	8900	6	340	5190	128	0.005	<0.0001	0.001	0.020	<0.001	0.001	0.027	0.008	<0.05		VOCs–ND
20/06/13	2220	8930	8	410	7470	141	<0.005	<0.0005	<0.005	0.028	0.295	<0.005	0.045	<0.005	<0.25		NR
28/11/13	2250	8620	6	321	4980	114	0.005	<0.0001	0.001	0.014	0.002	0.003	0.020	0.008	<0.05		VOCs–ND
12/07/14	2580	8980	8	383	7380	131	0.005	<0.0001	0.001	0.017	0.002	0.004	0.022	0.001	<0.05		NR
29/11/14	1900	7970	8	334	5220	128	0.004	<0.0001	<0.001	0.006	0.001	0.004	0.016	<0.001	<0.05		VOCs – ND
18/08/15	1800	8140	20	281	5280	100	0.004	<0.0001	<0.001	0.069	0.024	0.003	0.065	0.003	<0.05		NR
08/12/15	1750	7340	12	278	5350	98	0.005	<0.0001	<0.001	0.046	0.011	0.004	0.038	0.002	<0.05		VOCs – ND
27/10/16	2430	8740	16	374	7000	118	0.006	<0.0001	<0.001	0.006	<0.001	0.001	<0.005	<0.001	<0.05		VOCs – ND
09/12/16	2490	8730	16	367	6580	112	<0.005	<0.0005	<0.005	0.040	0.007	<0.005	0.034	<0.005	<0.05		NR
23/05/17	2220	9140	18	414	7490	127	<0.005	<0.0005	<0.005	0.038	<0.005	<0.005	0.036	<0.005	<0.05		VOCs – ND
09/12/17	2040	9310	20	353	6420	116	0.004	<0.0001	<0.001	0.038	0.006	0.003	0.053	0.001	<0.05		NR
11/08/18	1670	6630	11	332	6560	116	<0.005	<0.0005	<0.005	0.033	<0.005	<0.005	0.073	<0.005	<0.05		VOCs – ND
05/12/18	1340	6440	14	229	5010	93	0.003	<0.0001	<0.001	0.041	0.014	0.010	0.092	0.003	<0.05		NR
21/06/19	634	4730	10	149	3730	75	0.004	<0.0001	0.002	0.013	0.007	0.002	0.055	0.001	<0.05		VOCs – ND
21/11/19	527	4350	6	113	3290	67	0.004	<0.0001	<0.001	0.023	0.012	0.002	0.056	0.002	<0.05		NR
29/05/20	535	4090	5	104	3110	61	0.003	<0.0001	0.001	0.012	0.003	0.002	0.040	0.002	<0.05		VOCs – ND
09/12/20	430	3970	4	93	2900	59	0.003	<0.0001	0.002	0.012	0.005	0.001	0.052	0.002	<0.05		NR
18/08/21	403	3790	4	82	2590	54	0.003	<0.0001	0.002	0.011	0.010	0.002	0.123	0.001	<0.05		VOCs – ND
10/12/21	334	3370	4	72	2540	51	0.003	<0.0001	0.002	0.007	0.005	0.001	0.083	<0.001	<0.05		NR
14/07/22	644	4730	7	135	3450	68	0.003	<0.0001	0.002	0.015	0.013	0.002	0.098	0.003	<0.05		VOCs – ND
08/12/22	2200	9290	9	454	7910	122	<0.005	<0.0005	<0.005	0.012	<0.005	<0.005	0.046	<0.005	0.10		NR
20/07/23	2040	7260	7	372	6400	105	<0.005	<0.0005	<0.005	0.011	<0.005	<0.005	0.030	<0.005	0.09		VOCs - ND

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; VOCs = Volatile organic compounds; Bold = unfiltered; NR = Not required; Nil detected.

Table 10: Field analytes, water level, nutrients, carbon, pesticides, phenols – Well NBH4

NBH4	*Field analytes*					*Water levels*		*Nutrients*				*Carbon*				*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.05	0.0005 – 0.002
08/09/06	1.64	4085	7.66	+214	21.2	9.76	204.14	1133	44	235	1	0.032	0.439	0.2	0.6		ND
11/01/07	1.88	4270	7.59	+194	36.2	9.73	204.17	1100	26	223	<1	0.014	0.226	<0.1	0.2		ND
16/04/07	1.86	4422	7.51	+93	26.0	9.70	204.20	1093	35	225	3	0.015	0.217	0.1	0.3	<0.05	ND
28/07/07	3.76	4355	7.65	+85	20.6	9.64	204.26	1105	35	227	<1	0.015	0.210	<0.1	0.2	NR	ND
16/02/08	4.20	4528	7.32	+69	23.6	9.73	204.17	1115	44	231	<1	<0.01	0.210	0.2	0.4	NR	NR
12/07/08	1.54	4170	7.70	+62	21.0	9.62	204.28	1085	38	224	<1	0.047	0.199	<0.1	0.2	<0.05	ND
03/02/09	3.00	4603	7.92	+79	23.5	9.58	204.32	1175	44	243	<1	<0.01	<0.010	<0.1	<0.1	<0.05	ND
28/10/09	2.13	4820	7.69	+122	22.7	9.59	204.31	1147	132	262	31	0.02	0.260	<0.1	0.3	NR	NR
23/03/10	2.03	4830	7.62	+58	23.9	9.50	204.40	1267	59	265	52	<0.01	0.260	<0.1	0.3	<0.05	ND
05/11/10	2.77	4700	7.66	+75	21.5	9.44	204.46	1161	63	246	1	0.01	0.170	<0.1	0.2	NR	NR
10/06/11	1.97	4915	7.71	+78	21.3	9.41	204.49	1200	65	254	50	0.05	0.98	0.2	1.2	<0.05	ND
05/01/12	5.83	4983	8.00	+132	23.4	9.40	204.50	1200	30	244	8	0.02	0.11	<0.1	0.1	NR	NR
22/04/12	2.87	4883	7.59	+66	24.1	9.31	204.59	1267	44	261	3	0.03	0.15	<0.1	0.2	NR	NR
16/08/12	3.00	4828	7.92	+120	21.2	9.29	204.61	1133	44	235	<1	<0.01	0.17	0.1	0.3	<0.05	ND
09/12/12	3.61	4943	7.72	+95	24.0	9.33	204.57	1188	44	246	<1	0.02	0.23	0.1	0.3	<0.05	ND
21/06/13	3.49	4580	7.57	+504	20.5	9.25	204.65	1200	47	249	65	0.05	0.21	<0.1	0.2	NR	NR
28/11/13	2.63	4950	7.67	+49	23.1	9.22	204.68	1133	44	235	52	0.03	0.22	<0.1	0.2	<0.05	ND
11/07/14	1.95	4780	7.49	+76	22.2	9.19	204.71	1173	70	250	10	0.02	0.22	0.1	0.3	NR	NR
28/11/14	2.13	4900	7.59	+112	24.7	9.16	204.74	1200	79	258	14	0.03	0.21	0.2	0.4	<0.05	ND
17/08/15	3.31	4570	7.76	+133	21.0	9.09	204.81	1167	65	247	<5	<0.01	0.27	<0.1	0.3	NR	NR
08/12/15	2.32	3571	7.76	-75	28.3	9.12	204.78	1100	59	232	<1	0.04	0.24	<0.1	0.2	<0.05	ND
26/10/16	4.16	4735	7.83	+119	23.0	9.02	204.88	1667	59	344	<5	<0.01	0.21	<0.1	0.2	NR	NR
10/12/16	3.77	4805	7.71	+182	22.4	9.05	204.85	1084	56	228	<1	0.01	0.22	0.1	0.3	<0.05	ND
23/05/17	2.37	4818	7.65	+88	23.2	8.92	204.98	1340	59	280	8	<0.01	0.24	<0.1	0.2	<0.05	ND
09/12/17	4.31	4813	7.66	+35	24.5	8.92	204.98	1120	59	236	<5	0.03	0.24	<0.1	0.2	NR	NR
10/08/18	2.67	4633	7.75	+45	22.1	8.86	205.04	1173	59	247	5	<0.01	0.25	<0.1	0.2	<0.05	ND
05/12/18	3.30	4790	7.81	-567	24.6	8.87	205.03	1173	59	247	11	0.04	0.22	<0.1	0.2	NR	NR
22/06/19	2.46	4830	7.38	+125	21.5	8.78	205.14	1167	70	249	17	<0.01	0.23	<0.1	0.2	<0.05	ND
21/11/19	2.14	4420	7.68	+102	26.3	8.73	205.19	1187	50	247	<2	<0.01	0.21	<0.1	0.2	NR	NR
29/05/20	2.66	4640	7.71	+110	22.7	8.72	205.20	1167	59	246	11	<0.01	0.22	<0.1	0.2	<0.05	ND
08/12/20	3.92	4693	7.91	+112	23.0	8.71	205.21	1167	53	244	7	<0.01	0.22	0.1	0.3	NR	NR
30/06/21	2.58	4735	7.66	+98	24.1	8.73	205.19	1187	59	249	4	<0.01	0.21	0.1	0.3	<0.05	ND
11/12/21	3.14	4720	7.66	+70	23.7	8.62	205.30	1173	62	248	13	<0.01	0.23	<0.1	0.2	NR	NR
15/07/22	2.96	4708	7.53	+88	19.8	8.66	205.26	1167	65	247	19	<0.01	0.23	<0.1	0.2	<0.05	ND
08/12/22	3.97	4778	7.57	+147	23.3	8.54	205.38	1167	65	247	<2	<0.01	0.23	<0.1	0.2	NR	NR
19/07/23	4.90	4810	7.62	+96	22.3	8.51	205.41	1153	65	244	7	<0.01	0.24	<0.1	0.2	<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required.; ND = Nil detected.

(Original – Coordinates GPS 1m: E761918, N6641517; RL from top of PVC casing = 213.895 m use 213.90 m; RL ground level = 213.247 m; Depth of well from top of PVC = 14.90 m.

23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E761917.521, N6641515.725; RL from top of PVC casing = 213.919 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

Table 11: Laboratory analytes – geochemical, metals, BTEX, TPH – Well NBH4

NBH4	*Laboratory analytes – geochemical and metals*																*BTEX*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	yearly
Measure	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
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	0.001 or 0.002
08/09/06	17	925	1	4	878	32	0.009	0.0001	0.008			<0.001	<0.005	<0.01	<0.05		BTEX – Toluene 0.002
11/01/07	20	762	2	4	959	30	0.006	<0.0001	0.013			<0.001	<0.005	0.02	0.08		ND
16/04/07	20	780	1	4	928	34	0.006	<0.0001	<0.001			<0.001	<0.005	<0.01	0.07	<0.01	VOCs – ND
28/07/07	22	795	1	4	1010	30	0.007	<0.0001	<0.001			<0.001	<0.005	<0.01	<0.05		ND
16/02/08	22	1100	2	4	973	32	0.007	<0.0001	0.002			0.005	0.014	0.02	<0.05		NR
12/07/08	22	840	1	4	1000	29	0.008	0.0003	<0.001	0.005	0.006	0.002	0.014	<0.01	<0.05		ND
03/02/09	23	800	1	4	1050	33	0.006	<0.0001	0.022	0.006	0.002	0.001	0.014	<0.01	0.06		ND
28/10/09	27	775	1	5	1080	37	0.006	<0.0001	0.001	0.011	0.004	0.002	0.030	0.004	0.12	0.002	NR
23/03/10	27	1010	1	4	1060	34	0.006	<0.0001	0.002	0.021	0.002	0.002	0.008	0.005	<0.05		ND
05/11/10	26	888	1	4	1060	34	0.007	<0.0001	0.008	0.008	0.003	0.002	0.014	0.005	<0.05		NR
10/06/11	29	819	1	5	1080	37	0.007	<0.0001	0.004	0.007	0.003	0.001	0.017	0.006	0.11		ND
05/01/12	56	904	1	5	991	38	0.006	<0.0001	0.006	0.016	0.003	0.002	0.025	0.007	0.05		NR
22/04/12	33	852	<1	3	981	34	0.006	<0.0001	<0.001	0.009	0.004	0.001	0.020	0.006	<0.05		NR
16/08/12	36	831	1	5	999	38	0.007	<0.0001	<0.001	0.010	0.002	0.002	0.020	0.006	<0.05		ND
09/12/12	34	917	2	5	1100	33	0.007	<0.0001	0.002	0.008	0.002	0.001	0.015	0.004	0.06		ND
21/06/13	26	852	1	4	1040	34	0.006	<0.0001	<0.005	0.015	0.002	0.002	0.028	0.009	0.09		NR
28/11/13	35	857	1	5	1090	35	0.006	<0.0001	<0.001	0.008	0.004	0.002	0.015	0.006	0.09		ND
11/07/14	32	944	1	5	1230	38	0.005	<0.0001	<0.001	0.005	0.001	0.001	0.012	0.003	<0.05		NR
28/11/14	35	841	2	5	1100	39	0.005	<0.0001	<0.001	0.006	0.004	0.001	0.014	0.029	0.05		ND
17/08/15	29	912	1	4	922	30	0.004	<0.0001	<0.001	0.012	0.008	<0.001	0.037	0.006	<0.05		NR
08/12/15	25	855	1	5	1020	31	0.005	<0.0001	<0.001	0.004	0.008	0.002	0.017	0.008	<0.05		ND
26/10/16	26	874	2	6	1180	35	0.006	<0.0001	<0.001	0.001	<0.001	<0.001	<0.005	0.009	0.05		NR
10/12/16	28	850	1	6	1080	32	0.005	<0.0001	<0.001	0.018	0.007	0.002	0.021	0.005	<0.05		ND
23/05/17	28	864	1	5	1020	30	0.005	<0.0001	<0.001	0.005	0.005	0.002	0.016	0.007	<0.05		ND
09/12/17	28	893	1	5	1020	31	0.006	<0.0001	<0.001	0.007	0.002	<0.001	0.018	<0.001	<0.05		NR
10/08/18	26	772	1	5	1020	31	0.005	<0.0001	<0.001	0.008	0.001	0.001	0.028	0.005	<0.05		ND
05/12/18	25	880	1	4	1070	32	0.006	<0.0001	<0.001	0.006	0.007	0.003	0.011	0.003	<0.05		NR
22/06/19	21	897	1	5	1120	34	0.005	<0.0001	<0.001	0.006	0.006	0.002	0.024	0.007	<0.05		ND
21/11/19	27	907	1	5	1070	33	0.006	<0.0001	<0.001	0.005	0.005	0.001	0.016	0.005	<0.05		NR
29/05/20	28	910	1	5	1090	33	0.005	<0.0001	<0.001	0.003	0.002	0.002	0.011	0.007	<0.05		ND
08/12/20	28	979	1	5	1110	33	0.005	<0.0001	0.002	0.014	0.006	0.004	0.029	0.013	0.22		NR
30/06/21	26	970	1	5	1040	31	0.005	<0.0001	0.001	0.004	0.006	0.001	0.034	0.003	<0.05		ND
11/12/21	27	917	2	5	1120	32	0.005	<0.0001	<0.001	0.001	0.001	0.001	0.009	0.002	<0.05		NR
15/07/22	26	955	1	5	1040	32	0.005	<0.0001	<0.001	0.003	0.002	<0.001	0.024	0.002	<0.05		ND
08/12/22	27	912	1	6	1190	34	0.005	<0.0001	<0.001	0.005	0.001	0.002	0.022	0.003	<0.05		NR
19/07/23	26	975	1	5	1100	33	0.005	<0.0001	<0.001	0.002	0.002	<0.001	0.007	0.002	<0.05		ND

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; VOCs = Volatile organic compounds; Bold = unfiltered; NR = Not required; ND = Nil detected.

Table 12: Field analytes, water level, nutrients, carbon, pesticides, phenols –Well NBH5

NBH5	*Field analytes*					*Water levels*		*Carbon*				*Nutrients*				*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.05	0.0005 – 0.002
08/09/06	2.75	9925	7.25	+173	20.2	8.58	205.81	783	98	181	7	0.026	2.04	0.2	2.2		ND
11/01/07	3.19	10035	7.22	+177	28.8	8.57	205.82	800	70	176	7	0.070	2.04	0.2	2.2		ND
16/04/07	3.30	10840	7.31	+105	28.3	8.56	205.83	805	73	178	8	0.058	2.27	0.3	2.6	<0.05	ND
28/07/07	2.76	10058	7.20	+107	21.8	8.56	205.83	793	79	178	7	<0.010	1.94	<0.1	1.9	NR	ND
16/02/08	3.48	10348	6.99	+95	22.9	8.64	205.75	773	73	172	5	<0.010	1.83	<0.1	1.8	NR	NR
13/07/08	4.88	9270	7.41	+89	21.3	8.64	205.75	768	44	163	<1	0.098	1.67	0.2	1.8	<0.05	ND
03/02/09	3.86	10168	7.42	+87	23.3	8.62	205.77	787	70	174	5	<0.010	1.90	0.3	2.2	<0.05	ND
28/10/09	3.34	9940	7.25	+123	22.3	8.72	205.67	713	73	160	25	0.020	1.40	<0.1	1.4	NR	NR
23/03/10	3.56	10493	7.18	+88	23.4	8.64	205.75	750	81	170	41	0.030	2.09	0.6	2.7	0.06	ND
05/11/10	6.32	9453	7.31	+91	20.9	8.64	205.75	774	73	172	6	0.010	0.41	0.2	0.6	NR	NR
10/06/11	4.95	10183	7.50	+89	21.3	8.60	205.79	788	70	174	53	0.16	1.48	0.2	1.7	<0.05	ND
05/01/12	4.89	10533	7.31	+136	22.5	8.62	205.77	773	67	170	7	0.03	0.53	0.1	0.6	NR	NR
22/04/12	4.82	11013	7.24	+106	22.1	8.69	205.70	787	62	172	<1	0.04	1.63	0.2	1.8	NR	NR
16/08/12	4.53	10608	7.21	+136	20.3	8.58	205.81	776	88	177	<1	<0.01	1.71	0.2	1.9	<0.05	ND
09/12/12	4.71	10163	7.24	+143	23.6	8.59	205.80	773	67	170	<1	0.05	1.86	0.2	2.1	<0.05	ND
21/06/13	5.76	10968	7.28	+102	20.0	8.58	205.81	773	67	171	55	0.04	2.00	0.2	2.2	NR	NR
29/11/13	5.53	10383	7.33	+87	21.4	8.58	205.81	773	67	171	43	0.03	1.92	0.1	2.0	<0.05	ND
11/07/14	3.90	10783	7.12	+84	21.5	8.59	205.80	747	94	172	12	0.02	1.95	0.2	2.2	NR	NR
29/11/14	4.88	10955	7.20	+122	23.3	8.62	205.77	787	103	183	14	0.03	1.76	0.2	2.0	<0.05	ND
17/08/15	5.17	10578	7.24	+172	21.9	8.56	205.83	753	103	176	<5	0.02	2.99	0.1	3.1	NR	NR
08/12/15	6.34	10900	7.49	+134	25.6	8.59	205.80	793	79	178	5	0.01	2.12	0.2	2.3	<0.05	ND
26/10/16	4.46	10425	7.34	+83	23.4	8.56	205.83	847	76	187	<5	0.01	2.07	<1.0	2.1	NR	NR
10/12/16	6.04	10395	7.27	+159	23.4	8.60	205.79	788	59	171	3	0.03	2.27	0.2	2.5	<0.05	ND
24/05/17	5.45	11325	7.13	+85	22.8	8.49	205.90	817	79	182	14	<0.01	3.44	0.2	3.6	<0.05	ND
09/12/17	4.63	11143	7.31	+66	24.5	8.54	205.85	831	91	188	11	0.04	4.11	<0.5	4.1	NR	NR
10/08/18	4.27	10145	7.74	+81	22.7	8.55	205.84	953	73	208	25	0.02	4.58	0.3	4.9	<0.05	ND
05/12/18	5.42	10453	7.41	+199	24.4	8.56	205.83	1007	88	222	5	0.03	3.79	0.4	4.2	NR	NR
22/06/19	4.83	10073	7.13	+168	22.7	8.28	205.83	960	97	215	23	<0.01	3.65	0.4	4.0	<0.05	ND
22/11/19	4.77	9793	7.25	+107	25.1	8.28	205.83	920	62	198	9	<0.01	3.77	0.3	4.1	NR	NR
30/05/20	4.47	10078	7.45	+92	22.9	8.24	205.87	985	85	217	16	<0.01	3.98	1.0	5.0	<0.05	ND
08/12/20	5.30	9963	7.56	+94	23.4	8.26	205.85	984	73	214	12	<0.01	4.17	0.4	4.6	NR	NR
30/06/21	5.05	10178	7.38	+102	25.6	8.22	205.89	959	73	209	13	<0.01	4.06	0.6	4.7	<0.05	ND
11/12/21	5.03	10270	7.41	+79	23.3	8.18	205.93	993	70	215	20	<0.01	4.54	0.2	4.7	NR	NR
15/07/22	4.94	10230	7.39	+97	21.8	8.21	205.90	993	70	215	26	<0.01	4.41	0.6	5.0	<0.05	ND
08/12/22	7.66	10623	7.34	+130	23.2	8.09	206.02	1013	73	219	13	<0.01	4.83	0.3	5.1	NR	NR
19/07/23	6.82	10285	7.37	+111	22.5	8.08	206.03	1007	65	216	15	0.14	4.86	0.3	5.2	<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.

(Original – Coordinates GPS 1m: E762108, N6641437; RL from top of PVC casing = 214.390 m; RL ground level = 213.484 m; Depth of well from top of PVC = 16.37 m.

23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E762107.508, N6641433.687; RL from top of PVC casing = 214.112 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

Table 13: Laboratory analytes – geochemical, metals, BTEX – Well NBH5

NBH5	*Laboratory analytes – geochemical and metals*																*BTEX*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	yearly
Measure	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
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	0.001 or 0.002
08/09/06	72	3720	27	52	2260	102	0.006	0.0002	0.009			<0.001	0.008	<0.01	<0.05		ND
11/01/07	77	3280	26	53	2270	90	<0.001	<0.0001	0.011			<0.001	<0.005	<0.01	<0.05		ND
16/04/07	74	3850	25	54	2240	101	<0.001	<0.0001	<0.001			<0.001	<0.005	<0.01	<0.05	<0.01	ND
28/07/07	73	3140	23	50	2170	78	<0.001	<0.0001	0.002			<0.001	<0.005	<0.01	<0.05		ND
16/02/08	66	3330	22	47	2090	77	0.002	<0.0001	0.002			0.004	0.027	<0.01	<0.05		NR
13/07/08	63	3200	22	47	2120	72	0.006	0.0002	<0.001	0.016	0.006	0.002	0.022	<0.01	<0.05		ND
03/02/09	64	2920	20	48	2080	72	0.003	0.0004	0.018	<0.001	0.030	0.003	0.030	<0.01	0.06	0.015	ND
28/10/09	60	2930	19	44	2090	84	0.004	0.0002	0.002	0.014	0.005	0.001	0.032	0.006	0.15	0.005	NR
23/03/10	119	3580	26	71	2140	91	0.001	0.0001	0.003	0.020	0.008	0.002	0.031	0.010	<0.05		ND
05/11/10	56	3100	17	39	1960	73	0.003	0.0001	0.006	0.011	0.004	0.001	0.019	0.007	<0.05		NR
10/06/11	72	3100	19	47	2150	82	0.005	<0.0001	0.003	0.002	0.001	<0.001	<0.005	0.006	0.11		ND
05/01/12	125	3370	19	49	2140	91	<0.001	<0.0001	0.006	0.012	0.003	0.001	0.040	0.005	<0.05		NR
22/04/12	89	3310	17	47	2080	83	0.003	<0.0001	0.002	0.010	0.003	<0.001	0.031	0.015	0.10		NR
16/08/12	78	3450	19	49	2100	89	0.005	<0.0001	0.001	0.014	0.005	0.001	0.030	0.014	0.12		ND
09/12/12	72	3630	19	49	2150	80	0.003	<0.0001	0.004	0.011	0.003	0.002	0.029	0.012	0.10		ND
21/06/13	75	3400	19	48	2230	87	0.003	<0.0001	0.004	0.014	0.003	0.002	0.026	0.014	0.28		NR
29/11/13	68	3180	18	48	2170	71	0.002	<0.0001	<0.001	0.009	0.004	<0.001	0.024	0.006	0.06		ND
11/07/14	58	3490	18	50	2410	79	0.003	<0.0001	<0.001	0.007	0.002	0.001	0.019	0.012	0.05		NR
29/11/14	72	3240	17	47	2090	75	0.002	<0.0001	<0.001	0.008	0.002	<0.001	0.023	0.003	<0.05		ND
17/08/15	76	3360	16	44	1920	64	0.002	<0.0001	<0.001	0.022	0.022	0.002	0.073	0.003	<0.05		NR
08/12/15	72	3220	17	46	2140	67	0.003	<0.0001	<0.001	0.016	0.003	0.002	0.028	0.010	0.08		ND
26/10/16	73	3110	16	46	2200	70	0.003	<0.0001	<0.001	0.002	<0.001	<0.001	0.006	0.008	<0.05		NR
10/12/16	71	3240	16	47	2180	69	0.002	<0.0001	<0.001	0.019	0.006	0.002	0.036	0.003	<0.05		ND
24/05/17	88	3460	17	50	2270	71	0.002	<0.0001	<0.001	0.011	0.006	0.001	0.036	0.002	<0.05		ND
09/12/17	94	3490	16	48	2200	69	0.003	<0.0001	<0.001	0.011	0.002	0.001	0.032	0.004	<0.05		NR
10/08/18	84	2800	16	44	2120	68	0.004	<0.0001	<0.001	0.009	0.002	<0.001	0.030	0.005	<0.05		ND
05/12/18	92	2920	16	42	2200	69	0.004	<0.0001	<0.001	0.014	0.008	0.001	0.032	0.009	0.06		NR
22/06/19	87	2870	16	45	2250	71	0.004	<0.0001	<0.001	0.008	0.009	0.002	0.029	0.019	0.08		ND
22/11/19	89	2880	15	40	2140	67	0.004	<0.0001	<0.001	0.012	0.005	<0.001	0.040	0.001	<0.05		NR
30/05/20	96	2930	15	40	2150	66	0.004	<0.0001	<0.001	0.006	0.002	0.001	0.026	0.002	<0.05		ND
08/12/20	91	3200	14	44	2210	69	0.004	<0.0001	<0.001	0.010	0.004	0.002	0.031	0.008	<0.05		NR
30/06/21	96	3150	15	44	2180	69	0.003	<0.0001	<0.001	0.006	0.004	<0.001	0.038	<0.001	<0.05		ND
11/12/21	98	3190	16	47	2350	71	0.004	<0.0001	<0.001	0.006	0.003	<0.001	0.025	<0.001	<0.05		NR
15/07/22	107	3400	15	48	2230	70	0.004	<0.0001	<0.001	0.006	0.002	<0.001	0.032	<0.001	<0.05		ND
08/12/22	94	3340	20	56	2570	80	0.004	<0.0001	<0.001	0.008	0.002	<0.001	0.034	<0.001	<0.05		NR
19/07/23	99	3360	19	52	2350	71	0.004	<0.0001	<0.001	0.007	0.002	<0.001	0.018	0.030	<0.05		ND

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; Bold = unfiltered; NR = Not required; ND = Nil detected.

Table 14: Field analytes, water level, nutrients, carbon, pesticides, phenols – Well NBH6

NBH6	*Field analytes*					*Water levels*		*Carbon*				*Nutrients*				*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.05	0.0005 – 0.002
08/09/06	1.33	2650	6.85	+174	21.4	8.30	206.31	517	109	131	1	0.045	0.318	0.1	0.4		ND
12/01/07	1.12	2630	6.85	+172	27.8	8.41	206.20	381	70	94	<1	0.049	0.062	0.3	0.3		ND
17/04/07	3.25	2782	6.99	+112	26.6	8.45	206.16	554	40	120	11	0.034	0.059	0.3	0.4	<0.05	ND
28/07/07	1.21	2708	7.15	+119	19.9	8.35	206.26	567	98	138	<1	0.040	0.060	<0.1	<0.1	NR	ND
16/02/08	0.78	2840	6.67	+86	22.7	8.38	206.23	573	95	139	<1	<0.010	0.049	<0.1	<0.1	NR	NR
13/07/08	0.83	2755	6.90	+78	21.8	8.36	206.25	559	85	133	<1	0.021	0.043	<0.1	<0.1	<0.05	ND
03/02/09	1.03	2880	7.04	+92	23.6	8.36	206.25	560	110	140	<1	<0.010	0.05	<0.1	<0.1	<0.05	ND
28/10/09	0.99	2833	6.96	+129	22.4	8.36	206.25	547	109	137	14	0.020	0.07	<0.1	<0.1	NR	NR
23/03/10	0.95	2790	6.94	+97	23.3	8.39	206.22	533	103	133	27	<0.01	0.06	<0.1	<0.1	0.06	ND
06/11/10	1.26	2740	6.84	+85	21.4	8.33	206.28	567	103	140	<1	<0.01	0.03	0.2	0.2	NR	NR
10/06/11	1.25	2830	6.94	+118	21.9	8.30	206.31	594	111	147	44	0.18	0.25	0.3	0.6	<0.05	ND
05/01/12	6.02	2792	7.30	+154	22.2	8.24	206.37	563	66	129	7	0.03	0.02	<0.1	<0.1	NR	NR
22/04/12	1.06	2855	6.93	+122	22.2	8.17	206.44	573	103	141	5	0.03	0.04	<0.1	<0.1	NR	NR
16/08/12	1.41	2800	6.91	+135	20.0	8.11	206.50	547	73	128	<1	0.04	0.07	0.1	0.2	<0.05	ND
09/12/12	2.48	2690	6.92	+138	22.8	8.21	206.40	540	103	134	<1	0.03	0.06	0.1	0.2	<0.05	ND
21/06/13	2.68	2760	7.00	+98	20.6	8.16	206.45	542	103	135	47	0.04	0.05	<0.1	<0.1	NR	NR
29/11/13	1.61	2878	7.02	+94	21.7	8.13	206.48	533	109	135	29	0.03	0.06	<0.1	<0.1	<0.05	ND
11/07/14	6.09	2845	7.14	+263	20.3	8.11	206.50	520	59	118	4	0.03	0.04	0.8	0.8	NR	NR
29/11/14	1.23	2912	6.99	+91	23.6	8.14	206.47	587	117	147	7	0.03	0.06	0.1	0.2	<0.05	ND
17/08/15	9.36	3903	7.56	+147	21.1	8.05	206.56	753	103	176	<5	0.04	0.94	0.6	1.5	NR	NR
08/12/15	4.94	3968	7.42	+192	28.3	8.12	206.49	627	38	134	<1	0.07	0.66	0.2	0.9	<0.05	ND
26/10/16	1.55	9645	7.32	+69	23.0	7.94	206.67	1133	132	259	<10	0.03	3.75	<1.0	3.8	NR	NR
10/12/16	3.53	12900	7.40	+105	24.3	7.99	206.62	1627	132	356	6	0.02	5.92	0.7	6.6	<0.05	ND
24/05/17	3.96	13510	7.43	+69	22.3	7.98	206.63	2027	132	435	24	<0.01	7.56	0.4	8.0	<0.05	ND
10/12/17	3.79	15260	7.58	+102	23.1	8.05	206.56	2000	132	429	17	0.03	8.76	0.9	9.7	NR	NR
10/08/18	2.87	14458	7.59	+62	21.9	8.10	206.51	2600	117	543	35	0.03	9.59	<0.5	9.6	<0.05	ND
05/12/18	2.94	15545	7.80	+346	23.6	8.12	206.49	2700	120	564	3	0.03	8.76	0.3	9.1	NR	NR
22/06/19	4.57	12765	7.41	+122	22.7	7.89	206.45	2540	135	536	41	<0.01	5.84	0.4	6.2	<0.05	ND
22/11/19	3.97	14220	7.68	+107	24.6	7.97	206.37	2750	103	569	65	<0.01	7.71	0.5	8.2	NR	NR
30/05/20	3.32	14540	8.01	+29	22.8	7.92	206.42	3080	120	639	32	<0.01	7.60	0.9	8.5	<0.05	ND
08/12/20	3.37	14025	8.04	+82	25.5	7.93	206.41	3020	117	626	<10	0.04	7.69	0.8	8.5	NR	NR
30/06/21	4.29	13890	8.05	+88	25.5	7.89	206.45	3150	126	654	23	0.02	7.11	1.1	8.2	<0.05	ND
10/12/21	3.96	13543	8.00	+89	23.4	7.83	206.51	3300	103	677	38	<0.01	7.05	0.7	7.8	NR	NR
15/07/22	4.17	12510	8.05	+82	22.7	7.83	206.51	5200	103	1051	8	<0.01	6.63	0.9	7.5	0.20	ND
08/12/22	7.07	12828	8.01	+92	23.4	7.56	206.78	3300	94	675	10	<0.01	6.91	0.6	7.5	NR	NR
19/07/23	5.41	11923	8.06	+91	21.7	7.64	206.70	3330	67	673	42	<0.01	6.55	0.9	7.4	<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.

(Original – Coordinates GPS 1m: E762095, N6641277; RL from top of PVC casing = 214.605 m use 214.61 m; RL ground level = 213.542 m; Depth of well from top of PVC = 16.03 m.

23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E762094.145, N6641278.568; RL from top of PVC casing = 214.339 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

Table 15: Laboratory analytes – geochemical, metals, BTEX – Well NBH6

NBH6	*Laboratory analytes – geochemical and metals*																*BTEX*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	yearly
Measure	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
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	0.001 or 0.002
08/09/06	<1	720	3	5	576	25	0.001	0.0002	0.004			0.001	0.020	<0.01	0.10		ND
12/01/07	<1	559	3	5	618	22	<0.001	<0.0001	0.006			<0.001	<0.005	0.02	0.12		ND
17/04/07	1	540	2	5	572	24	0.002	0.0001	<0.001			0.002	0.019	<0.01	0.22	<0.01	ND
28/07/07	1	569	3	5	608	21	<0.001	<0.0001	<0.001			0.001	<0.005	<0.01	0.96		ND
16/02/08	2	781	3	5	606	21	<0.001	<0.0001	<0.001			0.006	0.064	<0.01	0.10		NR
13/07/08	1	565	3	5	577	19	0.001	0.0001	<0.001	0.006	0.009	0.002	0.030	<0.01	0.07		ND
03/02/09	1	569	3	5	613	22	<0.001	<0.0001	0.014	0.006	0.003	0.002	0.028	<0.01	0.44		ND
28/10/09	2	529	3	5	611	23	<0.001	<0.0001	0.001	0.008	0.004	0.003	0.044	0.012	0.43	<0.002	NR
23/03/10	4	686	3	6	600	24	<0.001	0.0003	0.001	0.013	0.006	<0.001	0.033	<0.001	<0.05		ND
06/11/11	<1	586	3	4	575	20	<0.001	<0.0001	0.003	0.004	0.003	<0.001	0.017	<0.001	<0.05		NR
10/06/11	1	547	3	5	590	23	<0.001	<0.0001	0.002	0.003	0.001	<0.001	0.010	<0.001	<0.05		ND
05/01/12	<1	600	3	5	559	24	<0.001	<0.0001	0.003	0.008	0.003	0.004	0.028	0.021	0.49		NR
22/04/12	<1	569	2	4	540	21	<0.001	<0.0001	<0.001	0.006	0.002	0.004	0.031	0.024	0.53		NR
16/08/12	2	569	3	5	532	22	<0.001	<0.0001	<0.001	0.007	0.003	0.004	0.030	0.018	0.60		ND
09/12/12	2	618	3	5	598	20	<0.001	<0.0001	<0.001	0.004	0.002	0.002	0.019	0.010	0.32		ND
21/06/13	<1	591	3	5	602	22	<0.001	<0.0001	0.002	0.004	0.002	0.002	0.020	0.010	0.47		NR
29/11/13	1	581	3	5	640	21	<0.001	<0.0001	0.001	0.005	0.004	0.002	0.026	0.010	0.64		ND
11/07/14	<1	637	2	5	696	23	<0.001	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005	<0.001	<0.05		NR
29/11/14	<1	585	3	5	610	20	<0.001	<0.0001	<0.001	0.004	0.002	<0.001	0.015	<0.001	<0.05		ND
17/08/15	16	915	4	7	734	25	<0.001	<0.0001	<0.001	<0.001	0.004	<0.001	<0.005	<0.001	<0.05		NR
08/12/15	9	826	4	6	766	25	<0.001	<0.0001	<0.001	0.002	0.002	<0.001	<0.005	<0.001	<0.05		ND
26/10/16	50	2660	24	47	2200	66	0.001	<0.0001	0.005	0.002	<0.001	0.002	<0.005	0.008	0.35		NR
10/12/16	92	3550	35	65	2770	80	0.001	<0.0001	0.006	0.019	0.004	0.004	0.032	0.010	0.56		ND
24/05/17	162	3870	26	53	3060	90	0.002	<0.0001	0.004	0.011	0.006	0.002	0.027	0.001	<0.05		ND
10/12/17	128	4150	26	54	3230	93	0.002	<0.0001	0.005	0.014	0.004	0.002	0.022	<0.001	<0.05		NR
10/08/18	148	3550	20	46	3260	96	0.004	<0.0001	0.004	0.011	0.003	0.002	0.018	0.002	<0.05		VOCs ND
05/12/18	117	3880	20	47	3630	101	0.004	<0.0001	0.005	0.019	0.009	0.005	0.019	0.007	0.17		NR
22/06/19	141	3520	20	52	4070	116	0.004	<0.0001	0.005	0.009	0.009	0.005	0.022	0.002	<0.05		ND
22/11/19	115	3700	13	39	3390	96	0.005	<0.0001	0.004	0.014	0.010	0.003	0.020	0.002	<0.05		NR
30/05/20	152	3620	10	32	3020	84	0.004	<0.0001	0.004	0.007	0.007	0.001	0.012	0.001	<0.05		ND
08/12/20	155	3760	9	38	3620	100	0.006	<0.0001	0.006	0.011	0.008	0.001	0.015	<0.001	<0.05		NR
30/06/21	157	3520	8	33	3300	93	0.006	<0.0001	0.005	0.006	0.010	<0.001	0.012	<0.001	<0.05		ND
10/12/21	147	3320	8	34	3590	96	0.008	<0.0001	0.006	0.007	0.012	<0.001	0.013	<0.001	<0.05		NR
15/07/22	148	3200	7	31	3260	90	0.007	<0.0001	0.005	0.008	0.014	0.002	0.019	<0.001	<0.05		ND
08/12/22	131	3020	9	33	3450	95	0.009	<0.0001	0.002	0.008	0.014	<0.001	0.013	0.001	<0.05		NR
19/07/23	133	2600	6	27	3090	86	0.010	<0.0001	0.004	0.010	0.015	0.001	0.009	0.002	<0.05		ND

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; Bold = unfiltered; NR = Not required; ND = Nil detected.

Table 16: Field analytes, water level, nutrients, carbon, pesticides, phenols – Well NBH7

NBH7	*Field analytes*					*Water levels*		*Carbon*				*Nutrients*					*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.1	0.05	0.0005 – 0.002
16/07/06 to 06/12/18	0.05-7.30	320-2653	5.49-7.70	+23-+252	17.2-29.8	2.73-4.83	209.81-211.91	13-367	53-161	28-116	<1-280	<0.01-6.24	0.016-41.60	<0.1-29.6	1.5-54.8	1.84	<0.05-3.49	ND-ND
05/03/19	0.84	705	6.10	+155	28.8	4.65	209.99	93	82	41	30	0.08	0.52	6.8	7.3		NR	NR
22/06/19	0.88	653	5.73	+143	23.0	4.41	209.77	67	111	44	28	0.08	1.23	5.1	6.3		<0.05	ND
30/09/19	1.74	655	5.98	+86	22.3	4.47	209.71	67	82	36	29	0.03	1.26	11.1	12.4		NR	NR
22/11/19	3.14	589	5.81	+168	25.0	4.70	209.48	67	76	34	27	0.05	0.46	11.4	11.9		NR	NR
13/02/20	6.07	705	6.61	+123	26.1	4.05	210.13	70	73	34	24	0.16	6.60	11.6	18.2		NR	NR
30/05/20	2.50	525	6.76	-25	21.9	4.02	210.16	153	73	50	23	4.57	2.99	22.5	25.5		<0.05	ND
02/10/20	0.18	685	6.71	-128	22.6	4.10	210.08	300	70	78	47	27.1	0.16	41.2	41.4		NR	NR
08/12/20	0.81	954	6.95	-95	25.8	4.23	209.95	467	161	136	26	45.7	0.01	55.6	55.6		NR	NR
21/02/21	2.66	637	6.50	+63	24.3	4.10	210.08	150	76	50	21	1.13	1.43	3.0	4.4		NR	NR
30/06/21	5.06	536	7.16	+152	24.7	3.78	210.40	83	53	31	17	0.08	3.69	6.5	10.2		<0.05	ND
20/09/21	6.20	502	6.62	+104	19.8	3.66	210.52	110	76	42	13	0.04	2.81	4.1	6.9		NR	NR
10/12/21	5.71	397	8.23	+133	23.1	2.43	211.75	70	35	23	<1	0.04	2.80	1.0	3.8		NR	NR
20/03/22	0.78	515	6.02	+105	24.5	3.38	210.80	97	76	40	14	0.02	1.83	2.9	4.7		NR	NR
15/07/22	2.86	488	6.99	+109	21.8	3.62	210.56	113	73	42	14	0.01	0.64	2.1	2.7		<0.05	ND
28/09/22	4.27	419	6.53	+167	19.6	2.84	211.34	80	56	31	8	<0.01	2.77	1.5	4.3		NR	NR
11/12/22	5.16	484	6.51	+127	23.0	1.75	212.43	70	35	23	6	<0.01	1.62	0.6	2.2		NR	NR
19/03/23	4.19	437	6.44	+129	26.1	2.84	211.34	80	56	31	8	<0.01	0.36	0.7	1.1		<0.05	ND
20/07/23	3.23	469	6.70	+124	19.6	2.99	211.19	117	59	39	7	<0.01	0.75	1.1	1.8		<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = Total Phosphorus; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.

(Original – Coordinates GPS 1m: E762098, N6641024; RL from top of PVC casing = 214.643 m use 214.64 m; RL ground level = 213.346 m; Depth of well from top of PVC = 5.95 m.

23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E762096.954, N6641029.981; RL from top of PVC casing = 214.182 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

See Appendix D for archived results July 2006 to December 2018.

Table 17: Laboratory analytes – geochemical, metals, BTEX – Well NBH7

NBH7	*Laboratory analytes – geochemical and metals*																	*BTEX*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	Br	yearly
Measure	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	mg/L
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	0.1	0.001 or 0.002
16/07/06 to 06/12/18	<1-325	1-256	<1-25	3-61	43-345	9-133	0.001-0.013	<0.0001-0.0062	<0.001-0.104	0.006-0.130	0.006-0.105	<0.001-0.075	0.008-0.457	<0.01-0.637	0.07-104.0	<0.001-<0.010	0.3-0.3	ND ND
05/03/19	100	90	1	4	129	13	0.007	<0.0001	0.075	0.047	0.061	0.028	0.151	0.094	63.6			NR
22/06/19	94	81	<1	4	137	10	0.006	0.0003	0.036	0.028	0.036	0.021	0.059	0.053	30.0			ND
30/09/19	103	85	<1	3	119	9	0.011	<0.0001	0.065	0.053	0.057	0.038	0.266	0.093	47.9			NR
22/11/19	98	86	<1	2	124	7	0.016	0.0001	0.154	0.091	0.115	0.064	0.204	0.192	119.0			NR
13/02/20	68	61	1	4	103	18	0.008	<0.0001	0.061	0.047	0.048	0.072	0.100	0.111	48.6			NR
30/05/20	35	36	2	4	91	19	0.009	0.0001	0.054	0.051	0.041	0.048	0.103	0.139	48.3			ND
02/10/20	40	54	3	5	94	19	0.008	<0.0001	0.025	0.026	0.026	0.016	0.117	0.202	24.0			NR
08/12/20	14	49	4	7	126	21	0.008	<0.0001	0.012	0.006	0.013	0.004	0.014	0.053	9.43			NR
21/02/21	62	54	2	6	119	16	0.002	<0.0001	0.003	0.006	0.009	0.001	0.007	0.016	3.26			NR
30/06/21	62	50	2	5	98	17	0.004	<0.0001	0.019	0.022	0.016	0.016	0.045	0.038	16.0			ND
20/09/21	64	50	3	7	102	17	0.003	<0.0001	0.021	0.012	0.013	0.009	0.027	0.032	16.6			NR
10/12/21	52	37	4	7	68	14	0.002	<0.0001	0.007	0.004	0.004	0.004	0.008	0.015	5.40			NR
20/03/22	55	32	3	7	78	15	0.001	<0.0001	<0.001	0.005	0.004	<0.001	0.017	<0.001	0.09			NR
15/07/22	61	45	2	7	93	18	0.003	<0.0001	0.024	0.013	0.016	0.009	0.023	0.038	18.7			ND
28/09/22	44	40	4	8	68	10	<0.001	<0.0001	<0.001	0.003	0.002	<0.001	0.007	0.009	<0.05			NR
11/12/22	40	32	5	6	60	9	0.001	<0.0001	0.004	0.003	0.003	0.002	0.006	0.008	3.12			NR
19/03/23	36	41	5	8	73	12	0.001	<0.0001	0.002	0.004	0.004	0.001	0.005	0.017	1.95			ND
20/07/23	30	37	7	8	64	10	<0.001	<0.0001	0.002	0.003	0.004	<0.001	<0.005	0.026	1.71			ND

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cu = Copper; Ni = Nickel; Cr^{+6} = Hexavalent Chromium; Br = Bromine; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; Bold = unfiltered; NR = Not required; ND = Nil detected.

See Appendix D for archived results July 2006 to December 2018.

Table 18: Field analytes, water level, nutrients, carbon, pesticides, phenols – Well NBH8

NBH8	*Field analytes*					*Water levels*		*Nutrients*				*Carbon*					*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.1	0.05	0.0005 – 0.002
16/07/06	1.17	3323	6.91	+131	16.1	9.04	205.99	377	117	106	9	0.050	1.18	0.7	1.9	0.12		ND
09/09/06	0.58	4000	6.46	+120	23.2	9.10	205.93	419	122	116	8	0.059	0.626	0.4	1.1			ND
12/01/07	3.26	920	6.35	+186	34.3	7.10	207.93	184	97	63	16	0.079	1.60	12.4	14.0			ND
17/04/07	0.32	652	6.16	+144	23.4	5.93	209.10	319	61	79	26	0.067	1.09	2.1	3.2		<0.05	ND
29/07/07	3.53	855	6.46	+133	20.4	4.09	210.94	169	69	52	63	0.143	1.14	8.5	9.6		NR	ND
17/02/08	1.01	962	6.32	+104	22.7	7.62	207.41	169	44	45	42	0.213	0.108	2.5	2.6		NR	NR
13/07/08	-0.05	1876	6.59	+33	21.9	9.07	205.96	173	53	48	20	0.115	0.574	1.2	1.8		<0.05	ND
04/02/09	3.33	3215	7.10	+17	23.2	9.20	205.83	290	44	69	8	0.160	0.20	2.1	2.3		<0.05	ND
29/10/09	0.32	3890	6.62	+64	22.1	9.28	205.75	353	117	101	19	0.030	0.16	0.4	0.5		NR	NR
23/03/10	0.34	4388	6.54	-16	23.1	9.28	205.75	294	78	79	21	0.040	0.06	0.4	0.5		<0.05	ND
06/11/10	1.22	4460	6.50	-22	21.7	9.26	205.77	377	123	108	7	<0.01	0.12	0.2	0.3		NR	NR
11/06/11	0.37	4663	6.63	+15	21.0	9.20	205.83	367	129	107	38	0.30	0.07	0.5	0.6		<0.05	ND
05/01/12	5.14	4635	7.09	+130	21.6	9.21	205.82	353	55	84	6	0.03	0.05	0.3	0.4		NR	NR
25/04/12	1.89	4903	6.77	+95	21.2	9.14	205.89	390	100	104	12	0.02	0.12	0.4	0.5		NR	NR
17/08/12	0.33	5000	6.54	+120	20.3	9.12	205.91	383	59	91	6	0.04	0.09	0.4	0.5		<0.05	ND
09/12/12	5.37	4865	6.96	+75	22.2	9.15	205.88	400	62	96	<1	0.04	0.10	0.3	0.4		<0.05	ND
20/06/13	1.54	5243	6.70	+117	19.9	8.98	206.05	433	59	101	19	0.04	0.13	0.4	0.5		NR	NR
29/11/13	5.71	5170	7.14	+123	20.5	8.98	206.05	419	65	100	24	0.04	0.12	0.2	0.3		<0.05	ND
12/07/14	2.85	5383	6.70	+160	20.8	8.88	206.15	413	79	103	11	0.02	0.14	0.3	0.4		NR	NR
29/11/14	6.10	5468	7.11	+75	23.5	8.95	206.08	500	67	117	10	0.03	0.13	0.3	0.4		<0.05	ND
18/08/15	8.00	5395	7.15	+125	20.1	8.93	206.10	467	47	105	4	0.02	0.12	0.3	0.4		NR	NR
08/12/15	5.35	5643	7.20	+107	26.2	8.93	206.10	427	38	94	5	0.05	0.14	0.2	0.3		<0.05	ND
26/10/16	3.46	5395	7.00	+118	22.0	8.84	206.19	463	65	109	2	0.01	0.21	<1.0	<1.0		NR	NR
09/12/16	4.96	5600	7.15	+108	21.6	8.83	206.20	456	67	108	3	0.01	0.13	0.3	0.4		<0.05	ND
23/05/17	4.97	5613	6.75	+98	21.5	8.76	206.27	467	97	118	7	<0.01	0.12	0.2	0.3		<0.05	ND
09/12/17	6.19	5588	6.83	+58	22.0	8.76	206.27	467	65	109	13	0.10	0.16	0.3	0.5		NR	NR
10/08/18	1.40	5563	6.71	+110	21.2	8.74	206.29	487	76	117	4	0.02	0.17	0.2	0.4		<0.05	ND
06/12/18	4.04	5428	7.10	+162	21.8	8.82	206.21	447	59	104	8	0.03	0.14	0.2	0.3		NR	NR
23/06/19	6.07	5740	6.98	+120	22.1	8.73	206.20	480	59	110	10	<0.01	0.15	0.2	0.4		<0.05	ND
21/11/19	0.88	5700	6.71	+120	25.0	8.83	206.10	483	50	109	7	<0.01	0.16	0.3	0.5		NR	NR
29/05/20	1.12	5505	6.76	+84	23.1	8.86	206.07	477	65	111	9	0.01	0.12	0.2	0.3		<0.05	ND
08/12/20	5.44	5685	7.28	+90	21.4	8.94	205.99	487	65	113	7	0.04	0.13	0.2	0.3		NR	NR
30/06/21	1.13	5793	6.88	-18	25.1	8.96	205.97	487	76	117	5	0.01	0.18	0.3	0.5		<0.05	ND
10/12/21	4.73	5620	7.15	+97	21.9	8.95	205.98	470	56	108	9	0.15	0.37	0.3	0.7		NR	NR
14/07/22	1.34	5595	6.70	+106	20.9	8.89	206.04	493	94	123	12	<0.01	0.30	0.2	0.5		<0.05	ND
08/12/22	4.78	5465	7.08	+96	21.5	8.85	206.08	473	65	111	6	<0.01	0.45	0.2	0.6		NR	NR
19/07/23	6.17	5273	6.92	+145	21.1	8.86	206.07	473	44	105	5	<0.01	0.34	0.3	0.6		<0.05	ND

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = Total Phosphorus; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.

(Original – Coordinates GPS 1m: E761954, N6640909; RL from top of PVC casing = 215.032 m use 215.03 m; RL ground level = 214.075 m; Depth of well from top of PVC = 16.00 m.

23/07/19 Stewart Surveys after PVC casing shortened: Coordinates – E761952.975, N6640913.969; RL from top of PVC casing = 214.926 m. RL calculations therefore adjusted from March 2019 from when PVC casings had been sawn off and shortened.)

Table 19: Laboratory analytes – geochemical, metals, BTEX – Well NBH8

NBH8	*Laboratory analytes – geochemical and metals*																	*BTEX*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	Br	yearly
Measure	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	mg/L
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	0.1	0.001 or 0.002
16/07/06	42	1060	6	19	677	11	<0.001	<0.0001	0.003			0.009	0.017	0.02	0.87		2.8	Toluene 0.003
09/09/06	33	1150	8	24	728	14	0.002	0.0005	0.003			0.002	0.017	0.03	<0.05			Toluene 0.002
12/01/07	40	656	6	17	561	10	0.002	<0.0001	0.020			0.011	0.018	0.02	0.74			ND
17/04/07	37	850	8	21	621	12	0.003	0.0008	0.003			0.055	0.050	0.03	2.30	<0.01		VOCs – ND
29/07/07	52	286	2	4	285	4	0.001	0.0003	0.002			0.066	0.130	0.09	4.58			ND
17/02/08	43	164	<1	3	221	4	0.010	0.0002	0.173			0.164	0.332	0.22	100.0			NR
13/07/08	40	315	3	6	300	5	0.003	0.0002	<0.001	0.023	0.017	0.010	0.040	0.02	0.64			ND
04/02/09	40	788	6	18	668	12	0.003	<0.0001	0.002	0.018	0.021	0.002	0.080	0.03	0.36			ND
29/10/09	37	824	7	22	750	13	0.002	0.0001	<0.001	0.010	0.011	0.004	0.036	0.040	0.41			NR
23/03/10	37	1210	8	27	788	14	0.002	0.0003	0.002	0.020	0.014	0.001	0.072	0.069	0.88			ND
06/11/10	31	1130	8	28	840	13	0.002	<0.0001	0.004	0.010	0.008	<0.001	0.036	0.060	0.37			NR
11/06/11	35	1120	10	35	917	16	0.001	<0.0001	0.002	0.006	0.007	<0.001	0.016	0.042	0.69			ND
05/01/12	<1	1220	10	35	864	16	<0.001	<0.0001	0.003	0.014	0.007	0.003	0.038	0.025	0.23			NR
25/04/12	<1	1220	10	37	944	17	0.002	<0.0001	0.001	0.010	0.007	<0.001	0.039	0.015	<0.05			NR
17/08/12	36	1180	11	38	908	16	0.001	<0.0001	<0.001	0.016	0.008	<0.001	0.039	0.018	<0.05			ND
09/12/12	34	1280	12	40	1010	15	0.001	<0.0001	<0.001	0.011	0.008	<0.001	0.031	0.011	0.07			ND
20/06/13	30	1250	12	41	1020	17	0.001	<0.0001	0.001	0.008	0.006	<0.001	0.020	0.007	<0.05			NR
29/11/13	35	1340	12	43	1080	15	0.002	<0.0001	<0.001	0.019	0.007	<0.001	0.053	0.021	<0.05			ND
12/07/14	24	1530	13	46	1190	19	0.002	<0.0001	<0.001	0.017	0.008	<0.001	0.037	0.007	<0.05			NR
29/11/14	31	1310	12	43	1030	15	0.002	0.0002	<0.001	0.023	0.006	<0.001	0.045	0.014	<0.05			ND
18/08/15	37	1520	12	43	915	14	0.001	<0.0001	<0.001	0.021	0.028	<0.001	0.054	0.009	<0.05			NR
08/12/15	28	1390	13	44	1010	16	0.002	<0.0001	<0.001	0.026	0.019	0.001	0.074	0.004	<0.05			ND
26/10/16	28	1460	13	51	1150	17	0.002	<0.0001	<0.001	0.013	0.007	<0.001	0.015	0.003	<0.05			NR
09/12/16	30	1410	13	48	1070	16	0.002	<0.0001	<0.001	0.017	0.017	<0.001	0.044	0.002	<0.05			ND
23/05/17	29	1400	13	48	1060	16	0.002	<0.0001	<0.001	0.029	0.017	0.001	0.109	0.002	<0.05			ND
09/12/17	29	1490	12	47	1050	15	0.002	<0.0001	<0.001	0.020	0.014	<0.001	0.060	0.002	<0.05			NR
10/08/18	27	1310	10	46	1030	16	0.002	<0.0001	<0.001	0.016	0.009	<0.001	0.097	0.003	<0.05			ND
06/12/18	27	1490	14	47	1110	17	0.002	<0.0001	<0.001	0.017	0.012	<0.001	0.056	0.001	<0.05			NR
23/06/19	29	1550	15	55	1140	18	0.002	<0.0001	<0.001	0.019	0.021	0.001	0.072	0.008	<0.05			ND
21/11/19	28	1530	15	49	1110	17	0.002	<0.0001	<0.001	0.026	0.024	0.004	0.074	0.014	0.08			NR
29/05/20	30	1570	15	49	1110	16	0.002	<0.0001	<0.001	0.015	0.014	0.002	0.082	0.012	0.07			ND
08/12/20	29	1670	14	52	1140	17	0.002	<0.0001	<0.001	0.014	0.009	0.002	0.044	0.008	0.05			NR
30/06/21	28	1640	15	52	1140	18	0.002	<0.0001	<0.001	0.007	0.010	0.002	0.070	0.011	0.08			ND
10/12/21	29	1570	15	51	1160	17	0.002	<0.0001	<0.001	0.009	0.008	0.003	0.057	0.010	0.12			NR
14/07/22	28	1620	14	51	1110	16	0.001	<0.0001	<0.001	0.014	0.010	0.003	0.104	0.007	<0.05			ND
08/12/22	28	1560	16	56	1200	18	0.002	<0.0001	<0.001	0.011	0.007	0.003	0.062	0.013	0.05			NR
19/07/23	27	1580	14	51	1130	17	0.002	<0.0001	<0.001	0.012	0.006	0.006	0.042	0.023	0.16			ND

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; Br = Bromine; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; Bold = unfiltered; NR = Not required; ND = Nil detected.

6.2 Surface water quality results – licensed

Table 20: Field analytes, nutrients, carbon, pesticides, phenols – Surface water point NS1

NS1	FLOW or No flow	*Field analytes*					*Nutrients*					*Carbon*				*Pesticides*		
		DO	EC	pH	Eh	Temp	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	Alk	Free CO_2	CO_2 + Alk	TOC	OC & OP	*Total Phenols*	*Oil & Grease*
Measure		mg/L	µS/cm	1-14	mV	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit		0.01	1	0.01	1	0.1	0.010	0.01	0.1	0.1	0.1	1	1	1	1	0.0005 – 0.002	0.05	5
17/04/07	No flow	7.08	994	7.78	+136	23.8	0.123	4.24	11.2	15.4	4.26	207	4	42	29	ND	<0.05	
29/07/07	No flow	8.13	390	7.50	+169	11.1	0.242	1.16	6.0	7.2	1.94	101	2	20	18	ND	<0.050	
18/11/07	No flow	5.88	296	7.29	+105	34.6	0.103	1.26	6.5	7.8	1.82	87	4	18	29	NR	NC	
12/02/08	FLOW	8.54	217	8.00	+94	24.9	0.173	0.014	5.5	5.5	0.85	42	2	9	19	NC		
06/04/08	No flow																	
13/07/08	No flow																	
10/09/08	No flow																	
04/02/09	No flow																	
10/04/09	No flow																	
29/10/09	No flow																	
23/03/10	No flow																	
21/08/10	No flow																	
06/11/10	No flow																	
02/03/11	No flow																	
11/06/11	No flow																	
05/01/12	No flow																	
24/02/12	No flow	9.10	2620	8.29	-42	31.2		<0.01	8.8	8.8	1.39	467	12	95	NT			
25/04/12	No flow																	
16/08/12	No flow																	
02/02/13	FLOW	6.74	387	6.57	+132	27.0	0.20	0.01	3.9	3.9	0.34	66	15	21	30			<5
25/09/13	No Flow																	
30/11/13	FLOW	13.16	198	8.42	+106	25.9	0.19	<0.01	9.1	9.1	2.31	50	1	10	7			<5
12/07/14	No flow																	
10/03/15	No flow																	
18/08/15	No flow																	
16/10/15	No flow																	
08/12/15	No flow																	
09/03/16	No flow																	
24/10/16	No flow	13.20	307	8.87	+135	28.0	0.07	0.08	2.2	2.3	0.43	93	<1	18	11			<5
10/12/16	No flow	8.16	454	7.80	+168	33.0	0.03	0.06	1.5	1.6	0.20	153	15	34	12			<5
10/12/17	No flow	3.89	267	6.95	+163	25.7	0.04	<0.01	1.0	1.0	0.24	100	18	24	10			<5
28/03/18	No flow																	
10/08/18	No flow																	
06/12/18	No flow	6.82	291	8.17	+269	25.8	0.03	<0.01	1.3	1.3	0.14	117	12	26	11			<5
05/03/19	No flow																	
22/06/19	No flow																	
30/09/19	No flow																	
21/11/19	No flow																	
10/02/20	FLOW		126	7.44			0.27	0.38	1.8	2.2	0.70				5			8
31/03/20	FLOW		167	7.28			0.18	0.16	1.6	1.8	0.70				5			<5
30/05/20	No flow	7.86	200	8.10	+136	20.6	0.08	0.72	0.6	1.3	0.36	77	12	18	5			<5
08/12/20	No flow																	
23/03/21	FLOW		130	7.46			0.08	0.36	1.3	1.6	0.32				7			<5
01/07/21	FLOW	8.65	221	6.90	+122	13.2	0.21	1.04	2.2	3.2	0.21	73	9	17	7			5
10/12/21	No flow	6.46	207	6.85	+89	25.7	0.08	0.35	1.2	1.6	0.54	93	15	22	7			<5
11/12/22	No flow	6.63	226	7.97	+130	24.6	0.19	0.50	1.0	1.5	0.33	70	9	16	6			<5

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = total Phosphorus; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; OC & OP = Organochlorine & Organophosphorus pesticides; NR = Not required; ND = Nil detected; NC = Not continuing.
NOTE: Voluntary assessments of the water quality has been taken on extra occasions to give an overall understanding of the water's irrigation potential. Only the results for FLOW were necessary under the Environment Protection Licence. All results are kept in the one table for comparison purposes.

Table 21: Lab analytes – geochemical, metals, water depth, SS – Surface water point NS1

NS1	FLOW or No flow	*Laboratory analytes – geochemical and metals*															*Water depth*	*SS*	*VFR*
		SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	gauge		
Measure		mg/L	mg/L	mg/L	mg/L	mg/L	mg/	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	m	mg/L	kL/day
Reporting Limit		1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	1	
17/04/07	No flow	109	113	9	5	183	8	0.005	0.0013	0.002			0.020	0.202	0.29	1.63	1.00	1,000	
29/07/07	No flow	35	52	5	3	66	3	0.006	0.0003	0.075			0.079	0.308	0.58	91.7	0.60	135	
18/11/07	No flow	29	26	7	4	43	5	0.006	0.0011	0.076			0.105	0.293	0.41	90.0	0.80	376	
12/02/08	FLOW	14	14	4	3	29	3	0.004	0.0002	0.049			0.053	0.150	0.19	42.3	0.10	150	734
06/04/08	No flow																		
13/07/08	No flow																		
10/09/08	No flow																		
04/02/09	No flow																		
10/04/09	No flow																		
29/10/09	No flow																		
23/03/10	No flow																		
21/08/10	No flow																		
06/11/10	No flow																		
02/03/11	No flow																		
11/06/11	No flow																		
05/01/12	No flow																		
24/02/12	No flow	NC	NC	NC	NC	NC	NC	0.011	<0.0001	0.003	0.009	0.021	0.003	0.026	0.20	1.23	0.35	29	
25/04/12	No flow																		
16/08/12	No flow																		
02/02/13	FLOW							0.003	<0.0001	<0.001	0.006	0.005	<0.001	<0.005	0.02	0.20	0.15	376	7.78
25/09/13	No Flow																		
30/11/13	FLOW							0.003	<0.0001	0.001	0.007	0.004	0.002	0.013	0.006	0.88	0.15	327	2.0
12/07/14	No flow																		
10/03/15	No flow																		
18/08/15	No flow																		
16/10/15	No flow																		
08/12/15	No flow																		
09/03/16	No flow																		
24/10/16	No flow							0.002	<0.0001	<0.001	0.004	0.002	<0.001	<0.005	0.001	<0.05	0.20	42	
10/12/16	No flow							0.003	<0.0001	<0.001	0.003	0.002	<0.001	<0.005	0.001	<0.05	0.30	26	
10/12/17	No flow							0.005	<0.0001	<0.001	0.001	<0.001	<0.001	<0.005	0.060	<0.05	0.20	12	
28/03/18	No flow																		
10/08/18	No flow																		
06/12/18	No flow							0.002	<0.0001	<0.001	0.003	0.001	<0.001	0.005	<0.001	<0.05	0.35	31	
05/03/19	No flow																		
22/06/19	No flow																		
30/09/19	No flow																		
21/11/19	No flow																		
10/02/20	FLOW							0.005	0.0001	0.041	0.025	0.024	0.049	0.136	0.298	38.8	0.04	240	
31/03/20	FLOW							0.006	<0.0001	0.040	0.021	0.021	0.038	0.110	0.204	30.3		49	
30/05/20	No flow							0.001	<0.0001	<0.001	0.002	0.001	<0.001	<0.005	0.001	<0.05	0.70	15	None
08/12/20	No flow																		
23/03/21	FLOW							0.002	<0.0001	0.013	0.009	0.008	0.017	0.043	0.133	11.9		104	40.5
01/07/21	FLOW							0.002	<0.0001	0.017	0.012	0.009	0.018	0.062	0.076	15.1	0.80	14	8.1
10/12/21	No flow							0.003	<0.0001	0.020	0.016	0.012	0.027	0.084	0.234	17.2	1.60	58	None
11/12/22	No flow							0.004	<0.0001	0.018	0.011	0.010	0.017	0.060	0.195	15.8	1.40	5	None

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; SS = Suspended solids; VFR = Volumetric Flow Rate; NC = Not Continuing.
NOTE: Voluntary assessments of the water quality has been taken on extra occasions to give an overall understanding of the water's irrigation potential. Only the results for FLOW were necessary under the Environment Protection Licence. All results are kept in the one table for comparison purposes.

Table 22: Field analytes, nutrients, carbon, pesticides, phenols – Surface water point NS2

NS2	FLOW or No flow	*Field analytes*					*Nutrients*					*Carbon*				*Pesticides*		
		DO	EC	pH	Eh	Temp	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	Alk	Free CO_2	CO_2 + Alk	TOC	OC & OP	*Total Phenols*	*Oil & Grease*
Measure		mg/L	µS/cm	1-14	mV	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit		0.01	1	0.01	1	0.1	0.010	0.01	0.1	0.1	0.1	1	1	1	1	0.0005 – 0.002	0.05	5
17/04/07	No flow	7.98	333	8.54	+128	26.8	0.041	0.259	5.5	5.8	2.42	130	1	26	7	ND	<0.05	
28/07/07	No flow	9.77	318	9.11	+89	15.1	0.102	0.693	3.6	4.3	1.78	92	3	19	8	ND	<0.050	
18/11/07	No flow	12.77	203	9.11	+68	32.5	0.099	0.096	8.7	8.8	2.98	70	<1	14	42	NR	NR	
12/02/08	FLOW	6.86	292	7.55	+91	24.3	0.142	0.606	3.0	3.6	1.71	74	1	15	25	NC	NC	
06/04/08	No flow																	
13/07/08	No flow																	
10/09/08	No flow																	
04/02/09	No flow																	
10/04/09	No flow																	
29/10/09	No flow																	
23/03/10	No flow																	
21/08/10	No flow																	
06/11/10	No flow																	
02/03/11	No flow																	
11/06/11	No flow																	
05/01/12	No flow																	
24/02/12	No flow	18.25	771	9.19	-49	32.1	NT	<0.01	4.9	4.9	0.43	210	<1	41	NT			
25/04/12	No flow																	
16/08/12	No flow																	
02/02/13	FLOW	2.26	274	6.73	+154	25.1	0.11	0.18	3.1	3.3	0.32	67	15	21	18			<5
25/09/13	No Flow																	
30/11/13	FLOW	7.47	172	7.07	+144	25.2	0.07	0.24	2.7	2.9	1.73	57	15	15	4			<5
12/07/14	No flow																	
10/03/15	No flow																	
18/08/15	No flow																	
16/10/15	No flow																	
08/12/15	No flow																	
09/03/16	No flow																	
24/10/16	No flow	6.36	721	7.89	+186	27.1	0.24	0.40	2.4	2.8	0.49	160	12	35	27			<5
10/12/16	No flow	11.40	1244	8.50	+142	31.2	0.09	0.01	2.8	2.8	0.27	280	<1	56	32			<5
10/12/17	No flow	2.82	785	7.47	+220	24.4	0.03	<0.01	3.1	3.1	0.20	143	23	35	40			<5
28/03/18	No flow																	
10/08/18	No flow																	
06/12/18	No flow	6.53	547	8.22	+187	27.4	0.07	<0.01	1.9	1.9	0.47	183	15	40	20			<5
05/03/19	No flow																	
22/06/19	No flow																	
30/09/19	No flow																	
21/11/19	No flow																	
30/05/20	No flow	8.54	398	8.33	+97	20.2	0.03	0.36	1.1	1.5	0.30	107	0	21	9			<5
08/12/20	No flow																	
23/03/21	No flow																	
10/12/21	No flow	9.19	553	8.23	+89	26.7	0.05	<0.01	2.8	2.8	0.35	137	6	28	22			<5
11/12/22	No flow	5.07	559	7.97	+113	23.9	1.06	0.14	2.9	3.0	0.21	193	15	42	17			<5

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = total Phosphorus; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; OC & OP = Organochlorine & Organophosphorus; NR = Not required; ND = Nil detected; NC = Not continuing.
NOTE: Voluntary assessments of the water quality has been taken on extra occasions to give an overall understanding of the water's irrigation potential. Only the results for FLOW were necessary under the Environment Protection Licence. All results are kept in the one table for comparison purposes.

Table 23: Laboratory analytes – geochemical, metals, water depth, SS – Surface water NS2

NS2	FLOW or No flow	*Laboratory analytes – geochemical and metals*															*Water depth*	*SS*	*VFR*
		SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe			
Measure		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	m	mg/L	kL/day
Reporting Limit		1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	1	-
17/04/07	No flow	7	36	2	4	68	6	0.002	0.0005	<0.001	NT	NT	0.004	0.169	0.19	1.28	0.80	115	NT
28/07/07	No flow	12	46	2	2	59	3	0.007	0.0008	0.104	NT	NT	0.120	0.626	0.37	189.0	0.40	98	NT
18/11/07	No flow	14	22	2	2	42	4	0.007	0.0008	0.103	NT	NT	0.168	1.05	0.82	0.88	0.70	316	NT
12/02/08	FLOW	3	23	<1	<1	12	1	0.005	0.0005	0.078	NT	NT	0.119	0.491	0.37	64.10	0.05	339	194
06/04/08	No flow																		
13/07/08	No flow																		
10/09/08	No flow																		
04/02/09	No flow																		
10/04/09	No flow																		
29/10/09	No flow																		
23/03/10	No flow																		
21/08/10	No flow																		
06/11/10	No flow																		
02/03/11	No flow																		
11/06/11	No flow																		
05/01/12	No flow																		
24/02/12	No flow	NC	NC	NC	NC	NC	NC	0.010	<0.0001	0.003	0.014	0.020	0.007	0.015	0.205	1.21	0.25	59	No flow
25/04/12	No flow																		
16/08/12	No flow																		
02/02/13	FLOW							0.003	<0.0001	<0.001	0.004	0.005	<0.001	0.006	0.055	0.12	0.25	300	7.2
25/09/13	No Flow																		
30/11/13	FLOW							0.003	<0.0001	0.001	0.009	0.004	0.002	0.018	0.007	0.78	0.10	323	2.0
12/07/14	No flow																		
10/03/15	No flow																		
18/08/15	No flow																		
16/10/15	No flow																		
08/12/15	No flow																		
09/03/16	No flow																		
24/10/16	No flow							0.004	<0.0001	<0.001	0.006	0.004	<0.001	0.007	0.012	<0.05	0.25	10	No flow
10/12/16	No flow							0.008	<0.0001	<0.001	0.005	0.006	<0.001	<0.005	<0.001	<0.05	0.15	24	No flow
10/12/17	No flow							0.007	<0.0001	0.001	0.004	0.004	<0.001	0.010	0.220	0.33	0.15	14	No flow
28/03/18	No flow																		
10/08/18	No flow																		
06/12/18	No flow							0.006	<0.0001	<0.001	0.005	0.003	<0.001	0.012	0.014	<0.05	0.15	33	No flow
05/03/19	No flow																		
22/06/19	No flow																		
30/09/19	No flow																		
21/11/19	No flow																		
30/05/20	No flow							0.003	<0.0001	<0.001	0.007	0.003	<0.001	<0.005	<0.001	<0.05	0.20	6	No flow
08/12/20	No flow																		
23/03/21	No flow																		
10/12/21	No flow							0.004	<0.0001	0.003	0.005	0.005	0.003	0.012	0.157	1.70	0.80	13	No flow
11/12/22	No flow							0.005	<0.0001	0.009	0.006	0.008	0.007	0.030	0.189	6.63	0.80	6	No flow

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cr^{+6} = Hexavalent Chromium; SS = Suspended solids; VFR = Volumetric Flow Rate; NC = Not continuing.
NOTE: Voluntary assessments of the water quality has been taken on extra occasions to give an overall understanding of the water's irrigation potential. Only the results for FLOW were necessary under the Environment Protection Licence. All results are kept in the one table for comparison purposes.

6.3 Surface water quality results – voluntary

On a number of occasions, voluntary sampling was undertaken to ascertain site surface water runoff quality. These sampling points were defined as NS3, NS4, NS5 and NS6 (Figure 1).

Table 24: Field analytes, nutrients, carbon, pesticides, phenols – Surface water point NS3

NS3	*Field analytes*					*Nutrients*					*Carbon*				*Pesticides*	*Total Phenols*
	DO	EC	pH	Eh	Temp	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	Alk	Free CO_2	CO_2 + Alk	TOC	OC & OP	
Measure	mg/L	µS/cm	1-14	mV	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.010	0.01	0.1	0.1	0.1	1	1	1	1	0.0005 – 0.002	0.05
24/02/12	8.10	471	8.74	-75	33.8	NR	<0.01	3.7	3.7	0.62	111	12	25	NR	NR	NR

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = Total Phosphorus; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; OC & OP = Organochlorine & Organophosphorus; NR = Not required.

Table 25: Laboratory analytes – geochemical, metals, water depth, SS – Surface water NS3

NS3	*Laboratory analytes – geochemical and metals*																*Water depth*	*SS*	*VFR*
	SO_4	Cl	Ca	Mg	Na	K	Fe	Mn	As	Cd	Cr	Cr^{+6}	Cu	Ni	Pb	Zn			
Measure	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	m	mg/L	kL/day
Reporting Limit	1	1	1	1	1	1	0.01	0.1	0.001	0.0001	0.001	0.01	0.001	0.001	0.001	0.001	0.01	1	-
24/02/12	NR	NR	NR	NR	NR	NR	1.60	0.061	0.003	<0.0001	0.001	NR	0.010	0.006	0.005	0.016	0.08	49	No flow

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; Fe = Iron; Mn = Manganese; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cr^{+6} = Hexavalent Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; SS = Suspended solids; VFR = Volumetric Flow Rate; NR = Not required.

Table 26: Field analytes, nutrients, carbon, pesticides, phenols – Surface water point NS4

NS4	*Field analytes*					*Nutrients*					*Carbon*				*Pesticides*	*Total Phenols*
	DO	EC	pH	Eh	Temp	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	Alk	Free CO_2	CO_2 + Alk	TOC	OC & OP	
Measure	mg/L	µS/cm	1-14	mV	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.010	0.01	0.1	0.1	0.1	1	1	1	1	0.0005 – 0.002	0.05
24/02/12	8.71	865	8.69	-63	31.8	NR	0.01	8.0	8.0	1.79	243	<1	48	NR	NR	NR

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = Total Phosphorus; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; OC & OP = Organochlorine & Organophosphorus; NR = Not required.

Table 27: Laboratory analytes – geochemical, metals, water depth, SS – Surface water NS4

NS4	*Laboratory analytes – geochemical and metals*																*Water depth*	*SS*	*VFR*
	SO_4	Cl	Ca	Mg	Na	K	Fe	Mn	As	Cd	Cr	Cr^{+6}	Cu	Ni	Pb	Zn			
Measure	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	m	mg/L	kL/day
Reporting Limit	1	1	1	1	1	1	0.01	0.1	0.001	0.0001	0.001	0.01	0.001	0.001	0.001	0.001	0.01	1	-
24/02/12	NR	NR	NR	NR	NR	NR	<0.05	0.149	0.007	<0.0001	<0.001	NR	0.009	0.009	<0.001	0.014	0.20	428	No flow

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; Fe = Iron; Mn = Manganese; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cr^{+6} = Hexavalent Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; SS = Suspended solids; VFR = Volumetric Flow Rate; NR = Not required.

Table 28: Field analytes, nutrients, carbon, pesticides, phenols – Surface water point NS6

NS6	*Field analytes*					*Nutrients*					*Carbon*			
	DO	EC	pH	Eh	Temp	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	Alk	Free CO_2	CO_2 + Alk	TOC
Measure	mg/L	µS/cm	1-14	mV	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.010	0.01	0.1	0.1	0.1	1	1	1	1
24/10/16	7.85	381	7.41	+205	27.3	NR	0.09	0.74	5.4	6.1	87	15	21	16
10/12/16	7.44	402	7.91	+99	30.0	0.13	0.37	3.40	3.8	1.15	93	18	23	12
10/12/17	6.98	718	7.77	+227	24.6	0.12	0.13	2.60	2.7	1.08	157	21	36	15

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = Total Phosphorus; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NR = Not required.

Table 29: Laboratory analytes – geochemical, metals, water depth, SS – Surface water NS6

NS6	*Laboratory analytes – geochemical and metals*									*Water depth*	*SS*	*VFR*
	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe			
Measure	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	m	mg/L	kL/day
Reporting Limit	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.01	1	-
24/10/16	0.002	<0.0001	0.002	0.006	0.005	0.001	0.006	0.004	1.01	0.20	52	No flow
10/12/16	0.002	<0.0001	<0.001	0.005	0.003	<0.001	<0.005	0.002	0.16	0.25	25	No flow
10/12/17	0.008	<0.0001	0.057	0.029	0.037	0.033	0.081	0.192	47.0	0.15	42	No flow

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; Fe = Iron; Mn = Manganese; As = Arsenic; Cd = Cadmium; Cr = Chromium; Cr^{+6} = Hexavalent Chromium; Cu = Copper; Ni = Nickel; Pb = Lead; Zn = Zinc; SS = Suspended solids; VFR = Volumetric Flow Rate; NR = Not required.

6.4 Leachate quality

Table 30: Field analytes, nutrients, carbon, ions – Leachate NL1

NL1	*Field analytes*					*Nutrients*					*Carbon*				*Anions and cations*						
	DO	EC	pH	Eh	Temp	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	Alk	Free CO_2	CO_2 + Alk	TOC	SO_4	Cl	Ca	Mg	Na	K	Fl
Measure	mg/L	µS/cm	1-14	mV	°C	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
Reporting Limit	0.01	1	0.01	1	0.1	0.010	0.01	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	0.1
15/04/07	20.98	2515	7.98	+92	26.8	25.4	0.023	40.4	40.4	2.20	916	3	181	149	11	204	69	25	357	82	NT
18/11/07	2.07	1630	7.55	+124	29.8	1.32	<0.01	25.5	25.5	1.38	815	21	166	174	7	91	134	16	220	29	NT
06/04/08	No	leach	ate																		
13/07/08	No	leach	ate																		
10/09/08	No	leach	ate																		
04/02/09	No	leach	ate																		
10/04/09	13.88	4515	8.38	+80	25.7	47.5	0.01	81.5	81.5	1.68	873	<1	172	264	268	783	130	56	621	173	0.2
23/03/10	No	leach	ate																		
21/08/10	No	leach	ate																		
06/11/10	No	leach	ate																		
02/03/11	No	leach	ate																		
11/06/11	No	leach	ate																		
05/01/12	No	leach	ate																		
22/04/12	14.72	1730	8.98	+24	24.8	0.12	<0.01	16.2	16.2	1.21	533	<1	105	93	<1	239	26	18	271	47	0.3
02/02/13	8.07	3760	8.87	+86	26.5	4.03	0.07	34.0	34.1	2.06	867	<1	171	203	6	656	12	14	789	76	0.6
12/07/14	13.04	5065	9.46	+97	15.3	0.15	<0.01	14.9	14.9	2.18	955	<1	188	133	60	1040	26	33	1120	93	0.6
18/08/15	8.93	3110	8.93	+139	21.3	0.56	0.07	8.5	8.6	1.57	700	<1	138	53	54	588	14	15	657	45	0.7
24/10/16	10.29	1117	8.42	+161	26.1	0.02	0.06	3.4	3.5	1.60	340	<1	67	16	26	162	12	6	218	14	0.3
10/12/17	9.77	2371	8.41	+117	28.7	0.12	0.13	2.6	2.7	1.08	433	0	85	15	82	362	8	5	457	20	0.8
11/08/18	1.28	16870	7.62	+3	19.7	640.0	0.64	702.0	703.0	7.11	5200	880	1263	1800	<100	2290	1	1	26	7	0.3
23/06/19	1.51	16230	8.54	+54	16.1	563.0	0.53	828.0	828.0	7.72	5000	0	984	2060	<100	2840	72	136	2660	706	0.3
30/05/20	1.69	14570	8.76	+69	20.9	523.0	<2.00	904.0	904.0	8.62	6000	0	1180	1700	<200	2350	80	98	2490	628	0.4
09/12/20	1.83	16325	8.49	+38	30.2	669.0	<1.00	810.0	810.0	7.54	4400	0	866	1850	<50	3000	84	101	2370	725	0.3
18/08/21	3.44	13665	9.16	+3	15.9	563.0	<1.00	787.0	787.0	7.42	5200	0	1023	1470	<100	2350	4	10	240	63	0.3
11/12/21	1.85	13255	8.78	+40	29.5	311.0	<0.50	470.0	470.0	8.74	5600	0	1102	1490	<100	2470	81	109	2600	653	0.3
15/07/22	4.62	12360	8.95	+43	19.3	231.0	<1.00	362.0	362.0	6.86	6000	0	1180	1130	<100	1550	3	7	162	42	0.3
20/07/23	1.95	12125	8.67	+13	16.2	542.0	<1.00	740.0	740.0	7.67	5000	0	984	1470	<100	2120	78	96	2220	586	0.3

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = Total Phosphorus; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; Fl = Fluoride; NT = Not tested; Bold = unfiltered.

Table 31: Laboratory analytes metals – Leachate NL1

NL1	*Laboratory analytes – metals*																		
	Br	Al	As	B	Ba	Be	Cd	Co	Cr	Cu	Mn	Ni	Pb	Se	V	Zn	Fe	Hg	Cr^{+6}
Measure	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	mg/L	mg/L
Reporting Limit	0.1	0.01	0.001	0.05	0.001	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.01	0.005	0.01	0.0001	0.002
15/04/07	0.8	NT	0.007				<0.0001		0.005		0.63		0.005			0.043	19.4		
18/11/07			0.006				0.0002		0.002		1.42		0.002			0.034	14.8		
06/04/08	No	leac	hate																
13/07/08	No	leac	hate																
10/09/08	No	leac	hate																
04/02/09	No	leac	hate																
10/04/09	NT	0.62	0.015		0.184	<0.001	0.0004	0.030	0.101	0.022	0.456	0.112	0.009		0.07	0.104	4.88	<0.0001	<0.002
23/03/10	No	leac	hate																
21/08/10	No	leac	hate																
06/11/10	No	leac	hate																
02/03/11	No	leac	hate																
11/06/11	No	leac	hate																
05/01/12	No	leac	hate																
22/04/12	NR	0.10	0.016		0.066	<0.001	<0.0001	0.003	0.009	0.002	0.270	0.010	<0.001		0.02	0.009	0.30	<0.0001	<0.001
02/02/13	NR	4.63	0.033		0.139	<0.001	<0.0001	0.007	0.014	0.007	0.093	0.023	0.004		0.04	0.020	5.34	<0.0001	0.004
12/07/14	NR	3.52	0.020		0.154	<0.001	<0.0001	0.006	0.009	0.019	0.040	0.030	0.002	<0.01	0.09	0.018	3.30	<0.0001	<0.001
18/08/15	NR	5.97	0.012		0.154	<0.001	<0.0001	0.006	0.012	0.014	0.086	0.019	0.006	<0.01	0.07	0.029	7.40	<0.0001	0.004
08/12/15	No	leac	hate																
24/10/16	NR	18.8	0.009		0.172	<0.001	<0.0001	0.007	0.025	0.011	0.098	0.017	0.012	<0.01	0.05	0.030	20.2	<0.0001	0.002
10/12/17	NR	49.8	0.023		0.532	0.004	0.0002	0.032	0.082	0.036	0.667	0.047	0.048	<0.01	0.24	0.128	60.5	<0.0001	0.001
11/08/18	NR	2.7	0.033		0.749	<0.001	0.0019	0.102	0.900	0.119	1.44	0.382	0.094	<0.01	0.26	0.929	25.6	<0.0010	<0.100
23/06/19	NR	9.82	0.032	2.43	0.750	<0.010	0.0035	0.110	0.983	0.186	1.46	0.377	0.117	<0.10	0.27	1.380	27.0	<0.0010	<0.100
30/05/20	NR	2.96	0.036	2.42	0.795	<0.001	0.0021	0.111	0.919	0.114	1.39	0.379	0.086	<0.01	0.23	1.300	22.1	<0.0010	<0.500
09/12/20	NR	2.88	0.033	2.77	0.667	<0.021	0.0022	0.116	1.030	0.099	1.55	0.397	0.080	<0.21	0.24	1.310	23.5	<0.0020	<0.100
18/08/21	NR	1.92	0.028	2.52	0.574	<0.010	0.0013	0.097	0.795	0.046	1.24	0.326	0.037	<0.10	0.20	0.805	23.5	<0.0010	<0.100
11/12/21	NR	2.14	0.027	2.91	0.630	<0.010	0.0012	0.082	0.688	0.128	1.31	0.309	0.051	<0.10	0.16	1.090	20.5	<0.0001	<0.100
15/07/22	NR	2.16	0.026	2.75	0.632	<0.021	<0.0021	0.096	0.745	0.142	1.28	0.344	0.050	<0.21	0.22	1.250	24.9	<0.0100	<0.100
20/07/23	NR	1.58	0.021	2.63	0.561	<0.010	0.0011	0.076	0.562	0.169	0.997	0.273	0.046	<0.10	0.16	0.525	19.4	<0.0010	<0.100

Abbreviations: Br = Bromine; Al = Aluminium; As = Arsenic; B = Boron; Ba = Barium; Be = Beryllium; Cd = Cadmium; Co = Cobalt; Cr = Chromium; Cu = Copper; Mn = Manganese; Ni = Nickel; Pb = Lead; Se= Selenium; V = Vanadium; Zn = Zinc; Fe = Iron; Hg = Mercury; Cr^{+6} = Hexavalent Chromium; NR = Not required; Bold = Unfiltered.

Table 32: Laboratory analytes organics plus sample depth – Leachate NL1

NL1	*Total petroleum hydrocarbons (TPH) fractions*					*VOCs*	*Pesticides*	*Total Phenols*	*PAHs*	*Sample Depth*
	C6-C9	C10-C14	C15-C28	C29-C36	>C10-C36 (sum)		OC & OP			
Measure	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	m
Reporting Limit	0.020	0.050	0.100	0.050	0.050	1	0.0005 – 0.002	0.05		0.01
15/04/07	NT					nil detected	nil detected	<0.05		0.12
18/11/07	NT					Toluene 0.007	NT	NT		0.10
06/04/08	No	leachate								
13/07/08	No	leachate								
10/09/08	No	leachate								
04/02/09	No	leachate								
10/04/09	<0.020	1.880	14.400	4.300	20.580	<LOR	<LOR	0.46	<LOR	0.10
23/03/10	No	leachate								
21/08/10	No	leachate								
06/11/10	No	leachate								
02/03/11	No	leachate								
11/06/11	No	leachate								
05/01/12	No	leachate								
22/04/12	<0.020	0.150	1.140	0.230	1.520	<LOR	<LOR	<0.05	<LOR	0.30
02/02/13	<0.020	0.220	0.990	0.180	1.390	<LOR	<LOR	<0.05	<LOR	0.25
12/07/14	<0.020	0.160	1.290	0.260	1.710	<LOR	<LOR	<0.05	<LOR	0.10
18/08/15	<0.020	0.150	0.540	0.160	0.850	<LOR	<LOR	<0.05	<LOR	0.15
08/12/15	No									
24/10/16	<0.020	<0.050	0.280	0.060	0.340	<LOR	<LOR	<0.05	<LOR	0.20
10/12/17	<0.020	0.090	0.380	0.120	0.590	<LOR	<LOR	<0.05	<LOR	0.08
11/08/18	0.120	2.110	9.880	0.440	12.400	Benzene 0.001 Ethylbenzene 0.006 Xylenes 0.018	<LOR	<0.25	<LOR	15cm at base of tank
23/06/19	0.060	2.180	8.580	0.650	11.400	<LOR	<LOR	<0.25	<LOR	10cm base of tank
30/05/20	0.050	2.130	10.600	0.920	13.600	<LOR	<LOR	<0.10	<LOR	8cm base of tank
09/12/20	0.040	1.520	8.870	0.540	10.900	<LOR	<LOR	<0.10	<LOR	8cm base of tank
18/08/21	<0.001	1.290	5.120	0.530	6.940	<LOR	<LOR	<0.10	<LOR	6cm base of tank
11/12/21	<0.020	1.290	7.700	0.790	9.780	<LOR	<LOR	<0.20	<LOR	6cm base of tank
15/07/22	<1.000	1.080	4.520	0.460	6.060	<LOR	<LOR	<0.05	<LOR	6cm base of tank
20/07/23	<0.100	1.730	8.230	0.500	10.500	<LOR	<LOR	<0.10	<LOR	10cm base of tank

Abbreviations: VOCs = Volatile Organic Compounds; OC & OP = Organochlorine & Organophosphorus; PAHs = Polyaromatic Hydrocarbons; NT = Not tested; LOR = Level of reporting.

6.5 Groundwater quality – surrounding properties

In March 2019, at Narrabri Council request, CodyHart sampled bore water at properties surrounding the current and old Narrabri landfills and found that their water quality was safe for intended purposes (drinking, home use, stock drinking and irrigation) and that no effects can be contributed to landfill leachates.

This proof of no landfill leachate effects on the closest users of groundwater is supported by risk reduction factors:

1. There are attenuating clay lenses in the Lower Namoi alluvium.
2. There is a low hydraulic gradient.
3. Due to 1 above combined with 2, site groundwater velocity is slow and was estimated at 0.38 m/year in early July 2007.
4. The distance to the closest neighbouring bores is 500 m, one to the north and one to the south, which allows more attenuation of landfill leachate.
5. The northern landfill cell and leachate collection system were engineered to prevent leachate contamination of groundwater from incoming waste. Further engineering controls of the old section of the landfill, plus the construction of a new cell on top of it, reduces the risk of groundwater contamination from the old, unlined section of the landfill.

7. WATER QUALITY COMPARISONS

The following table includes guidelines from the latest Australian and New Zealand surface water quality guidelines (Year 2000) and drinking water guidelines (2011). Its purpose is to aid review of environmental health risks for specific forms of water beneficial uses.

Table 33: Environmental health warning limits - some landfill analytes

Analyte	***Reason for Inclusion***	***Aquatic*** 1	***Human*** 2	***Irrigation*** 3	***Livestock*** 4
Temperature	Biodegradation of waste increases temperature. Temp + EC have successfully defined a leachate plume (Scrudato & Pagano, 1994).	>80%ile <20%ile	NR	NR	NR
pH	varies from acidic to alkaline as waste decomposition progresses (Andreottola & Cannas, 1992:72). But pH levels in groundwater are often naturally low.	6.5 to 8.0 (2000); 6.5 – 9.0 (1992)	6.5 to 8.5 (A)	>6 limits corrosion of pipes	NR
Electric Conductivity (EC)	a general indicator that summarises the general trend of major cation and anion concentrations.	125 - 2200 µS/cm (2000); ≤1500 µS/cm (1992)	>1875 µS/cm (unpalatable)	varies, e.g., ≤1,000µS/cm carrots	≥3582 µS/cm analyse for specific ions which may affect
Alkalinity	Measures acid-neutralising capacity, a solution's ability to buffer, that is stop pH changing. Often high in leachate, but some groundwaters can also have high alkalinity.	NR	NR	NR	NR
Ammonia	From decaying plants and animals. May be high in leachate (Hancock & Phillips, 1992:22). Toxic to fish (ANZECC, 1992:2-30).	Table 8.3.7 ≤0.18 mg/L as N for pH 9.0; ≤0.9 mg/L as N pH 8.0; ≤2.18 mg/L pH 7.0.	≤0.04 mg/L as N (A – corrosion of copper pipes)	Nitrogen ≤5 mg/L (long term; 25-125 mg/L (short term – up to 20 years)	NR
Nitrate	From final stage of plant and animal decomposition or fertilisers. May be high in leachate (Canter *et. al*, 1997:6). Toxic to infants and livestock (ANZECC, 1992:4-10,5-23).	Table 3.3.2 eutro - NO_x as N ≤0.015 mg/L; TN ≤0.25 mg/L; Table 3.4.1 Toxic ≤0.158 NO_x as N	≤11.3 mg/L as N (2011) for up to 3 month bottle fed babies. Others ≤22.6 mg/L as N.	As for ammonia	≤ 90 mg/L as N; Nitrite ≤9 mg/L as N

Table 33 continued:

Analyte	***Reason for Inclusion***	***Aquatic*** 1	***Human*** 2	***Irrigation*** 3	***Livestock*** 4
Phosphorus	Csuros (1994:228-229) explains that phosphorus occurs in animal, plant and mineral kingdoms. Its discharge to streams may stimulate growth of photosynthetic organisms especially if it is the nutrient whose low values are limiting the primary productivity of the water.	Total P ≤0.02 mg/L	NR	≤0.05 mg/L (long term to prevent clogging equipment; ≤0.8-12 mg/L (short term)	NR
BTEX and VOCs	Good indicators of man-made pollutants found in landfill leachate (USEPA, 1991:51075). Toxic and carcinogenic to animals and humans.	varies for different compounds	varies for different compounds	NR	NR
Iron and manganese	High iron concentrations affect plant growth and high manganese concentrations clog irrigation equipment and are toxic to plants (ANZECC, 1992:5-15,5-16).	Fe NR (2000), ≤1 mg/L (1992), Mn≤1.9mg/L	Fe 0.3 mg/L (A) Mn 0.1 mg/L (A), Health 0.5 mg/L	Fe & Mn 0.2 mg/L long term, 10 mg/L short term	not sufficiently toxic (2000); ≤17 mg/L for dairy cattle (1992)
Arsenic	Found in cattle dip soils; toxic, possibly carcinogenic (Manahan, 1990:150), toxic to livestock in high concentrations (ANZECC, 1992:5-25)	≤0.024 mg/L (III) form; ≤0.05 aquaculture	≤0.01 mg/L	≤0.1 mg/L long term; ≤2 mg/L short term	0.5 to 5 mg/L tolerated
Cadmium	Causes high blood pressure, kidney damage, destroys testicular tissue and red blood cells, toxic to aquatic biota (Manahan, 1990:150), toxic and carcinogenic to livestock (ANZECC, 1992:5-26)	≤0.0002 mg/L	≤0.002 mg/L	≤0.01 mg/L long term; ≤0.05 mg/L short term	≤0.01 mg/L
Chromium	Cr^{+6} is possibly carcinogenic and is toxic to humans (anaemia, kidney disease, nervous system) (Manahan, 1990:150), reduces crop yield (ANZECC, 1992:5-14).	≤0.001 mg/L for Cr^{+6}	≤0.05 mg/L (Cr^{+6})	≤0.1 mg/L long term; ≤1 mg/L short term	≤1 mg/L
Copper	Essential in small concentrations for plant growth and animals (ANZECC, 1992:5-15&5-27). Toxic to sensitive plants and animals and bioaccumulated.	≤0.0014 mg/L	≤2 mg/L (Health) ≤1 mg/L (A)	≤0.2 mg/L long term; ≤5 mg/L short term	<0.4 mg/L sheep, <1 mg/L cattle; <5 mg/L pigs and poultry
Lead	Wildlife destruction (Manahan, 1990:151), reduces plant growth (ANZECC, 1992:5-16). Decreases human intelligence, growth (Csuros, 1994:210).	≤0.0034 mg/L	≤0.01 mg/L	≤2 mg/L long term; ≤5 mg/L short term	≤0.1 mg/L
Zinc	Found both naturally (weathering & erosion) and from anthropogenic sources (ANZECC, 1992:2-42). Zinc coating used to protect iron, steel and brass; used in dry batteries, construction materials, printing processes (Csuros, 1994:215). One of seven analytes with greatest percentage increase from 71 unlined landfills in North Carolina, USA (Borden and Yanoschak, 1990:269). Also found by CodyHart in landfill ponds and leachate.	≤0.008 mg/L	≤3 mg/L (A)	≤2 mg/L long term; ≤5 mg/L short term	≤20 mg/L

1. from Tables 3.3.1, 3.3.2, 3.3.3 - Default trigger values for aquatic ecosystems in upland rivers of south-east Australia that are slightly-moderately disturbed; and Table 3.4.1 trigger values for toxicants 95% level aquatic ecosystem protection in *'Australian and New Zealand Guidelines for Fresh and Marine Water Quality'*, ANZECC & ARMCANZ 2000.
2. from *'Australian Drinking Water Guidelines 6'* NHMRC & NRMMC 2011. <http://www.nhmrc.gov.au/guidelines/publications/eh52/>.
3. from Tables 4.2.5, 4.2.10, 4.2.11, 4.2.14 and 4.2.15 *'Australian and New Zealand Guidelines for Fresh and Marine Water Quality'*, ANZECC & ARMCANZ 2000.
4. from page 4.3-3 – 4.3-5 *'Australian and New Zealand Guidelines for Fresh and Marine Water Quality'*, ANZECC & ARMCANZ 2000.

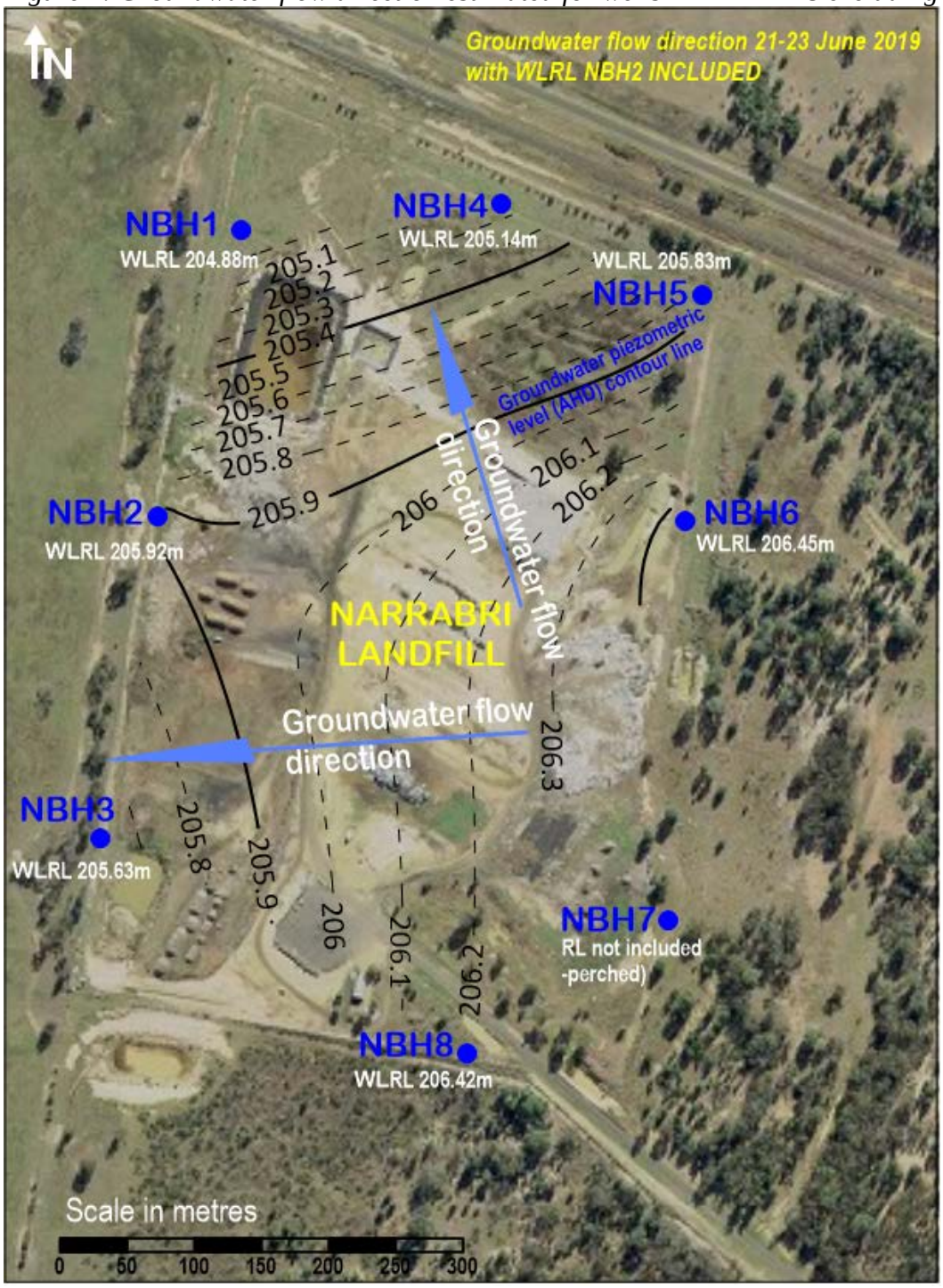
NR - No recommendation
(A) aesthetic guideline rather than an environmental health guideline
(1992) refers to 1992 edition of the *'Australian and New Zealand Guidelines for Fresh and Marine Water Quality'*

8. GROUNDWATER FLOW DIRECTION AND LEACHATE RISK

Figure 2 provides the June 2019 on-site predominant (general) groundwater flow direction, which is an update of the September 2006 and December 2012 plots that included datum from well NBH2 but excluded that for well NBH7 which is a shallow well that collapsed during drilling.

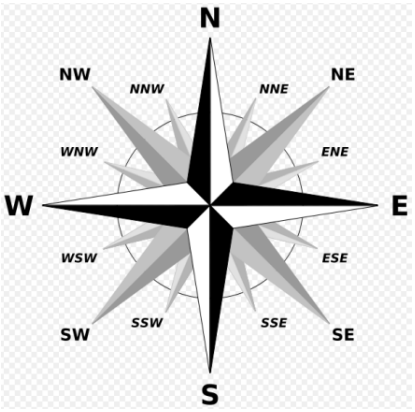
Figure 2 was contour plotted using the *Surfer* software package. A 'Natural Neighbour' grid was chosen because this type of grid system does not try to extrapolate beyond the extent of the wells whose northing, easting and RL are digitised. The generalised groundwater flow direction is at right angles to the contour lines (because due to gravity water mostly flows downhill).

Figure 2: Groundwater flow direction estimated for wells NBH1-NBH8 excluding NBH7, 2019



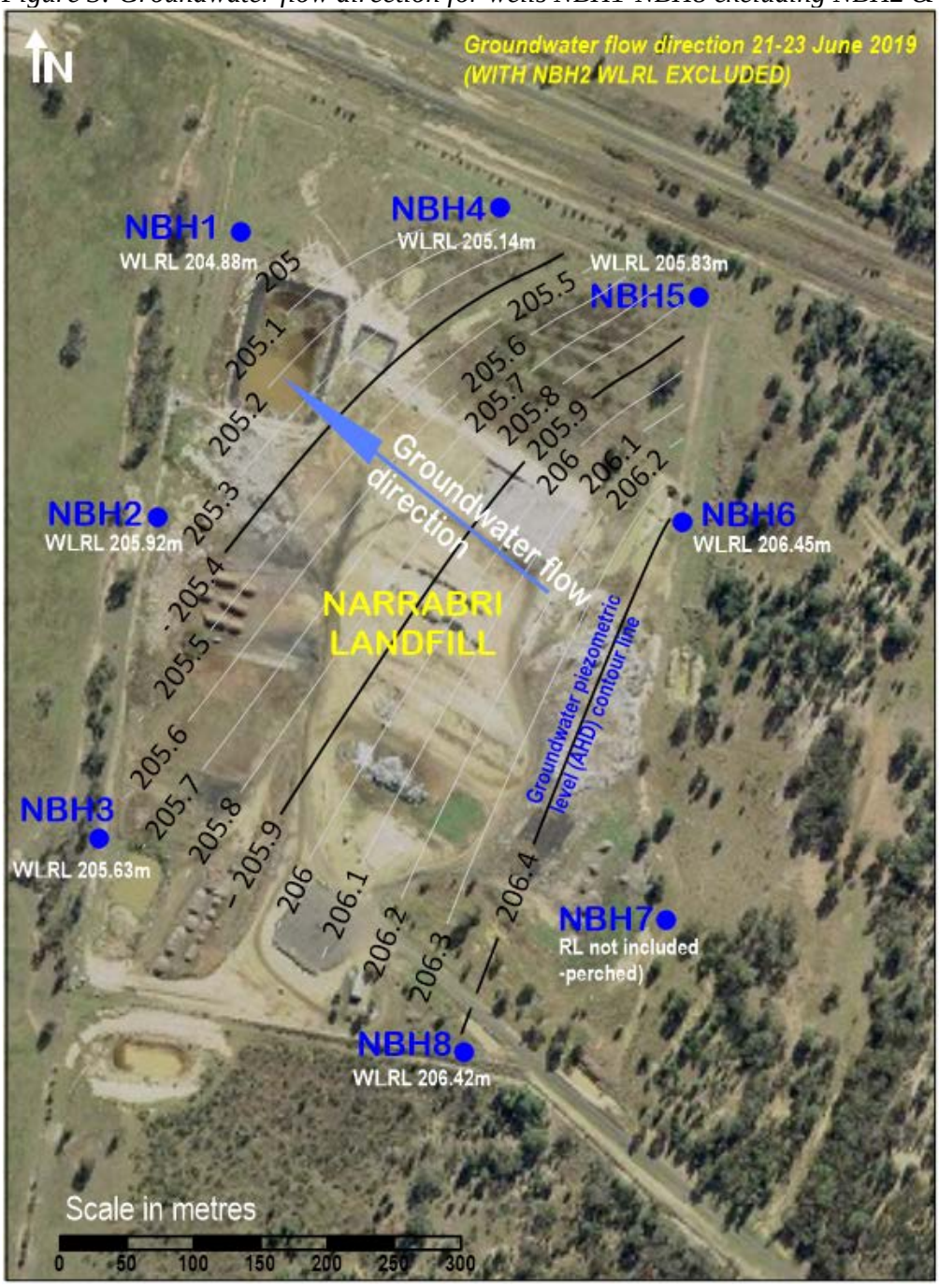
Base map Narrabri Shire Council 2009

Figure 2 indicates that the groundwater flow direction in the northern part of the site is in a northwest direction; and in the southern portion of the site, the flow is to the west-southwest. Well NBH2 has the highest WLRL and it is this that creates a groundwater divide to split the flow directions. The west-southwest flow is likely exacerbated by the lightly covered old waste trenches retaining rainwater that infiltrated due to lack of clay cover and illustrates localised flow effects. Such localised effects can also be caused by underlying geological strata.



To obtain a picture of the predominant groundwater flow direction under the landfill site, without the localised effect of the higher WLRL for NBH2, its WLRL was excluded from the *Surfer* natural neighbour contour plot (Figure 3).

Figure 3: Groundwater flow direction for wells NBH1-NBH8 excluding NBH2 & NBH7, 2019



(Hart 2019)

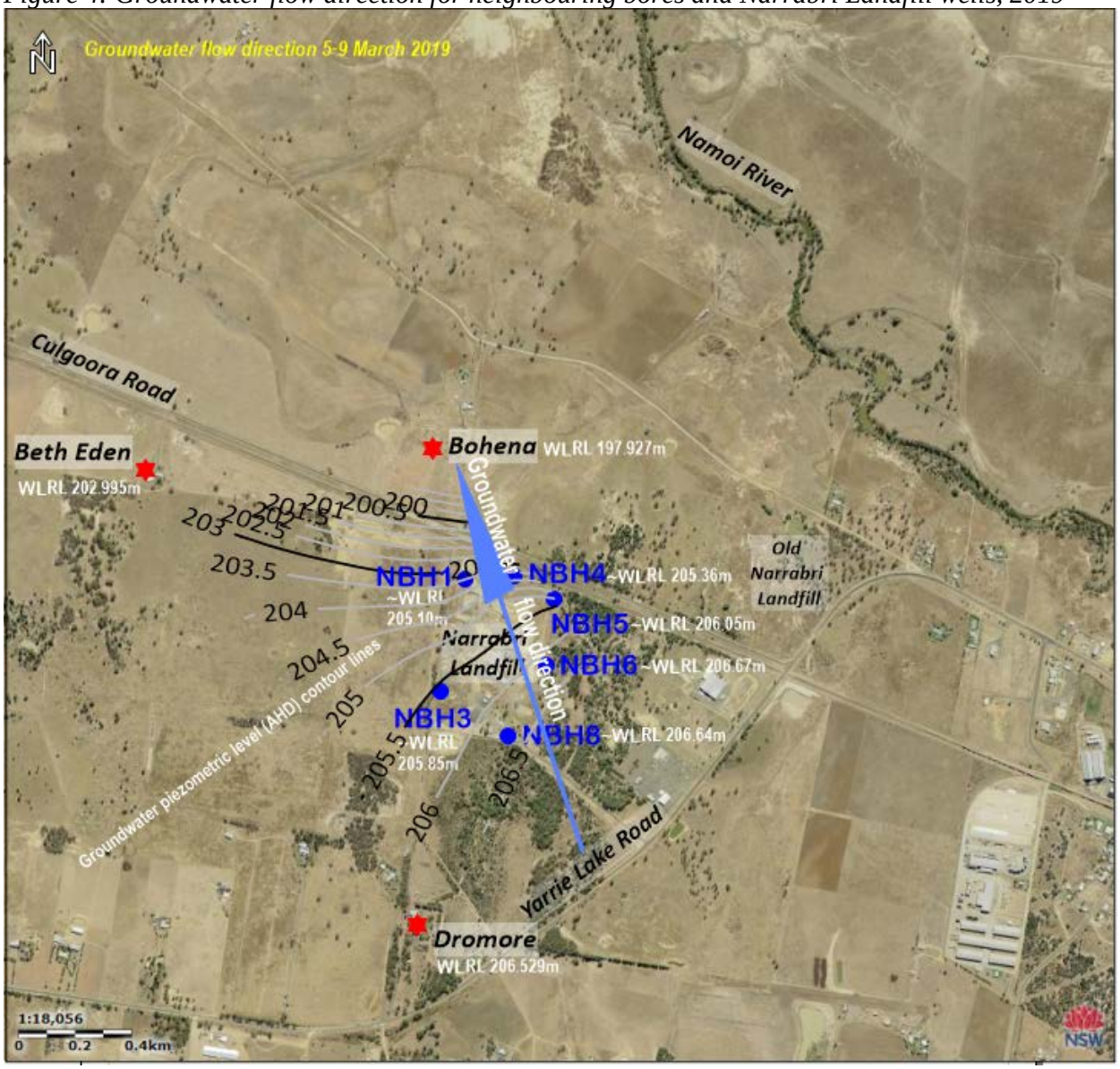
In Figure 3, there is no longer a groundwater divide caused by the higher NBH2 WLRL, and the predominant groundwater flow direction at right angles to the contour lines is northwest, which matches the reported regional northwest groundwater flow direction towards Bohena Creek and the Namoi River.

Flow direction beyond the landfill site cannot be assumed unless further water level information is obtained.

During the March 2019 groundwater quality sampling of bore water at properties surrounding the current and old Narrabri landfills, water levels were measured in old bores adjacent to three sampled bores as a preliminary to assessing the groundwater flow direction beyond the surrounds of the Narrabri Landfill.

Due to water level relative levels (WLRLs) that were similar in these Lower Namoi alluvium formation wells/bores, the combined WLRLs for the three neighbouring bores and the landfill wells were plotted in Figure 4. Again monitoring wells NBH2 and NBH7 were excluded due to their localised anomalies.

Figure 4: Groundwater flow direction for neighbouring bores and Narrabri Landfill wells, 2019



(Hart 2019)

Taking the wider spectrum of WLRLs into the *Surfer* natural neighbour grid calculation, results in a predominant north-northwest groundwater flow direction, which is similar to the northwest flow direction in the northern section of the Narrabri Landfill site as estimated in Figure 3.

A review of borelogs, a geological map, a topographical map and a plot of a nearby paleochannel, resulted in the decision that the groundwater flow direction was in sympathy with and due to topographical fall (Hart 2019).

9. COMMENTS ON WATER QUALITY

The landfill's Environment Protection Licence requires all wells to be sampled six-monthly, except for well NBH7 which requires quarterly sampling, the surface water dams NS1 and NS2 on discharge only, and leachate annually.

Well NBH7 was sampled in both March and July 2023. In July, wells NBH1-NBH3 and NBH7 were sampled on 20 July 2023, and NBH4-NBH6 and NBH8 were sampled on 19 July 2024. Thus, the total groundwater network was reviewed in July.

The annual leachate sampling was conducted on 20 July 2023.

Groundwater

Piezometric levels (water levels)

In comparison to the December 2022 sampling round, groundwater levels (piezometric levels) rose in wells NBH1 – NBH5 and NBH8 varying between a 1cm rise and a 11 cm rise. The extreme rise in well NBH7 of 109 cm in December 2022 has been countered by an extreme fall of 124 cm since. Well NBH7 appears to be in a perched water table. Well NBH6 piezometric level declined by 8 cm.

Piezometric levels in all wells except wells NBH7 and NBH8 were at or close to their greatest height since sampling commenced in 2006.

Annual groundwater tests
Annual tests are required for BTEX (Benzene, Toluene, Ethylbenzene and Xylene), total phenols and organochlorine and organophosphorus pesticides. These were conducted this July sampling round. None were detected.

NBH1, NBH4 and NBH8
There is no sign of contamination from landfill leachate in these wells.

Although the salinity of well NBH8, as indicated by its electrical conductivity (EC) at 5,273 µS/cm this round, has increased considerably since April 2007 (652 µS/cm), no other analytes are of concern from a landfill leachate contamination perspective. It is emphasised that this high EC value can be completely attributed to groundwater picking up salts in the underlying clay, and not from landfill leachate. The EC varies over time because surface water from the NS1 dam sometimes dilutes the EC. This well was poorly constructed, and sediment is building up at the base of the well. The depth of the well is now 14.42 m rather than 16.0 m and the sampling pump position has been raised. No analytes are of concern.

Well NBH2
Well NBH2 continues to show signs of landfill leachate contamination. Concentrations of two field analytes remain high: electrical conductivity (EC) at 18,248 µS/cm; and total alkalinity at 3,900 mg/L. Although the total nitrogen concentration was generally declining until last sampling round (December 2022), it increased substantially to 53.7 mg/L this sampling round, with nitrate predominating indicating an old leachate source. This may be due to considerable rain in the month preceding sampling and permeating of pooled rainwater alongside this well down through old waste trenches to the saturated groundwater level.

Two trace volatile organic compounds (VOCs) [Tetrachloroethene (PCE) and cis-1.2-Dichloroethene (DCE)] are commonly detected in this well. Neither of these were detected this sampling round.

Tetrachloroethene (PCE) is a chlorinated solvent widely used as a dry-cleaning fluid and is also found in consumer products including some paint and spot removers, water repellents, brake and wood cleaners, glues, and suede protectors.

Tetrachloroethene (PCE) is dechlorinated by an anaerobic, reductive process from which daughter products arise: trichloroethene (TCE) to cis-1.2-dichloroethene (cis-1,2-DCE) or other DCE forms to vinyl chloride (VC) to ethene and ethane.

$$\mathrm{PCE} \rightarrow \mathrm{TCE} \rightarrow \frac{\mathrm{cis-1,2-DCE\ (dominant)\ or}}{\mathrm{trans-1,2-DCE\ (subordinate)}} \rightarrow \mathrm{VC} \rightarrow \mathrm{Ethene}$$

(Vaske 2005, WHO 2006, p. 4)

The fact that DCE has been detected shows that the trace PCE is degrading.

The Australian Drinking Water Guidelines (NHMRC & NRMMC 2011, Fact Sheets) state that PCE concentration should not exceed 0.05 mg/L in drinking water and that it is possibly carcinogenic. The trace concentrations found in NBH2 are less than this. There are no Australian guideline values for PCE or TCE in freshwater aquatic ecosystems, stock drinking water or irrigation waters.

It also needs to be remembered that this well is only about two metres from the side of the landfill and there is therefore little distance for attenuation to occur.

Well NBH3

Since June 2011, Well NBH3 has shown signs of contamination (Figures 5 and 6).

By December 2017, the total nitrogen had increased to 110 mg/L, which is excessive, then dissipated, but followed by an extreme concentration (288 mg/L) in December 2022. This extreme concentration became more extreme to 495 mg/L this sampling round (Figure 5).

Other contaminant indicator concentrations also increased, as exemplified this round: chloride 7,260 mg/L from 3,370 mg/L in December 2021; and sulphate to 2,040 mg/L compared to 334 mg/L in December 2021 (Figure 6).

Metal concentrations in general are still trace concentrations.

It needs to be remembered that this well, like well NBH2, is only about two metres from the side of the landfill and therefore there is little distance for attenuation to occur in the clay strata.

The decreasing results to December 2021 were promising indicating that increased soil/clay cover and site contouring was assisting, considering that there has been relatively high rainfall since that time.

However, both well NBH2 and NBH3 are alongside a site road that was flooded in the months before the December 2022 and the July 2023 sampling rounds, thus aiding solid waste contaminant egress from the landfill.

Key indicators such as those in Figures 5 and 6 show that the analytes chosen for the Narrabri Landfill wells are suitable for detecting contamination.

Figure 5: Total nitrogen contamination of well NBH3, Narrabri Landfill

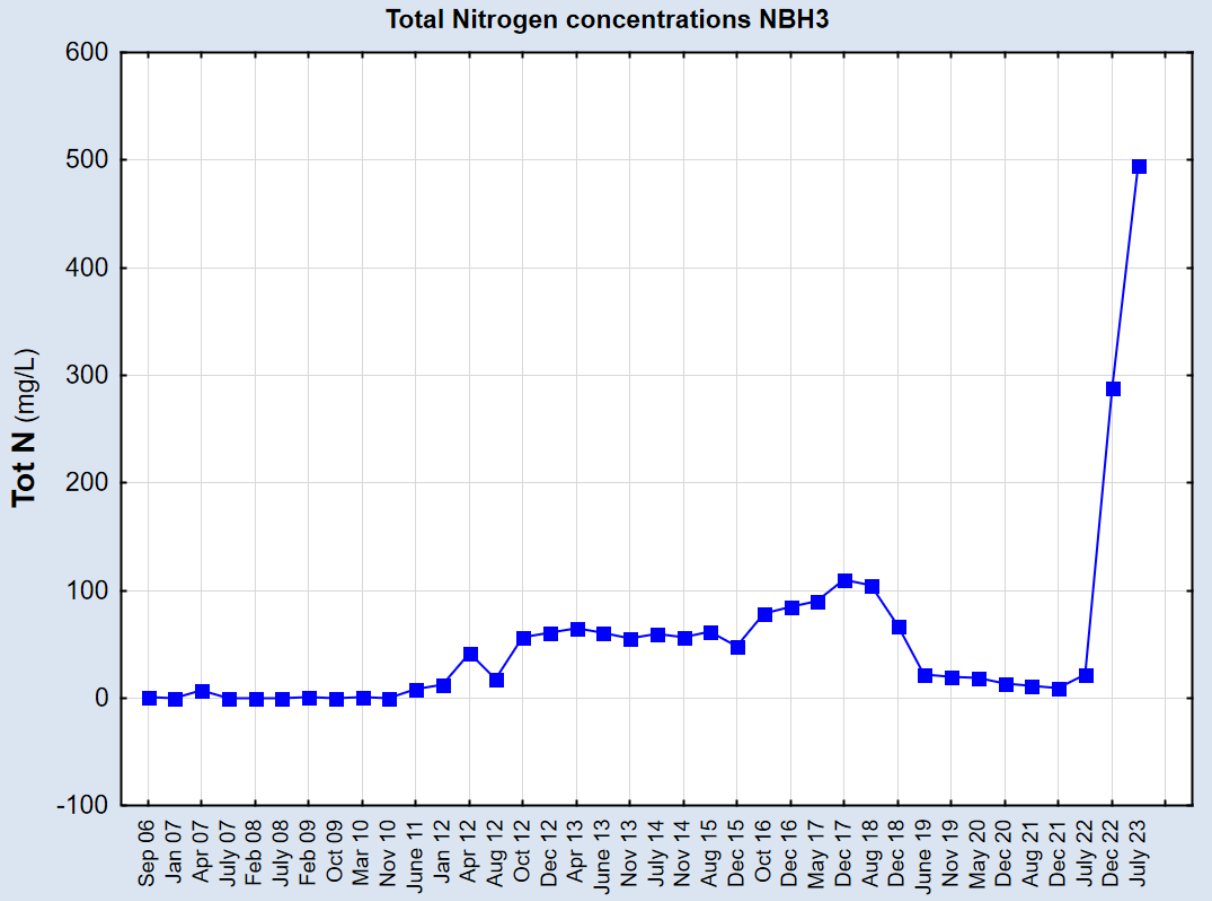
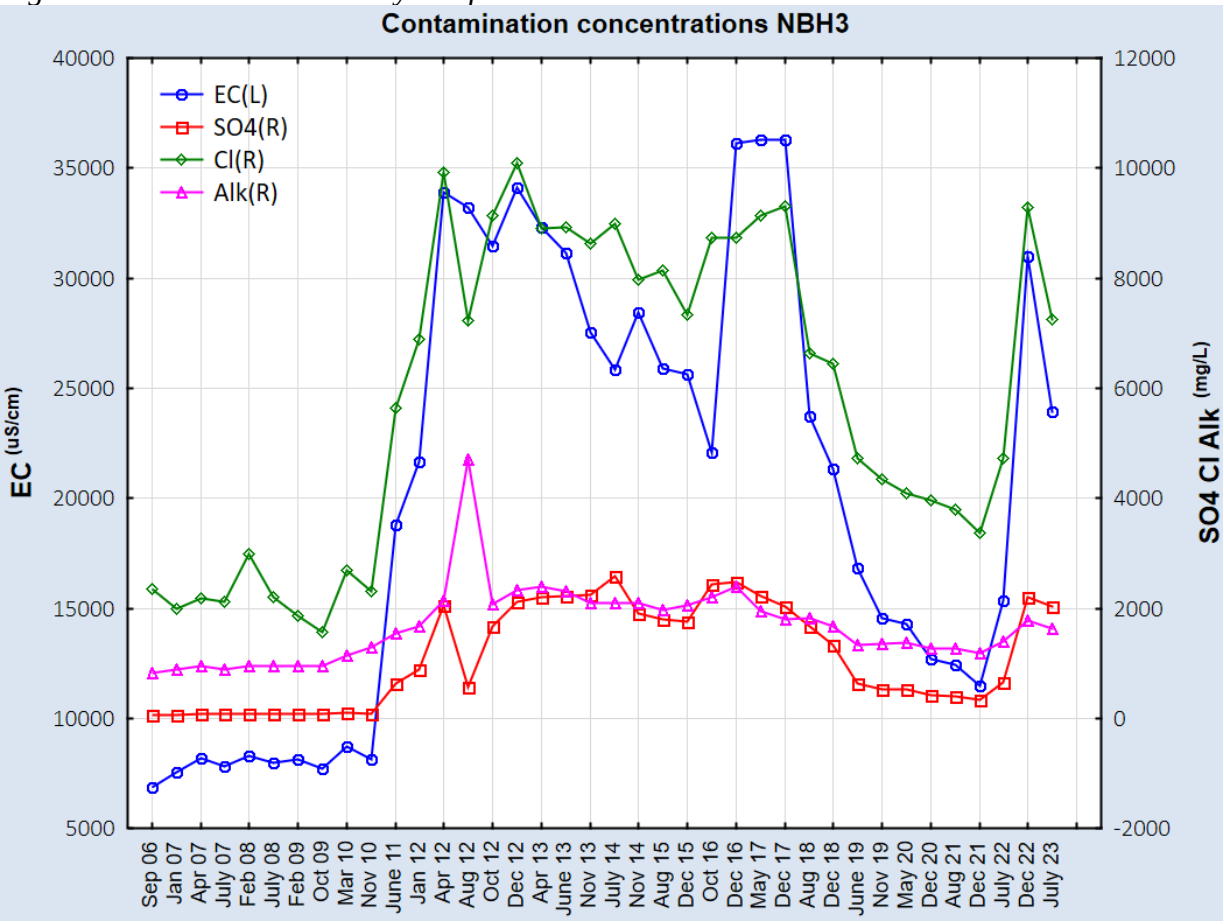


Figure 6: Other indicator analytes of contamination - well NBH3



Well NBH5
This well's water quality continues to show slight contamination, as indicated by its elevated total nitrogen concentration. Its concentration at 5.2 mg/L this sampling round is typical of its slightly greater concentration since 2017, when a dead animal pit, now covered, was placed about 25 m hydraulically upgradient from this well.

Well NBH6
Well NBH6 has a decommissioned dead animal pit just upgradient of it, and it continues to be slightly contaminated with nitrate at 6.55 mg/L. Chloride is a negative ion that does not absorb to clay, so its increased concentrations are often the initial indicator of landfill leachate contamination reaching a well. The chloride concentration tripled in the October 2016 sampling round to 2,660 mg/L and its concentration at 2,600 mg/L this sampling round is still high. Volatile organic compounds tests were conducted in August 2018, and BTEXN compounds are tested annually. None have been detected, thus indicating that the contamination is more likely from the dead animal pit rather than from general solid waste.

Well NBH7
The total nitrogen concentrations have varied considerably over time in the shallow sandy surrounds of this well. The greatest concentrations were 54.8 mg/L in January 2012, and 55.6 mg/L in December 2020. The total nitrogen concentration has since declined and was 1.8 mg/L in the July sampling round. The breaking of the drought increased the water level in this well considerably adding a dilution factor to the analyte concentrations. Excrement of frogs that were breeding in this well despite three clean-outs were likely the influence on total nitrogen concentrations, but dead animal pits and Cargill seed waste upgradient may be continuing to impact the water quality. (Extra purging in October 2010 showed that the concentrations are likely localised with a decrease from 48.2 mg/L to 22.7 mg/L after 6 L extra purging.)

In both March and July, the metals samples were not filtered and analysed for total metals. The metal that reflects the filtering versus non-filtering difference is iron being 1.71 mg/L in July 2023 and <0.05 mg/L in September 2022. This iron may either be an iron waste source or may be washout from the surrounding clays.

Leachate

NL1 (sampled from leachate tank)
This July 2023 landfill leachate sample was the annually required sample.

Leachate sample concentrations from the first lined cell have increased considerably since being collected in August 2018 from the leachate tank rather than from the old leachate dam that has now been converted to an asbestos pit. The samples are therefore no longer diluted by rainwater. For example, this sampling round electrical conductivity (EC) (a measure of salt levels) was high at 12,125 µS/cm, and similarly, total nitrogen was high at 740 mg/L.

The total nitrogen was all young leachate as represented by total kjeldahl nitrogen (TKN), an analysis that quantifies the combined organic nitrogen and ammoniacal nitrogen portions.

No pesticides, total phenols, polyaromatic hydrocarbons (PAHs) or volatile organic compounds (VOCs) were detected. However, 10.5 mg/L petroleum products were detected.

These are concentrated landfill leachate quality results, and therefore can be used as comparisons against groundwater and surface water results to assess if they are contaminated.

10. CONCLUSION

In March 2023, methane monitoring and groundwater monitoring of well NBH7 were conducted at the Narrabri Landfill.

On 19 and 20 July 2023, the following water sampling was conducted:

- The six-monthly round of groundwater sampling at wells NBH1 to NBH8
- The annual groundwater sampling for BTEX (Benzene, Toluene, Ethylbenzene and Xylene), total phenols and organochlorine and organophosphorus pesticides
- Annual leachate monitoring (NL1).

No methane was detected in or under buildings or on the landfill surface in March or July. In July 2023, methane emissions from inside the leachate sump vent were detected at ≥50,000 ppm. Take care. 50,000 ppm is 100% the lower explosive limit (LEL). There should be no fires or smoking at landfills, as the potential for hazardous levels of methane is constant.

BTEX (Benzene, Toluene, Ethylbenzene and Xylene), total phenols and organochlorine and organophosphorus pesticides were not detected in any of the groundwater wells.

Groundwater contamination is present in wells NBH2, NBH3, NBH5 and NBH6.

- NBH2 - The saltiness of this groundwater is still high at 18,248 µS/cm. Total nitrogen returned to a higher concentration – 53.7 mg/L. Neither of the two, trace volatile organic compounds (VOCs) [Tetrachloroethene (PCE) and cis-1.2-Dichloroethene (DCE)] often found in this groundwater well, were detected this sampling round.
- NBH3 – The July total nitrogen concentration in this well was extreme - 495 mg/L (Figure 5). Groundwater piezometric level was at its highest since measurement commenced in Year 2006.
  [It needs to be remembered that both wells NBH2 and NBH3 are only about two metres from the side of the landfill and therefore little distance for attenuation to occur in the clay strata. Considerable rain and ponding of rainwater alongside both wells in the months prior to the December 2022 and July 2023 sampling allowed surface water to pass through the upper strata of solid waste into the saturated groundwater below.]
- NBH5 – This well's slightly elevated total nitrogen concentration (5.2 mg/L) is due to the now covered dead animal pit placed about 25 m hydraulically upgradient from this well.
- NBH6 – Nitrate at 6.55 mg/L in this well indicates nitrate contamination due to the upgradient dead animal pit.

The annual leachate samples (NL1) were concentrated because they were taken from the leachate tank. For example, this sampling round electrical conductivity (EC) (a measure of salt levels) was high at 12,125 µS/cm, and similarly, total nitrogen was high at 740 mg/L.

The total nitrogen was all young leachate as represented by total kjeldahl nitrogen (TKN), an analysis that quantifies the combined organic nitrogen and ammoniacal nitrogen portions.

No pesticides, total phenols, polyaromatic hydrocarbons (PAHs) or volatile organic compounds (VOCs) were detected. However, 10.5 mg/L petroleum products were detected.

The first half of monitoring program for this annual reporting year (13 December 2022 to 12 December 2023) is up to date with the landfill Environment Protection Licence (EPL) No. 12193 monitoring requirements.

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APPENDIX A

Field Parameter Forms

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental | ***Project:*** **NARRABRI LANDFILL** | ***Sample Point ID:*** **NBH1**

E761786.240, N6641464.447

Date: 20/07/23

Start Purge: (24hr clock) 14:15
Start Sample: (24hr clock) 14:30

Total well depth (from top of casing) (m) **15.50** (Previously 15.80 m)
Depth to groundwater (m) **9.19**
(from top of PVC casing)
Water column depth (m) **6.31**
(well depth minus depth to groundwater)
Relative Level (RL) **205.06**
(RL top of internal PVC casing 214.250 m - as per survey 23 July 2019.)

Pump type : bladder - CodyHart
Tubing: LDPE
Beaker : Polypropylene
Air Controller : QED MP10
Pump Position : (from top of PVC) 13.0 m
Previously 13.5 m

Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
0.5	2.44	1542	7.57	+112	22.0	
1.0	2.62	1506	7.58	+113	22.0	
1.5	3.72	1462	7.60	+113	22.1	
2.0	3.35	1464	7.61	+113	22.2	
2.5	4.26	1436	7.62	+116	22.0	
3.0	4.11	1455	7.60	+116	22.1	9.31
Mean last 4 values	3.86	1454	7.61	+115	22.1	
Max last 4 values	4.26	1464	7.62	+116	22.2	
Min last 4 values	3.35	1436	7.60	+113	22.0	
RPD (as decimal)	**0.24**	**0.02**	**0.00**	**0.03**	**0.01**	
RPD <20% (0.20)	✗	✓	✓	✓	✓	

Refill *(secs):* 15
Discharge (secs): 15
Previously 45/15
Cycle time *(minutes):* 0.5
psi: 35

Purge volume : (L) 3
Cycle Vol (mL)**:** 100
Pump rate (mL/min)**:** 200
Purge time (hr:min) 0:15

Filtered metals? (Y/N) Y
Tick on metals bottle? (Y/N) Y
Dissolved/Total metals? Dissolved
No longer filtering TOC.
Turbidity (NTU) 54.5
Sample Colour: cloudy white

Duplicate? (Y/N) N

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
Paddock

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 20/07/23 ***Time:*** (24hr clock) 15:00

ALKALINITY & FREE CO_2 - NBH1

pH	Sample	Titrant	Alkalinity	Sample	Titrant	Free CO_2
	Vol (mL)	mL	mg/L	Vol (mL)	mL	mg/L
7.61	10	6.50	650	30	0.22	32

If pH ≤ 4.5 don't test alkalinity because <1. If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
650	32	137

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental | ***Project:*** **NARRABRI LANDFILL** | ***Sample Point ID:*** **NBH2**

E761732.594, N6641261.448

Date: 20/07/23

Total well depth (from top of casing) (m) **15.86** (Previously 16.42 m)
Depth to groundwater (m) **9.37**
(from top of standpipe)
Water column depth (m) **6.49**
(well depth minus depth to groundwater)
Relative Level (RL) **206.06**
(RL top of PVC casing 215.431m as per survey 23 July 2019.)

Start Purge: (24hr clock) 13:15
Start Sample: (24hr clock) 13:30
Pump type **:** bladder - CodyHart
Tubing: LDPE
Beaker **:** Polypropylene
Air Controller **:** QED MP10
Pump Position : (from top of PVC) 14.6 m
Previously 14.5m before shot off
then 14.8 m

Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
0.5	2.91	18150	7.87	+76	22.2	
1.0	4.01	18090	7.89	+75	22.3	
1.5	2.23	18250	7.83	+74	21.8	
2.0	1.02	18210	7.82	+74	21.9	
2.5	0.65	18240	7.82	+73	21.8	9.77
3.0	0.58	18290	7.82	+73	21.9	
Mean last 4 values	1.12	18248	7.82	+74	21.9	
Max last 4 values	2.23	18290	7.83	+74	21.9	
Min last 4 values	0.58	18210	7.82	+73	21.8	
RPD (as decimal)	**1.17**	**0.00**	**0.00**	**0.01**	**0.00**	
RPD <20% (0.20)	✗	✓	✓	✓	✓	

Refill *(secs):* 15
Discharge (secs): 15
Dropped back to 25/10 due to air
Cycle time *(minutes):* 0.5
psi: 35

Purge volume *:* (L) 3
Cycle Vol (mL)**:** 100
Pump rate (mL/min)**:** 200
Purge time (hr:min) 0:15

Filtered metals? (Y/N) N
Tick on metals bottle? (Y/N) Y
Dissolved/Total metals? Dissolved
No longer filtering TOC.
Turbidity (NTU) 0.0
Sample Colour: translucent light yellow

Duplicate? (Y/N) N

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
paddock

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 20/07/23 ***Time:*** 14:00

ALKALINITY & FREE CO_2 - NBH2

pH	Sample	Titrant	Alkalinity	Sample	Titrant	Free CO_2
	Vol (mL)	mL	mg/L	Vol (mL)	mL	mg/L
7.82	10	39.00	3900	30	0.90	132

If pH ≤ 4.5 don't test alkalinity because <1. If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
3900	132	803

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental

Project: **NARRABRI LANDFILL**

Sample Point ID: **NBH3**
E761698.812, N6641059.513

Date: 20/07/23

Total well depth (from top of casing) (m)	**16.08** (Previously 16.36 m)	***Start Purge:*** (24hr clock)	12:18
Depth to groundwater (m)	**9.81**	***Start Sample:*** (24hr clock)	12:30
(from top of open standpipe)		***Pump type*** **:** bladder - CodyHart	
Water column depth (m)	**6.27**	***Tubing:*** LDPE	
(well depth minus depth to groundwater)		***Beaker*** **:** Polypropylene	
Relative Level (RL)	**205.74**	***Air Controller*** **:** QED MP10	
(RL top of PVC casing 215.547m as per survey 23 July 2019.)		***Pump Position*** : (from top of PVC)	14.5 m
		Previously 15.0 m	

Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
0.5	3.38	23380	7.25	+103	22.1	
1.0	3.31	23780	7.25	+105	22.3	
1.5	3.47	24080	7.26	+108	22.7	
2.0	3.85	23990	7.27	+109	22.7	
2.5	4.26	23950	7.28	+112	22.9	
3.5						9.97
Mean last 4 values	3.72	23950	7.27	+109	22.7	
Max last 4 values	4.26	24080	7.28	+112	22.9	
Min last 4 values	3.31	23780	7.25	+105	22.3	
RPD (as decimal)	**0.25**	**0.01**	**0.00**	**0.06**	**0.03**	
RPD <20% (0.20)	✗	✓	✓	✓	✓	

Refill *(secs):*	15
Discharge (secs):	15
Previously 30/15	
Cycle time *(minutes):*	0.5
psi:	35
Purge volume *:* (L)	2.5
Cycle Vol (mL)**:**	110
Pump rate (mL/min)**:**	220
Purge time (hr:min)	0:11
Filtered metals? (Y/N)	N
Tick on metals bottle? (Y/N)	Y
Dissolved/Total metals?	Dissolved
No longer filtering TOC.	
Turbidity (NTU)	6.1
Sample Colour:	clear
Duplicate? (Y/N)	N

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
Paddock

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** BH ***Date:*** 20/07/23 ***Time:*** 13:00

ALKALINITY & FREE CO_2 - NBH3

pH	Sample Vol (mL)	Titrant mL	Alkalinity mg/L	Sample Vol (mL)	Titrant mL	Free CO_2 mg/L
7.27	10	16.40	1640	30	0.80	117

If pH ≤ 4.5 don't test alkalinity because <1. If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
1640	117	355

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental

Project: **NARRABRI LANDFILL**

Sample Point ID: **NBH4**
E761917.521, N6641515.725

Date: 19/07/23

Start Purge: (24hr clock) 15:15
Start Sample: (24hr clock) 15:30

Total well depth (from top of casing) (m) **14.98** (Previously 14.90 m)
Depth to groundwater (m) **8.51**
(from top of PVC casing)
Water column depth (m) **6.47**
(well depth minus depth to groundwater)
Relative Level (RL) **205.41**
(RL top of PVC casing 213.919 as per survey 23 July 2019.)

Pump type : bladder - CodyHart
Tubing: LDPE
Beaker : Polypropylene
Air Controller : QED MP10
Pump Position : (from top of PVC) 13.75 m
Used 25/7 this round
Try 25/7 if problems with 15/15

Refill *(secs):* 15
Discharge (secs): 15
Previously 60/15
Cycle time *(minutes):* 0.5
psi: 35

Purge volume *:* (L) 3
Cycle Vol (mL)**:** 100
Pump rate (mL/min)**:** 200
Purge time (hr:min) 0:15

Filtered metals? (Y/N) N
Tick on metals bottle? (Y/N) Y
Dissolved/Total metals? Dissolved
No longer filtering TOC.
Turbidity (NTU) 2.3
Sample Colour: clear

Duplicate? (Y/N) N

	Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
	0.5	5.25	4820	7.72	+91	22.3	
	1.0	7.26	4840	7.83	+86	22.2	
	1.5	5.22	4760	7.63	+95	22.2	
	2.0	4.71	4920	7.62	+94	22.4	
	2.5	4.79	4780	7.62	+97	22.5	
	3.0	4.87	4780	7.61	+98	22.1	
	4.5						8.91
Mean last 4 values		4.90	4810	7.62	+96	22.3	
Max last 4 values		5.22	4920	7.63	+98	22.5	
Min last 4 values		4.71	4760	7.61	+94	22.1	
RPD (as decimal)		**0.10**	**0.03**	**0.00**	**0.04**	**0.02**	
RPD <20% (0.20)		✓	✓	✓	✓	✓	

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
landfill

Purging and sampling procedures were those detailed by CodyHart Environmental

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 19/07/23 ***Time:*** 16:00

ALKALINITY & FREE (17.2

pH	Sample Vol (mL)	Titrant mL	Alkalinity mg/L	Sample Vol (mL)	Titrant mL	Free CO_2 mg/L
7.62	15	17.30	1153	30	0.44	65

If pH ≤ 4.5 don't test alkalinity because <1.
If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
1153	65	244

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental

Project: **NARRABRI LANDFILL**

Sample Point ID: **NBH5**
E762107.508, N6641433.687

Date: 19/07/23

Start Purge: (24hr clock) 14:17
Start Sample: (24hr clock) 14:30

Total well depth (from top of casing) (m) **15.13** (Previously 16.37 m)
Depth to groundwater (m) **8.08**
(from top of PVC casing)
Water column depth (m) **7.05**
(well depth minus depth to groundwater)
Relative Level (RL) **206.03**
(RL top of PVC casing 214.112m as per survey 23 July 2019.)

Pump type **:** bladder - CodyHart
Tubing: LDPE
Beaker **:** Polypropylene
Air Controller **:** QED MP10
Pump Position : (from top of PVC) 13.8 m
Previously 14.00

Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
0.5	4.60	10150	7.29	+115	23.8	
1.0	5.45	10440	7.28	+114	22.8	
1.5	6.07	10390	7.31	+112	22.6	
2.0	6.55	10320	7.34	+111	22.5	
2.5	7.28	10230	7.39	+110	22.4	
3.0	7.39	10200	7.42	+109	22.4	
4.5						8.40
Mean last 4 values	6.82	10285	7.37	+111	22.5	
Max last 4 values	7.39	10390	7.42	+112	22.6	
Min last 4 values	6.07	10200	7.31	+109	22.4	
RPD (as decimal)	**0.20**	**0.02**	**0.01**	**0.03**	**0.01**	
RPD <20% (0.20)	✓	✓	✓	✓	✓	

Refill *(secs):* 15
Discharge (secs): 15
Previously 45/15
Cycle time *(minutes):* 0.5
psi: 35

Purge volume *:* (L) 3
Cycle Vol (mL)**:** 120
Pump rate (mL/min)**:** 240
Purge time (hr:min) 0:12

Filtered metals? (Y/N) Y
Tick on metals bottle? (Y/N) Y
Dissolved/Total metals? Dissolved
No longer filtering TOC.
Turbidity (NTU) 23.7
Sample Colour: cloudy white

Duplicate? (Y/N) N

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
Landfill flat

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 19/07/23 ***Time:*** 15:00

ALKALINITY & FREE CO_2 - NBH5

pH	Sample Vol (mL)	Titrant mL	Alkalinity mg/L	Sample Vol (mL)	Titrant mL	Free CO_2 mg/L
7.37	15	15.10	1007	30	0.44	65

If pH ≤ 4.5 don't test alkalinity because <1.
If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
1007	65	216

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental

Project: **NARRABRI LANDFILL**

Sample Point ID: **NBH6**
E762094.145, N6641278.568

Date: 19/07/23

Start Purge: (24hr clock) 12:16
Start Sample: (24hr clock) 12:30

Total well depth (from top of casing) (m) **15.20** (Previously 14.75 m)
Depth to groundwater (m) **7.64**
(from top of PVC casing)
Water column depth (m) **7.56**
(well depth minus depth to groundwater)
Relative Level (RL) **206.70**
(RL top of PVC casing 214.339m as per survey 23 July 2019.)

Pump type **:** bladder - CodyHart
Tubing: LDPE
Beaker **:** Polypropylene
Air Controller **:** QED MP10
Pump Position : (from top of PVC) 13.2 m
Previously 14.75m , ↑ sediment then 13.5m
Refill *(secs):* 15
Discharge (secs): 15
Previously 45/15
Cycle time *(minutes):* 0.5
psi: 35

Purge volume *:* (L) 3
Cycle Vol (mL)**:** 110
Pump rate (mL/min)**:** 220
Purge time (hr:min) 0:13

Filtered metals? (Y/N) N
Tick on metals bottle? (Y/N) Y
Dissolved/Total metals? Dissolved
No longer filtering TOC.
Turbidity (NTU) 3.3
Sample Colour: clear

Duplicate? (Y/N) N

	Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
	0.5	6.07	11180	8.09	+100	22.1	
	1.0	5.89	11790	8.07	+96	21.7	
	1.5	5.43	11850	8.05	+94	21.4	
	2.0	5.45	11890	8.06	+92	21.9	
	2.5	5.32	11950	8.06	+90	21.9	
	3.0	5.44	12000	8.07	+88	21.7	7.87
Mean last 4 values		5.41	11923	8.06	+91	21.7	
Max last 4 values		5.45	12000	8.07	+94	21.9	
Min last 4 values		5.32	11850	8.05	+88	21.4	
RPD (as decimal)		**0.02**	**0.01**	**0.00**	**0.07**	**0.02**	
RPD <20% (0.20)		✓	✓	✓	✓	✓	

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)

Upwind activities:
Landfill

Details:

Cap missing off well.

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 19/07/23 ***Time:*** 13:00

ALKALINITY & FREE CO_2 - NBH6

pH	Sample	Titrant	Alkalinity	Sample	Titrant	Free CO_2
	Vol (mL)	mL	mg/L	Vol (mL)	mL	mg/L
8.06	10	33.30	3330	30	0.46	67

If pH ≤ 4.5 don't test alkalinity because <1.
If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
3330	67	673

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental

Project: **NARRABRI LANDFILL**

Sample Point ID: **NBH7**
E762096.954, N6641029.981

Date: 19/03/23

Start Purge: (24hr clock) 9:15
Start Sample: (24hr clock) 9:30

Total well depth (from top of casing) (m) **5.20** (Previously 5.95 m, then 5.5 m)
Depth to groundwater (m) **2.84**
(from top of PVC casing)
Water column depth (m) **2.36**
(well depth minus depth to groundwater)
Relative Level (RL) **211.34**
(RL top of PVC casing 214.182m as per survey 23 July 2019.)

Pump type **:** peristaltic, dial 2.25 black
Tubing: LDPE
Beaker **:** Polypropylene
USED BAILER THIS ROUND
Tube base position : (from top of PVC) 4.60 m

	Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
	0.5	4.28	439	6.40	+128	26.5	
	1.0	4.10	434	6.48	+129	25.7	
							3.25
Mean last 4 values		4.19	437	6.44	+129	26.1	
Max last 4 values		4.28	439	6.48	+129	26.5	
Min last 4 values		4.10	434	6.40	+128	25.7	
RPD (as decimal)		**0.04**	**0.01**	**0.01**	**0.01**	**0.03**	
RPD <20% (0.20)		✓	✓	✓	✓	✓	

Purge volume : (L) 1.5
Pump rate (mL/min)**:** 100
Purge time (hr:min) 0:15

Filtered metals? (Y/N) N
Tick on metals bottle? (Y/N) Y
Dissolved/Total metals? Total
No longer filtering TOC.
Turbidity (NTU) 21.8
Sample Colour:
translucent, very light yellow

Duplicate? (Y/N) N

Non-conformances well condition 'Field checks' & equipment (Y/N): Y
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
fenceline & landfill

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 19/03/23 ***Time:*** 10:00

ALKALINITY & FREE CO_2 - NBH7

pH	Sample	Titrant	Alkalinity	Sample	Titrant	Free CO_2
	Vol (mL)	mL	mg/L	Vol (mL)	mL	mg/L
6.44	30	2.40	80	30	0.38	56

If pH ≤ 4.5 don't test alkalinity because <1.

Alk	Free CO_2	Alk + Free CO_2
80	56	31

If pH ≥8.3 don't test Free CO_2 because <1.

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental

Project: **NARRABRI LANDFILL**

Sample Point ID: **NBH7**
E762096.954, N6641029.981

Date: 20/07/23

Start Purge: (24hr clock)	9:45		
Total well depth (from top of casing) (m)	**5.51** (Previously 5.95 m, then 5.5 m)	***Start Sample:*** (24hr clock)	10:00
Depth to groundwater (m) (from top of PVC casing)	**2.99**	***Pump type*** **:** peristaltic, dial 2.25 black	
		Tubing: LDPE	
Water column depth (m) (well depth minus depth to groundwater)	**2.52**	***Beaker*** **:** Polypropylene	
		Used bailer this round	
Relative Level (RL) (RL top of PVC casing 214.182m as per survey 23 July 2019)	**211.19**	***Bailer base position*** : (from top of PVC)	4.60 m

Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
0.5	3.37	514	6.75	+127	19.8	
1.0	3.08	424	6.65	+120	19.3	
1.5						3.40
Previously to 1.5 L						
Mean last 4 values	3.23	469	6.70	+124	19.6	
Max last 4 values	3.37	514	6.75	+127	19.8	
Min last 4 values	3.08	424	6.65	+120	19.3	
RPD (as decimal)	**0.09**	**0.19**	**0.01**	**0.06**	**0.03**	
RPD <20% (0.20)	✓	✓	✓	✓	✓	

PREVIOUSLY	
Purge volume : (L)	1.5
Pump rate (mL/min)**:**	100
Purge time (hr:min)	0:15
THIS ROUND	
Filtered metals? (Y/N)	N
Tick on metals bottle? (Y/N)	Y
Dissolved/Total metals?	Total
No longer filtering TOC	
Turbidity (NTU)	97
Sample Colour:	lt yellow translucent
Duplicate? (Y/N)	N

Non-conformances well condition 'Field checks' & equipment (Y/N): Y
(If yes, write details and remedy or arrange remedy.)
Details: *New black sealed lid installed Oct 2020. Not tampered with. No frogs extracted.*

Upwind activities:
landfill border area

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 20/07/23 ***Time:*** 10:30

ALKALINITY & FREE CO_2 - NBH7

pH	Sample Vol (mL)	Titrant mL	Alkalinity mg/L	Sample Vol (mL)	Titrant mL	Free CO_2 mg/L
6.70	30	3.50	117	30	0.40	59

If pH ≤ 4.5 don't test alkalinity because <1. If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
117	59	39

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

GROUNDWATER FIELD PARAMETER FORM (Monitoring wells)

CodyHart Environmental

Project: **NARRABRI LANDFILL**

Sample Point ID: **NBH8**
E761952.975, N6640913.969

Date: 19/07/23

Total well depth (from top of casing) (m)	**14.42** (Previously 16.0 m)	***Start Purge:*** (24hr clock)	11:15
Depth to groundwater (m)	**8.86**	***Start Sample:*** (24hr clock)	11:30
(from top of PVC casing)		***Pump type*** : bladder - CodyHart	
Water column depth (m)	**5.56**	***Tubing:*** LDPE	
(well depth minus depth to groundwater)		***Beaker*** : Polypropylene	
Relative Level (RL)	**206.07**	***Air Controller*** : QED MP10	
(RL top of PVC casing 214.926m as per survey 23 July 2019.)		***Pump Position*** : (from top of PVC)	13.5 m

Vol (L)	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)	WL (m)
0.5	1.56	5250	6.67	+144	21.0	
1.0	2.05	5220	6.70	+150	21.1	
1.5	4.75	5240	6.82	+148	21.1	
2.0	5.88	5260	6.89	+146	21.1	
2.5	6.67	5290	6.95	+144	21.0	
3.0	7.36	5300	7.02	+141	21.1	10.20
Mean last 4 values	6.17	5273	6.92	+145	21.1	
Max last 4 values	7.36	5300	7.02	+148	21.1	
Min last 4 values	4.75	5240	6.82	+141	21.0	
RPD (as decimal)	**0.43**	**0.01**	**0.03**	**0.05**	**0.00**	
RPD <20% (0.20)	✗	✓	✓	✓	✓	

Refill *(secs):*	15
Discharge (secs):	15
Previously 45/15	
Cycle time *(minutes):*	0.5
psi:	35
Purge volume *:* (L)	3
Cycle Vol (mL)**:**	100
Pump rate (mL/min)**:**	200
Purge time (hr:min)	0:15
Filtered metals? (Y/N)	N
Tick on metals bottle? (Y/N)	Y
Dissolved/Total metals?	Dissolved
No longer filtering TOC	
Turbidity (NTU)	3.3
Sample Colour:	clear
Duplicate? (Y/N)	Y

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
NS1 sedimentation dam

Purging and sampling procedures were those detailed by CodyHart Environmental.

I certify that purging and sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 19/07/23 ***Time:*** 12:00

ALKALINITY & FREE CO_2 - NBH8

pH	Sample Vol (mL)	Titrant mL	Alkalinity mg/L	Sample Vol (mL)	Titrant mL	Free CO_2 mg/L
6.92	15	7.10	473	30	0.30	44

If pH ≤ 4.5 don't test alkalinity because <1.
If pH ≥8.3 don't test Free CO_2 because <1.

Alk	Free CO_2	Alk + Free CO_2
473	44	105

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

LEACHATE FIELD PARAMETER FORM (Leachate dam)

CodyHart Environmental | ***Project:*** **NARRABRI LANDFILL** | ***Sample Point ID:*** **NL1**

Date: 20/07/23

Location: Leachate tank (used bailer)
Estimated depth of leachate:
at sampling point **0.10**

Start Sample: (24hr clock) 11:00

Beaker **:** Polypropylene

Filtered? (Y/N) N
Tick on metals bottle? (Y/N) Y
Dissolved/Total? Total

	DO (mg/L)	EC (µS/cm)	pH (STD)	Eh (mV)	Temp (°C)
Sample 1	1.98	11910	8.66	+15	16.5
Sample 2	1.92	12340	8.67	+11	15.9
Mean last 2 values	1.95	12125	8.67	+13	16.2
Max last 2 values	1.98	12340	8.67	+15	16.5
Min last 2 values	1.92	11910	8.66	+11	15.9
RPD (as decimal)	**0.03**	**0.04**	**0.00**	**0.31**	**0.04**
RPD <20% (0.20)	✓	✓	✓	✗	✓

OK ALS criteria

Turbidity (NTU) high
Sample Colour: black

Non-conformances well condition 'Field checks' & equipment (Y/N): N
(If yes, write details and remedy or arrange remedy.)
Details:

Upwind activities:
Landfill

Other comments:

I certify that sampling procedures were those detailed by CodyHart Environmental.

Name: Barbara Hart ***Signature:*** ***Date:*** 20/07/23 ***Time:*** 11:30

ALKALINITY & FREE CO $_2$ - NL1

pH	Sample Vol (mL)	Titrant mL	Alkalinity mg/L	Sample Vol (mL)	Titrant mL	Free CO_2 mg/L
8.67	5	25.00	5000	30	0.00	0

If pH ≤ 4.5 don't test alkalinity because <1. If pH ≥8.3 don' `

Alk	Free CO_2	Alk + Free CO_2
5000	0	984

Alkalinity = (Titrant (mL) x 0.02 x 50,000) / Sample Vol (mL)
Free CO2 = (Titrant (mL) x 0.1 x 44,000) / Sample Vol (mL)

Field analytical methods used by CodyHart:

Conductivity [APHA (1998) 2510B]; pH [APHA (1998) 4500-H+];
Dissolved Oxygen [APHA (1998) 4500-O];
Redox potential (oxidation-reduction potential) [APHA (1998) 2580B];
Temperature [APHA (1998) 2550]; Turbidity [APHA (1998) 2130];
Alkalinity [APHA (1998) 2320B;
Free carbon dioxide [APHA (1998) 4500 & 2310B].
Methods used by CodyHart comply with APHA 1998 methods listed in the NSW EPA Approved Methods, but Free CO2 is not listed.

CodyHart Environmental

OTHER FIELD DATA FORM

Project: **NARRABRI LANDFILL**

Date: 19/03/23

WATER QA ***Deionised water pretest*** (µS/cm): 2.95 ***Field blank EC*** (µS/cm at 25˚C): 3.23

WEATHER CONDITIONS

12:30		
Wind Direction (°):	20	
5 min Max Temp (°c):	24.2	at ground level
5 min Max Wind Speed (m/s):	2.48	at ground level
5 min Max Wind Speed (km/hr):	8.93	
5 min Av. Wind Speed (m/s):	1.03	at ground level
5 min Av. Wind Speed (km/hr):	3.71	
Rain Y/N:	N	
Cloud Cover (%):	0	

Date: 19/03/23

METHANE **9:30**

Buildings: Nil

Surface: Nil

Leachate pump Vent:
0 ppm
nil at base

Weather at time of methane testing

Wind Direction (°):	20	
5 min Max Temp (°c):	35.1	at ground level
5 min Max Wind Speed (m/s):	1.98	at ground level
5 min Max Wind Speed (km/hr):	7.13	
5 min Av. Wind Speed (m/s):	0.81	at ground level
5 min Av. Wind Speed (km/hr):	2.92	
Rain Y/N:	N	
Cloud Cover (%):	0	

Date: 20/07/23

WATER QA ***Deionised water pretest*** (µS/cm): 3.1 ***Field blank EC*** (µS/cm at 25˚C): 3.23

WEATHER CONDITIONS

AM			**PM**		
Wind Direction (°):	150		Wind Direction (°):	290.0	
5 min Max Temp (°c):	13.7	at ground level	**5 min Max Temp (°c):**	22.9	at ground level
5 min Max Wind Speed (m/s):	1.5	at ground level	**5 min Max Wind Speed (m/s):**	1.04	at ground level
5 min Max Wind Speed (km/hr):	5.40		5 min Max Wind Speed (km/hr):	3.74	
5 min Av. Wind Speed (m/s):	0.46	at ground level	**5 min Av. Wind Speed (m/s):**	0.37	at ground level
5 min Av. Wind Speed (km/hr):	1.66		5 min Av. Wind Speed (km/hr):	1.33	
Rain Y/N:	N		Rain Y/N:	N	
Cloud Cover (%):	0		Cloud Cover (%):	0	

Date: 19-20/7/23

METHANE

Buildings: Nil

Surface: Nil

Vent: 50,000 ppm
nil at base

Weather at time of methane testing

Wind Direction (°):	290	
5 min Max Temp (°c):	22.9	at ground level
5 min Max Wind Speed (m/s):	1.04	at ground level
5 min Max Wind Speed (km/hr):	3.74	
5 min Av. Wind Speed (m/s):	0.37	at ground level
5 min Av. Wind Speed (km/hr):	1.33	
Rain Y/N:	N	
Cloud Cover (%):	0	

APPENDIX B

Calibration Certificate
and
Chain of Custody Forms

CodyHart COC to Site & Calibration Certificate

Chain of Custody for sample containers - laboratory to site

CodyHart ordered sample containers from ALS laboratory, Stafford, Brisbane. When they were received they were stored in the locked and security monitored CodyHart office at Burleigh Heads, Queensland.

CodyHart labels were adhered to appropriate containers. The containers for each sampling point were placed into self sealing plastic bags, which were then labelled with the sampling point identity. The containers for each sampling point were then placed into CodyHart eskies and transported to the Narrabri Landfill by CodyHart.

It is certified that the sample bottles were received in unbroken sealed containers from ALS, and that no tampering with the sample containers occurred when in CodyHart hands.

BF Hart 19/03/23 and 19/07/23

Calibration certificate

CodyHart uses a TPS 90-FL Series field lab to take field temperature, pH, electrical conductivity (EC), redox potential (Eh) and dissolved oxygen (DO) readings.

A yearly maintenance service is conducted on the TPS field lab by TPS Pty Ltd, Brisbane.

It is certified that the scientific instrument used was calibrated at Narrabri so that sampling was conducted within 48 hours of field testing. The pH was recalibrated if any probe drift was noticed. The calibration process was documented and is available on request.

BF Hart 19/03/23 and 20/07/23

CHAIN OF CUSTODY TO LAB

BATCH 2 of 4

CodyHart Environmental
Monitoring & Management

CLIENT: *CodyHart Environmental*
ADDRESS / OFFICE: 3/29 Township Drive, BURLEIGH HEADS 4220 (PO Box 1073 BURLEIGH HEADS 4220)
PROJECT MANAGER (PM): Barbara Hart
PROJECT ID: **Narrabri 287**
SITE: **Narrabri Landfill** P.O. NO.:
RESULTS REQUIRED (Date): QUOTE NO.: EN/222/19 (Blanket quote)

SAMPLER: B. Hart
MOBILE: 042 777 5120
PHONE:
EMAIL REPORT TO: pelican@codyhart.com.au
EMAIL INVOICE TO: (above)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate) >
Intact: Yes No N/A
SAMPLE TEMPERATURE: °C

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

PLEASE SCAN THIS FORM **ON DAY OF ARRIVAL** AND EMAIL.

ANALYSES REQUIRED:

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		WATER - ED041G Sulphate	WATER - ED045G Chloride	WATER - NT-01 Major cations Ca Mg Na K	WATER EK055A - ~~Water~~ Ammonia	WATER - NT-05 Total Nitrogen (TKN+NOx)	WATER - NT-11 NOx TKN Tot P	WATER W-01-F - 7 metals ICP/MS Dissolved	W - EG020 F - Fe Mn only ICP/MS Dissolved	WATER W-01 T ICP/MS Total	W - EG020 T - Fe Mn only ICP/MS Total	WATER - W-03-T Total ICP/MS	W - EG020 T - B Fe Mn Al only	WATER - EG050G LL - T Total Hexavalent Cr (low level)	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP020 Oil & Grease (O&G)	WATER - EA025H Suspended Solids (High L)	WATER - EK040P Fluoride	WATER - EP074 (water) VOCs	WATER - EP080 BTEXN	WATER - W-12 OC/OP Pesticides	WATER - EP035G Total Phenols	WATER - W-10 - TRH/VOC/PAH
ALS ID	SAMPLE ID	MATRIX	DATE	Time	TYPE	Bottles																							
	NBH7	W	14/3/23	9:30	250mL Green; 60mL Red; 2 x 40 mL Purple; 40mL, 2 x 60 mL Purple, 1 x 100 mL Orange.	8	X	X	X	X	X			X	X				X					X	X	X	

RELINQUISHED BY:
Name: *Barbara Hart* Date: 21/3/23
Of: *CodyHart Environmental* Time: 7:00
Signature: *B F Hart* B Hart

RECEIVED BY:
Name: SW Date: 22/3/23
Of: *ALS Laboratory, Brisbane* Time: 1328
Signature:

METHOD OF SHIPMENT
Con' Note No: 85 96340
Transport Co: TAMEX

Itched in CodyHart Esky/Eskies numbered: 3 + small gel bricks large gel bricks + towels
PLEASE HOLD CODYHART ESKIES AT ALS UNTIL RETURN REQUESTED.

Environmental Division
Brisbane
Work Order Reference
EB2308600

Telephone : +61-7-3243 7222

CodyHart Consulting Pty Ltd trading as *CodyHart Environmental*

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2308600**

Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Contact	: Customer Services EB
Address	: 3/29 Township Drive BURLEIGH HEADS QLD, AUSTRALIA 4220	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: pelican@codyhart.com.au	E-mail	: ALSEnviro.Brisbane@alsglobal.com
Telephone	: +61 55205532	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 55206531	Facsimile	: +61-7-3243 7218
Project	: Narrabri 287	Page	: 1 of 2
Order number	: ----	Quote number	: EB2015CODCON0001 (EN/222 (Planned event tables))
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Narrabri Landfill		
Sampler	: B. HART		

Dates

Date Samples Received	: 22-Mar-2023 13:28	Issue Date	: 22-Mar-2023
Client Requested Due Date	: 30-Mar-2023	Scheduled Reporting Date	: **30-Mar-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 3.4°C - Ice present
Receipt Detail	: HARD ESKY	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please be advised that where "EK055A – Ammonia" analysis is requested on the Chain of Custody, ALS has assigned "EK055G – Ammonia as N" analysis. If you wish to discuss this, please contact client services at ALSEnviro.Brisbane@alsglobal.com**
- **Please be advised that where "EP035G – Total Phenols" analysis is requested on the Chain of Custody, ALS has assigned "EP035SF – Total Phenol" analysis. If you wish to discuss this, please contact client services at ALSEnviro.Brisbane@alsglobal.com**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- **"EP035SF – Total Phenol" analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - ED041G Sulfate (Turbidimetric) as SO4 2 by Discrete	WATER - ED045G Chloride by Discrete Analyser	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EP005 Total Organic Carbon (TOC)	WATER - NT-05 Total Nitrogen	WATER - W-01T 7 metals (Total)
EB2308600-001	19-Mar-2023 09:30	NBH7	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP035SF Total Phenol by Segmented Flow Analyser	WATER - EP080 BTEXN	WATER - NT-01 Major Cations (Ca, Mg, Na, K)	WATER - W-12 OC/OP Pesticides
EB2308600-001	19-Mar-2023 09:30	NBH7	✓	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

BARBARA HART

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

CHAIN OF CUSTODY TO LAB

CodyHart Environmental
Monitoring & Management

CLIENT: *CodyHart Environmental*
ADDRESS / OFFICE: 3/29 Township Drive, BURLEIGH HEADS 4220 (PO Box 1073 BURLEIGH HEADS 4220)
PROJECT MANAGER (PM): Barbara Hart
PROJECT ID: **Narrabri 287**
SITE: **Narrabri Landfill** P.O. NO.:
RESULTS REQUIRED (Date): QUOTE NO.: EN/222/19 (Blanket quote)

SAMPLER: B. Hart
MOBILE: 042 777 5120
PHONE:
EMAIL REPORT TO: pelican@codyhart.com.au
EMAIL INVOICE TO: (above)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate) Intact: Yes No N/A
SAMPLE TEMPERATURE °C

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:
PLEASE SCAN THIS FORM **ON DAY OF ARRIVAL** AND EMAIL.

ANALYSES REQUIRED:

ALS ID	SAMPLE ID	MATRIX	DATE	Time	CONTAINER INFORMATION TYPE	Bottles	WATER - ED041G Sulphate	WATER - ED045G Chloride	WATER - NT-01 Major cations Ca Mg Na K	WATER - EK055G Ammonia as N	WATER - NT-05 Total Nitrogen (TKN+NOx)	WATER - NT-11 NOx TKN Tot P	WATER W-01-F - 7 metals ICP/MS Dissolved	W - EG020 F Fe Mn only ICP/MS Dissolved	WATER W-01 T ICP/MS Total	W - EG020 T Fe Mn only ICP/MS Total	WATER - W-03-T Total ICP/MS	W - EG020 T B Fe Mn Al only	WATER - EG050G LL - T Total Hexavalent Cr (low level)	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP020 Oil & Grease (O&G)	WATER - EA025H Suspended Solids (High L)	WATER - EK040P Fluoride	WATER - EP074 (water) VOCs	WATER - EP080 BTEXN	WATER - W-12 OC/OP Pesticides	WATER - EP035G Total Phenols	WATER - W-10 - TRH/VOC/PAH
1	NBH1	W	20/7/23	14:30	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x					x	x	x	
2	NBH2	W	"	13:30	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x				x		x	x	
3	NBH3	W	"	12:30	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x				x		x	x	
4	NBH4	W	19/7/23	15:30	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x					x	x	x	
5	NBH5	W	"	14:30	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x					x	x	x	
6	NBH6	W	"	12:30	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x					x	x	x	
7	NBH7	W	20/7/23	10:00	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x				x	x				x					x	x	x	
8	NBH8	W	19/7/23	11:30	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x					x	x	x	
9	NBHD	W	"	NA	250mL Green; 60mL Red; 40mL, 60 mL Purple	4	x	x	x	x	x		x	x						x								
10	NL1	Leachate	20/7/23	11:00	250 mL Green; 60mL Red; 2X40mL Purple; 60 mL Cr^{+6} Blue; 40mL,2x60mL Purple; 2x100mL Orange.	10	x	x	x	x		x					x	x	x	x			x			x	x	x

RELINQUISHED BY:
Name: *Barbara Hart* Date: 24/7/23
Of: *CodyHart Environmental* Time: 8:00
Signature: *B F Hart* B Hart

RECEIVED BY:
Name: Date:
Of: *ALS Laboratory, Brisbane* Time:
Signature: KH 1517 24-07-23

METHOD OF SHIPMENT
Con' Note No:
Transport Co: Quick as a Flash

Samples were despatched in CodyHart Esky/Eskies numbered: 7+27 + **small gel bricks** **large gel bricks +** **towels**
PLEASE HOLD CODYHART

CodyHart Consulting Pty Ltd trading as *CodyHart Environmental*

Environmental Division
Brisbane
Work Order Reference
EB2322442

JESTED.

Telephone : + 61-7-3243 7222

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EB2322442**		
Amendment	: **1**		
Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Contact	: Customer Services EB
Address	: 3/29 Township Drive BURLEIGH HEADS QLD, AUSTRALIA 4220	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: pelican@codyhart.com.au	E-mail	: ALSEnviro.Brisbane@alsglobal.com
Telephone	: +61 55205532	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 55206531	Facsimile	: +61-7-3243 7218
Project	: Narrabri 287	Page	: 1 of 3
Order number	: ----	Quote number	: EB2015CODCON0001 (EN/222 (Planned event tables))
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Narrabri Landfill		
Sampler	: B.Hart		

Dates

Date Samples Received	: 24-Jul-2023 17:00	Issue Date	: 04-Aug-2023
Client Requested Due Date	: 01-Aug-2023	Scheduled Reporting Date	: **01-Aug-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 2	Temperature	: 1.3,1.5°C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 10 / 10

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- ***SRN Reissued 04/08/2023: As per the email from Barbara Hart on 02/08/2023 this work order has been amended to amend the sampling dates on samples 001-010 (NBH1, NBH2, NBH3, NBH4, NBH5, etc.) from 24/07/02 to 20/07/23 and 19/07/23 respectively.***
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- **Total phenol analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - ED041G Sulfate (Turbidimetric) as SO4 2 by Discrete	WATER - ED045G Chloride by Discrete Analyser	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EP035SF Total Phenol by Segmented Flow Analyser	WATER - NT-01 Major Cations (Ca, Mg, Na, K)	WATER - NT-05 Total Nitrogen	WATER - W-01 7 Metals
EB2322442-001	20-Jul-2023 14:30	NBH1	✓	✓	✓	✓	✓	✓	✓
EB2322442-002	20-Jul-2023 13:30	NBH2	✓	✓	✓	✓	✓	✓	✓
EB2322442-003	20-Jul-2023 12:30	NBH3	✓	✓	✓	✓	✓	✓	✓
EB2322442-004	19-Jul-2023 15:30	NBH4	✓	✓	✓	✓	✓	✓	✓
EB2322442-005	19-Jul-2023 14:30	NBH5	✓	✓	✓	✓	✓	✓	✓
EB2322442-006	19-Jul-2023 12:30	NHB6	✓	✓	✓	✓	✓	✓	✓
EB2322442-007	20-Jul-2023 10:00	NBH7	✓	✓	✓	✓	✓	✓	
EB2322442-008	19-Jul-2023 13:30	NBH8	✓	✓	✓	✓	✓	✓	✓
EB2322442-009	19-Jul-2023 00:00	NBHD	✓	✓	✓		✓	✓	✓
EB2322442-010	20-Jul-2023 11:00	NL1	✓	✓	✓	✓	✓		

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP074 (water) Volatile Organic Compounds	WATER - EP080 BTEXN	WATER - W-01T 7 metals (Total)	WATER - W-12 OC/OP Pesticides
EB2322442-001	20-Jul-2023 14:30	NBH1	✓		✓		✓		✓
EB2322442-002	20-Jul-2023 13:30	NBH2	✓		✓	✓			✓
EB2322442-003	20-Jul-2023 12:30	NBH3	✓		✓	✓			✓
EB2322442-004	19-Jul-2023 15:30	NBH4	✓		✓		✓		✓
EB2322442-005	19-Jul-2023 14:30	NBH5	✓		✓		✓		✓
EB2322442-006	19-Jul-2023 12:30	NHB6	✓		✓		✓		✓
EB2322442-007	20-Jul-2023 10:00	NBH7		✓	✓		✓	✓	✓
EB2322442-008	19-Jul-2023 13:30	NBH8	✓		✓		✓		✓
EB2322442-009	19-Jul-2023 00:00	NBHD	✓		✓				
EB2322442-010	20-Jul-2023 11:00	NL1		✓	✓				✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG050G LL-T Total Hexavalent Chromium - Low Level	WATER - EK040-P Fluoride (Auto Titrator)	WATER - NT-11 Total Nitrogen and Total Phosphorus	WATER - W-03T 15 Metals (Total) (NEPM)	WATER - W-10 TRH/BTEX/VOC/PAH
EB2322442-010	20-Jul-2023 11:00	NL1	✓	✓	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

BARBARA HART

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

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP035SF: Total Phenol by Segmented Flow Analyser

APPENDIX C

Laboratory Reports

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2308600**	Page	: 1 of 6
Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Contact	: Customer Services EB
Address	: 3/29 Township Drive BURLEIGH HEADS QLD, AUSTRALIA 4220	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 55205532	Telephone	: +61-7-3243 7222
Project	: Narrabri 287	Date Samples Received	: 22-Mar-2023 13:28
Order number	: ----	Date Analysis Commenced	: 23-Mar-2023
C-O-C number	: ----	Issue Date	: 29-Mar-2023 16:01
Sampler	: B. HART		
Site	: Narrabri Landfill		
Quote number	: EN/222 (Planned event tables)		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Keegan Mullane	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Wisam Marassa	Inorganics Coordinator	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 moisture content, insufficient sample (reduced weight employed) or matrix interference.

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

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

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

- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- **"EP035SF – Total Phenol" analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH7	----	----	----	----
				Sampling date / time	19-Mar-2023 09:30	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2308600-001	--------	--------	--------	--------
					Result	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**36**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**41**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**5**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**8**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**73**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**12**	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.001**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.002**	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.004**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.004**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.001**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.005**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.017**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**1.95**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.36**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.7**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**1.1**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**8**	----	----	----	----
EP035SF: Total Phenol by Segmented Flow Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH7	----	----	----	----
				Sampling date / time	19-Mar-2023 09:30	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2308600-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH7	----	----	----	----
				Sampling date / time	19-Mar-2023 09:30	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2308600-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
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	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**77.1**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**85.1**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**98.6**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**95.4**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**112**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	45	139
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	45	139
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP035SF: Total Phenol by Segmented Flow Analyser

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2308600**	Page	: 1 of 7
Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Contact	: Customer Services EB
Address	: 3/29 Township Drive BURLEIGH HEADS QLD, AUSTRALIA 4220	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 55205532	Telephone	: +61-7-3243 7222
Project	: Narrabri 287	Date Samples Received	: 22-Mar-2023
Order number	: ----	Date Analysis Commenced	: 23-Mar-2023
C-O-C number	: ----	Issue Date	: 29-Mar-2023
Sampler	: B. HART		
Site	: Narrabri Landfill		
Quote number	: EN/222 (Planned event tables)		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Keegan Mullane	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Wisam Marassa	Inorganics Coordinator	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 moisture content, insufficient sample (reduced weight employed) or matrix interference.

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP035SF: Total Phenol by Segmented Flow Analyser (QC Lot: 4950294)									
EB2308600-001	NBH7	EP035SF: Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4949462)									
EB2308403-012	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
EB2308053-006	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	4	4	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 4949458)									
EB2308403-012	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	2730	2810	2.9	0% - 20%
EB2308053-006	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1020	1020	0.6	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4954751)									
EB2308576-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	129	130	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	184	180	1.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1740	1730	0.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	70	70	0.0	0% - 20%
EB2308716-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	80	78	1.6	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	23	22	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	362	358	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	104	101	2.4	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4951354)									
EB2308493-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0005	<0.0005	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.059	0.058	0.0	0% - 50%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4951354) - continued									
EB2308493-001	Anonymous	EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.037	0.038	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.16	0.16	0.0	No Limit
EB2308704-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.004	0.005	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.038	0.038	0.0	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.061	0.062	2.7	0% - 50%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.41	0.41	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4949651)									
EB2308598-004	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.06	0.0	No Limit
EB2308474-006	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.03	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4949647)									
EB2308598-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.43	0.39	8.8	0% - 20%
EB2308474-006	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4952178)									
EB2308601-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	1.1	0.0	0% - 50%
EB2308606-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	1.0	0.0	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 4948251)									
EB2308355-005	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.0	No Limit
EB2308607-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	3	4	0.0	No Limit
EP080: BTEXN (QC Lot: 4947450)									
EB2308528-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<2	<2	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	57	58	2.6	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	7	6	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	301	288	4.5	0% - 20%
		EP080: ortho-Xylene	95-47-6	2	µg/L	168	160	4.4	0% - 20%
		EP080: Naphthalene	91-20-3	5	µg/L	66	61	7.6	0% - 50%
EB2308544-043	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 4950294)								
EP035SF: Phenols (Total)	----	0.05	mg/L	<0.05	0.2 mg/L	102	70.9	123
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4949462)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	109	85.0	118
				<1	100 mg/L	98.4	85.0	118
ED045G: Chloride by Discrete Analyser (QCLot: 4949458)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	92.1	90.0	115
				<1	1000 mg/L	107	90.0	115
ED093F: Dissolved Major Cations (QCLot: 4954751)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	112	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	105	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	105	70.0	130
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	101	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4951354)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	107	88.0	112
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	88.0	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	108	89.0	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	103	88.0	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	89.0	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	105	88.0	114
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	105	88.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	84.0	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	110	82.0	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4949651)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	100	83.5	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4949647)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	95.7	85.7	111
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4952178)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	92.3	70.1	108
EP005: Total Organic Carbon (TOC) (QCLot: 4948251)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	89.0	79.0	113
				<1	100 mg/L	96.2	79.0	113
EP068A: Organochlorine Pesticides (OC) (QCLot: 4952016)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	84.2	60.3	131

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 4952016) - continued								
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	75.5	45.1	126
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	86.0	63.1	128
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	83.8	60.2	130
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	85.7	58.6	120
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	86.5	53.8	118
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	83.0	53.7	120
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	85.4	57.0	122
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	84.7	56.3	121
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	107	56.5	123
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	84.7	55.8	122
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	85.8	55.3	124
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	88.2	52.8	122
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	90.9	48.9	131
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	83.5	50.0	121
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	87.7	46.5	123
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	79.5	42.0	122
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	73.6	49.8	130
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	77.2	39.4	134
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	74.9	51.4	129
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	86.3	45.7	139
EP068: Total Chlordane (sum)	----	0.5	µg/L	<0.5	----	----	----	----
EP068: Sum of DDD + DDE + DDT	72-54-8/72-5 5-9/50-2	0.5	µg/L	<0.5	----	----	----	----
EP068: Sum of Aldrin + Dieldrin	309-00-2/60- 57-1	0.5	µg/L	<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4952016)								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	81.6	53.2	133
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	82.8	44.2	158
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	7.9	5.00	32.6
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	76.3	27.6	153
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	89.0	73.0	123
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	89.8	51.6	122
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	84.1	45.2	139
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	84.6	47.5	135
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	96.5	53.4	133
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	88.1	56.3	125
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	85.3	37.1	144
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	87.4	49.8	131
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	76.6	37.0	131

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4952016) - continued								
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	79.0	47.3	127
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	77.0	16.0	150
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	79.3	45.5	128
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	75.6	39.1	129
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	79.0	38.4	134
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	74.4	27.5	146
EP080: BTEXN (QCLot: 4947450)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	96.8	79.8	115
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	93.5	78.6	116
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.0	77.3	115
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	93.0	82.0	118
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	91.9	86.0	119
EP080: Total Xylenes	----	2	µg/L	<2	----	----	----	----
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	99.1	77.8	116

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 4950294)							
EB2308600-001	NBH7	EP035SF: Phenols (Total)	----	0.2 mg/L	101	65.1	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4949462)							
EB2308403-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	104	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4949458)							
EB2308403-013	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4951354)							
EB2308493-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	99.4	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	104	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	98.5	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	89.9	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	97.1	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	97.9	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4951354) - continued							
EB2308493-002	Anonymous	EG020A-T: Nickel	7440-02-0	1 mg/L	89.8	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	91.1	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4949651)							
EB2308598-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	81.2	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4949647)							
EB2308598-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	2 mg/L	78.6	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4952178)							
EB2308606-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	100	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4948251)							
EB2308576-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	89.3	70.0	130
EP080: BTEXN (QCLot: 4947450)							
EB2308530-001	Anonymous	EP080: Benzene	71-43-2	10 µg/L	103	70.0	130
		EP080: Toluene	108-88-3	10 µg/L	105	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2308600**	Page	: 1 of 7
Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Telephone	: +61-7-3243 7222
Project	: Narrabri 287	Date Samples Received	: 22-Mar-2023
Site	: Narrabri Landfill	Issue Date	: 29-Mar-2023
Sampler	: B. HART	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	EB2308403--013	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
ED093F: Dissolved Major Cations						
Clear Plastic Bottle - Natural						
NBH7	----	----	----	28-Mar-2023	26-Mar-2023	**2**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Pesticides by GCMS	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Pesticides by GCMS	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
NBH7	**19-Mar-2023**	**----**	----	----	**23-Mar-2023**	16-Apr-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
NBH7	**19-Mar-2023**	**----**	----	----	**23-Mar-2023**	16-Apr-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
NBH7	**19-Mar-2023**	**----**	----	----	**28-Mar-2023**	26-Mar-2023	×
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
NBH7	**19-Mar-2023**	**24-Mar-2023**	15-Sep-2023	✓	**28-Mar-2023**	15-Sep-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
NBH7	**19-Mar-2023**	**----**	----	----	**23-Mar-2023**	16-Apr-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
NBH7	**19-Mar-2023**	**----**	----	----	**23-Mar-2023**	16-Apr-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
NBH7	**19-Mar-2023**	**24-Mar-2023**	16-Apr-2023	✓	**24-Mar-2023**	16-Apr-2023	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
NBH7	**19-Mar-2023**	**----**	----	----	**23-Mar-2023**	16-Apr-2023	✓
EP035SF: Total Phenol by Segmented Flow Analyser							
Clear Plastic Bottle - Sulfuric Acid (EP035SF)							
NBH7	**19-Mar-2023**	**----**	----	----	**24-Mar-2023**	16-Apr-2023	✓
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
NBH7	**19-Mar-2023**	**24-Mar-2023**	26-Mar-2023	✓	**27-Mar-2023**	03-May-2023	✓
EP068B: Organophosphorus Pesticides (OP)							
Amber Glass Bottle - Unpreserved (EP068)							
NBH7	**19-Mar-2023**	**24-Mar-2023**	26-Mar-2023	✓	**27-Mar-2023**	03-May-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
NBH7	**19-Mar-2023**	**24-Mar-2023**	02-Apr-2023	✓	**26-Mar-2023**	02-Apr-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	1	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
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 thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Total Phenol by Segmented Flow Analyser	EP035SF	WATER	In house: Referenced to ISO 14402. The sample is in-line-distilled at pH 1- 4. The distillate, containing steam-volatile phenolic compounds is then oxidised by hexacyanoferrate(III). The resulting quinones react with 4-aminoantipyrine forming red condensation products, which are measured spectrometrically in a flow spectrometer at 505 nm.. This method is compliant with NEPM Schedule B(3)
Pesticides by GCMS	EP068	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
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)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
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 purging.

CERTIFICATE OF ANALYSIS

Work Order	: **EB2322442**	Page	: 1 of 16
Amendment	: **1**		
Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Contact	: Customer Services EB
Address	: 3/29 Township Drive BURLEIGH HEADS QLD, AUSTRALIA 4220	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 55205532	Telephone	: +61-7-3243 7222
Project	: Narrabri 287	Date Samples Received	: 24-Jul-2023 17:00
Order number	: ----	Date Analysis Commenced	: 25-Jul-2023
C-O-C number	: ----	Issue Date	: 04-Aug-2023 16:31
Sampler	: B.Hart		
Site	: Narrabri Landfill		
Quote number	: EN/222 (Planned event tables)		
No. of samples received	: 10		
No. of samples analysed	: 10		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Organics, Stafford, QLD
Matt Frost	Assistant Laboratory Manager	Brisbane Organics, Stafford, QLD
Timothy Creagh	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- ED041G (Sulfate as SO4): Sample NL1 (EB2322442-010) was diluted due to matrix interference. LOR adjusted accordingly.
- EG050G LL-T (Total Hexavalent Chromium - Low Level): Sample NL1 (EB2322442-010) was diluted due to matrix interference. LOR adjusted accordingly.
- EP035SF: LOR raised for PHENOL sample 10 due to sample matrix.
- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- **Total phenol analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- EP005 - (Total Organic Carbon): Sample "NBH4' (EB2322442-004)' required dilution prior to analysis due to the presence of samp matrix interference. LOR values have been adjusted accordingly.
- EP080 - TRH Volatiles/BTEX: Sample 'NL1' (EB2322442-010) required dilution prior to analysis due to the presence of sample matrix interference (foamy). LOR values have been adjusted accordingly.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- EG035T (Total Mercury): Limit of reporting raised for sample NL1(EB2322442-010) due to matrix interference.
- EK059G (Nitrite + Nitrate as N (NOx)): Sample NL1 (EB2322442-010) was diluted due to matrix interference. LOR adjusted accordingly.
- Amendment (04/08/2023): This report has been amended as a result of a request from Barbara Hart via email on 02/08/2023 to amend the sampling dates on Samples 001-010 (NBH1, NBH2, NBH3, NBH4, NBH5, etc.). All analysis results are as per the previous report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	NBH1	NBH2	NBH3	NBH4	NBH5
				Sampling date / time	20-Jul-2023 14:30	20-Jul-2023 13:30	20-Jul-2023 12:30	19-Jul-2023 15:30	19-Jul-2023 14:30
					EB2322442-001	EB2322442-002	EB2322442-003	EB2322442-004	EB2322442-005
					Result	Result	Result	Result	Result
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		1	1170	2040	26	99
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		134	4330	7260	975	3360
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		<1	<1	7	1	19
Magnesium	7439-95-4	1	mg/L		1	76	372	5	52
Sodium	7440-23-5	1	mg/L		343	4740	6400	1100	2350
Potassium	7440-09-7	1	mg/L		10	129	105	33	71
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.006	0.019	<0.005	0.005	0.004
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0005	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	0.002	<0.005	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		0.004	0.014	0.011	0.002	0.007
Nickel	7440-02-0	0.001	mg/L		<0.001	0.022	<0.005	0.002	0.002
Lead	7439-92-1	0.001	mg/L		<0.001	0.001	<0.005	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		0.008	0.006	0.030	0.007	0.018
Manganese	7439-96-5	0.001	mg/L		<0.001	0.023	<0.005	0.002	0.030
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	0.09	<0.05	<0.05
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.14
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.19	48.3	436	0.24	4.86
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		<0.1	5.4	59.3	<0.1	0.3
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		0.2	53.7	495	0.2	5.2
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		3	78	39	7	15
EP035SF: Total Phenol by Segmented Flow Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH1	NBH2	NBH3	NBH4	NBH5
				Sampling date / time	20-Jul-2023 14:30	20-Jul-2023 13:30	20-Jul-2023 12:30	19-Jul-2023 15:30	19-Jul-2023 14:30
Compound	CAS Number	LOR	Unit		EB2322442-001	EB2322442-002	EB2322442-003	EB2322442-004	EB2322442-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-BHC	319-85-7	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
gamma-BHC	58-89-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
delta-BHC	319-86-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	76-44-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	309-00-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Dieldrin	60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	72-20-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Methoxychlor	72-43-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
Dimethoate	60-51-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon	333-41-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
Malathion	121-75-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	55-38-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Parathion	56-38-2	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH1	NBH2	NBH3	NBH4	NBH5
				Sampling date / time	20-Jul-2023 14:30	20-Jul-2023 13:30	20-Jul-2023 12:30	19-Jul-2023 15:30	19-Jul-2023 14:30
Compound	CAS Number	LOR	Unit		EB2322442-001	EB2322442-002	EB2322442-003	EB2322442-004	EB2322442-005
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Prothiofos	34643-46-4	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	563-12-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Carbophenothion	786-19-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	1	µg/L		----	<1	<1	----	----
Toluene	108-88-3	2	µg/L		----	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	<2	<2	----	----
Styrene	100-42-5	5	µg/L		----	<5	<5	----	----
ortho-Xylene	95-47-6	2	µg/L		----	<2	<2	----	----
Isopropylbenzene	98-82-8	5	µg/L		----	<5	<5	----	----
n-Propylbenzene	103-65-1	5	µg/L		----	<5	<5	----	----
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		----	<5	<5	----	----
sec-Butylbenzene	135-98-8	5	µg/L		----	<5	<5	----	----
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		----	<5	<5	----	----
tert-Butylbenzene	98-06-6	5	µg/L		----	<5	<5	----	----
p-Isopropyltoluene	99-87-6	5	µg/L		----	<5	<5	----	----
n-Butylbenzene	104-51-8	5	µg/L		----	<5	<5	----	----
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		----	<50	<50	----	----
2-Butanone (MEK)	78-93-3	50	µg/L		----	<50	<50	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		----	<50	<50	----	----
2-Hexanone (MBK)	591-78-6	50	µg/L		----	<50	<50	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		----	<5	<5	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		----	<5	<5	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		----	<5	<5	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		----	<5	<5	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH1	NBH2	NBH3	NBH4	NBH5
				Sampling date / time	20-Jul-2023 14:30	20-Jul-2023 13:30	20-Jul-2023 12:30	19-Jul-2023 15:30	19-Jul-2023 14:30
Compound	CAS Number	LOR	Unit		EB2322442-001	EB2322442-002	EB2322442-003	EB2322442-004	EB2322442-005
					Result	Result	Result	Result	Result
EP074D: Fumigants - Continued									
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		----	<5	<5	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		----	<5	<5	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		----	<50	<50	----	----
Chloromethane	74-87-3	50	µg/L		----	<50	<50	----	----
Vinyl chloride	75-01-4	50	µg/L		----	<50	<50	----	----
Bromomethane	74-83-9	50	µg/L		----	<50	<50	----	----
Chloroethane	75-00-3	50	µg/L		----	<50	<50	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		----	<50	<50	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		----	<5	<5	----	----
Iodomethane	74-88-4	5	µg/L		----	<5	<5	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		----	<5	<5	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		----	<5	<5	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		----	<5	<5	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		----	<5	<5	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		----	<5	<5	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		----	<5	<5	----	----
1.2-Dichloroethane	107-06-2	5	µg/L		----	<5	<5	----	----
Trichloroethene	79-01-6	5	µg/L		----	<5	<5	----	----
Dibromomethane	74-95-3	5	µg/L		----	<5	<5	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		----	<5	<5	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		----	<5	<5	----	----
Tetrachloroethene	127-18-4	5	µg/L		----	<5	<5	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		----	<5	<5	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		----	<5	<5	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		----	<5	<5	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		----	<5	<5	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		----	<5	<5	----	----
Pentachloroethane	76-01-7	5	µg/L		----	<5	<5	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		----	<5	<5	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		----	<5	<5	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		----	<5	<5	----	----
Bromobenzene	108-86-1	5	µg/L		----	<5	<5	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH1	NBH2	NBH3	NBH4	NBH5
				Sampling date / time	20-Jul-2023 14:30	20-Jul-2023 13:30	20-Jul-2023 12:30	19-Jul-2023 15:30	19-Jul-2023 14:30
Compound	CAS Number	LOR	Unit		EB2322442-001	EB2322442-002	EB2322442-003	EB2322442-004	EB2322442-005
					Result	Result	Result	Result	Result
EP074F: Halogenated Aromatic Compounds - Continued									
2-Chlorotoluene	95-49-8	5	µg/L		----	<5	<5	----	----
4-Chlorotoluene	106-43-4	5	µg/L		----	<5	<5	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		----	<5	<5	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		----	<5	<5	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L		----	<5	<5	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		----	<5	<5	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		----	<5	<5	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		----	<5	<5	----	----
Bromodichloromethane	75-27-4	5	µg/L		----	<5	<5	----	----
Dibromochloromethane	124-48-1	5	µg/L		----	<5	<5	----	----
Bromoform	75-25-2	5	µg/L		----	<5	<5	----	----
EP074H: Naphthalene									
Naphthalene	91-20-3	5	µg/L		----	<5	<5	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	<1	<1
Toluene	108-88-3	2	µg/L		<2	----	----	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	<2	<2
^ Total Xylenes	----	2	µg/L		<2	----	----	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	----	----	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	----	----	<5	<5
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**66.1**	**87.3**	**66.8**	**77.1**	**66.8**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**71.5**	**91.2**	**76.0**	**88.6**	**76.4**
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	5	%		----	**99.7**	**104**	----	----
Toluene-D8	2037-26-5	5	%		----	**105**	**106**	----	----
4-Bromofluorobenzene	460-00-4	5	%		----	**107**	**105**	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**108**	----	----	**105**	**105**
Toluene-D8	2037-26-5	2	%		**97.9**	----	----	**97.1**	**97.4**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NBH1	NBH2	NBH3	NBH4	NBH5
				Sampling date / time	20-Jul-2023 14:30	20-Jul-2023 13:30	20-Jul-2023 12:30	19-Jul-2023 15:30	19-Jul-2023 14:30
Compound	CAS Number	LOR	Unit		EB2322442-001	EB2322442-002	EB2322442-003	EB2322442-004	EB2322442-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%		**102**	**----**	**----**	**106**	**104**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NHB6	NBH7	NBH8	NBHD	NL1
				Sampling date / time	19-Jul-2023 12:30	20-Jul-2023 10:00	19-Jul-2023 13:30	19-Jul-2023 00:00	20-Jul-2023 11:00
Compound	CAS Number	LOR	Unit		EB2322442-006	EB2322442-007	EB2322442-008	EB2322442-009	EB2322442-010
					Result	Result	Result	Result	Result
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		133	30	27	27	<100
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		2600	37	1580	1600	2120
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		6	7	14	14	78
Magnesium	7439-95-4	1	mg/L		27	8	51	51	96
Sodium	7440-23-5	1	mg/L		3090	64	1130	1130	2220
Potassium	7440-09-7	1	mg/L		86	10	17	17	586
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.010	----	0.002	0.002	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		0.004	----	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		0.010	----	0.012	0.012	----
Nickel	7440-02-0	0.001	mg/L		0.015	----	0.006	0.006	----
Lead	7439-92-1	0.001	mg/L		0.001	----	0.006	0.005	----
Zinc	7440-66-6	0.005	mg/L		0.009	----	0.042	0.042	----
Manganese	7439-96-5	0.001	mg/L		0.002	----	0.023	0.022	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	0.16	0.12	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	----	----	1.58
Arsenic	7440-38-2	0.001	mg/L		----	<0.001	----	----	0.021
Boron	7440-42-8	0.05	mg/L		----	----	----	----	2.63
Barium	7440-39-3	0.001	mg/L		----	----	----	----	0.561
Beryllium	7440-41-7	0.001	mg/L		----	----	----	----	<0.010
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	----	----	0.0011
Cobalt	7440-48-4	0.001	mg/L		----	----	----	----	0.076
Chromium	7440-47-3	0.001	mg/L		----	0.002	----	----	0.562
Copper	7440-50-8	0.001	mg/L		----	0.003	----	----	0.169
Manganese	7439-96-5	0.001	mg/L		----	0.026	----	----	0.997
Nickel	7440-02-0	0.001	mg/L		----	0.004	----	----	0.273
Lead	7439-92-1	0.001	mg/L		----	<0.001	----	----	0.046
Selenium	7782-49-2	0.01	mg/L		----	----	----	----	<0.10
Vanadium	7440-62-2	0.01	mg/L		----	----	----	----	0.16
Zinc	7440-66-6	0.005	mg/L		----	<0.005	----	----	0.525

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NHB6	NBH7	NBH8	NBHD	NL1
				Sampling date / time	19-Jul-2023 12:30	20-Jul-2023 10:00	19-Jul-2023 13:30	19-Jul-2023 00:00	20-Jul-2023 11:00
Compound	CAS Number	LOR	Unit		EB2322442-006	EB2322442-007	EB2322442-008	EB2322442-009	EB2322442-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Iron	7439-89-6	0.05	mg/L		----	1.71	----	----	19.4
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	----	<0.0010
EG050G LL-T: Total Hexavalent Chromium by Discrete Analyser - Low Level									
Hexavalent Chromium	18540-29-9	0.001	mg/L		----	----	----	----	<0.100
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		----	----	----	----	0.3
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	542
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		6.55	0.75	0.34	0.35	<1.00
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		0.9	1.1	0.3	0.3	740
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		7.4	1.8	0.6	0.6	740
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	----	----	----	7.67
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		42	7	5	6	1470
EP035SF: Total Phenol by Segmented Flow Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	<0.05	<0.05	----	<0.10
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
beta-BHC	319-85-7	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
gamma-BHC	58-89-9	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
delta-BHC	319-86-8	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Heptachlor	76-44-8	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Aldrin	309-00-2	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NHB6	NBH7	NBH8	NBHD	NL1
				Sampling date / time	19-Jul-2023 12:30	20-Jul-2023 10:00	19-Jul-2023 13:30	19-Jul-2023 00:00	20-Jul-2023 11:00
Compound	CAS Number	LOR	Unit		EB2322442-006	EB2322442-007	EB2322442-008	EB2322442-009	EB2322442-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
Dieldrin	60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Endrin	72-20-8	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	<2.0	<2.0	----	<2.0
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Methoxychlor	72-43-5	2.0	µg/L		<2.0	<2.0	<2.0	----	<2.0
^ **Total Chlordane (sum)**	----	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	<2.0	<2.0	----	<2.0
Dimethoate	60-51-5	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Diazinon	333-41-5	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	<2.0	<2.0	----	<2.0
Malathion	121-75-5	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Fenthion	55-38-9	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Parathion	56-38-2	2.0	µg/L		<2.0	<2.0	<2.0	----	<2.0
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Prothiofos	34643-46-4	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Ethion	563-12-2	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Carbophenothion	786-19-6	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	<0.5	<0.5	----	<0.5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NHB6	NBH7	NBH8	NBHD	NL1
				Sampling date / time	19-Jul-2023 12:30	20-Jul-2023 10:00	19-Jul-2023 13:30	19-Jul-2023 00:00	20-Jul-2023 11:00
Compound	CAS Number	LOR	Unit		EB2322442-006	EB2322442-007	EB2322442-008	EB2322442-009	EB2322442-010
					Result	Result	Result	Result	Result
EP074A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	5	µg/L		----	----	----	----	<5
Isopropylbenzene	98-82-8	5	µg/L		----	----	----	----	<5
n-Propylbenzene	103-65-1	5	µg/L		----	----	----	----	<5
1.3.5-Trimethylbenzene	108-67-8	5	µg/L		----	----	----	----	<5
sec-Butylbenzene	135-98-8	5	µg/L		----	----	----	----	<5
1.2.4-Trimethylbenzene	95-63-6	5	µg/L		----	----	----	----	<5
tert-Butylbenzene	98-06-6	5	µg/L		----	----	----	----	<5
p-Isopropyltoluene	99-87-6	5	µg/L		----	----	----	----	<5
n-Butylbenzene	104-51-8	5	µg/L		----	----	----	----	<5
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	50	µg/L		----	----	----	----	<50
2-Butanone (MEK)	78-93-3	50	µg/L		----	----	----	----	<50
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L		----	----	----	----	<50
2-Hexanone (MBK)	591-78-6	50	µg/L		----	----	----	----	<50
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	5	µg/L		----	----	----	----	<5
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		----	----	----	----	<5
1.2-Dichloropropane	78-87-5	5	µg/L		----	----	----	----	<5
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		----	----	----	----	<5
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		----	----	----	----	<5
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		----	----	----	----	<5
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		----	----	----	----	<50
Chloromethane	74-87-3	50	µg/L		----	----	----	----	<50
Vinyl chloride	75-01-4	50	µg/L		----	----	----	----	<50
Bromomethane	74-83-9	50	µg/L		----	----	----	----	<50
Chloroethane	75-00-3	50	µg/L		----	----	----	----	<50
Trichlorofluoromethane	75-69-4	50	µg/L		----	----	----	----	<50
1.1-Dichloroethene	75-35-4	5	µg/L		----	----	----	----	<5
Iodomethane	74-88-4	5	µg/L		----	----	----	----	<5
trans-1.2-Dichloroethene	156-60-5	5	µg/L		----	----	----	----	<5
1.1-Dichloroethane	75-34-3	5	µg/L		----	----	----	----	<5
cis-1.2-Dichloroethene	156-59-2	5	µg/L		----	----	----	----	<5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NHB6	NBH7	NBH8	NBHD	NL1
				Sampling date / time	19-Jul-2023 12:30	20-Jul-2023 10:00	19-Jul-2023 13:30	19-Jul-2023 00:00	20-Jul-2023 11:00
Compound	CAS Number	LOR	Unit		EB2322442-006	EB2322442-007	EB2322442-008	EB2322442-009	EB2322442-010
					Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued									
1.1.1-Trichloroethane	71-55-6	5	µg/L		----	----	----	----	<5
1.1-Dichloropropylene	563-58-6	5	µg/L		----	----	----	----	<5
Carbon Tetrachloride	56-23-5	5	µg/L		----	----	----	----	<5
1.2-Dichloroethane	107-06-2	5	µg/L		----	----	----	----	<5
Trichloroethene	79-01-6	5	µg/L		----	----	----	----	<5
Dibromomethane	74-95-3	5	µg/L		----	----	----	----	<5
1.1.2-Trichloroethane	79-00-5	5	µg/L		----	----	----	----	<5
1.3-Dichloropropane	142-28-9	5	µg/L		----	----	----	----	<5
Tetrachloroethene	127-18-4	5	µg/L		----	----	----	----	<5
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		----	----	----	----	<5
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		----	----	----	----	<5
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		----	----	----	----	<5
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		----	----	----	----	<5
1.2.3-Trichloropropane	96-18-4	5	µg/L		----	----	----	----	<5
Pentachloroethane	76-01-7	5	µg/L		----	----	----	----	<5
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		----	----	----	----	<5
Hexachlorobutadiene	87-68-3	5	µg/L		----	----	----	----	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		----	----	----	----	<5
Bromobenzene	108-86-1	5	µg/L		----	----	----	----	<5
2-Chlorotoluene	95-49-8	5	µg/L		----	----	----	----	<5
4-Chlorotoluene	106-43-4	5	µg/L		----	----	----	----	<5
1.3-Dichlorobenzene	541-73-1	5	µg/L		----	----	----	----	<5
1.4-Dichlorobenzene	106-46-7	5	µg/L		----	----	----	----	<5
1.2-Dichlorobenzene	95-50-1	5	µg/L		----	----	----	----	<5
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		----	----	----	----	<5
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		----	----	----	----	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		----	----	----	----	<5
Bromodichloromethane	75-27-4	5	µg/L		----	----	----	----	<5
Dibromochloromethane	124-48-1	5	µg/L		----	----	----	----	<5
Bromoform	75-25-2	5	µg/L		----	----	----	----	<5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		----	----	----	----	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NHB6	NBH7	NBH8	NBHD	NL1
				Sampling date / time	19-Jul-2023 12:30	20-Jul-2023 10:00	19-Jul-2023 13:30	19-Jul-2023 00:00	20-Jul-2023 11:00
Compound	CAS Number	LOR	Unit		EB2322442-006	EB2322442-007	EB2322442-008	EB2322442-009	EB2322442-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	1.0	µg/L		----	----	----	----	<1.0
Acenaphthene	83-32-9	1.0	µg/L		----	----	----	----	<1.0
Fluorene	86-73-7	1.0	µg/L		----	----	----	----	<1.0
Phenanthrene	85-01-8	1.0	µg/L		----	----	----	----	<1.0
Anthracene	120-12-7	1.0	µg/L		----	----	----	----	<1.0
Fluoranthene	206-44-0	1.0	µg/L		----	----	----	----	<1.0
Pyrene	129-00-0	1.0	µg/L		----	----	----	----	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L		----	----	----	----	<1.0
Chrysene	218-01-9	1.0	µg/L		----	----	----	----	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		----	----	----	----	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		----	----	----	----	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		----	----	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		----	----	----	----	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		----	----	----	----	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		----	----	----	----	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		----	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		----	----	----	----	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	----	----	<100
C10 - C14 Fraction	----	50	µg/L		----	----	----	----	**1730**
C15 - C28 Fraction	----	100	µg/L		----	----	----	----	**8230**
C29 - C36 Fraction	----	50	µg/L		----	----	----	----	**500**
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	----	----	----	**10500**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	----	----	<100
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		----	----	----	----	<100
>C10 - C16 Fraction	----	100	µg/L		----	----	----	----	**2450**
>C16 - C34 Fraction	----	100	µg/L		----	----	----	----	**8180**
>C34 - C40 Fraction	----	100	µg/L		----	----	----	----	**230**
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	----	**10900**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	----	**2450**
EP080: BTEXN									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NHB6	NBH7	NBH8	NBHD	NL1
				Sampling date / time	19-Jul-2023 12:30	20-Jul-2023 10:00	19-Jul-2023 13:30	19-Jul-2023 00:00	20-Jul-2023 11:00
Compound	CAS Number	LOR	Unit		EB2322442-006	EB2322442-007	EB2322442-008	EB2322442-009	EB2322442-010
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Benzene	71-43-2	1	µg/L		<1	<1	<1	----	<2
Toluene	108-88-3	2	µg/L		<2	<2	<2	----	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	----	<5
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	----	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	----	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	----	<2
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	<5
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		80.4	75.0	75.2	----	52.9
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		83.1	88.4	86.1	----	55.8
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	5	%		----	----	----	----	122
Toluene-D8	2037-26-5	5	%		----	----	----	----	110
4-Bromofluorobenzene	460-00-4	5	%		----	----	----	----	93.5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		----	----	----	----	16.0
2-Chlorophenol-D4	93951-73-6	1.0	%		----	----	----	----	53.2
2.4.6-Tribromophenol	118-79-6	1.0	%		----	----	----	----	67.4
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		----	----	----	----	44.3
Anthracene-d10	1719-06-8	1.0	%		----	----	----	----	56.3
4-Terphenyl-d14	1718-51-0	1.0	%		----	----	----	----	52.8
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		103	105	103	----	102
Toluene-D8	2037-26-5	2	%		95.6	100	99.2	----	102
4-Bromofluorobenzene	460-00-4	2	%		94.5	94.4	95.0	----	97.6

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	45	139
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	45	139
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	72
2-Chlorophenol-D4	93951-73-6	27	130
2.4.6-Tribromophenol	118-79-6	19	181
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	14	146
Anthracene-d10	1719-06-8	35	137
4-Terphenyl-d14	1718-51-0	36	154
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP035SF: Total Phenol by Segmented Flow Analyser

QUALITY CONTROL REPORT

Work Order	: **EB2322442**	Page	: 1 of 23
Amendment	: **1**		
Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Contact	: Customer Services EB
Address	: 3/29 Township Drive BURLEIGH HEADS QLD, AUSTRALIA 4220	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 55205532	Telephone	: +61-7-3243 7222
Project	: Narrabri 287	Date Samples Received	: 24-Jul-2023
Order number	: ----	Date Analysis Commenced	: 25-Jul-2023
C-O-C number	: ----	Issue Date	: 04-Aug-2023
Sampler	: B.Hart		
Site	: Narrabri Landfill		
Quote number	: EN/222 (Planned event tables)		
No. of samples received	: 10		
No. of samples analysed	: 10		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Beatriz Llarinas	Senior Chemist - Inorganics	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Organics, Stafford, QLD
Matt Frost	Assistant Laboratory Manager	Brisbane Organics, Stafford, QLD
Timothy Creagh	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP035SF: Total Phenol by Segmented Flow Analyser (QC Lot: 5197248)									
EB2322442-001	NBH1	EP035SF: Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EP035SF: Total Phenol by Segmented Flow Analyser (QC Lot: 5197249)									
EB2322442-003	NBH3	EP035SF: Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ES2324834-003	Anonymous	EP035SF: Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5195086)									
EB2321438-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	1	0.0	No Limit
EB2322150-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	13	13	0.0	0% - 50%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5195088)									
EB2321570-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
EB2322586-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	27	27	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5198242)									
EB2322566-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	257	249	3.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 5195077)									
EB2321438-005	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	94	87	7.6	0% - 20%
EB2322150-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	71	70	1.4	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5195079)									
EB2321570-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.0	No Limit
EB2322586-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	17	17	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 5198243)									
EB2322566-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	240	234	2.6	No Limit
ED093F: Dissolved Major Cations (QC Lot: 5194586)									
EB2322382-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED093F: Dissolved Major Cations (QC Lot: 5194586) - continued									
EB2322382-001	Anonymous	ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EB2322460-004	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	240	239	0.4	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	78	77	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	296	288	2.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	8	8	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 5194729)									
EB2322433-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	31	31	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	6	7	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	50	52	2.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 5194730)									
EB2322442-003	NBH3	ED093F: Calcium	7440-70-2	1	mg/L	7	7	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	372	374	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	6400	6380	0.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	105	104	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5194727)									
EB2322433-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EB2322433-012	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.009	0.009	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5194728)									
EB2322442-003	NBH3	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0005	<0.0005	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.005	<0.005	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5194728) - continued									
EB2322442-003	NBH3	EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.011	0.010	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.030	0.032	3.4	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.09	0.07	19.6	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5194754)									
EB2322442-007	NBH7	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.062	0.062	0.0	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.003	0.0	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.026	0.026	0.0	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.004	0.003	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	1.58	1.53	3.2	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	0.07	0.08	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.71	1.70	0.7	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 5194985)									
EB2322589-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.044	0.044	0.0	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.013	0.013	0.0	0% - 50%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.730	0.716	1.9	0% - 20%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 5194985) - continued									
EB2322589-001	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5194987)									
EB2322442-010	NL1	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.0	No Limit
EG050G LL-T: Total Hexavalent Chromium by Discrete Analyser - Low Level (QC Lot: 5200164)									
EB2322341-001	Anonymous	EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 5196352)									
EB2322442-010	NL1	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.3	0.3	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5193204)									
EB2322414-008	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	2.27	2.29	0.8	0% - 20%
EB2322442-002	NBH2	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5198233)									
ET2302955-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	67.8	68.8	1.4	0% - 20%
EB2322385-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.52	0.51	0.0	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5193208)									
EB2322414-008	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EB2322442-002	NBH2	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	48.3	47.6	1.4	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5198234)									
ET2302955-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<1.00	<1.00	0.0	No Limit
EB2322385-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	3.98	4.36	9.1	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5196300)									
EB2321798-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.9	0.0	No Limit
EB2322133-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.4	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5196301)									
EB2322459-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	164	174	5.5	0% - 20%
ET2303692-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5196299)									
EB2321798-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.06	0.0	No Limit
EB2322133-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.02	41.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 5198424)									
EB2322133-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	5	5	0.0	No Limit
EB2322442-002	NBH2	EP005: Total Organic Carbon	----	1	mg/L	78	82	5.4	0% - 50%
EP068A: Organochlorine Pesticides (OC) (QC Lot: 5196035)									
EB2322357-042	Anonymous	EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 5196035) - continued									
EB2322357-042	Anonymous	EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	<2.0	0.0	No Limit
		EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	<2.0	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 5196035)									
EB2322357-042	Anonymous	EP068: Dimethoate	60-51-5	0.5	µg/L	<2.0	<2.0	0.0	No Limit
EB2322357-042	Anonymous	EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	<2.0	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	0.0	No Limit
		EP068: Parathion	56-38-2	2	µg/L	<2.0	<2.0	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP074: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP074: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 5193767) - continued									
EB2322442-002	NBH2	EP074: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP074: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP074: Styrene	100-42-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	<5	0.0	No Limit
EP074B: Oxygenated Compounds (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50	0.0	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50	0.0	No Limit
EP074C: Sulfonated Compounds (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: Carbon disulfide	75-15-0	5	µg/L	<5	<5	0.0	No Limit
EP074D: Fumigants (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.0	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 5193767) - continued									
EB2322442-002	NBH2	EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.0	No Limit
EP074G: Trihalomethanes (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.0	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.0	No Limit
EP074H: Naphthalene (QC Lot: 5193767)									
EB2322442-002	NBH2	EP074: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5196032)									
EB2322590-007	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5196032) - continued									
EB2322590-007	Anonymous	EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5193766)									
EB2322402-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EB2322475-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5193766)									
EB2322402-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	20	<20	0.0	No Limit
EB2322475-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5193766)									
EB2322402-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EB2322475-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 5197248)								
EP035SF: Phenols (Total)	----	0.05	mg/L	<0.05	0.2 mg/L	97.6	70.9	123
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 5197249)								
EP035SF: Phenols (Total)	----	0.05	mg/L	<0.05	0.2 mg/L	99.8	70.9	123
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5195086)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	85.0	118
				<1	100 mg/L	95.3	85.0	118
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5195088)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.4	85.0	118
				<1	100 mg/L	93.1	85.0	118
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5198242)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.2	85.0	118
				<1	100 mg/L	95.0	85.0	118
ED045G: Chloride by Discrete Analyser (QCLot: 5195077)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	96.8	90.0	115
				<1	1000 mg/L	101	90.0	115
ED045G: Chloride by Discrete Analyser (QCLot: 5195079)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	94.5	90.0	115
				<1	1000 mg/L	103	90.0	115
ED045G: Chloride by Discrete Analyser (QCLot: 5198243)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	96.6	90.0	115
				<1	1000 mg/L	102	90.0	115
ED093F: Dissolved Major Cations (QCLot: 5194586)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	129	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	113	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	107	70.0	130
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	106	70.0	130
ED093F: Dissolved Major Cations (QCLot: 5194729)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	107	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	95.2	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	96.4	70.0	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Acceptable Limits (%)
				Result	Concentration	LCS	Low	High
ED093F: Dissolved Major Cations (QCLot: 5194729) - continued								
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.3	70.0	130
ED093F: Dissolved Major Cations (QCLot: 5194730)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	108	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.5	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.7	70.0	130
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.2	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5194727)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	116
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.7	88.0	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	100	87.0	113
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.9	88.0	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	106	89.0	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	89.0	120
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.0	89.0	113
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.9	87.0	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	82.0	114
EG020F: Dissolved Metals by ICP-MS (QCLot: 5194728)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	116
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	88.0	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	87.0	113
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.5	88.0	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	104	89.0	110
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	103	89.0	120
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	89.0	113
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.9	87.0	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	82.0	114
EG020T: Total Metals by ICP-MS (QCLot: 5194754)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	105	80.0	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	106	88.0	112
EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	105	81.0	119
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	104	70.0	130
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	88.0	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	89.0	115
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	105	89.0	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 5194754) - continued								
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	103	89.0	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	106	88.0	114
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	106	88.0	116
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	103	79.0	111
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	105	87.0	114
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	104	84.0	114
EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	118	82.0	128
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	109	82.0	118
EG020T: Total Metals by ICP-MS (QCLot: 5194985)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	80.0	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	112
EG020A-T: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	97.0	81.0	119
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	100	70.0	130
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	105	88.0	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	103	89.0	115
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	96.5	89.0	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.4	88.0	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.9	89.0	112
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	88.0	114
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.2	88.0	116
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	99.7	79.0	111
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	101	87.0	114
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.9	84.0	114
EG020A-T: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	105	82.0	128
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82.0	118
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5194987)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.8	84.0	118
EG050G LL-T: Total Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 5200164)								
EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	0.5 mg/L	90.4	79.0	120
EK040P: Fluoride by PC Titrator (QCLot: 5196352)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	10 mg/L	96.8	80.0	117
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5193204)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	104	83.5	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5198233)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	106	83.5	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5193208)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.9	85.7	111
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5198234)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.5	85.7	111
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5196300)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	1 mg/L	92.5	70.1	108
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5196301)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	99.4	70.1	108
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5196299)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.442 mg/L	96.0	84.7	106
EP005: Total Organic Carbon (TOC) (QCLot: 5198424)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	90.7	79.0	113
				<1	100 mg/L	97.8	79.0	113
EP068A: Organochlorine Pesticides (OC) (QCLot: 5193158)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	75.4	60.3	131
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	80.2	45.1	126
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	77.5	63.1	128
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	75.2	60.2	130
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	75.9	58.6	120
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	73.6	53.8	118
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	81.7	53.7	120
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	67.8	57.0	122
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	66.5	56.3	121
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	78.5	56.5	123
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	66.8	55.8	122
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	79.3	55.3	124
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	83.4	52.8	122
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	85.9	48.9	131
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	74.8	50.0	121
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	76.1	46.5	123
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	80.2	42.0	122
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	74.2	49.8	130
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	76.5	39.4	134

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 5193158) - continued								
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	81.1	51.4	129
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	78.8	45.7	139
EP068: Total Chlordane (sum)	----	0.5	µg/L	<0.5	----	----	----	----
EP068: Sum of DDD + DDE + DDT	72-54-8/72-5 5-9/50-2	0.5	µg/L	<0.5	----	----	----	----
EP068: Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	----	----	----	----
EP068A: Organochlorine Pesticides (OC) (QCLot: 5196035)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	70.8	60.3	131
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	61.3	45.1	126
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	72.3	63.1	128
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	69.2	60.2	130
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	74.6	58.6	120
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	70.9	53.8	118
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	71.8	53.7	120
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	63.7	57.0	122
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	66.4	56.3	121
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	79.2	56.5	123
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	67.3	55.8	122
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	81.1	55.3	124
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	79.8	52.8	122
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	90.9	48.9	131
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	76.2	50.0	121
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	82.2	46.5	123
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	88.4	42.0	122
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	78.1	49.8	130
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	80.3	39.4	134
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	73.2	51.4	129
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	78.2	45.7	139
EP068: Total Chlordane (sum)	----	0.5	µg/L	<0.5	----	----	----	----
EP068: Sum of DDD + DDE + DDT	72-54-8/72-5 5-9/50-2	0.5	µg/L	<0.5	----	----	----	----
EP068: Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5193158)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5193158) - continued								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	88.2	53.2	133
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	81.7	44.2	158
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	12.0	10.0	32.6
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	79.2	27.6	153
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	83.5	53.6	128
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	83.4	51.6	122
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	79.3	45.2	139
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	81.3	47.5	135
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	89.8	53.4	133
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	82.5	56.3	125
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	92.2	37.1	144
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	76.3	49.8	131
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	97.5	37.0	131
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	75.9	47.3	127
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	110	16.0	150
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	77.8	45.5	128
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	81.0	39.1	129
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	78.6	38.4	134
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	71.3	27.5	146
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5196035)								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	96.4	53.2	133
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	97.4	44.2	158
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	17.6	10.0	32.6
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	93.1	27.6	153
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	85.0	53.6	128
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	79.2	51.6	122
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	94.3	45.2	139
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	98.3	47.5	135
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	89.5	53.4	133
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	81.3	56.3	125
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	94.0	37.1	144
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	79.2	49.8	131
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	114	37.0	131
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	66.5	47.3	127

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5196035) - continued								
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	125	16.0	150
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	84.3	45.5	128
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	94.5	39.1	129
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	76.7	38.4	134
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	81.5	27.5	146
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 5193767)								
EP074: Benzene	71-43-2	1	µg/L	<1	10 µg/L	84.6	82.4	114
EP074: Toluene	108-88-3	2	µg/L	<2	10 µg/L	90.9	83.2	126
EP074: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	80.4	77.6	121
EP074: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	79.5	78.1	125
EP074: Styrene	100-42-5	5	µg/L	<5	10 µg/L	84.7	84.7	122
EP074: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	87.0	81.1	123
EP074: Isopropylbenzene	98-82-8	5	µg/L	<5	10 µg/L	# 73.3	73.8	125
EP074: n-Propylbenzene	103-65-1	5	µg/L	<5	10 µg/L	# 63.3	68.5	121
EP074: 1.3.5-Trimethylbenzene	108-67-8	5	µg/L	<5	10 µg/L	# 68.4	72.5	120
EP074: sec-Butylbenzene	135-98-8	5	µg/L	<5	10 µg/L	# 59.9	69.4	121
EP074: 1.2.4-Trimethylbenzene	95-63-6	5	µg/L	<5	10 µg/L	# 71.3	74.2	117
EP074: tert-Butylbenzene	98-06-6	5	µg/L	<5	10 µg/L	# 68.5	70.0	122
EP074: p-Isopropyltoluene	99-87-6	5	µg/L	<5	10 µg/L	# 59.0	68.5	121
EP074: n-Butylbenzene	104-51-8	5	µg/L	<5	10 µg/L	# 50.4	80.0	122
EP074B: Oxygenated Compounds (QCLot: 5193767)								
EP074: Vinyl Acetate	108-05-4	50	µg/L	<50	10 µg/L	85.4	43.9	121
EP074: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	10 µg/L	82.8	80.4	152
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	10 µg/L	84.0	61.2	135
EP074: 2-Hexanone (MBK)	591-78-6	50	µg/L	<50	10 µg/L	96.7	60.2	150
EP074C: Sulfonated Compounds (QCLot: 5193767)								
EP074: Carbon disulfide	75-15-0	5	µg/L	<5	10 µg/L	83.7	51.0	133
EP074D: Fumigants (QCLot: 5193767)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	87.4	52.0	126
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	88.6	85.7	111
EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	10 µg/L	81.6	79.3	110
EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	10 µg/L	81.5	54.5	114
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	104	92.3	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 5193767)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	10 µg/L	84.0	66.4	146
EP074: Chloromethane	74-87-3	50	µg/L	<50	10 µg/L	84.2	73.8	126
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	10 µg/L	111	74.3	136
EP074: Bromomethane	74-83-9	50	µg/L	<50	10 µg/L	104	48.2	145
EP074: Chloroethane	75-00-3	50	µg/L	<50	10 µg/L	83.9	63.7	125
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	10 µg/L	97.4	71.5	116
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	88.2	65.8	116
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	60.1	52.0	135
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	87.0	73.2	121
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	93.2	77.5	113
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	89.8	77.6	116
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	93.4	63.1	121
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	80.2	72.7	114
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	90.5	60.2	122
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	111	68.0	124
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	82.6	80.5	113
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	94.9	83.5	115
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	105	81.0	122
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	106	90.7	119
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	84.9	75.1	141
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	100	78.0	120
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	90.9	63.4	130
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	76.5	43.8	111
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	107	82.0	122
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	106	76.2	133
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	93.5	21.8	130
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	87.7	62.5	123
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	# 54.1	59.8	123
EP074F: Halogenated Aromatic Compounds (QCLot: 5193767)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	90.4	86.4	118
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	88.4	80.0	117
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	75.8	75.6	118
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	# 73.2	73.5	118
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	79.8	77.6	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP074F: Halogenated Aromatic Compounds (QCLot: 5193767) - continued								
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	# 73.2	75.0	116
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	82.8	81.0	112
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	79.1	62.9	119
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	87.1	76.8	115
EP074G: Trihalomethanes (QCLot: 5193767)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	94.7	74.3	116
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	94.3	72.9	116
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	105	65.4	126
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	103	50.4	134
EP074H: Naphthalene (QCLot: 5193767)								
EP074: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	86.8	79.8	116
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5196032)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	10 µg/L	57.3	50.0	110
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	10 µg/L	60.4	49.0	124
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	10 µg/L	55.6	55.0	114
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	10 µg/L	60.5	55.0	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	10 µg/L	61.7	51.0	127
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	10 µg/L	64.3	55.0	127
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	10 µg/L	64.9	55.0	127
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	10 µg/L	63.6	54.0	126
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	10 µg/L	66.7	47.0	136
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	10 µg/L	65.9	51.0	129
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	10 µg/L	55.2	55.0	132
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	10 µg/L	65.5	58.0	128
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	10 µg/L	68.4	55.0	131
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	10 µg/L	67.5	52.0	133
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	10 µg/L	64.3	48.0	137
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	10 µg/L	60.4	53.0	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5193766)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	180 µg/L	97.0	77.0	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5196033)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	1192 µg/L	81.5	51.9	126
EP071: C15 - C28 Fraction	----	100	µg/L	<100	1390 µg/L	82.9	51.4	124

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5196033) - continued								
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5193766)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	225 µg/L	93.1	76.0	121
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5196033)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	1592 µg/L	82.1	51.0	133
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	932 µg/L	89.2	49.5	123
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN (QCLot: 5193766)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	88.7	79.8	115
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	83.4	78.6	116
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	79.2	77.3	115
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	82.7	82.0	118
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	87.5	86.0	119
EP080: Total Xylenes	----	2	µg/L	<2	----	----	----	----
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	85.7	77.8	116

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 5197248)							
EB2322442-001	NBH1	EP035SF: Phenols (Total)	----	0.2 mg/L	98.2	65.1	128
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 5197249)							
EB2322442-003	NBH3	EP035SF: Phenols (Total)	----	0.2 mg/L	95.3	65.1	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5195086)							
EB2321438-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	98.6	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5195088)							
EB2322520-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	97.8	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5198242)							
EB2322566-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	2000 mg/L	91.3	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5195077)							
EB2321438-004	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	110	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5195079)							
EB2322520-001	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	108	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5198243)							
EB2322566-002	Anonymous	ED045G: Chloride	16887-00-6	40000 mg/L	106	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5194727)							
EB2322433-015	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	116	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	115	70.0	130
		EG020A-F: Chromium	7440-47-3	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	123	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	118	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	115	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	117	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5194728)							
EB2322442-004	NBH4	EG020A-F: Arsenic	7440-38-2	1.3 mg/L	105	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.325 mg/L	102	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	127	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	130	70.0	130
		EG020A-F: Lead	7439-92-1	1.3 mg/L	106	70.0	130
		EG020A-F: Manganese	7439-96-5	1.3 mg/L	103	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	130	70.0	130
		EG020A-F: Zinc	7440-66-6	1.3 mg/L	101	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5194754)							
EB2322344-066	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	104	70.0	130
		EG020A-T: Beryllium	7440-41-7	1 mg/L	106	70.0	130
		EG020A-T: Barium	7440-39-3	1 mg/L	104	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	105	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	104	70.0	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	106	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	105	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	107	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	105	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	108	70.0	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	103	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 5194754) - continued							
EB2322344-066	Anonymous	EG020A-T: Zinc	7440-66-6	1 mg/L	103	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5194985)							
EB2322589-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	99.3	70.0	130
		EG020A-T: Beryllium	7440-41-7	1 mg/L	92.4	70.0	130
		EG020A-T: Barium	7440-39-3	1 mg/L	97.7	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	103	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	99.2	70.0	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	96.0	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	99.4	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	91.5	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	97.0	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	96.9	70.0	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	97.5	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	98.4	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5194987)							
EB2322589-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	92.5	70.0	130
EG050G LL-T: Total Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 5200164)							
EB2322341-002	Anonymous	EG050G: Hexavalent Chromium	18540-29-9	0.04 mg/L	92.3	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 5196352)							
EB2322566-002	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	89.4	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5193204)							
EB2322414-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	91.2	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5198233)							
EB2322385-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	112	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5193208)							
EB2322414-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	106	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5198234)							
EB2322385-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	# Not Determined	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5196300)							
EB2321798-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	98.7	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5196301)							
EB2322459-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	103	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5196299)							
EB2321798-005	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	94.7	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP005: Total Organic Carbon (TOC) (QCLot: 5198424)							
EB2322385-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	98.9	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 5196035)							
EB2322357-043	Anonymous	EP068: gamma-BHC	58-89-9	5 µg/L	70.8	60.2	130
		EP068: Heptachlor	76-44-8	5 µg/L	72.6	48.1	132
		EP068: Aldrin	309-00-2	5 µg/L	72.5	53.7	120
		EP068: Dieldrin	60-57-1	5 µg/L	79.6	55.3	124
		EP068: Endrin	72-20-8	5 µg/L	91.7	48.9	131
		EP068: 4.4`-DDT	50-29-3	5 µg/L	88.1	39.4	134
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5196035)							
EB2322357-043	Anonymous	EP068: Diazinon	333-41-5	5 µg/L	85.1	55.6	141
		EP068: Chlorpyrifos-methyl	5598-13-0	5 µg/L	79.1	58.4	130
		EP068: Pirimphos-ethyl	23505-41-1	5 µg/L	77.5	49.8	131
		EP068: Bromophos-ethyl	4824-78-6	5 µg/L	65.0	47.3	127
		EP068: Prothiofos	34643-46-4	5 µg/L	82.7	45.5	128
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 5193767)							
EB2322442-003	NBH3	EP074: Benzene	71-43-2	10 µg/L	100	70.0	130
		EP074: Toluene	108-88-3	10 µg/L	121	70.0	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 5193767)							
EB2322442-003	NBH3	EP074: 1.1-Dichloroethene	75-35-4	10 µg/L	83.5	70.0	130
		EP074: Trichloroethene	79-01-6	10 µg/L	105	70.0	130
EP074F: Halogenated Aromatic Compounds (QCLot: 5193767)							
EB2322442-003	NBH3	EP074: Chlorobenzene	108-90-7	10 µg/L	125	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5193766)							
EB2322442-001	NBH1	EP080: C6 - C9 Fraction	----	40 µg/L	71.8	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5196033)							
EB2322442-010	NL1	EP071: C10 - C14 Fraction	----	1192 µg/L	83.4	49.0	134
		EP071: C15 - C28 Fraction	----	1390 µg/L	# Not Determined	50.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5193766)							
EB2322442-001	NBH1	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	72.4	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5196033)							
EB2322442-010	NL1	EP071: >C10 - C16 Fraction	----	1592 µg/L	84.5	43.0	119
		EP071: >C16 - C34 Fraction	----	932 µg/L	# Not Determined	38.0	114
EP080: BTEXN (QCLot: 5193766)							
EB2322442-001	NBH1	EP080: Benzene	71-43-2	10 µg/L	79.8	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 5193766) - continued							
EB2322442-001	NBH1	EP080: Toluene	108-88-3	10 µg/L	77.4	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2322442**	Page	: 1 of 13
Amendment	: **1**		
Client	: **CODYHART CONSULTING PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS BARBARA HART	Telephone	: +61-7-3243 7222
Project	: Narrabri 287	Date Samples Received	: 24-Jul-2023
Site	: Narrabri Landfill	Issue Date	: 04-Aug-2023
Sampler	: B.Hart	No. of samples received	: 10
Order number	: ----	No. of samples analysed	: 10

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**Isopropylbenzene**	98-82-8	73.3 %	73.8-125%	**Recovery less than lower control limit**
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**n-Propylbenzene**	103-65-1	63.3 %	68.5-121%	**Recovery less than lower control limit**
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**1.3.5-Trimethylbenzene**	108-67-8	68.4 %	72.5-120%	**Recovery less than lower control limit**
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**sec-Butylbenzene**	135-98-8	59.9 %	69.4-121%	**Recovery less than lower control limit**
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**1.2.4-Trimethylbenzene**	95-63-6	71.3 %	74.2-117%	**Recovery less than lower control limit**
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**tert-Butylbenzene**	98-06-6	68.5 %	70.0-122%	**Recovery less than lower control limit**
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**p-Isopropyltoluene**	99-87-6	59.0 %	68.5-121%	**Recovery less than lower control limit**
EP074A: Monocyclic Aromatic Hydrocarbons	QC-5193767-002	----	**n-Butylbenzene**	104-51-8	50.4 %	80.0-122%	**Recovery less than lower control limit**
EP074E: Halogenated Aliphatic Compounds	QC-5193767-002	----	**Hexachlorobutadiene**	87-68-3	54.1 %	59.8-123%	**Recovery less than lower control limit**
EP074F: Halogenated Aromatic Compounds	QC-5193767-002	----	**4-Chlorotoluene**	106-43-4	73.2 %	73.5-118%	**Recovery less than lower control limit**
EP074F: Halogenated Aromatic Compounds	QC-5193767-002	----	**1.4-Dichlorobenzene**	106-46-7	73.2 %	75.0-116%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EB2322385--002	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080/071: Total Petroleum Hydrocarbons	EB2322442--010	NL1	**C15 - C28 Fraction**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EB2322442--010	NL1	**>C16 - C34 Fraction**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
	0				
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	10	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	10	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	----	----	----	**26-Jul-2023**	16-Aug-2023	✓
Clear Plastic Bottle - Natural (ED041G) NBH1, NBH2, NBH3, NBH7	**20-Jul-2023**	----	----	----	**26-Jul-2023**	17-Aug-2023	✓
Clear Plastic Bottle - Natural (ED041G) NL1	**20-Jul-2023**	----	----	----	**28-Jul-2023**	17-Aug-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	----	----	----	**26-Jul-2023**	16-Aug-2023	✓
Clear Plastic Bottle - Natural (ED045G) NBH1, NBH2, NBH3, NBH7	**20-Jul-2023**	----	----	----	**26-Jul-2023**	17-Aug-2023	✓
Clear Plastic Bottle - Natural (ED045G) NL1	**20-Jul-2023**	----	----	----	**28-Jul-2023**	17-Aug-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) NBH7, NL1	**20-Jul-2023**	----	----	----	**26-Jul-2023**	27-Jul-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	----	----	----	**26-Jul-2023**	16-Aug-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) NBH1, NBH2, NBH3	**20-Jul-2023**	----	----	----	**26-Jul-2023**	17-Aug-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	**----**	----	----	**26-Jul-2023**	15-Jan-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
NBH1, NBH2, NBH3	**20-Jul-2023**	**----**	----	----	**26-Jul-2023**	16-Jan-2024	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
NBH7	**20-Jul-2023**	**26-Jul-2023**	16-Jan-2024	✓	**26-Jul-2023**	16-Jan-2024	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
NL1	**20-Jul-2023**	**27-Jul-2023**	16-Jan-2024	✓	**27-Jul-2023**	16-Jan-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
NL1	**20-Jul-2023**	**----**	----	----	**28-Jul-2023**	17-Aug-2023	✓
EG050G LL-T: Total Hexavalent Chromium by Discrete Analyser - Low Level							
Clear Plastic Bottle - NaOH (EG050G LL-T)							
NL1	**20-Jul-2023**	**----**	----	----	**28-Jul-2023**	17-Aug-2023	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
NL1	**20-Jul-2023**	**----**	----	----	**27-Jul-2023**	17-Aug-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	**----**	----	----	**25-Jul-2023**	16-Aug-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
NBH1, NBH2, NBH3, NBH7	**20-Jul-2023**	**----**	----	----	**25-Jul-2023**	17-Aug-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
NL1	**20-Jul-2023**	**----**	----	----	**28-Jul-2023**	17-Aug-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	**----**	----	----	**25-Jul-2023**	16-Aug-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
NBH1, NBH2, NBH3, NBH7	**20-Jul-2023**	**----**	----	----	**25-Jul-2023**	17-Aug-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
NL1	**20-Jul-2023**	**----**	----	----	**28-Jul-2023**	17-Aug-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	**26-Jul-2023**	16-Aug-2023	✓	**26-Jul-2023**	16-Aug-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
NBH1, NBH2, NBH3, NBH7, NL1	**20-Jul-2023**	**26-Jul-2023**	17-Aug-2023	✓	**26-Jul-2023**	17-Aug-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
NL1	**20-Jul-2023**	**26-Jul-2023**	17-Aug-2023	✓	**26-Jul-2023**	17-Aug-2023	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
NBH4, NBH5, NHB6, NBH8, NBHD	**19-Jul-2023**	**----**	----	----	**27-Jul-2023**	16-Aug-2023	✓
Amber TOC Vial - Sulfuric Acid (EP005)							
NBH1, NBH2, NBH3, NBH7, NL1	**20-Jul-2023**	**----**	----	----	**27-Jul-2023**	17-Aug-2023	✓
EP035SF: Total Phenol by Segmented Flow Analyser							
Clear Plastic Bottle - Sulfuric Acid (EP035SF)							
NBH4, NBH5, NHB6, NBH8	**19-Jul-2023**	**----**	----	----	**27-Jul-2023**	16-Aug-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EP035SF)							
NBH1, NBH2, NBH3, NBH7, NL1	**20-Jul-2023**	**----**	----	----	**27-Jul-2023**	17-Aug-2023	✓
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
NBH4, NBH5, NHB6, NBH8	**19-Jul-2023**	**26-Jul-2023**	26-Jul-2023	✓	**28-Jul-2023**	04-Sep-2023	✓
Amber Glass Bottle - Unpreserved (EP068)							
NBH1, NBH2, NBH3, NBH7, NL1	**20-Jul-2023**	**26-Jul-2023**	27-Jul-2023	✓	**28-Jul-2023**	04-Sep-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068B: Organophosphorus Pesticides (OP)							
Amber Glass Bottle - Unpreserved (EP068) NBH4, NBH5, NHB6, NBH8	**19-Jul-2023**	**26-Jul-2023**	26-Jul-2023	✓	**28-Jul-2023**	04-Sep-2023	✓
Amber Glass Bottle - Unpreserved (EP068) NBH1, NBH2, NBH3, NBH7, NL1	**20-Jul-2023**	**26-Jul-2023**	27-Jul-2023	✓	**28-Jul-2023**	04-Sep-2023	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP074) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓
EP074B: Oxygenated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓
EP074C: Sulfonated Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074H: Naphthalene							
Amber VOC Vial - Sulfuric Acid (EP074) NBH2, NBH3	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) NL1	**20-Jul-2023**	**26-Jul-2023**	27-Jul-2023	✓	**26-Jul-2023**	04-Sep-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) NL1	**20-Jul-2023**	**26-Jul-2023**	27-Jul-2023	✓	**27-Jul-2023**	04-Sep-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) NL1	**20-Jul-2023**	**26-Jul-2023**	27-Jul-2023	✓	**27-Jul-2023**	04-Sep-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) NHB6, NBH8	**19-Jul-2023**	**26-Jul-2023**	02-Aug-2023	✓	**26-Jul-2023**	02-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) NBH4, NBH5	**19-Jul-2023**	**26-Jul-2023**	02-Aug-2023	✓	**27-Jul-2023**	02-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) NBH7, NL1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**26-Jul-2023**	03-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) NBH1	**20-Jul-2023**	**26-Jul-2023**	03-Aug-2023	✓	**27-Jul-2023**	03-Aug-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	5	45	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	30	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	4	27	**14.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	5	40	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Hexavalent Chromium by DA - Low Level	EG050G LL-T	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	3	19	**15.79**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	10	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	6	45	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	3	30	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	6	40	**15.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Hexavalent Chromium by DA - Low Level	EG050G LL-T	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	9	**22.22**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	3	45	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	3	30	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	40	**7.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Hexavalent Chromium by DA - Low Level	EG050G LL-T	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	9	**22.22**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	3	45	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	10	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	40	**7.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Hexavalent Chromium by DA - Low Level	EG050G LL-T	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	9	**22.22**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol by Segmented Flow Analyser	EP035SF	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
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 thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Hexavalent Chromium by DA - Low Level	EG050G LL-T	WATER	In house: Referenced to APHA 3500 Cr-A & B. Hexavalent chromium is determined directly on water sample by Seal Descrete Analyser as received by pH adjustment and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Fluoride by Auto 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)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Total Phenol by Segmented Flow Analyser	EP035SF	WATER	In house: Referenced to ISO 14402. The sample is in-line-distilled at pH 1- 4. The distillate, containing steam-volatile phenolic compounds is then oxidised by hexacyanoferrate(III). The resulting quinones react with 4-aminoantipyrine forming red condensation products, which are measured spectrometrically in a flow spectrometer at 505 nm.. This method is compliant with NEPM Schedule B(3)
Pesticides by GCMS	EP068	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
Volatile Organic Compounds	EP074	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. This method is compliant with NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. 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)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
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.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
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 purging.

APPENDIX D

Archived Data

Archived tables are provided once the tables in the Environmental Monityoring Report (EMR) reach a full A4 page.

Results commence at Year 2006.

ARCHIVED TABLES

Table 1: Surface methane detections to 2017 – Narrabri Landfill

Date	Sampling location	ppm by vol in air	% CH_4 by volume in air	% LEL (Lower Explosive Limit)
	Note:	500ppm CH_4 by vol in air =	0.05% CH_4 by vol in air =	1% LEL
09/09/06	nil detects			
11/12/07	nil detects			
16/04/07	nil detects			
29/07/07	nil detects			
18/11/07	nil detects			
17/02/08	nil detects			
06/04/08	nil detects			
12/07/08	nil detects			
10/09/08	nil detects			
04/02/09	nil detects			
10/04/09	nil detects			
29/10/09	nil detects			
26/11/09	nil detects			
23/03/10	nil detects			
21/08/10	nil detects			
06/11/10	nil detects			
02/03/11	nil detects			
10&11/6/11	nil detects			
18/10/11	nil detects			
05/01/12	nil detects			
24/02/12	northern drainage pathways from landfill – a few detections <200 ppm – may be rotting vegetation			
21/04/12	nil detects			
16/08/12	nil detects			
18/10/12	nil detects			
09/12/12	nil detects –OHS leachate sump 37,750 ppm (76% LEL)			
12/04/13	nil detects			
21/06/13	8,850 ppm around leachate sump. OHS internal leachate vent +50,000 ppm.	8,850	0.885%	17.7%
25/09/13	nil detects – OHS internal leachate vent +50,000 ppm			
30/11/13	nil detects – OHS internal leachate vent +50,000 ppm			
10/03/14	nil detects – OHS internal leachate vent +50,000 ppm			
12/07/14	7,600 ppm around leachate sump. OHS internal leachate vent +50,000 ppm.	7,600	0.760%	15.2%
03/10/14	Zero around leachate sump. OHS internal leachate vent +50,000 ppm.			
29/11/14	550 SE corner of landfill. OHS internal leachate vent +50,000 ppm.	550	0.055%	1.10%
10/03/15	Nil detects. OHS internal leachate vent +50,000 ppm.			
18/08/15	Nil detects.			
16/10/15	Nil detects. OHS internal leachate vent +50,000 ppm			
09/12/15	Nil detects. OHS internal leachate vent +50,000 ppm			
09/03/16	Nil detects. OHS internal leachate vent +50,000 ppm			
26-27/10/16	Nil detects. OHS internal leachate vent +50,000 ppm			
09/12/16	Nil detects. OHS internal leachate vent 650 ppm			
03/02/17	Nil detects. OHS internal leachate vent 0 ppm			
23/05/17	Nil detects. OHS internal leachate vent 17,000 ppm			
21/07/17	Nil detects. OHS – internal leachate vent 980 ppm			
09/12/17	Nil detects. OHS – internal leachate vent 780 ppm			

Notes:

1. 100% LEL for methane (CH_4) = 5% CH_4 by volume in air (50,000 ppm by volume in air). Methane may explode in confined spaces or ignite in open spaces if ignited when CH_4 is 5% to 15% by volume in air. Oxygen levels should never fall below 18% by volume in air (180,000 ppm by volume in air) and carbon dioxide levels should not exceed 0.5% by volume in air (5000 ppm by volume in air) for an 8 hour working day (Gendebien et al., 1992, p. 282-284).
2. NSW EPA (2016, p.33) surface methane monitoring threshold for investigation & corrective action = 0.05% CH_4 by volume in air = 500 ppm by volume in air = 1% LEL.

3 NSW EPA (2016, p.35) surface methane monitoring notification promptly to EPA if concentration ≥ 1 % CH_4 by volume in air = 10,000 ppm by volume in air = 20% LEL. Plan for further investigation or remediation to EPA within 14 days.

Table 2: Council buildings methane detections to 2017 – Narrabri Landfill

Date	Sampling location	ppm by vol in air	% CH_4 by volume in air	% LEL (Lower Explosive Limit)
	Note:	12,500ppm CH_4 by vol in air	= 1.25% = CH_4 by vol in air	25% LEL
09/09/06	Nil methane detected in Council shed.			
11/12/06	Nil methane detected in Council shed.			
16/04/07	Nil methane detected in Council shed.			
29/07/07	Nil methane detected in Council shed.			
18/11/07	Nil methane detected in Council shed.			
06/04/08	Nil methane detected in Council shed.			
17/02/08	Nil methane detected in Council shed.			
12/07/08	Nil methane detected in Council shed.			
10/09/08	Nil methane detected in Council shed.			
04/02/09	Nil methane detected in Council shed.			
10/04/09	Nil methane detected in Council shed.			
29/10/09	Nil methane detected in Council shed.			
26/11/09	Nil methane detected in Council shed.			
24/03/10	Nil methane detected in Council shed.			
21/08/10	Nil methane detected in Council shed.			
06/11/10	Nil methane detected in Council shed.			
02/03/11	Nil methane detected in Council shed.			
11/06/11	Nil methane detected in Council shed.			
18/10/11	Nil methane detected in Council shed.			
05/01/12	Nil methane detected in Council shed.			
24/04/12	Nil methane detected in Council shed.			
16/08/12	Nil methane detected in Council shed.			
18/10/12	Nil methane detected in Council shed.			
09/12/12	Nil methane detected in Council shed.			
12/04/13	Nil methane detected in Council shed.			
21/06/13	Nil methane detected in Council shed.			
25/09/13	Nil methane detected in Council shed.			
30/11/13	Nil methane detected in Council shed.			
10/03/14	Nil methane detected in Council shed.			
12/07/14	Nil methane detected in Council shed & amenities.			
03/10/14	Nil methane detected in Council shed & amenities.			
29/11/14	Nil methane detected in Council shed & amenities.			
10/03/15	Nil methane detected in Council shed & amenities.			
18/08/15	Nil methane detected in Council shed & amenities.			
16/10/15	Nil methane detected in Council shed & amenities.			
09/12/15	Nil methane detected in Council shed & amenities.			
09/03/16	Nil methane detected in Council shed & amenities.			
26-27/10/16	Nil methane detected in Council shed & amenities.			
09/12/16	Nil methane detected in Council shed & amenities.			
03/02/17	Nil methane detected in Council shed & amenities.			
23/05/17	Nil methane detected in Council shed & amenities.			
21/07/17	Nil methane detected in Council shed & amenities.			
09/12/17	Nil methane detected in Council shed & amenities.			

Note: EPA NSW (2016, p.35) notification level for surface, subsurface and building methane monitoring is 1% methane by volume in air, that is, 10,000 ppm.

Table 3: Field analytes, water level, nutrients, carbon, pesticides, phenols – Well NBH7

NBH7	*Field analytes*					*Water levels*		*Carbon*				*Nutrients*					*Total Phenols*	*Pesticides*
	DO	EC	pH	Eh	Temp	D	RL	Alk	Free CO_2	CO_2 + Alk	TOC	NH_3 as N	NO_x as N	TKN as N	TotN	TotP	yearly	OC & OP yearly
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reporting Limit	0.01	1	0.01	1	0.1	0.01	0.01	1	1	1	1	0.010	0.01	0.1	0.1	0.1	0.05	0.0005 – 0.002
16/07/06	0.26	496	6.13	+126	17.2	3.97	210.67	137	116	59	69	0.155	3.75	20.2	23.9	1.84		ND
09/09/06	0.48	320	5.98	+140	17.9	4.02	210.62	93	96	44	28	0.090	0.206	9.4	9.6			ND
12/01/07	0.68	362	6.20	+40	29.8	4.26	210.38	106	78	42	60	0.251	0.016	11.1	11.1			ND
15/04/07	0.20	397	5.84	+64	24.7	4.40	210.24	113	142	61	34	0.173	2.59	18.5	21.1		<0.05	ND
29/07/07	4.03	591	6.42	+93	18.7	4.41	210.23	170	94	59	<1	0.077	1.70	12.2	13.8		NR	ND
18/11/07	2.53	564	6.54	+118	21.7	4.41	210.23	154	59	46	40	0.128	4.27	12.5	16.7		NR	NR
16/02/08	3.13	334	5.63	+64	24.0	4.45	210.19	78	73	35	31	0.034	2.34	4.3	6.6		NR	NR
06/04/08	4.47	370	6.41	+42	25.3	4.52	210.12	95	54	33	35	0.080	0.731	15.9	16.6		NR	NR
13/07/08	0.05	343	5.93	+123	21.0	4.69	209.95	92	123	52	24	0.079	0.155	27.3	27.4		<0.05	ND
10/09/08	1.83	372	5.60	+107	19.2	4.71	209.93	138	65	45	25	0.210	0.200	17.8	18.0		NR	NR
04/02/09	2.24	560	6.54	+146	26.0	4.40	210.24	91	117	50	34	1.130	1.18	5.9	7.1		0.14	ND
10/04/09	0.35	324	5.49	+150	25.0	4.54	210.10	96	87	43	22	0.190	2.09	3.2	5.3		NR	NR
29/10/09	0.94	325	5.78	+147	22.0	4.77	209.87	45	132	45	42	0.100	0.25	9.8	10.0		NR	NR
26/11/09	0.43	349	5.73	+116	23.7	4.77	209.87	50	132	46	34	0.170	0.29	14.3	14.6		NR	NR
23/03/10	0.35	558	5.97	+93	25.9	4.25	210.39	13	132	39	280	0.060	37.80	16.0	53.8		3.49	ND
21/08/10	7.30	1468	6.93	+137	18.8	4.22	210.42	30	103	34	101	0.110	32.30	2.6	34.9		NR	NR
06/11/10	2.61	2316	6.59	+133	20.3	3.93	210.71	367	161	116	99	6.24	15.5	29.6	45.1		NR	NR
02/03/11	1.48	907	6.23	+131	24.0	3.44	211.20	133	110	56	24	0.59	4.46	5.1	9.6		NR	NR
11/06/11	0.88	790	6.25	+132	20.1	3.88	210.76	161	110	62	27	0.05	0.78	4.2	5.0		<0.05	ND
20/09/11	0.80	749	6.47	+138	19.7	4.05	210.59	187	117	69	26	<0.01	1.03	3.6	4.6		NR	NR
05/01/12	5.42	2523	6.75	+137	22.4	3.15	211.49	150	76	50	71	0.11	41.6	13.2	54.8		NR	NR
25/04/12	0.39	806	6.58	+111	22.3	2.73	211.91	15	91	28	14	0.08	4.36	4.6	9.0		NR	NR
16/08/12	1.76	449	6.33	+165	17.3	2.73	211.91	125	117	57	10	0.03	0.12	1.4	1.5		<0.05	ND
18/10/12	5.93	832	6.53	+113	19.9	3.07	211.57	103	75	41	20	0.42	0.26	3.3	3.6		NR	NR
09/12/12	0.22	1056	6.50	+117	23.8	3.53	211.11	113	88	46	<1	0.46	0.02	5.6	5.6		<0.05	ND
12/04/13	0.41	1372	6.38	+131	25.0	3.45	211.19	117	132	59	65	0.12	7.39	10.1	17.5		NR	NR
20/06/13	0.39	1035	6.32	+135	20.1	3.73	210.91	150	88	54	56	0.07	8.48	1.8	10.3		NR	NR
25/09/13	0.31	1318	6.28	+97	21.7	3.85	210.79	143	73	48	68	0.34	28.3	8.0	36.3		NR	NR
29/11/13	0.35	1446	6.50	+101	21.7	3.65	210.99	133	79	48	73	0.34	10.2	6.7	16.9		<0.05	ND
10/03/14	0.27	1681	6.19	+87	26.2	4.15	210.49	217	132	79	77	0.37	33.2	13.7	46.9		NR	NR
12/07/14	1.24	1462	6.31	+244	20.0	4.03	210.61	233	110	76	87	0.06	27.6	12.2	39.8		NR	NR
03/10/14	0.20	2653	6.56	+103	20.6	4.11	210.53	267	111	83	93	0.85	35.0	13.4	48.4		NR	NR
03/10/14										After	6L	purge	16.9	5.8	22.7			
29/11/14	2.74	1449	6.46	+68	21.5	4.22	210.42	267	132	88	59	0.10	19.2	11.0	30.2		<0.05	ND
10/03/15	0.31	1527	6.32	+93	27.2	4.40	210.24	267	117	84	86	0.08	15.2	9.1	24.3		NR	NR
18/08/15	3.19	1089	6.60	+173	17.7	4.18	210.46	200	103	67	40	0.04	11.5	6.3	17.8		NR	NR
16/10/15	0.55	1023	6.41	+252	22.6	4.23	210.41	177	88	59	33	0.09	6.30	3.9	10.2		NR	NR
08/12/15	0.52	1250	6.54	+176	24.8	4.16	210.48	147	103	57	30	0.05	6.52	<0.1	6.5		<0.05	ND
09/03/16	0.39	1045	6.59	+93	26.7	4.21	210.43	167	88	57	27	1.51	2.75	5.6	8.4		NR	NR
26/10/16	3.83	569	6.60	+137	20.9	3.56	211.08	103	88	44	20	0.02	1.73	3.4	5.1		NR	NR
10/12/16	2.46	818	6.64	+169	23.6	3.77	210.87	130	53	40	20	0.03	1.22	2.4	3.6		<0.05	ND
03/02/17	0.77	769	6.37	+79	25.8	3.99	210.65	170	82	56	24	0.04	1.00	2.0	3.0		NR	NR
24/05/17	0.37	808	6.36	+43	23.4	4.29	210.35	147	79	50	32	0.01	0.52	3.4	3.9		<0.05	ND
21/07/17	2.57	744	5.81	+87	19.4	4.36	210.28	150	97	56	24	0.04	0.64	3.2	3.8		NR	NR
10/12/17	0.64	766	7.01	+25	24.7	4.52	210.12	158	97	57	30	0.19	0.24	6.8	7.0		NR	NR
28/03/18	0.41	689	6.31	+23	24.3	4.65	209.99	100	88	44	32	0.13	0.15	6.9	7.0		NR	NR
10/08/18	2.07	734	7.70	+64	22.9	4.80	209.84	90	73	38	30	0.17	0.16	7.8	8.0		<0.05	ND
12/09/18	1.37	659	6.82	+141	22.7	4.82	209.82	100	88	44	30	0.05	0.29	12.9	13.2		NR	NR
06/12/18	2.83	703	6.38	+169	26.5	4.83	209.81	103	59	36	27	0.05	1.23	6.4	7.6		NR	NR

Abbreviations: DO = Dissolved Oxygen; EC = Electrical Conductivity also called specific conductance; Eh = Redox Potential; Temp = Temperature; D = Depth to water from top of internal well PVC casing; RL = water level converted to Reduced Level relative to mean sea level; Alk = Alkalinity measured as mg/L $CaCO_3$ equivalent; Free CO_2 = Free Carbon Dioxide; Unfiltered C of (Alk + CO_2) = 12/61 Alk + 12/44 CO_2; TOC = Total Organic Carbon; NH_3 = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; TKN = Total Kjeldahl Nitrogen (organic nitrogen and ammonia); Tot N = Total Nitrogen; Tot P = Total Phosphorus; OC & OP = Organochlorine & Organophosphorus pesticides; Bold = unfiltered; NR = Not required; ND = Nil detected.
(Coordinates GPS 1m: E762098, N6641024; RL from top of PVC casing = 214.643 m use 214.64 m; RL ground level = 213.346 m; Depth of well from top of PVC = 5.95 m.

Table 4: Laboratory analytes – geochemical, metals, BTEX – Well NBH7

NBH7	*Laboratory analytes – geochemical and metals*																	*BTEX*
	SO_4	Cl	Ca	Mg	Na	K	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Cr^{+6}	Br	yearly
Measure	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	mg/L
Reporting Limit	1	1	1	1	1	1	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.1	0.01	0.01	0.1	0.001 or 0.002
16/07/06	36	39	4	8	53	74	0.008	0.0002	0.061			0.025	0.094	0.16	54.6		0.3	ND
09/09/06	17	17	2	6	44	56	0.002	0.0006	0.002			0.006	0.062	0.05	2.12			ND
12/01/07	21	31	3	7	43	38	0.004	<0.0001	0.052			0.011	0.050	0.06	2.71			ND
15/04/07	29	54	3	8	67	35	0.004	0.0062	0.005			0.032	0.271	0.20	9.96	<0.010		ND
29/07/07	50	48	4	8	92	42	0.004	0.0003	0.003			0.007	0.144	0.05	7.14			ND
18/11/07	54	52	5	10	92	49	0.003	0.0005	0.002			0.002	0.038	<0.01	0.81			ND
16/02/08	23	26	1	4	48	26	0.003	0.0004	0.005			0.011	0.064	0.03	4.10			NR
06/04/08	34	39	2	4	74	24	0.004	0.0004	0.013			0.026	0.140	0.02	2.25			NR
13/07/08	34	43	2	6	64	9	0.003	0.0004	0.003	0.027	0.030	0.013	0.088	<0.01	3.70			ND
10/09/08	40	76	1	3	72	12	0.006	0.0004	0.104	0.084	0.074	0.066	0.140	0.04	104.0			NR
04/02/09	36	34	4	7	81	38	0.003	0.0007	0.004	0.046	0.029	0.013	0.230	<0.01	2.24			ND
10/04/09	29	1	3	21	71	36	0.002	0.0002	0.012	0.048	0.034	0.018	0.158	<0.01	5.29			NR
29/10/09	31	53	2	12	67	20	0.002	0.0003	0.018	0.084	0.041	0.036	0.306	0.058	13.6			NR
26/11/09	33	54	2	14	68	24	0.010	0.0013	0.010	0.083	0.044	0.075	0.457	0.128	13.0			NR
23/03/10	249	244	17	43	291	98	0.013	0.0004	0.074	0.130	0.105	0.062	0.257	0.637	91.8	<0.001		ND
21/08/10	124	166	8	28	244	65	0.007	0.0001	0.060	0.068	0.050	0.026	0.158	0.138	41.8			NR
06/11/10	173	237	11	36	345	65	0.004	0.0002	0.007	0.062	0.039	0.003	0.105	0.172	0.64			NR
02/03/11	54	81	4	10	125	34	0.002	0.0002	0.001	0.018	0.012	<0.001	0.056	0.050	0.13			NR
11/06/11	52	74	5	13	116	38	0.003	<0.0001	0.005	0.032	0.021	0.002	0.092	0.068	2.19			ND
20/09/11	46	64	5	15	121	34	0.002	<0.0001	0.001	0.036	0.024	0.005	0.203	0.090	0.74			NR
05/01/12	<1	256	25	61	266	133	0.002	0.0001	0.004	0.049	0.029	0.002	0.094	0.169	0.27			NR
25/04/12	<1	56	4	11	116	39	0.002	<0.0001	0.002	0.018	0.013	0.003	0.044	0.032	0.92			NR
16/08/12	23	46	2	6	69	20	0.001	<0.0001	0.002	0.012	0.008	0.003	0.036	0.035	1.02			ND
18/10/12	64	55	6	13	97	25	0.002	<0.0001	0.001	0.031	0.009	0.003	0.034	0.053	0.61			NR
09/12/12	158	107	10	23	141	34	0.002	<0.0001	0.002	0.020	0.016	0.003	0.060	0.073	0.60			ND
12/04/13	175	138	12	27	174	72	0.003	<0.0001	0.003	0.020	0.024	0.004	0.058	0.106	1.17			NR
20/06/13	122	80	6	12	143	90	0.004	<0.0001	0.005	0.024	0.018	0.003	0.061	0.051	2.61			NR
25/09/13	176	79	14	34	193	55	0.003	<0.0001	0.001	0.011	0.011	<0.001	0.076	0.038	0.18			NR
29/11/13	101	64	11	25	169	39	0.002	<0.0001	0.002	0.015	0.015	<0.001	0.073	0.054	0.13			ND
10/03/14	265	112	17	39	234	74	0.003	<0.0001	0.003	0.021	0.022	0.002	0.136	0.086	0.70			NR
12/07/14	206	108	15	41	259	76	0.003	<0.0001	0.002	0.020	0.020	<0.001	0.078	0.060	0.13			NR
03/10/14	325	168	22	60	307	92	0.005	<0.0001	0.002	0.020	0.022	<0.001	0.057	0.088	0.16			NR
29/11/14	208	108	11	28	184	67	0.005	<0.0001	0.002	0.014	0.018	<0.001	0.022	0.057	0.24			ND
10/03/15	193	124	10	26	223	56	0.003	<0.0001	0.002	0.024	0.022	<0.001	0.031	0.054	0.14			NR
18/08/15	161	80	8	20	152	42	0.002	<0.0001	0.001	0.011	0.013	<0.001	0.049	0.006	0.09			NR
16/10/15	113	61	4	11	102	35	0.003	<0.0001	0.001	0.010	0.010	<0.001	0.008	0.013	0.16			NR
08/12/15	137	74	7	18	124	47	0.003	<0.0001	<0.001	0.007	0.006	<0.001	0.009	0.022	0.09			ND
09/03/16	120	63	5	14	114	47	0.003	<0.0001	0.001	0.009	0.010	<0.001	0.015	0.023	0.34			NR
26/10/16	68	41	4	9	92	27	0.002	<0.0001	0.001	0.021	0.010	<0.001	0.026	0.004	0.25			NR
10/12/16	100	60	6	14	110	22	0.001	<0.0001	<0.001	0.009	0.007	<0.001	0.018	0.001	0.09			ND
03/02/17	84	57	5	11	102	21	0.002	<0.0001	<0.001	0.013	0.018	<0.001	0.025	0.007	0.07			NR
24/05/17	101	67	4	11	135	27	0.002	<0.0001	0.001	0.010	0.011	<0.001	0.043	0.027	0.13			ND
21/07/17	97	62	4	12	114	25	0.002	<0.0001	<0.001	0.006	0.007	<0.001	0.026	0.014	0.13			NR
10/12/17	105	75	2	8	133	22	0.002	<0.0001	0.001	0.010	0.013	<0.001	0.008	0.015	0.15			NR
28/03/18	98	76	2	5	135	18	0.002	<0.0001	0.002	0.014	0.019	<0.001	0.029	0.026	0.26			NR
10/08/18	99	76	1	4	123	14	0.002	<0.0001	0.001	0.014	0.016	<0.001	0.010	0.005	0.22			ND
12/09/18	96	83	<1	3	113	11	0.002	<0.0001	0.001	0.015	0.020	<0.001	0.008	0.115	49.8			NR
06/12/18	104	82	2	4	129	16	0.002	<0.0001	0.001	0.018	0.014	<0.001	0.064	0.004	0.26			NR

Abbreviations: SO_4 = Sulphate; Cl = Chloride; Ca = Calcium; Mg = Magnesium; Na = Sodium; K = Potassium; As = Arsenic; Cd = Cadmium; Cr = Chromium; Pb = Lead; Zn = Zinc; Mn = Manganese; Fe = Iron; Cu = Copper; Ni = Nickel; Cr^{+6} = Hexavalent Chromium; Br = Bromine; BTEX = Benzene, Toluene, Ethylbenzene, Xylene; Bold = unfiltered; NR = Not required; ND = Nil detected.