

# Armidale Regional Landfill

Location: Waterfall Way, Armidale NSW 2350 Environment Protection Licence (EPL) Number: 21362 Activity: Waste disposal (application to land)

The internet link to EPL No. 21362 is <https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=21362&id=21362&option=licence&searchrange=general&range=POEO%20licence&prp=no&status=Issued>

Licensee under Protection of Environment Operations Act 1997 (POEO Act): Armidale Regional Council, PO Box 75A, Armidale NSW 2350.

Under EPL 21362, Council is required to monitor groundwater, surface water, leachate, methane (after completion of Cell 1) and dust at various sampling points. This document details recent results to meet Council's obligation under Section 66 (6) of the POEO Act to provide monitoring data to the public via Council's website.

Figures on the following pages provide sampling locations. Groundwater and proximal surface water sampling locations are shown on Figure 1. Figure 2 displays the locations of overflow surface water sampling locations. (GARA6 is a voluntary sampling point.) Dust monitoring locations are pinpointed on Figure 3.

Abbreviations on the maps: A = Armidale; BH =BoreHole (monitoring well); L =Leachate; SB = Sediment Basin; DB = Dry Basin; D = Dust where N = North, S = South, E = East, and SW = South West.

Corresponding Environment Protection Authority (EPA) Identification Numbers from EPL 21362 are detailed below and on the figures displayed on the following pages.

EPA No. 1	GARA1R (surface water + dry basin overflow)	EPA No. 16	ASB1 (surface water - sediment basin - dam)
EPA No. 2	GARA2 (surface water + dry basin overflow)	EPA No. 17	ADB1-IN (surface water – dry basin internal)
EPA No. 3	GARA3 (surface water + dry basin overflow)	EPA No. 18	ADB1-OUT (surface water – dry basin overflow)
EPA No. 4	GARA5 (surface water + dry basin overflow)	EPA No. 22	ABH13 (piezometric level – if groundwater)
EPA No. 5	ABH02 (groundwater monitoring well)	EPA No. 23	ABH14 (piezometric level – if groundwater)
EPA No. 6	ABH02A (groundwater monitoring well)	EPA No. 24	ABH15C (piezometric level – if groundwater)
EPA No. 7	ABH4 (groundwater monitoring well)	EPA No. 25	surface methane after Cell 1 completion
EPA No. 8	ABH04 (groundwater monitoring well)	EPA No. 26	building methane after Cell 1 completion
EPA No. 9	ABH04A (groundwater monitoring well)	EPA No. 27	ADN-EPA27 (dust gauge)
EPA No. 10	ABH9 (groundwater monitoring well)	EPA No. 28	ADS-EPA28 (dust gauge)
EPA No. 11	ABH11 (groundwater monitoring well)	EPA No. 29	ADE-EPA29 (dust gauge)
EPA No. 12	ABH12 (groundwater monitoring well)	EPA No. 30	ADSW-EPA30 (dust gauge)
EPA No. 13	ABH15A (groundwater monitoring well)	EPA No. 31	Meteorological station
EPA No. 14	ABH15B (groundwater monitoring well)	EPA No. 32	sub-surface methane after Cell 1 completion
EPA No. 15	AL1 (leachate)	EPA No. 33	ABH4A (groundwater monitoring well)

Figure 1: Proximal groundwater and surface water sampling points, Armidale Regional Landfill



Figure 2: Armidale Regional Landfill overflow surface water sampling locations (GARA6 is a voluntary location.)

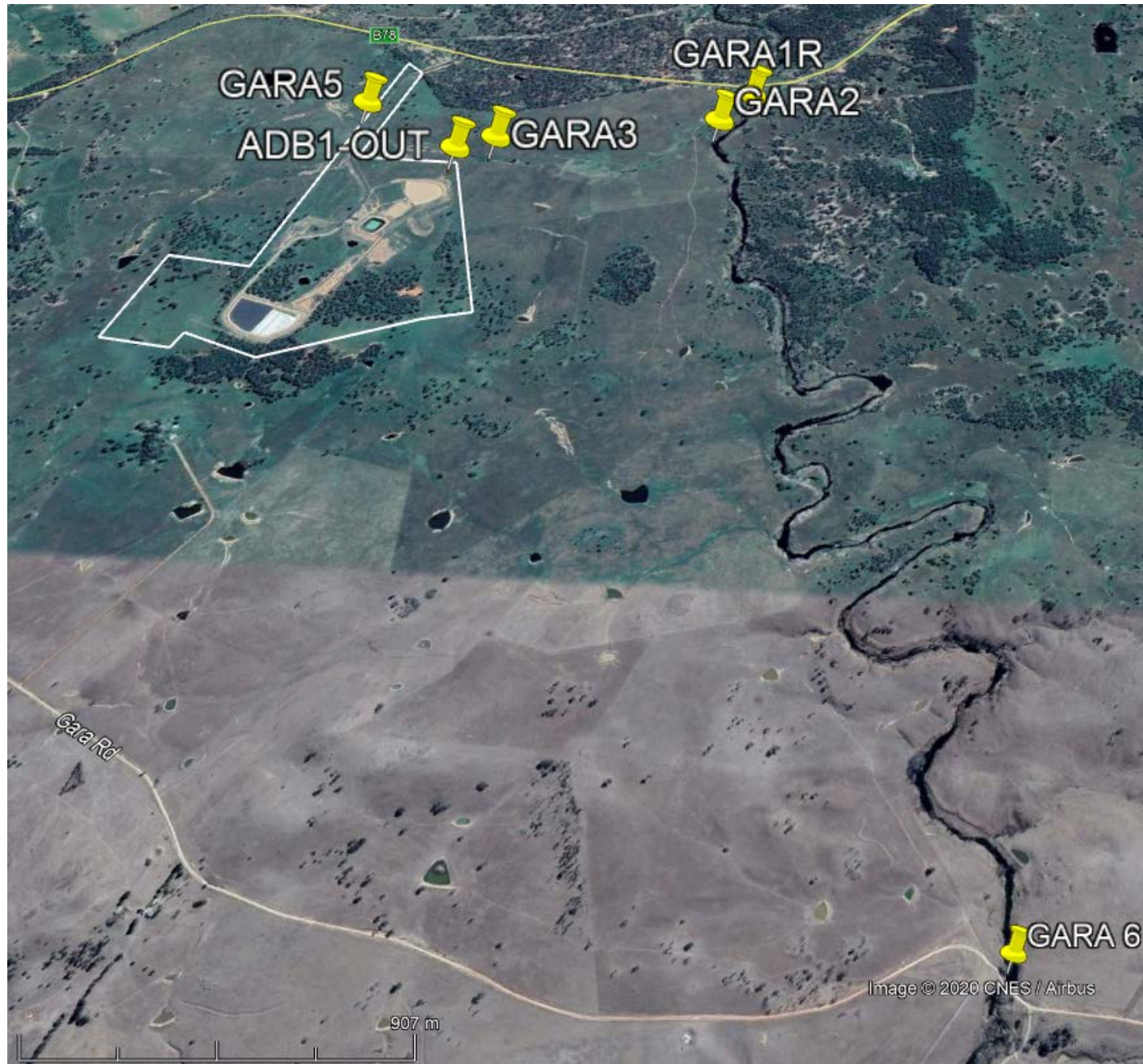


Figure 3: Armidale Regional Landfill dust gauge sampling locations



The EPA requires the publication of the last four year's monitoring results for an EPL. Where possible, eight rounds of baseline monitoring were conducted before the Armidale Regional Landfill opened on 18 November 2020. These results are important for comparison against monitoring results post solid waste acceptance at an engineered landfill cell.

**Water quality analytes** are organised in tables on following pages according to chemical grouping to assist chemical review. [Analytes are listed on the licence in alphabetical order.] They include analytes for groundwater, surface water and landfill leachate.

Abbreviations in the tables are provided here in alphabetical order:

Al = Aluminium; Alk = Alkalinity measured as mg/L CaCO<sub>3</sub> equivalent; As = Arsenic; B = Boron; Ca = Calcium; Cd = Cadmium; Cl = Chloride; Cr = Chromium; Cu = Copper; D = Depth to water from top of internal well PVC casing; DO = Dissolved Oxygen; EC = Electrical Conductivity also called conductivity; Eh = Redox Potential; Fe = Iron; Fe (II) = Iron Oxide; Free CO<sub>2</sub> = Free carbon dioxide; K = Potassium; Mg = Magnesium; Mn = Manganese; Na = Sodium; NA = Not applicable; ND = Nil detected; NT = Not tested; NH<sub>3</sub> = Ammonia as a measure of ammonium ions; Ni = Nickel; NO<sub>x</sub> = Nitrite + Nitrate; NR = Not Required by licence; WC = Water Column height; WL RL = water level converted to Reduced Level relative to mean sea level; PAH = Polynuclear aromatic hydrocarbons; Pb = Lead; SAR = Sodium adsorption ratio; SO<sub>4</sub> = Sulphate; SS = Total suspended solids; Temp = Temperature; TKN = Total Kjeldahl Nitrogen (organic nitrogen + ammonia); TN = Total Nitrogen; TOC = Total Organic Carbon; TP = Total Phosphorus; VFR = Volumetric Flow Rate; VOCs = Volatile Organ Compounds; Zn = Zinc.

Measures:

g = grams; mg/L = milligram per litre (equivalent to ppm); µS/cm = micro Siemens per centimetre; mV = millivolts; °C= degrees Celsius; kL = kilolitres; ppm = parts per million.

Choice of water quality analytes:

Some analytes are tested because they give a general understanding of groundwater, surface water and leachate quality. Commonly, the concentrations are greater in leachate than in groundwater and surface water. A simple comparison can tell us if landfill leachate may have escaped into groundwater or surface water. However, caution is needed when reviewing results so that false conclusions are not made.

Some analytes give us specific information about the possible presence of landfill leachate in groundwater and surface water. Even with these we must carefully consider if their increased concentrations are due to landfill leachate and are not from some other source.

- Nitrogen compounds indicate biodegradation of the plant and animal waste in our solid waste. They may also be due to fertilizer use on nearby properties or old night soil trenches. A general rule of thumb is that total nitrogen (TKN + NO<sub>x</sub>) should be <5 mg/L.
- Iron and manganese above 10 mg/L are an indicator that landfill leachate may be present in groundwater. However, these groundwater analytes may increase due to leaching of iron and manganese from the soil after excessive rainfall or flood water infiltration.
- Organic analytes such as VOC compounds are most likely to indicate landfill leachate, especially if not detected before.

Thus, it is important to conduct baseline monitoring preferably before solid waste deposition, and then to monitor on a regular basis to note any changes in water quality parameter or analyte concentrations and to judicially review the results. Increases in groundwater and surface water concentrations due to landfill leachate intrusion are often at least three to four times the previous concentrations.

# Groundwater - Quarterly

Table 1a: ABH9 - Groundwater quality & quarterly depth – field parameters & analytes

EPA Point 10	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m		NTU	mg/L	mg/L
<b>ABH9 - Baseline monitoring phase range – 8 sampling events 30/07/15 to 27/11/16</b>											
Min	1.39	1464	6.11	+31	15.9	45.85	968.18		1.1	93	73
Max	2.85	1677	6.48	+148	20.2	45.28	968.75		50.0	109	111
<b>ABH9 - Detection monitoring phase</b>											
02/12/20	1.18	1327	6.35	+46	22.5	46.45	967.58		15.8	123	44
21/03/21	0.96	1300	6.34	+17	19.6	46.17	967.86		16.2	127	100
14/06/21	3.75	1344	6.59	+86	18.5	45.43	968.60		4.4	153	88
24/10/21	3.82	1302	6.69	+14	17.8	44.62	969.41		7.5	140	56
17/01/22	4.77	1217	6.73	+37	20.7	43.34	970.69		3.2	143	67
26/03/22	5.10	1154	6.57	+26	17.3	42.49	971.54		4.7	144	67
22/06/22	3.96	1018	6.54	+73	18.4	41.73	972.30		4.5	133	59
15/10/22	3.37	965	6.44	+142	16.9	41.22	972.81		7.9	120	62
15/12/22	4.24	942	6.46	+96	17.4	40.58	973.45		5.4	127	65
03/03/23	1.97	913	6.39	+99	18.9	41.60	972.43		2.3	117	70
30/06/23	0.99	1067	5.63	+120	18.4	42.65	971.38		10.4	33	123
09/09/23	0.79	1150	5.42	+120	18.1	43.15	970.88		10.0	23	144
30/12/23	0.82	1029	5.40	+83	20.4	43.57	970.46		3.9	13	170

Table 1b: ABH9 - Groundwater quality quarterly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH9 - Baseline monitoring phase range – 8 sampling events 30/07/15 to 27/11/16</b>																					
Min	NA	NA	102	356	<0.01	<0.001	<0.0001	<0.001	<0.001	0.004	<0.001	0.013	0.676	0.05	<0.05	<0.01	0.39	<0.1	0.4	<1	<0.05
Max	NA	NA	152	410	<0.01	<0.001	<0.0001	<0.001	0.006	0.017	0.001	0.064	2.730	1.64	1.17	0.03	0.53	0.2	0.7	5	<0.05
<b>ABH9 - Detection monitoring phase</b>																					
02/12/20	11/12/20	05/01/21	126	341	<0.01	<0.001	<0.0001	<0.001	<0.001	0.005	<0.001	0.018	0.872	1.02	1.02	<0.01	0.33	0.1	0.4	4	<0.05
21/03/21	12/04/21	21/04/21	104	345	<0.01	<0.001	<0.0001	<0.001	0.001	0.003	<0.001	0.010	0.377	0.20	0.06	<0.01	0.29	<0.1	0.3	1	<0.05
14/06/21	25/06/21	09/07/21	40	346	<0.01	<0.001	<0.0001	<0.001	<0.001	0.009	<0.001	<0.005	0.009	0.13	<0.05	0.04	0.74	0.1	0.8	5	<0.05
24/10/21	08/11/21	26/11/21	22	398	<0.01	<0.001	<0.0001	0.030	<0.001	0.020	<0.001	<0.005	0.003	0.24	<0.05	<0.01	0.65	<0.1	0.6	1	<0.05
17/01/22	27/01/22	11/02/22	21	376	<0.01	<0.001	<0.0001	0.017	<0.001	0.008	<0.001	<0.005	0.002	0.16	<0.05	<0.01	0.62	<0.1	0.6	<1	<0.05
26/03/22	07/04/22	19/04/22	17	366	<0.01	<0.001	<0.0001	0.017	<0.001	0.014	<0.001	<0.005	0.003	0.25	<0.05	<0.01	0.64	<0.1	0.6	4	<0.05
22/06/22	01/07/22	14/07/22	14	314	<0.01	<0.001	<0.0001	0.024	<0.001	0.034	<0.001	<0.005	0.003	0.20	<0.05	<0.01	0.65	0.1	0.8	3	<0.05
15/10/22	26/10/22	11/11/22	15	256	<0.01	<0.001	<0.0001	<0.001	<0.001	0.036	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.88	0.2	1.1	<1	<0.05
15/12/22	29/12/22	23/01/23	17	278	<0.01	<0.001	<0.0001	0.048	<0.001	0.026	<0.001	<0.005	0.003	0.31	<0.05	<0.01	0.89	0.1	1.0	<1	<0.05
03/03/23	15/03/23	04/04/23	26	248	<0.01	<0.001	<0.0001	0.011	<0.001	0.034	<0.001	<0.005	0.004	0.12	<0.05	<0.01	0.69	<0.1	0.7	3	<0.05
30/06/23	10/07/23	28/07/23	236	263	<0.01	<0.001	0.0006	0.004	0.002	0.127	<0.001	0.080	6.68	3.66	2.50	0.01	0.28	0.1	0.4	2	<0.05
09/09/23	19/09/23	10/10/23	296	244	0.06	<0.001	0.0006	0.002	0.002	0.115	<0.001	0.118	12.200	13.8	9.52	0.01	0.23	<0.1	0.2	<1	<0.05
30/12/23	11/12/23	02/01/24	336	258	0.24	<0.001	0.0004	<0.001	<0.001	0.071	<0.001	0.132	11.100	27.0	19.80	<0.01	0.21	<0.1	0.2	<1	<0.05

Table 2a: ABH11 - Groundwater quality & quarterly depth – field parameters & analytes

EPA Point 11	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m		NTU	mg/L	mg/L
<b>ABH11 - Baseline monitoring phase – 8 sampling events 30/07/15 to 27/11/16</b>											
Min	3.33	1208	6.79	+108	16.5	26.22	951.34		0.0	277	73
Max	4.73	1352	6.94	+230	18.3	25.72	951.84		21.0	343	109
<b>ABH11 - Detection monitoring phase</b>											
05/12/20	2.54	1133	6.92	+117	19.3	27.33	950.23		3.9	303	88
21/03/21	3.29	1141	6.89	+64	18.4	26.78	950.78		2.5	307	91
14/06/21	2.63	1138	6.87	+108	18.8	26.04	951.52		1.3	307	97
24/10/21	5.19	1144	6.89	+86	18.6	25.29	952.27		2.1	333	94
17/01/22	5.89	1169	6.92	+116	18.7	24.60	952.96		1.7	363	91
16/04/22	5.80	1193	6.85	+42	19.3	23.59	953.97		0.0	353	120
22/06/22	6.76	1204	6.82	+96	17.8	23.03	954.53		0.1	350	79
16/10/22	INACC ESSIBLE BY 4 WHEEL DRIVE										
15/12/22	6.31	1220	6.76	+128	18.1	21.92	955.64		1.4	343	82
03/03/23	6.52	1204	6.81	+144	18.4	21.98	955.58		1.6	340	82
30/06/23	6.29	1151	6.80	+121	16.9	22.30	955.26		0.1	327	88
10/09/23	6.38	1154	6.83	+114	17.3	22.60	954.96		2.7	333	79
01/12/23	6.56	1072	6.86	+110	20.6	22.85	954.71		2.8	300	79

Table 2b: ABH11 - Groundwater quality quarterly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH11 - Baseline monitoring phase – 8 sampling events 30/07/15 to 27/11/16</b>																					
Min		NA	NA	87	164	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.40	<0.1	0.4	<1	<0.05
Max		NA	NA	100	188	<0.01	<0.001	<0.0001	<0.001	0.003	<0.001	0.001	0.013	<0.001	<0.05	<0.05	0.04	0.45	0.2	0.6	9
<b>ABH11 - Detection monitoring phase</b>																					
05/12/20	16/12/20	05/01/21	75	177	<0.01	<0.001	<0.0001	<0.001	0.003	<0.001	<0.001	0.009	<0.001	<0.05	<0.05	<0.01	0.45	<0.1	0.4	<1	<0.05
21/03/21	12/04/21	21/04/21	85	170	0.02	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	0.05	<0.05	<0.01	0.39	0.1	0.5	2	<0.05
14/06/21	25/06/21	09/07/21	79	159	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.50	<0.1	0.5	8	<0.05
24/10/21	08/11/21	26/11/21	85	178	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.46	<0.1	0.5	3	<0.05
17/01/22	27/01/22	11/02/22	88	190	0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.49	<0.1	0.5	<3	<0.05
16/04/22	29/04/22	19/05/22	84	195	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.001	<0.05	<0.05	0.01	0.48	<0.1	0.5	6	<0.05
22/06/22	01/07/22	14/07/22	86	215	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.001	<0.05	<0.05	<0.01	0.47	<0.1	0.5	5	<0.05
16/10/22	INACCESSIBLE BY 4 WHEEL DRIVE																				
15/12/22	29/12/22	23/01/23	76	234	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	0.002	<0.005	0.002	<0.05	<0.05	<0.01	0.58	<0.1	0.6	<1	<0.05
03/03/23	15/03/23	04/04/23	81	221	0.06	<0.001	<0.0001	<0.001	<0.001	<0.001	0.008	<0.005	0.013	0.11	<0.05	<0.01	0.62	<0.1	0.6	4	<0.05
30/06/23	10/07/23	28/07/23	85	259	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	0.002	<0.005	0.004	<0.05	<0.05	<0.01	0.67	0.1	0.8	3	<0.05
10/09/23	19/09/23	10/10/23	84	240	0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	0.002	<0.005	0.003	<0.05	0.09	<0.01	0.69	0.2	0.9	<2	<0.05
01/12/23	11/12/23	02/01/24	84	258	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	0.002	<0.005	0.003	<0.05	<0.05	0.01	0.78	<0.1	0.8	3	<0.05

Table 3a: ABH12 - Groundwater quality & quarterly depth – field parameters & analytes

Point 12	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m		NTU	mg/L	mg/L
<b>ABH12 - Baseline monitoring phase – 8 sampling events 30/07/15 to 27/11/16</b>											
Min	0.45	1326	6.77	+45	16.9	20.17	949.62		0.0	487	132
Max	0.91	1414	7.17	+131	19.3	19.79	950.00		5.0	577	205
<b>ABH12 - Detection monitoring phase</b>											
02/12/20	0.59	1270	6.83	+85	23.3	20.61	949.18		2.3	520	85
20/03/21	0.93	1312	6.79	+100	19.7	19.76	950.03		4.9	500	205
13/06/21	0.71	1290	6.70	+125	19.6	19.30	950.49		2.3	552	173
22/10/21	0.82	1282	6.77	+140	17.8	18.74	951.05		7.8	520	185
17/01/22	0.78	1246	6.71	+106	18.5	18.19	951.60		0.0	513	188
15/04/22	0.85	1233	6.64	+80	18.6	17.57	952.22		1.7	500	205
21/06/22	0.82	1234	6.63	+80	17.6	17.54	952.25		1.3	500	117
16/10/22	INACC ESSIBLE BY 4 WHEEL DRIVE										
15/12/22	0.63	1208	6.63	+124	17.3	16.78	953.01		0.0	507	161
03/03/23	0.73	1150	6.68	+86	18.1	17.06	952.73		0.0	513	153
30/06/23	0.65	1186	6.65	+118	17.3	17.25	952.54		1.2	507	138
09/09/23	0.86	1186	6.69	+121	16.9	17.47	952.32		6.2	513	138
30/11/23	0.78	1081	6.74	+94	19.7	17.58	952.21		0.0	529	161

Table 3b: ABH12 - Groundwater quality quarterly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B	
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	
<b>ABH12 - Baseline monitoring phase – 8 sampling events 30/07/15 to 27/11/16</b>																						
Min		NA	NA	87	82	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.12	<0.1	0.1	1	0.14	
Max		NA	NA	112	96	<0.01	<0.001	<0.0001	<0.001	0.004	<0.001	0.001	0.035	0.027	<0.05	<0.05	0.04	0.15	0.2	0.3	11	0.17
<b>ABH12 - Detection monitoring phase</b>																						
02/12/20	11/12/20	05/01/21	107	99	<0.01	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	0.021	0.001	<0.05	<0.05	<0.01	0.13	<0.1	0.1	7	0.15	
20/03/21	12/04/21	21/04/21	109	104	<0.01	<0.001	<0.0001	<0.001	0.006	<0.001	<0.001	0.016	<0.001	<0.05	<0.05	<0.01	0.13	0.2	0.3	4	0.13	
13/06/21	25/06/21	09/07/21	106	91	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.15	<0.1	0.2	11	0.14	
22/10/21	08/11/21	26/11/21	108	106	<0.01	<0.001	<0.0001	<0.001	0.002	<0.001	<0.001	0.013	<0.001	<0.05	<0.05	<0.01	0.15	<0.1	0.2	6	0.12	
17/01/22	27/01/22	11/02/22	108	109	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.16	<0.1	0.2	4	0.14	
15/04/22	29/04/22	19/05/22	106	111	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.16	<0.1	0.2	10	0.12	
21/06/22	01/07/22	14/07/22	107	112	0.04	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.05	0.15	<0.1	0.2	8	0.12	
16/10/22	INACCESSIBLE BY 4 WHEEL DRIVE																					
15/12/22	29/12/22	23/01/23	99	112	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.16	<0.1	0.2	<1	0.15	
03/03/23	15/03/23	04/04/23	107	102	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.18	<0.1	0.2	4	0.15	
30/06/23	10/07/23	28/07/23	111	113	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.16	<0.1	0.2	6	0.17	
09/09/23	19/09/23	10/10/23	112	100	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	0.09	<0.01	0.15	<0.1	0.2	<2	0.14	
30/11/23	11/12/23	02/01/24	114	111	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	0.03	0.17	<0.1	0.2	2	0.16	



Table 4a: ABH15A - Groundwater quality & quarterly depth – field parameters & analytes

EPA Point 13	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	m	NTU	mg/L	mg/L
<b>ABH15A - Baseline monitoring phase – 8 sampling events 14/04/19 to 14/06/21</b>											
Min	0.04	1130	6.68	-104	17.2	15.56	946.251		0.0	480	66
Max	0.35	1237	7.11	-26	20.2	13.03	948.591		4.9	540	126
<b>ABH15A - Detection monitoring phase</b>											
22/10/21	0.14	1127	7.00	-92	18.1	12.98	948.831		0.0	507	117
15/01/22	0.10	1088	6.96	-101	19.2	12.17	949.641		0.0	500	103
15/04/22	0.02	1095	6.96	-42	19.6	11.05	950.761		0.0	497	106
21/06/22	0.08	1075	6.89	-67	16.5	12.08	949.731		0.0	487	88
16/10/22	0.07	1056	6.93	-59	17.7	11.10	950.711		0.0	480	106
15/12/22	0.18	1060	6.89	-49	18.6	11.55	950.261		0.0	480	106
04/03/23	0.08	1007	6.93	-94	18.6	12.26	949.551		0.0	487	103
30/06/23	0.09	1009	6.94	-39	17.4	12.60	949.211		0.0	567	103
09/09/23	0.85	1002	6.96	-38	16.5	12.96	948.851		0.0	487	117
30/11/23	0.09	902	7.00	-62	20.4	13.32	948.491		0.0	487	109

Table 4b: ABH15A - Groundwater quality quarterly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH15A - Baseline monitoring phase – 8 sampling events 14/04/19 to 14/06/21</b>																					
Min		NA	38	89	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.109	1.34	1.38	<0.01	<0.01	<0.1	<0.1	<5	0.10
Max		NA	48	105	0.02	<0.001	<0.0001	<0.001	0.006	0.003	<0.001	0.034	0.144	1.77	1.61	0.03	<0.01	<0.1	<0.1	11	0.15
<b>ABH15A - Detection monitoring phase</b>																					
22/10/21	08/11/21	26/11/21	43	104	<0.01	<0.001	<0.0001	<0.001	0.002	0.001	<0.001	0.014	0.122	1.64	1.68	<0.01	<0.01	<0.1	<0.1	5	0.12
15/01/22	27/01/22	11/02/22	41	101	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.124	1.53	1.52	0.03	<0.01	<0.1	<0.1	<3	0.14
15/04/22	29/04/22	19/05/22	42	97	<0.01	<0.001	<0.0001	<0.001	<0.001	0.001	<0.001	0.008	0.108	1.11	1.00	0.02	<0.01	0.1	0.1	9	0.15
21/06/22	01/07/22	14/07/22	38	100	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.120	1.40	1.46	<0.01	<0.01	<0.1	<0.1	8	0.14
16/10/22	26/10/22	11/11/22	40	87	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.118	1.50	1.47	<0.01	<0.01	<0.1	<0.1	<1	0.18
15/12/22	29/12/22	23/01/23	39	96	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.118	1.56	1.75	<0.01	<0.01	<0.1	<0.1	<1	0.16
04/03/23	15/03/23	04/04/23	41	84	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.114	1.66	1.59	<0.01	<0.01	<0.1	<0.1	4	0.14
30/06/23	10/07/23	28/07/23	38	96	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.110	1.56	1.56	0.01	<0.01	<0.1	<0.1	3	0.15
09/09/23	19/09/23	10/10/23	40	87	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.114	1.59	1.52	0.02	<0.01	<0.1	<0.1	<2	0.11
30/11/23	11/12/23	02/01/24	41	94	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.107	1.51	1.50	0.02	0.03	<0.1	<0.1	2	0.14

Table 5a: ABH15B - Groundwater quality & quarterly depth – field parameters & analytes

EPA Point 14	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	m	NTU	mg/L	mg/L
<b>ABH15B - Baseline monitoring phase – 8 sampling events 14/04/19 to 14/06/21</b>											
Min	0.41	1441	6.74	+60	17.4	15.89	945.789		0.2	453	100
Max	0.99	1560	6.92	+168	20.9	13.21	948.469		8.2	567	197
<b>ABH15B - Detection monitoring phase</b>											
22/10/21	0.41	1482	6.82	+65	17.8	13.26	948.419		2.1	533	167
15/01/22	0.25	1513	6.81	+54	19.2	12.45	949.229		1.6	527	173
15/04/22	0.40	1465	6.73	+66	18.3	11.22	950.459		0.8	480	182
21/06/22	0.36	1429	6.78	+58	16.7	12.45	949.229		0.0	516	132
16/10/22	0.42	1403	6.70	+67	17.8	11.37	950.309		2.7	493	170
15/12/22	0.42	1392	6.66	+75	17.1	11.98	949.699		0.0	507	147
04/03/23	0.44	1328	6.71	+42	17.9	12.64	949.039		3.3	513	164
30/06/23	0.40	1325	6.72	+59	16.6	13.14	948.539		0.0	500	176
09/09/23	0.47	1307	6.75	+130	16.3	13.45	948.229		1.8	527	110
30/11/23	0.46	1154	6.80	+82	19.5	13.56	948.119		1.9	520	110

Table 5b: ABH15B - Groundwater quality quarterly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH15B - Baseline monitoring phase – 8 sampling events 14/04/19 to 14/06/21</b>																					
Min		NA	85	156	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.35	<0.1	0.4	<1	<0.05
Max		NA	102	199	0.15	<0.001	<0.0001	<0.001	0.008	0.012	0.002	0.104	0.030	<0.05	<0.05	0.04	0.40	<0.1	0.4	12	0.08
<b>ABH15A - Detection monitoring phase</b>																					
22/10/21	08/11/21	26/11/21	94	203	<0.01	<0.001	<0.0001	<0.001	0.005	<0.001	<0.001	0.022	0.004	<0.05	<0.05	<0.01	0.39	<0.1	0.4	<2	0.06
15/01/22	27/01/22	11/02/22	98	214	0.01	<0.001	<0.0001	<0.001	0.001	<0.001	<0.001	<0.005	0.004	<0.05	<0.05	0.03	0.48	<0.1	0.5	3	0.07
15/04/22	29/04/22	19/05/22	97	206	0.01	<0.001	<0.0001	<0.001	0.004	<0.001	<0.001	0.009	0.008	<0.05	<0.05	0.02	0.48	0.1	0.6	6	0.08
21/06/22	01/07/22	14/07/22	91	210	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.45	<0.1	0.4	5	0.08
16/10/22	26/10/22	11/11/22	90	194	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.53	<0.1	0.5	<1	0.08
15/12/22	29/12/22	23/01/23	82	216	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	0.09	0.01	0.56	<0.1	0.6	<1	0.09
04/03/23	15/03/23	04/04/23	89	189	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.001	<0.05	<0.05	<0.01	0.48	<0.1	0.5	3	0.08
30/06/23	10/07/23	28/07/23	91	210	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.43	<0.1	0.4	3	0.08
09/09/23	19/09/23	10/10/23	89	191	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.41	<0.1	0.4	<2	<0.05
30/11/23	11/12/23	02/01/24	90	202	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.001	<0.05	<0.05	<0.01	0.46	<0.1	0.5	3	0.07

## Groundwater – Six-monthly

Table 6a: ABH02 - Groundwater quality & six-monthly depth – field parameters & analytes

EPA Point 5	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	m	NTU	mg/L	mg/L
<b>ABH02 - Baseline monitoring phase – 8 sampling events 29/07/15 to 27/11/16</b>											
Min	0.09	2063	6.83	+73	17.2	8.22	945.534		0.5	510	85
Max	0.58	2326	7.28	+281	19.5	7.68	946.074		33.7	613	214
<b>ABH02 - Detection monitoring phase</b>											
20/03/21	0.15	2049	6.89	+66	18.9	6.71	947.044		5.8	540	176
22/10/21	0.52	2041	6.87	+147	17.3	6.40	947.350		3.8	607	141
15/04/22	0.19	1227	7.12	+51	17.4	4.65	949.104		12.9	513	111
16/10/22	0.97	968	6.98	+162	16.3	4.56	949.194		26.7	400	91
04/03/23	0.16	1740	6.75	+113	17.7	5.43	948.324		4.4	507	129
09/09/23	0.62	1652	6.83	+150	15.4	5.97	947.784		0.0	520	167

Table 6b: ABH02 - Groundwater quality six-monthly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B	
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	
<b>ABH02 - Baseline monitoring phase – 8 sampling events 29/07/15 to 27/11/16</b>																						
Min		NA	NA	141	329	<0.01	<0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.005	0.013	<0.05	<0.05	<0.01	0.84	<0.1	0.9	<1	<0.05
Max		NA	NA	176	419	<0.01	<0.001	0.0002	<0.001	0.006	0.006	<0.001	0.031	0.155	<0.05	<0.05	0.06	0.98	0.2	1.2	28	<0.05
<b>ABH02 - Detection monitoring phase</b>																						
20/03/21	12/04/21	21/04/21	145	386	0.10	<0.001	<0.0001	<0.001	0.003	0.006	<0.001	0.042	0.144	0.11	<0.05	<0.01	0.71	0.2	0.9	4	<0.05	
22/10/21	08/11/21	26/11/21	139	408	<0.01	<0.001	<0.0001	<0.001	0.003	0.001	<0.001	0.022	0.013	<0.05	<0.05	<0.01	0.96	<0.1	1.0	2	<0.05	
15/04/22	29/04/22	19/05/22	60	147	1.91	0.001	<0.0001	0.002	0.001	0.001	0.006	<0.005	0.025	0.92	<0.05	0.05	2.53	0.7	3.2	9	<0.05	
16/10/22	26/10/22	11/11/22	50	138	0.04	<0.001	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005	0.002	0.10	<0.05	<0.01	1.16	0.8	2.0	10	<0.05	
04/03/23	15/03/23	04/04/23	142	366	0.07	<0.001	<0.0001	<0.001	0.002	0.004	<0.001	0.085	0.107	0.06	<0.05	<0.01	0.92	0.1	1.0	7	<0.05	
09/09/23	19/09/23	10/10/23	140	337	<0.01	<0.001	<0.0001	<0.001	0.002	0.001	<0.001	0.115	0.031	<0.05	<0.05	<0.01	0.85	0.2	1.0	<2	<0.05	

Table 7a: ABH02A - Groundwater quality & six-monthly depth – field parameters & analytes

EPA Point 6	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	m	NTU	mg/L	mg/L
<b>ABH02A - Baseline monitoring phase – 8 sampling events 28/07/15 to 27/11/16</b>											
Min	0.01	1728	6.77	+112	16.3	8.10	945.889		0.0	525	88
Max	0.55	1847	6.93	+293	18.9	7.52	946.469		20.0	627	232
<b>ABH02A - Detection monitoring phase</b>											
20/03/21	0.02	1669	6.83	+92	18.4	6.49	947.499		3.5	540	205
22/10/21	0.11	1627	6.84	+154	17.6	6.24	947.750		1.1	560	188
15/04/22	0.08	1595	6.73	+64	17.9	4.49	949.499		0.2	547	199
16/10/22	0.08	1525	6.68	+150	16.7	4.41	949.579		2.1	540	188
04/03/23	0.04	1415	6.68	-207	18.0	5.38	948.609		2.2	527	176
09/09/23	0.27	1412	6.74	+127	16.1	5.94	948.049		1.6	540	185

Table 7b: ABH02A - Groundwater quality six-monthly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH02A - Baseline monitoring phase - – 8 sampling events 28/07/15 to 27/11/16</b>																					
Min	NA	NA	141	207	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.59	<0.1	0.6	<1	<0.05
Max	NA	NA	164	242	<0.01	<0.001	<0.0001	<0.001	0.003	<0.001	<0.001	0.023	0.003	<0.05	<0.05	0.05	0.66	0.2	0.9	31	0.05
<b>ABH02A - Detection monitoring phase</b>																					
20/03/21	12/04/21	21/04/21	140	219	<0.01	<0.001	<0.0001	<0.001	0.001	<0.001	<0.001	<0.005	0.001	<0.05	<0.05	<0.01	0.46	0.1	0.6	4	<0.05
22/10/21	08/11/21	26/11/21	135	227	<0.01	<0.001	<0.0001	<0.001	0.003	0.005	<0.001	0.023	<0.001	<0.05	<0.05	<0.01	0.49	<0.1	0.5	3	<0.05
15/04/22	29/04/22	19/05/22	140	234	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.002	<0.05	<0.05	<0.01	0.51	<0.1	0.5	13	0.06
16/10/22	26/10/22	11/11/22	136	205	<0.01	<0.001	<0.0001	<0.001	0.002	<0.001	<0.001	0.006	<0.001	<0.05	<0.05	<0.01	0.52	0.2	0.7	6	0.07
04/03/23	15/03/23	04/04/23	134	205	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.05	<0.05	<0.01	0.54	0.2	0.7	5	0.06
09/09/23	19/09/23	10/10/23	133	211	<0.01	<0.001	<0.0001	<0.001	0.002	<0.001	<0.001	0.005	0.001	<0.05	<0.05	<0.01	0.51	0.1	0.6	<2	<0.05

Table 8a: ABH4 - Groundwater quality & six-monthly depth – field parameters & analytes

EPA Point 7	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	m	NTU	mg/L	mg/L
<b>ABH4 - Baseline monitoring phase – 8 sampling events 29/07/15 to 27/11/16</b>											
Min	0.24	1693	6.88	+32	14.1	4.93	948.084		0.0	546	79
Max	1.46	1777	7.01	+159	20.5	4.89	949.124		93.0	593	188
<b>ABH4 - Detection monitoring phase</b>											
21/03/21	0.23	395	6.62	-160	17.8	4.02	949.994		2184.0	160	88
21/10/21	0.51	558	6.70	-4	17.3	3.58	950.430		192.0	200	73
16/04/22	0.86	1533	6.66	-174	17.6	2.13	951.884		29.2	483	176
15/10/22	0.57	1590	6.70	-117	16.9	1.76	952.254		4.2	520	182
04/03/23	0.67	1488	6.74	-186	18.2	2.36	951.654		9.2	547	147
10/09/23	2.39	1407	6.84	-107	16.2	2.84	951.174		8.9	553	132

Table 8b: ABH4 - Groundwater quality six-monthly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH4 - Baseline monitoring phase - - 8 sampling events 29/07/15 to 27/11/16</b>																					
Min	NA	NA	137	161	<0.01	<0.001	<0.0001	<0.001	0.002	0.002	<0.001	0.006	0.084	<0.05	<0.05	<0.01	0.40	<0.1	0.5	<1	<0.05
Max	NA	NA	167	180	0.02	<0.001	<0.0001	<0.001	0.019	0.021	0.001	0.121	0.117	<0.05	0.15	0.04	0.51	0.4	0.9	9	<0.05
<b>ABH4 - Detection monitoring phase</b>																					
21/03/21	12/04/21	21/04/21	19	53	0.10	0.001	<0.0001	<0.001	0.001	0.005	<0.001	0.010	0.107	0.45	0.10	0.17	<0.01	3.8	3.8	15	<0.05
21/10/21	08/11/21	26/11/21	34	83	<0.01	0.001	<0.0001	<0.001	0.002	0.006	<0.001	0.143	0.621	1.42	1.21	0.10	0.02	0.9	0.9	8	<0.05
16/04/22	29/04/22	19/05/22	170	207	<0.01	0.002	<0.0001	<0.001	<0.001	0.011	<0.001	0.044	1.490	5.11	5.40	0.12	0.01	0.3	0.3	11	<0.05
15/10/22	26/10/22	11/11/22	167	210	<0.01	0.002	<0.0001	<0.001	0.001	0.008	<0.001	0.052	1.220	4.27	4.44	0.06	0.01	0.2	0.2	5	0.06
04/03/23	15/03/23	04/04/23	158	207	<0.01	0.002	<0.0001	<0.001	0.004	0.024	<0.001	0.078	1.080	3.71	3.42	0.06	0.02	0.2	0.2	8	0.05
10/09/23	19/09/23	10/10/23	141	191	0.13	0.001	<0.0001	<0.001	0.004	0.004	<0.001	0.079	1.000	1.95	1.34	0.08	<0.01	0.2	0.2	<2	<0.05

Table 9a: ABH4A - Groundwater quality & six-monthly depth – field parameters & analytes

EPA Point 33	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m		NTU	mg/L	mg/L
<b>ABH4A - Baseline monitoring – 8 sampling events 29/07/15 to 27/11/16 – water only once</b>											
09/10/16	8.40	501	7.22	-6	17.6	2.81	951.204		very high	327	82
21/03/21	4.23	437	6.75	-35	19.7	1.07	952.859		52.7	117	18
<b>ABH4A - Detection monitoring phase</b>											
21/10/21	0.44	273	6.83	-25	14.7	1.11	952.82		1278.0	80	35
16/04/22	0.37	362	6.85	-203	18.1	1.10	952.829		112.3	125	41
15/10/22	1.46	402	6.69	+121	15.2	1.00	952.929		36.1	113	41
04/03/23	0.90	482	6.58	-15	18.5	2.29	951.639		141.0	140	65
10/09/23	0.70	367	5.98	-83	13.6	2.54	951.389		1298.0	127	59

Note: Well ABH4A is usually dry or has insufficient water for sampling.

Table 9b: ABH4A - Groundwater quality six-monthly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH4A - Baseline monitoring phase - - 8 sampling events 29/07/15 to 27/11/16 – only once had water</b>																					
09/10/16	NA	NA	32	92	0.08	<0.001	<0.0001	<0.001	0.003	0.001	<0.001	0.026	0.001	0.09	<0.05	0.08	0.85	1.9	2.8	5	NT
21/03/21	12/04/21	21/04/21	6	67	0.02	<0.001	<0.0001	<0.001	0.005	0.006	<0.001	0.009	0.010	0.17	<0.05	0.01	0.14	0.8	0.9	11	<0.05
<b>ABH4A - Detection monitoring phase</b>																					
21/10/21	08/11/21	26/11/21	12	50	0.28	<0.001	<0.0001	<0.001	0.018	0.006	0.002	0.100	0.143	0.29	0.07	0.02	0.03	2.5	2.5	8	<0.05
16/04/22	29/04/22	19/05/22	6	42	0.12	0.002	<0.0001	<0.001	<0.001	0.005	<0.001	0.021	0.390	1.66	1.42	0.63	<0.01	1.5	1.5	11	<0.05
15/10/22	26/10/22	11/11/22	10	49	0.02	<0.001	<0.0001	<0.001	0.003	0.001	<0.001	0.018	0.017	<0.05	0.40	<0.01	0.07	0.3	0.4	5	<0.05
04/03/23	15/03/23	04/04/23	10	51	0.02	0.003	<0.0001	<0.001	0.001	0.006	<0.001	0.109	0.678	2.17	2.04	0.05	<0.01	0.5	0.5	10	<0.05
10/09/23	19/09/23	10/10/23	7	49	151.0	0.011	0.0011	0.132	0.199	0.108	0.123	1.150	3.260	199.0	<0.05	0.29	0.02	6.8	6.8	15	<0.05

Table 10a: ABH04 - Groundwater quality & six-monthly depth – field parameters & analytes

EPA Point 8	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m		NTU	mg/L	mg/L
<b>ABH04 - Baseline monitoring phase – 8 sampling events 28/07/15 to 27/11/16</b>											
Min	0.00	2253	6.74	-90	16.2	5.38	947.771		0.0	557	97
Max	0.21	2436	6.91	-243	19.1	4.88	948.271		16.0	610	235
<b>ABH04 - Detection monitoring phase</b>											
21/03/21	0.00	2026	6.88	-31	18.4	4.12	949.031		54.5	607	18
21/10/21	0.07	2042	6.83	-28	16.1	3.61	949.540		30.3	633	173
16/04/22	0.01	1941	6.73	-32	17.0	2.18	950.971		30.8	573	202
15/10/22	0.06	1967	6.69	-6	16.7	1.80	951.351		14.2	540	185
03/03/23	0.01	1815	6.73	-119	18.4	2.38	950.771		9.7	553	167
10/09/23	0.06	1645	6.73	-29	16.0	2.83	950.321		11.0	573	161

Table 10b: ABH04 - Groundwater quality six-monthly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH04 - Baseline monitoring phase - -8 sampling events 28/07/15 to 27/11/16</b>																					
Min		NA	288	309	<0.01	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	0.010	1.20	0.89	1.16	<0.01	<0.01	<0.1	<0.1	<1	<0.05
Max		NA	340	373	<0.01	0.002	<0.0001	<0.001	0.001	0.001	<0.001	0.026	1.69	1.75	1.70	0.04	0.01	0.1	0.1	12	<0.05
<b>ABH04 - Detection monitoring phase</b>																					
21/03/21	12/04/21	21/04/21	282	272	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	0.010	1.58	0.42	0.28	<0.01	<0.01	0.2	0.2	6	<0.05
21/10/21	08/11/21	26/11/21	282	297	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	0.006	1.70	0.42	0.42	<0.01	<0.01	0.2	0.2	3	<0.05
16/04/22	29/04/22	19/05/22	354	237	<0.01	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	0.012	0.765	0.67	0.63	0.05	<0.01	0.4	0.4	16	<0.05
15/10/22	26/10/22	11/11/22	292	302	<0.01	0.001	<0.0001	<0.001	0.002	<0.001	<0.001	0.019	0.479	0.57	0.57	<0.01	<0.01	0.2	0.2	7	<0.05
03/03/23	15/03/23	04/04/23	302	308	<0.01	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.142	0.88	0.77	<0.01	<0.01	<0.1	<0.1	7	<0.05
10/09/23	19/09/23	10/10/23	298	298	<0.01	0.001	<0.0001	<0.001	0.001	<0.001	<0.001	0.011	1.04	0.60	0.56	<0.01	<0.01	0.1	0.1	<2	<0.05

Table 11a: ABH04A - Groundwater quality & six-monthly depth – field parameters & analytes

EPA Point 9	DO	EC	pH	Eh	Temp	D	WL	RL	Turbidity	Alkalinity	Free CO <sub>2</sub>
Measure	mg/L	µS/cm	1-14	mV	°C	m	m		NTU	mg/L	mg/L
<b>ABH04A - Baseline monitoring phase – 8 sampling events 29/07/15 to 27/11/16</b>											
Min	1.46	1508	7.18	-37	15.7	5.41	947.559		0.0	510	59
Max	3.46	1660	7.95	+142	19.2	4.89	948.079		48.0	603	103
<b>ABH04A - Detection monitoring phase</b>											
21/03/21	1.65	1572	7.35	+19	18.0	4.03	948.939		0.7	573	85
21/10/21	3.50	1466	7.35	+137	15.9	3.60	949.370		0.0	600	67
16/04/22	1.77	1469	7.21	+32	16.9	3.60	949.369		0.0	600	97
15/10/22	1.79	1389	7.15	+175	15.5	1.76	951.209		0.9	587	79
03/03/23	0.28	1338	7.18	+28	18.9	2.41	950.559		5.0	587	79
10/09/23	3.58	1294	7.34	+120	15.7	2.88	950.089		0.0	587	65

Table 11b: ABH04A - Groundwater quality six-monthly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	SO <sub>4</sub>	Cl	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TOC	B
			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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L
<b>ABH04A - Baseline monitoring phase - 8 sampling events 29/07/15 to 27/11/16</b>																					
Min		NA	278	31	<0.01	0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	0.005	0.002	<0.05	<0.05	<0.01	0.14	<0.1	0.2	<1	<0.05
Max		NA	335	40	<0.01	0.001	<0.0001	<0.001	0.005	0.003	<0.001	0.020	0.391	<0.05	<0.05	0.04	1.34	0.3	1.6	17	<0.05
<b>ABH04A - Detection monitoring phase</b>																					
21/03/21	12/04/21	21/04/21	323	37	<0.01	<0.001	<0.0001	<0.001	0.001	0.001	<0.001	0.005	0.050	<0.05	<0.05	<0.01	1.22	0.2	1.4	6	<0.05
21/10/21	08/11/21	26/11/21	276	36	<0.01	<0.001	<0.0001	<0.001	0.003	<0.001	<0.001	0.010	<0.001	<0.05	<0.05	<0.01	2.19	0.2	2.4	4	<0.05
16/04/22	29/04/22	19/05/22	246	29	<0.01	0.001	<0.0001	<0.001	0.003	<0.001	<0.001	0.006	0.014	<0.05	<0.05	0.02	3.13	0.5	3.6	13	<0.05
15/10/22	26/10/22	11/11/22	238	29	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	0.045	<0.05	<0.05	<0.01	3.12	0.8	3.9	<1	<0.05
03/03/23	15/03/23	04/04/23	235	29	0.02	<0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.005	0.072	<0.05	<0.05	<0.01	2.33	0.4	2.7	8	<0.05
10/09/23	19/09/23	10/10/23	296	41	<0.01	<0.001	<0.0001	<0.001	0.001	<0.001	<0.001	0.008	0.022	<0.05	<0.05	0.08	0.68	0.2	0.9	<1	<0.05



## Dedicated water column bore loggers

Table 12a: Water column logger measurements and water level calculations ABH13, ABH14 and ABH15A

Date range	ABH13	ABH14	ABH15A WC MIN	ABH15A WC MAX	ABH15A WL MIN	ABH15A WL MAX	ABH15A WL RL MIN	ABH15A WL RL MAX
Measure	m	m	m	m	m	m	m	m
1 Oct 19 to 31 Dec 19	DRY	DRY	31.772	31.957	15.543	15.728	946.083	946.268
1 Jan 20 to 31 Mar 20	DRY	DRY	31.757	32.340	15.160	15.743	946.068	946.651
1 Apr 20 to 30 Jun 20	DRY	DRY	32.213	32.364	15.136	15.287	946.524	946.675
1 Jul 20 to 30 Sep 20	DRY	DRY	32.212	32.564	14.936	15.288	946.523	946.875
1 Oct 20 to 31 Dec 20	DRY	DRY	32.336	34.399	13.101	15.164	946.647	948.710
1 Jan 21 to 31 Mar 21	DRY	DRY	33.684	35.765	11.735	13.816	947.995	950.076
1 Apr 21 to 30 Jun 21	DRY	DRY	33.900	35.226	12.274	13.600	948.211	949.537
1 Jul 21 to 30 Sep 21	DRY	DRY	33.937	35.639	11.861	13.563	948.248	949.950
1 Oct 21 to 31 Dec 21	DRY	DRY	34.377	36.459	11.041	13.123	948.688	950.770
1 Jan 22 to 31 Mar 22	DRY	DRY	35.121	37.493	10.017	12.389	949.422	951.794
1 Apr 22 to 30 Jun 22	DRY	DRY	35.312	37.461	10.049	12.198	949.613	951.762
1 Jul 22 to 30 Sep 22	DRY	DRY	35.308	36.907	10.603	12.202	949.609	951.208
1 Oct 22 to 31 Dec 22	DRY	DRY	35.727	37.059	10.451	11.783	950.028	951.360
1 Jan 23 to 31 Mar 23	DRY	DRY	35.118	35.760	11.750	12.392	949.419	950.061
1 Apr 23 to 30 Jun 23	DRY	DRY	34.889	35.390	12.120	12.621	949.190	949.691
1 Jul 23 to 30 Sep 23	DRY	DRY	34.518	34.928	12.582	12.992	948.819	949.229
<b>Overall min &amp; max to date</b>	DRY	DRY					<b>946.068</b>	<b>951.794</b>
						<b>Range from</b>	<b>1 Oct 19</b>	<b>5.726</b>

Notes: WC = Water column from base of sensor to water level (WL) in well. Depth to WL from the top of the PVC casing is calculated from the known position of the logger in the well.

WL Relative Level (RL) is calculated from the surveyed RL for the top of PVC casing minus the WL.

Wells ABH13 and ABH14 have always been dry, information which is also captured by the water column loggers which are close to zero barometric adjusted WC measurements.

Table 12b: Water column logger measurements and water level calculations ABH15B and ABH15C

Date range	ABH15B WC MIN	ABH15B WC MAX	ABH15B WL MIN	ABH15B WL MAX	ABH15B WL RL MIN	ABH15B WL RL MAX	ABH15C WC MIN	ABH15C WC MAX	ABH15C WL MIN	ABH15C WL MAX	ABH15C WL RL MIN	ABH15C WL RL MAX
Measure	m	m	m	m	m	m	m	m	m	m	m	m
1 Oct 19 to 31 Dec 19	14.983	15.161	15.869	16.047	945.632	945.810	DRY					
1 Jan 20 to 31 Mar 20	14.972	15.639	15.391	16.058	945.621	946.288	DRY					
1 Apr 20 to 30 Jun 20	15.452	15.634	15.396	15.578	946.101	946.283	DRY					
1 Jul 20 to 30 Sep 20	15.464	15.874	15.156	15.566	946.113	946.523	DRY					
1 Oct 20 to 31 Dec 20	15.608	18.045	12.985	15.450	946.229	948.694	DRY					
1 Jan 21 to 31 Mar 21	16.953	19.585	11.445	14.077	947.602	950.234	DRY					
1 Apr 21 to 30 Jun 21	17.114	18.717	12.313	13.916	947.763	949.366	DRY					
1 Jul 21 to 30 Sep 21	17.139	19.184	11.846	13.891	947.788	949.833	DRY					
1 Oct 21 to 31 Dec 21	17.565	20.132	10.898	13.465	948.214	950.781	0.000	2.120	5.930	8.019	953.549	955.638
1 Jan 22 to 31 Mar 22	18.327	21.311	9.719	12.703	948.976	951.960	0.000	4.105	3.945	8.012	953.556	957.623
1 Apr 22 to 30 Jun 22	18.418	21.253	9.777	12.612	949.067	951.902	0.000	4.014	4.036	8.091	953.477	957.532
1 Jul 22 to 30 Sep 22	18.416	20.395	10.635	12.614	949.065	951.044	0.000	4.312	3.738	8.094	953.523	957.830
1 Oct 22 to 31 Dec 22	18.762	20.491	10.539	12.268	949.411	951.140	0.000	3.918	4.132	8.097	953.531	957.436
1 Jan 23 to 31 Mar 23	18.095	18.791	12.239	12.935	948.744	949.440	0.000	0.003	8.047	8.049	953.519	953.521
1 Apr 23 to 30 Jun 23	17.838	18.407	12.623	13.192	948.487	949.056	0.000	0.003	8.047	8.049	953.519	953.521
1 Jul 23 to 30 Sep 23	17.433	17.868	13.162	13.597	948.082	948.517	0.000	0.000				
<b>Overall min &amp; max to date</b>				<b>Range from</b>	<b>1 Oct 19</b>	<b>6.339</b>				<b>Range from</b>	<b>1 Oct 19</b>	<b>4.353</b>

← Recorded above logger base  
 ← Recorded above logger base  
 ← Recorded above logger base  
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 ← Recorded above logger base  
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## Surface water - Quarterly

Table 13a: ASB1 – Sediment basin – volume and surface water quality quarterly - field parameters & analytes + laboratory basic ions, sediment & calculations

EPA Point 16	Total Capacity	Volume	Freeboard (remaining capacity)	DO	EC	pH	Eh	Temp	D	Turbidity	Alkalinity	Free CO <sub>2</sub>	SO <sub>4</sub>	Cl	Ca	Mg	Na	K	SS	SAR	Hard-ness	
Measure	kL	kL	kL	mg/L	µS/cm	1-14	mV	°C	m	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ratio	mg/L	
ASB1 - Baseline monitoring phase - -since 23/02/20																						
23/02/20				7.56	81	7.17	+126	21.9	0.25	880	27	15	4	3	4	2	10	<1	52	1.02	18	
10/05/20				9.85	98	7.37	+186	13.9	0.25	414	33	15	5	4	6	3	11	1	13	0.92	27	
04/09/20				9.81	106	7.51	+123	18.9	0.30	374	37	15	6	4	6	2	10	1	32	0.90	23	
ASB1 - Detection monitoring phase																						
03/12/20				7.46	140	7.46	+112	24.4	0.50	807	42	15	6	4	9	3	12	2	75	0.88	35	
18/03/21				7.92	135	6.92	+168	20.8	0.30	453	3	15	6	2	8	2	7	2	33	0.57	28	
14/06/21				10.01	155	7.22	+91	13.5	0.20	284	34	12	7	4	8	3	9	2	27	0.69	32	
25/10/21				7.83	271	7.15	+142	20.1	0.20	274	35	12	8	9	9	3	12	2	17	0.88	35	
17/01/22				6.96	151	7.91	+117	31.4	0.40	250	41	12	7	7	11	3	12	3	40	0.83	40	
28/03/22				7.55	120	7.31	+155	18.3	0.20	309	30	13	5	5	8	2	8	2	62	0.66	28	
22/06/22				10.32	136	6.65	+113	11.3	0.20	227	42	23	9	8	10	3	13	2	12	0.92	37	
15/10/22				8.42	147	7.67	+82	22.4	0.15	147	39	12	10	6	12	4	11	2	18	0.70	46	
16/01/23				6.13	247	7.49	+110	29.0	0.30	819	63	12	13	9	17	6	14	3	105	0.74	67	
22/03/23				7.80	230	7.49	-24	20.6	0.15	908	67	10	17	11	18	7	19	4	51	0.96	74	
30/06/23				10.55	170	7.35	+108	11.1	0.40	537	53	12	10	8	10	4	13	2	33	0.88	41	
12/09/23				No water - being desilted																		
01/12/23				8.22	257	7.74	+108	24.3	0.35	714	60	15	18	11	10	4	22	2	40	1.49	41	

Table 13b: ASB1 – Sediment basin surface water quality quarterly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TP	TOC	B	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	mg/L	
<b>ASB1 - Baseline monitoring phase -since 23/02/20</b>																						
23/02/20	NA	NA	N	14.4	0.002	<0.0001	0.011	0.008	0.005	0.007	0.002	0.165	13.2	NT	0.07	0.50	0.8	1.3	0.26	4	<0.05	
10/05/20	NA	NA	Y - field	0.15	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.25									
10/05/20	NA	NA	N	12.2	0.001	<0.0001	0.009	0.006	0.005	0.004	0.001	0.054	10.8	NT	<0.01	0.47	0.8	1.3	0.14	4	<0.05	
04/09/20	NA	NA	N	10.6	0.002	<0.0001	0.009	0.007	0.004	0.004	0.002	0.051	8.83	NT	0.03	0.57	0.8	1.4	0.10	6	<0.05	
<b>ASB1 - Detection monitoring phase</b>																						
03/12/20	16/12/20	05/01/21	N	11.7	0.002	<0.0001	0.011	0.009	0.005	0.008	0.002	0.218	12.5	NT	<0.01	0.86	2.7	3.6	0.31	6	<0.05	
18/03/21	30/03/21	21/04/21	Y - field	0.09	<0.001	<0.0001	<0.001	0.001	<0.001	<0.001	<0.005	0.004	0.08	<0.05	0.05	0.27	1.1	1.4	0.15	5	<0.05	
14/06/21	25/06/21	09/07/21	Y - field	0.32	<0.001	<0.0001	<0.001	0.003	<0.001	<0.001	0.009	0.011	0.34	<0.05	0.09	0.38	1.1	1.5	0.08	8	<0.05	
25/10/21	08/11/21	26/11/21	Y - field	0.26	<0.001	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005	0.033	0.29	0.07	0.18	0.66	1.4	2.1	0.12	11	<0.05	
17/01/22	27/01/22	11/02/22	Y - field	0.25	0.001	<0.0001	<0.001	0.004	0.002	<0.001	<0.005	0.176	0.44	0.06	0.03	0.67	0.3	1.0	0.02	11	<0.05	
28/03/22	07/04/22	19/04/22	Y - field	0.59	<0.001	<0.0001	<0.001	0.003	<0.001	<0.001	<0.005	0.036	0.59	0.05	0.40	1.08	1.9	3.0	0.13	11	<0.05	
22/06/22	01/07/22	14/07/22	Y - field	9.60	0.002	<0.0001	0.009	0.010	0.006	0.005	0.024	0.130	8.90	<0.05	<0.05	0.82	1.0	1.8	0.05	13	<0.05	
15/10/22	26/10/22	11/11/22	Y - field	0.22	<0.001	<0.0001	0.001	0.003	0.001	<0.001	<0.005	0.025	0.38	0.06	0.06	2.03	2.0	4.0	<0.10	11	<0.05	
16/01/23	24/01/23	14/02/23	N	25.9	0.004	<0.0001	0.023	0.017	0.014	0.017	0.043	0.350	26.7	<0.05	0.07	0.52	1.9	2.4	0.38	10	<0.05	
22/03/23	31/03/23	24/04/23	N	43.4	0.005	<0.0001	0.035	0.021	0.019	0.020	0.054	0.326	40.5	<0.05	0.02	0.25	2.4	2.6	0.30	10	<0.05	
30/06/23	10/07/23	28/07/23	N	28.3	0.003	<0.0001	0.022	0.015	0.013	0.012	0.043	0.169	25.3	0.05	0.02	0.25	1.3	1.6	0.19	9	<0.05	
12/09/23				No water -			being desilted															
01/12/23	11/12/23	02/01/24	N	29.0	0.004	<0.0001	0.026	0.016	0.014	0.014	0.044	0.250	28.7	<0.05	0.10	2.80	2.6	5.4	0.34	17	<0.05	

Table 14a: ADB1-IN – Dry basin – volume and surface water quality quarterly - field parameters & analytes + laboratory basic ions, sediment & calculations

EPA Point 17	Total Capacity	Volume	Freeboard (remaining capacity)	DO	EC	pH	Eh	Temp	Sample Depth	Turbidity	Alkalinity	Free CO <sub>2</sub>	SO <sub>4</sub>	Cl	Ca	Mg	Na	K	SS	SAR	Hardness
Measure	kL	kL	kL	mg/L	µS/cm	1-14	mV	°C	m	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ratio	mg/L
<b>ADB1-IN - Baseline monitoring phase -since 23/02/20</b>																					
23/02/20				8.21	127	7.57	+117	21.4	0.25	1459	33	15	8	9	2	1	21	<1	74	3.03	9
10/05/20				10.01	143	7.64	+200	13.8	0.15	1460	37	18	10	11	2	2	30	<1	21	3.59	13
04/09/20				10.48	132	8.03	+56	19.4	0.15	1094	37	18	9	9	2	1	25	<1	28	3.60	9
<b>ADB1-IN - Detection monitoring phase</b>																					
03/12/20				8.04	155	7.32	+178	23.7	0.15	1067	40	21	9	9	2	1	27	<1	37	3.89	9
18/03/21				7.85	150	6.94	+133	26.1	0.10	301	217	32	2	8	5	4	18	4	15	1.46	29
14/06/21				10.51	96	7.34	+114	12.7	0.25	574	31	12	5	5	2	1	17	<1	17	2.45	9
25/10/21				8.95	188	7.55	+119	18.9	0.20	445	23	7	6	6	2	1	18	<1	14	2.59	9
17/01/22				10.72	113	8.98	+32	30.2	0.25	419	30	3	6	6	2	<1	19	<1	41	3.11	5
17/04/22				7.71	93	7.06	+135	15.7	0.20	2322	33	15	3	7	2	2	12	2	69	1.44	13
22/06/22				12.26	93	6.99	+96	12.8	0.15	1654	27	18	4	7	2	1	15	<1	64	2.16	9
15/10/22				8.98	87	6.91	+60	20.9	0.10	670	19	18	4	5	1	1	12	<1	44	2.03	7
16/01/23				6.64	152	7.36	+95	26.5	0.20	1249	33	18	4	8	1	1	17	<1	98	2.88	7
22/03/23				7.95	124	7.23	+53	20.8	0.09	1423	40	18	5	8	2	3	31	1	64	3.24	17
30/06/23				11.50	134	7.85	+88	11.6	0.10	1116	33	15	4	6	1	1	17	<1	86	2.88	7
12/09/23				10.60	130	7.97	+189	18.5	0.08	1005	40	15	6	8	2	2	21	<1	218	2.51	13
01/12/23				8.93	150	7.85	+123	24.3	0.15	1627	47	18	7	10	2	2	26	<1	147	3.11	13

Table 14b: ADB1-IN – Dry basin surface water quality quarterly – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TP	TOC	B	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	mg/L	
<b>ADB1-IN - Baseline monitoring phase -since 23/02/20</b>																						
23/02/20	NA	NA	N	35.5	0.003	<0.0001	0.027	0.019	0.014	0.018	0.048	0.242	32.9	NT	0.02	0.97	1.4	2.4	0.40	5	<0.05	
10/05/20	NA	NA	Y - field	1.33	<0.001	<0.0001	<0.001	0.001	<0.001	<0.001	<0.005	0.002	0.79	0.12								
10/05/20	NA	NA	N	31.5	0.003	<0.0001	0.024	0.018	0.014	0.016	0.047	0.184	29.8	NT	0.03	1.10	1.7	2.8	0.32	4	<0.05	
04/09/20	NA	NA	N	43.0	0.003	<0.0001	0.032	0.022	0.017	0.016	0.059	0.171	38.0	NT	<0.01	0.92	1.3	2.2	0.28	5	<0.05	
<b>ADB1-IN - Detection monitoring phase</b>																						
03/12/20	16/12/20	05/01/21	N	36.7	0.003	<0.0001	0.031	0.021	0.016	0.016	0.059	0.210	37.4	NT	0.01	0.87	2.5	3.4	0.37	6	<0.05	
18/03/21	30/03/21	21/04/21	Y - field	0.45	0.001	<0.0001	<0.001	0.002	0.001	<0.001	<0.005	0.047	0.43	0.10	0.03	<0.01	1.6	1.6	0.23	10	<0.05	
14/06/21	25/06/21	09/07/21	Y - field	0.11	<0.001	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005	0.001	0.05	<0.05	0.02	0.69	1.2	1.9	0.17	7	<0.05	
25/10/21	08/11/21	26/11/21	Y - field	0.56	<0.001	<0.0001	<0.001	0.003	<0.001	<0.001	<0.005	0.002	0.27	<0.05	<0.01	0.79	0.9	1.7	0.17	6	<0.05	
17/01/22	27/01/22	11/02/22	Y - field	0.85	<0.001	<0.0001	<0.001	0.012	<0.001	<0.001	0.007	0.003	0.44	<0.05	<0.01	0.30	2.0	2.3	0.20	7	<0.05	
17/04/22	29/04/22	19/05/22	Y-lab	1.25	0.005	<0.0001	<0.001	0.003	0.002	<0.001	<0.005	0.003	0.96	0.05	0.08	0.29	2.5	2.8	0.50	10	<0.05	
22/06/22	01/07/22	14/07/22	N	48.3	0.003	<0.0001	0.037	0.026	0.021	0.017	0.077	0.292	44.7	<0.05	<0.01	0.42	2.1	2.5	0.42	8	<0.05	
15/10/22	26/10/22	11/11/22	N	32.4	0.004	<0.0001	0.025	0.018	0.014	0.010	0.064	0.155	31.0	0.08	<0.01	0.43	2.5	2.9	0.29	8	<0.05	
16/01/23	24/01/23	14/02/23	N	25.2	0.003	<0.0001	0.017	0.014	0.011	0.012	0.041	0.190	22.2	<0.05	0.03	0.60	1.7	2.3	0.44	7	<0.05	
22/03/23	31/03/23	24/04/23	N	64.4	0.004	<0.0001	0.043	0.027	0.023	0.022	0.084	0.318	57.4	<0.05	0.08	0.03	3.0	3.0	0.39	7	<0.05	
30/06/23	10/07/23	28/07/23	N	33.7	0.003	<0.0001	0.024	0.018	0.016	0.014	0.057	0.201	30.0	<0.05	0.02	0.26	0.9	1.2	0.14	7	<0.05	
12/09/23	25/09/23	10/10/23	N	51.5	0.004	<0.0001	0.034	0.024	0.020	0.018	0.070	0.259	48.9	<0.05	0.02	0.16	2.5	2.7	0.29	6	<0.05	
01/12/23	11/12/23	02/01/24	N	106.0	0.005	<0.0001	0.077	0.044	0.041	0.029	0.138	0.463	106.0	<0.05	0.05	0.26	2.3	2.6	0.41	6	<0.05	

## Surface water - Six-monthly

Table 15a: GARA1 & GARA1R – surface water quality six-monthly & if discharge ADB1- field parameters & analytes + laboratory basic ions, sediment & calculations

EPA Point 1	DO	EC	pH	Eh	Temp	Sample Depth	Volumetric Flow Rate	Turbidity	Alkalinity	Free CO <sub>2</sub>	SO <sub>4</sub>	Cl	Ca	Mg	Na	K	SS	Hardness	Discharge ADB1
Measure	mg/L	µS/cm	1-14	mV	°C	m	kL/day	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Yes or No
<b>GARA1 - Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13.</b>																			
Min	3.85	144	6.19	+266	6.4	NT	NT	NT	35	NT	4	6	8	6	9	0.2	<2	45	No
Max	8.51	685	8.05	+267	25.9	NT	NT	NT	190	NT	20	27	29	26	22	4	20	179	No
04/05/15	6.61	300	7.94	+172	16.3	0.35	37,800	26.9	117	15	NT	NT	NT	NT	NT	13	NT	NT	No
<b>GARA1R - Detection monitoring phase</b>																			
30/06/20	NR	356	7.94	NR	NR	0.30	15,552	3.8	141	NR	22	16	27	21	21	4	<5	154	Yes
18/03/21	8.03	258	7.37	+129	23.9	0.50	28,800	11.3	103	18	15	10	19	14	15	4	6	105	No
25/10/21	8.03	258	7.37	+129	23.9	0.25	64,800	4.5	120	7	7	8	20	15	11	2	<5	112	No
15/03/22	9.76	240	8.07	+86	16.3	0.55	158,400	4.4	119	NR	5	7	18	14	9	3	<5	102	Yes
17/04/22	8.45	281	7.08	+124	18.4	0.45	36,000	4.4	127	12	6	8	20	16	10	2	<5	116	No
17/10/22	9.09	263	8.04	+134	18.9	0.70	30,240	5.4	123	12	6	7	20	17	11	2	<5	120	No
22/03/23	8.52	421	8.00	+53	22.8	0.04	8,640	0.5	210	12	6	16	35	34	21	3	<5	227	No
11/09/23	10.00	379	7.68	+160	17.2	0.10	8,640	3.5	180	12	9	15	32	28	20	3	<5	195	No

Note: GARA1R replaced GARA1 sampling point from 30/06/20 to be downstream of Gara River Bridge.

Table 15b: GARA1 & GARA1R – Surface water quality six-monthly & if discharge ADB1– laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TP	TOC	B
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	mg/L
<b>GARA1 – Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13. Minimum &amp; maximum results given below.</b>																					
Min	NA	NA	N	<0.005	0.001	<0.0001	<0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.01	NT	<0.01	0.01	<0.1	0.1	<0.01	NT	<0.005
Max	NA	NA	N	1.490	0.005	<0.0001	0.026	0.006	0.003	<0.001	0.014	0.055	4.48	NT	0.13	0.42	1.7	1.7	0.49	NT	0.411
04/05/15	NA	NA	Y - field	0.020	0.002	<0.0001	<0.001	0.001	0.001	<0.001	<0.005	0.046	0.230	NT	0.06	0.02	1.7	1.7	0.08	15	NT
<b>GARA1R - Detection monitoring phase</b>																					
30/06/20	NA	NA	N	0.05	0.003	<0.0001	<0.001	<0.001	0.002	<0.001	<0.005	0.110	0.50	<0.05	0.15	0.48	0.9	1.4	0.07	8	<0.05
18/03/21	30/03/21	21/04/21	Y - field	0.04	0.003	<0.0001	<0.001	0.002	0.003	<0.001	0.013	0.031	0.36	0.20	0.05	0.04	1.5	1.5	0.28	15	<0.05
25/10/21	08/11/21	26/11/21	Y - field	<0.01	0.003	<0.0001	<0.001	0.003	0.003	<0.001	0.016	0.043	0.21	0.09	<0.01	0.02	0.6	0.6	0.10	9	<0.05
15/03/22	30/03/22	19/04/22	N	0.18	0.004	<0.0001	<0.001	0.002	0.004	<0.001	<0.005	0.056	0.64	<0.05	0.08	0.18	0.7	0.9	0.14	11	<0.05
17/04/22	29/04/22	19/05/22	Y - field	0.02	0.003	<0.0001	<0.001	0.003	0.003	<0.001	0.012	0.042	0.29	0.17	0.07	0.15	0.8	1.0	0.11	11	<0.05
17/10/22	26/10/22	11/11/22	Y - field	<0.01	0.002	<0.0001	<0.001	0.002	0.003	<0.001	0.007	0.033	0.14	0.08	<0.01	<0.01	0.6	0.6	0.10	8	<0.05
22/03/23	31/03/23	24/04/23	Y - field	<0.01	0.005	<0.0001	<0.001	0.002	0.002	<0.001	0.012	0.061	0.09	0.06	0.04	0.05	0.8	0.8	0.06	9	<0.05
11/09/23	25/09/23	10/10/23	Y - field	<0.01	0.002	<0.0001	<0.001	0.002	0.002	<0.001	<0.005	0.056	0.18	0.05	0.03	0.08	0.7	0.8	0.28	7	<0.05

Table 16a: GARA2 – surface water quality six-monthly & if discharge ADB1 - field parameters & analytes + laboratory basic ions, sediment & calculations

EPA Point 2	DO	EC	pH	Eh	Temp	Sample Depth	Volumetric Flow Rate	Turbidity	Alkalinity	Free CO <sub>2</sub>	SO <sub>4</sub>	Cl	Ca	Mg	Na	K	SS	Hardness	Discharge ADB1
Measure	mg/L	µS/cm	1-14	mV	°C	m	kL/day	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Yes or No
<b>GARA2 - Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13.</b>																			
Min	3.32	140	6.27	NT	8.4	NT	NT	NT	32	NT	3	6	8	6	9	<1	2	108	No
Max	8.54	710	7.96	NT	25.5	NT	NT	NT	185	NT	20	22	30	26	22	4	20	45	No
04/05/15	6.88	386	8.24	+168	18.1	~≥2.5	16941	3.6	140	12	NT	NT	NT	NT	NT	13	NT	NT	No
<b>GARA2 - Detection monitoring phase</b>																			
30/06/20	NR	397	7.83	NR	NR	0.8	41472	6.0	141	NR	25	26	29	23	26	4	<5	167	Yes
18/03/21	7.82	257	7.01	+158	24.9	1.0	43200	9.6	120	18	15	10	18	14	16	4	8	102	No
25/10/21	9.76	319	7.90	+137	20.4	1.0	64,800	3.5	122	12	7	8	21	15	11	2	<5	114	No
15/03/22	10.05	239	8.05	+100	16.4	1.1	190,080	11.8	119	NR	5	7	18	14	9	3	<5	102	Yes
17/04/22	8.31	269	7.40	+149	18.0	1.4	34,560	6.7	123	12	5	8	20	16	10	3	<5	116	No
17/10/22	9.41	251	8.15	+181	18.6	1.4	55,296	7.1	127	9	6	7	20	17	11	2	5	120	No
22/03/23	6.42	432	7.70	+43	23.4	1.2	9,216	2.7	147	9	6	17	40	33	56	3	7	236	No
11/09/23	8.87	361	7.99	+183	16.8	0.7	3,360	0.8	180	9	9	15	28	26	17	3	<5	177	No

Table 16b: GARA2 – Surface water quality six-monthly & if discharge ADB1 – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	B	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TP	TOC	B
				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 as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	mg/L
<b>GARA2 - Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13.</b>																						
Min	NA	NA	N	<0.005	0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.001	0.001	<0.01	NT	<0.005	<0.01	0.01	<0.1	0.2	<0.01	NT	<0.005
Max	NA	NA	N	1.130	0.006	<0.0001	0.001	0.003	0.003	<0.001	0.014	0.055	4.48	NT	10.0	0.26	0.54	1.7	1.7	0.34	NT	10.0
04/05/15	NA	NA	Y - field	<0.010	0.002	<0.0001	<0.001	0.001	0.001	<0.001	<0.005	0.044	0.090	NT	NT	0.03	<0.01	0.9	0.9	0.03	13	NT
<b>GARA2 - Detection monitoring phase</b>																						
30/06/20	NA	NA	N	0.280	0.002	<0.0001	<0.001	<0.001	0.002	<0.001	<0.005	0.100	0.580	<0.05	<0.05	0.08	0.43	1.2	1.2	0.06	6	<0.05
18/03/21	30/03/21	21/04/21	Y - field	0.05	0.003	<0.0001	<0.001	0.006	0.003	<0.001	0.063	0.034	0.36	0.21	<0.05	0.06	0.05	1.6	1.6	0.20	15	<0.05
25/10/21	08/11/21	26/11/21	Y - field	<0.01	0.003	<0.0001	<0.001	0.002	0.003	<0.001	0.014	0.074	0.20	0.09	<0.05	0.02	0.02	0.7	0.7	0.10	9	<0.05
15/03/22	30/03/22	19/04/22	N	0.68	0.004	<0.0001	0.001	0.002	0.004	<0.001	<0.005	0.058	0.97	<0.05	<0.05	0.03	0.18	0.7	0.9	0.14	12	<0.05
17/04/22	29/04/22	19/05/22	Y-field	0.01	0.003	<0.0001	<0.001	0.005	0.004	<0.001	0.022	0.037	0.24	0.16	<0.05	0.04	0.15	0.7	0.8	0.11	11	<0.05
17/10/22	26/10/22	11/11/22	Y-field	0.01	0.002	<0.0001	0.001	0.002	0.003	<0.001	<0.005	0.032	0.16	0.08	<0.05	<0.01	<0.01	0.6	0.6	0.10	8	<0.05
22/03/23	31/03/23	24/04/23	Y - field	<0.01	0.005	<0.0001	<0.001	0.004	0.002	<0.001	0.026	0.078	0.47	<0.05	<0.05	0.04	0.04	0.6	0.6	0.05	9	<0.05
11/09/23	25/09/23	10/10/23	Y - field	<0.01	0.002	<0.0001	<0.001	0.001	0.002	<0.001	0.005	0.073	0.15	<0.05	<0.05	0.04	0.06	0.5	0.6	0.04	7	<0.05



Table 17a: GARA3 – Surface water quality six-monthly & if discharge ADB1 - field parameters & analytes + laboratory basic ions, sediment & calculations

EPA Point 3	DO	EC	pH	Eh	Temp	Sample Depth	Volumetric Flow Rate	Turbidity	Alkalinity	Free CO <sub>2</sub>	SO <sub>4</sub>	Cl	Ca	Mg	Na	K	SS	Hardness	Discharge ADB1
Measure	mg/L	µS/cm	1-14	mV	°C	m	kL/day	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Yes or No
<b>GARA3– Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13.</b>																			
Min	2.18	77	6.11	+264	4.6	NT	NT	NT	24	NT	<1	1	3	3	8	0.3	5	22	No
Max	9.72	1360	6.98	+317	26.1	NT	NT	NT	287	NT	103	101	53	58	147	9.4	440	370	No
04/05/15	6.35	94	7.58	+209	17.9	0.05	259.2	283	20	12	NT	NT	NT	NT	NT	NT	65	NT	No
<b>GARA3 - Detection monitoring phase</b>																			
30/06/20	NR	137	7.29	NR	NR	0.43	27,864	1070	39	NR	10	11	1	1	29	<1	26	7	Yes
18/03/21	6.26	66.2	7.14	+149	23.3	0.40	230	86.8	20	18	<1	3	4	2	6	2	14	18	No
25/10/21	7.47	254	6.85	+144	19.4	0.25	0	50.8	57	22	<1	10	8	5	17	2	28	40	No
15/03/22	8.97	92.0	7.22	+135	15.9	0.55	47,520	283.0	36	NR	4	6	3	2	13	1	14	16	Yes
17/04/22	5.63	279.5	6.55	+138	17.9	0.15	0	16.8	110	44	<1	13	19	9	19	2	8	84	No
17/10/22	8.09	168.0	7.18	+236	21.1	0.35	0	20.2	58	13	<1	11	10	6	15	3	13	50	No
31/03/23	7.99	93.5	6.40	+193	17.8	0.15	972	32.2	13	18	1	9	4	2	8	3	14	18	No
12/09/23	7.93	667	7.67	+159	21.6	0.30	0	50.5	240	18	9	85	48	20	85	6	28	202	No

Table 17b: GARA3 – Surface water quality six-monthly & if discharge ADB1 – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TP	TOC	B
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	mg/L
<b>GARA3 – Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13.</b>																					
Min	NA	NA	N	0.012	<0.001	<0.0001	<0.001	0.001	0.001	<0.001	<0.001	<0.005	0.58	NT	<0.02	<0.01	<0.2	0.2	<0.01	NT	<0.005
Max	NA	NA	N	41.2	0.005	<0.0001	0.029	0.021	0.018	0.013	0.069	3.42	17.5	NT	0.50	0.62	7.0	7.2	0.74	NT	0.049
04/05/15	NA	NA	Y - field	0.720	<0.001	<0.0001	<0.001	0.004	0.002	<0.001	0.006	0.013	0.84	NT	0.04	<0.01	3.4	3.4	0.36	16	NT
<b>GARA3 - Detection monitoring phase</b>																					
30/06/20	NA	NA	N	32.5	0.002	<0.0001	0.025	0.018	0.014	0.018	0.047	0.165	30.0	<0.05	<0.01	1.03	1.7	2.7	0.31	4	<0.05
18/03/21	30/03/21	21/04/21	Y - field	0.59	<0.001	<0.0001	<0.001	0.004	0.002	<0.001	0.010	0.025	0.74	0.31	0.02	<0.01	1.8	1.8	0.12	14	<0.05
25/10/21	08/11/21	26/11/21	Y - field	0.16	<0.001	<0.0001	<0.001	0.005	0.002	<0.001	0.019	0.195	0.57	0.22	0.22	<0.01	1.3	1.3	0.08	17	<0.05
15/03/22	30/03/22	19/04/22	N	13.6	0.002	<0.0001	0.010	0.007	0.006	0.005	0.023	0.075	11.70	<0.05	0.01	0.18	1.0	1.2	0.14	8	<0.05
17/04/22	29/04/22	19/05/22	Y - field	0.01	0.001	<0.0001	<0.001	0.008	0.006	<0.001	0.048	1.770	1.20	0.38	0.25	<0.01	1.2	1.2	0.07	20	<0.05
17/10/22	26/10/22	11/11/22	Y - field	0.10	<0.001	<0.0001	<0.001	0.002	0.002	<0.001	0.007	0.190	0.76	0.28	<0.01	<0.01	1.3	1.3	0.06	15	<0.05
31/03/23	17/04/23	08/05/23	Y - field	0.26	<0.001	<0.0001	<0.001	0.005	0.002	<0.001	0.030	0.017	0.42	0.34	<0.01	0.01	1.2	1.2	0.07	13	<0.05
12/09/23	25/09/23	10/10/23	Y - field	<0.01	0.001	<0.0001	<0.001	0.002	0.002	<0.001	0.006	1.440	<0.05	<0.05	<0.01	<0.01	1.4	1.4	0.07	16	<0.05

Table 18a: GARA5 – Surface water quality six-monthly & if discharge ADB1 - field parameters & analytes + laboratory basic ions, sediment & calculations

EPA Point 4 Measure	DO mg/L	EC µS/cm	pH 1-14	Eh mV	Temp °C	Sample Depth m	Volumetric Flow Rate kL/day	Turbidity NTU	Alkalinity mg/L	Free CO <sub>2</sub> mg/L	SO <sub>4</sub> mg/L	Cl mg/L	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	SS mg/L	Hardness mg/L	Discharge ADB1 Yes or No
GARA5 – Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13.																			
Min	1.80	81	6.10	NT	5.6	NT	NT	NT	24	NT	<1	5	2	2	7	<1	5	19	No
Max	6.78	265	7.07	NT	23.7	NT	NT	NT	94	NT	3	40	18	12	25	4	440	95	No
04/05/15	5.61	45	8.17	+206	20.4	0.25	270	63.8	13	9	NT	NT	NT	NT	NT	17	NT	NT	No
GARA5 - Detection monitoring phase																			
30/06/20	DRY			NR	NR					NR									Yes
18/03/21	7.23	116.3	6.84	+192	19.0	0.20	162	25.2	12	15	<1	1	2	1	4	1	9	9	No
24/10/21	4.92	137.8	7.54	+110	24.1	0.15	0	35.7	43	23	<5	7	9	5	9	3	20	43	No
15/03/22	3.39	139.0	7.03	+100	15.4	0.30	259	22.1	70	NR	<1	4	11	6	7	3	12	52	Yes
17/04/22	4.80	154.4	6.67	+124	14.9	0.15	0	29.6	47	23	<1	6	7	4	8	3	13	34	No
16/10/22	5.36	184.5	6.56	+140	20.8	0.30	HINT	18.2	87	26	<1	7	14	8	13	2	8	68	No
31/03/23	8.84	57.3	6.50	+210	17.4	0.30	864	6.1	10	12	<1	7	2	1	6	2	8	9	No
12/09/23	No water																		
01/12/23	6.31	277.5	7.30	+117	22.5	0.05	0	2.9	70	12	27	18	15	10	20	5	10	79	No

Table 18b: GARA5 – Surface water quality six-monthly & if discharge ADB1 – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al mg/L	As mg/L	Cd mg/L	Cr mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L	Mn mg/L	Fe mg/L	Fe(II) mg/L	NH <sub>3</sub> mg/L as N	NO <sub>x</sub> mg/L as N	TKN mg/L as N	TN mg/L	TP mg/L	TOC mg/L	B mg/L
GARA5 – Main baseline monitoring phase was 14 sampling events from 17/12/08 to 05/06/13.																					
Min	NA	NA	N	0.398	<0.001	<0.0001	<0.001	0.003	0.002	<0.001	0.004	<0.005	0.46	NT	<0.02	<0.02	0.6	0.6	0.05	NT	<0.005
Max	NA	NA	N	14.1	0.005	<0.0001	0.014	0.013	0.010	0.013	0.035	0.035	9.66	NT	0.30	0.55	2.6	2.9	0.61	NT	0.037
04/05/15	NA	NA	Y - field	0.410	<0.001	<0.0001	<0.001	0.004	0.001	<0.001	0.011	0.004	0.32	NT	0.03	<0.01	4.6	4.6	0.11	21	NT
GARA5 - Detection monitoring phase																					
30/06/20	NA	NA	DRY																		
18/03/21	30/03/21	21/04/21	Y - field	0.23	<0.001	<0.0001	<0.001	0.003	0.001	<0.001	0.012	0.031	0.45	0.28	<0.01	<0.01	1.0	1.0	0.04	11	<0.05
24/10/21	08/11/21	26/11/21	Y - field	0.15	0.010	<0.0001	0.002	0.011	0.003	<0.001	0.069	0.298	5.18	1.26	0.09	<0.01	2.9	2.9	0.24	34	<0.05
15/03/22	30/03/22	19/04/22	N	0.35	0.008	<0.0001	0.001	0.003	0.002	<0.001	0.041	0.544	7.66	0.12	0.02	<0.01	1.2	1.2	0.12	23	<0.05
17/04/22	29/04/22	19/05/22	Y - field	0.05	0.002	<0.0001	<0.001	0.002	0.002	<0.001	0.009	0.065	1.88	0.60	0.04	<0.01	1.4	1.4	0.12	20	<0.05
16/10/22	26/10/22	11/11/22	Y - field	0.03	0.003	<0.0001	<0.001	0.005	0.002	<0.001	0.038	0.251	2.87	0.72	<0.01	<0.01	1.3	1.3	0.07	19	<0.05
31/03/23	17/04/23	08/05/23	Y - field	0.12	<0.001	<0.0001	0.001	0.003	0.001	<0.001	0.008	0.005	0.33	0.25	<0.01	<0.01	1.1	1.1	0.05	13	<0.05
12/09/23	No water																				
01/12/23	11/12/23	02/01/24	Y - field	0.02	<0.001	<0.0001	<0.001	0.004	0.002	<0.001	0.010	0.001	0.40	0.52	0.02	0.03	1.2	1.2	0.07	25	<0.05

Table 19a: ADB1-OUT – Dry basin – surface water quality if discharging ADB1 - field parameters & analytes + laboratory basic ions, sediment & calculations

EPA Point 18	DO	EC	pH	Eh	Temp	Sample Depth	Volumetric Flow Rate	Turbidity	Alkalinity	Free CO <sub>2</sub>	SO <sub>4</sub>	Cl	Ca	Mg	Na	K	SS	Hardness	Discharge ADB1
Measure	mg/L	µS/cm	1-14	mV	°C	m	kL/day	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Yes or No
<b>ADB1-OUT - Detection monitoring phase</b>																			
30/06/20	NR	138	7.17	NR	NR	0.3	23,328	1080	39	NR	10	10	2	1	28	<1	26	9	Yes
15/03/22	NR	89	7.22	NR	NR	0.3	38,880	290	37	NR	5	5	2	2	13	1	13	5	Yes

Table 19b: ADB1-OUT – Dry basin – surface water quality if discharging ADB1 – laboratory analytes

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al	As	Cd	Cr	Cu	Ni	Pb	Zn	Mn	Fe	Fe(II)	NH <sub>3</sub>	NO <sub>x</sub>	TKN	TN	TP	TOC	B
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as N	mg/L as N	mg/L as N	mg/L	mg/L	mg/L	mg/L
<b>ADB1-OUT - Detection monitoring phase</b>																					
30/06/20	NA	NA	N	36.0	0.003	<0.0001	0.028	0.019	0.016	0.018	0.048	0.172	34.2	<0.05	<0.01	1.09	1.5	2.6	0.28	6	<0.05
15/03/22	30/03/22	19/04/22	N	14.9	0.002	<0.0001	0.011	0.008	0.006	0.005	0.024	0.078	13.0	<0.05	0.05	0.22	1.0	1.2	0.15	8	<0.05

## Concentrated leachate – Six-monthly

Table 20a: AL1 – Leachate dam volume & leachate quality – six-monthly – volume calcs, field parameters & analytes + laboratory basic ions, solids, organics

EPA Point 15 Measure	Capacity kL	Volume kL	Freeboard kL	DO mg/L	EC µS/cm	pH 1-14	Eh mV	Temp °C	Alkalinity mg/L	Free CO <sub>2</sub> mg/L	SO <sub>4</sub> mg/L	Cl mg/L	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	SS mg/L
<b>AL1 – to compare concentrated leachate concentrations to groundwater &amp; surface water</b>																	
18/03/21				6.51	727	6.93	+156	20.2	13	9	12	59	33	16	33	56	17
25/10/21				0.19	3780	7.93	-145	21.0	1767	59	<5	480	140	114	301	267	117
15/03/22				10.78	1600	8.59	+24	17.9	478	NR	36	248	30	49	137	140	52
28/03/22				20.77	1539	8.08	+85	19.6	490	12	83	217	53	52	147	113	NT
17/10/22				7.19	1880	8.54	+164	19.1	687	38	69	282	70	67	198	156	33
22/03/23				1.16	2665	8.19	-269	20.0	853	38	59	479	76	95	295	221	26
12/09/23				14.99	2845	8.53	+252	21.2	1000	47	61	522	95	103	314	253	65

Table 20b: AL1 – Leachate dam leachate quality – six-monthly – laboratory analytes – metals - nonfiltered

Sample date	Received from laboratory	Accessible on Council website by	Metal filtered Y/N	Al mg/L	As mg/L	Cd mg/L	Cr mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L	Mn mg/L	Fe mg/L	Fe(II) mg/L	NH <sub>3</sub> as N mg/L	NO <sub>x</sub> as N mg/L	TKN as N mg/L	TN mg/L	TP mg/L	TOC mg/L	B mg/L
<b>AL1 – to compare concentrated leachate concentrations to groundwater &amp; surface water quality concentrations</b>																					
18/03/21	30/03/21	21/04/21	N	0.03	0.002	<0.0001	0.001	0.001	0.004	<0.001	0.014	0.566	1.85	<0.05	3.30	<0.01	9.3	9.3	0.23	23	0.12
25/10/21	08/11/21	26/11/21	N	0.12	0.016	<0.0001	0.016	0.003	0.036	0.002	0.059	1.220	1.19	0.10	46.2	0.09	75.9	76.0	2.12	202	1.43
15/03/22	30/03/22	19/04/22	N	0.02	0.006	<0.0001	0.003	<0.001	0.015	<0.001	0.006	0.306	0.12	<0.05	2.32	0.01	18.8	18.8	0.46	58	0.58
28/03/22	07/04/22	19/04/22	N	0.08	0.007	<0.0001	0.005	0.004	0.021	<0.001	0.015	0.689	0.57	<0.05	12.00	0.69	29.2	29.9	0.92	68	0.59
17/10/22	26/10/22	11/11/22	N	0.05	0.007	<0.0001	0.005	0.001	0.022	<0.001	0.011	0.412	0.21	<0.05	14.50	0.26	149.0	149.0	3.06	73	0.54
22/03/23	31/03/23	24/04/23	N	0.02	0.010	<0.0001	0.007	<0.001	0.028	<0.001	0.006	0.426	0.29	0.26	24.9	<0.01	51.4	51.4	0.93	105	0.99
12/09/23	25/09/23	10/10/23	N	0.01	0.011	<0.0001	0.007	<0.001	0.029	<0.001	0.006	0.661	0.24	<0.05	28.20	6.59	60.2	66.8	2.18	99	1.08

Table 20c: AL1 – Leachate dam leachate quality – six-monthly – organic compounds

EPA Point 15 Measure	Phenols mg/L	PAH mg/L	VOCs mg/L
18/03/21	ND	ND	ND
25/10/21	0.0021 mg/L 2-Methylphenol; 0.158 mg/L 3- & 4-Methylphenol	ND	0.011 mg/L Toluene; 0.230 mg/L Acetone; 0.150 mg/L Butanone (MEK); 0.006 mg/L Carbon disulphide; 0.003mg/L Iodomethane; 0.005 mg/L Methylene chloride.
15/03/22	ND	ND	ND
28/03/22	ND	ND	0.020 mg/L 2-Propanone (Acetone)
17/10/22	ND	ND	0.040 mg/L 2-Propanone (Acetone); 0.030 mg/L Butanone (MEK).
22/03/23	ND	ND (31/03/23)	0.020 mg/L 2-Propanone (Acetone)
12/09/23	ND	ND	0.030 mg/L 2-Propanone (Acetone)

# Depositional dust monitoring - Monthly

Table 21: ADN-EPA27 Depositional dust

Date range	Insoluble matter/solids	Combustible matter/solids	Ash content	Received from laboratory	Accessible on Council website
	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth		
03/12/2020-05/01/2021	0.3	0.1	0.2	15/01/2021	01/02/2021
05/01/2021-01/02/2021	0.1	<0.1	0.1	12/02/2021	01/04/2021
01/02/2021-02/03/2021	0.2	<0.1	0.2	12/03/2021	01/04/2021
02/03/2021-01/04/2021	0.1	0.1	<0.1	15/04/2021	05/05/2021
01/04/2021-05/05/2021	0.1	<0.1	0.1	14/05/2021	04/06/2021
05/05/2021-07/06/2021	0.1	<0.1	0.1	21/06/2021	09/07/2021
07/06/2021-06/07/2021	0.1	<0.1	0.1	16/07/2021	05/08/2021
06/07/2021-05/08/2021	0.2	0.1	0.1	16/08/2021	03/09/2021
05/08/2021-01/09/2021	Collection bottle	broken in transit	to lab	13/09/2021	01/10/2021
01/09/2021-07/10/2021	0.1	<0.1	0.1	19/10/2021	08/11/2021
07/10/2021-02/11/2021	0.1	<0.1	0.1	12/11/2021	02/12/2021
02/11/2021-07/12/2021	0.3	0.1	0.2	17/12/2021	10/01/2022
07/12/2021-07/01/2022	10.9	5.8	5.1	21/01/2022	11/02/2022
07/01/2022-08/02/2022	0.7	0.1	0.6	21/02/2022	11/03/2022
08/02/2022-08/03/2022	0.1	<0.1	0.1	22/03/2022	11/04/2022
08/03/2022-10/05/2022	0.1	<0.1	0.1	23/05/2022	14/06/2022
10/05/2022-10/06/2022	0.3	<0.1	0.3	01/07/2022	14/07/2022
10/06/2022-12/07/2022	0.2	0.1	0.1	22/07/2022	11/07/2022
12/07/2022-10/08/2022	0.2	0.1	0.1	23/08/2022	12/09/2022
10/08/2022-08/09/2022	0.2	<0.1	0.2	21/09/2022	11/10/2022
08/09/2022-11/10/2022	0.1	<0.1	0.1	24/10/2022	11/11/2022
11/10/2022-08/11/2022	0.1	<0.1	0.1	21/11/2022	09/12/2022
08/11/2022-06/12/2022	0.4	0.4	<0.1	22/12/2022	16/01/2023
06/12/2022-10/01/2023	0.2	0.2	<0.1	24/01/2023	14/02/2023
10/01/2023-15/02/2023	0.1	<0.1	0.1	28/02/2023	20/03/2023
15/02/2023-09/03/2023	0.2	<0.1	0.2	22/03/2023	04/04/2023
09/03/2023-05/04/2023	0.3	0.2	0.1	25/04/2023	08/05/2023

Table 22: ADS-EPA28 Depositional dust

Date range	Insoluble matter/solids	Combustible matter/solids	Ash content	Received from laboratory	Accessible on Council website
	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth		
03/12/2020-05/01/2021	0.6	0.4	0.2	15/01/2021	01/02/2021
05/01/2021-01/02/2021	1.6	0.7	0.9	12/02/2021	01/04/2021
01/02/2021-02/03/2021	0.2	0.1	0.1	12/03/2021	01/04/2021
02/03/2021-01/04/2021	2.8	2.0	0.8	15/04/2021	05/05/2021
01/04/2021-05/05/2021	2.0	1.2	0.8	14/05/2021	04/06/2021
05/05/2021-07/06/2021	0.3	0.2	0.1	21/06/2021	09/07/2021
07/06/2021-06/07/2021	0.2	0.1	0.1	16/07/2021	05/08/2021
06/07/2021-05/08/2021	0.3	0.1	0.2	16/08/2021	03/09/2021
05/08/2021-01/09/2021	0.1	<0.1	0.1	13/09/2021	01/10/2021
01/09/2021-07/10/2021	0.4	0.2	0.2	19/10/2021	08/11/2021
07/10/2021-02/11/2021	0.3	<0.1	0.3	12/11/2021	02/12/2021
02/11/2021-07/12/2021	0.2	<0.1	0.2	17/12/2021	10/01/2022
07/12/2021-07/01/2022	0.5	0.3	0.2	21/01/2022	11/02/2022
07/01/2022-08/02/2022	0.4	0.2	0.2	21/02/2022	11/03/2022
08/02/2022-08/03/2022	0.1	<0.1	0.1	22/03/2022	11/04/2022
08/03/2022-10/05/2022	0.3	0.2	0.1	23/05/2022	14/06/2022
10/05/2022-10/06/2022	0.3	0.1	0.2	01/07/2022	14/07/2022
10/06/2022-12/07/2022	0.2	<0.1	0.2	22/07/2022	11/07/2022
12/07/2022-10/08/2022	0.1	<0.1	0.1	23/08/2022	12/09/2022
10/08/2022-08/09/2022	1.5	0.7	0.8	21/09/2022	11/10/2022
08/09/2022-11/10/2022	0.4	0.1	0.3	24/10/2022	11/11/2022
11/10/2022-08/11/2022	0.3	0.3	<0.1	21/11/2022	09/12/2022
08/11/2022-06/12/2022	7.8	6.9	0.9	22/12/2022	16/01/2023
06/12/2022-10/01/2023	0.5	0.2	0.3	24/01/2023	14/02/2023
10/01/2023-15/02/2023	1.1	0.3	0.8	28/02/2023	20/03/2023
15/02/2023-09/03/2023	0.5	0.1	0.4	22/03/2023	04/04/2023
09/03/2023-05/04/2023	0.9	0.5	0.4	25/04/2023	08/05/2023

Notes: 1. Dust is collected in dust gauges specified in AS/NZS 3580 to measure dust fall nuisance. The bottles are forwarded monthly to ALS Lab Newcastle who measure the mass of dust deposited in each dust gauge and express it as m<sup>2</sup> per month, that is, as g/m<sup>2</sup>/mth. This method provides overall dust accumulation results to compare between locations on site, and over time. For example, the dust at ADSW-EPA30 is upgradient of the operational road to the landfill which was bitumen sealed in February 2021. The dust measured at ADSW-EPA30 has overall decreased since that time.

Table 23: ADE-EPA29 Depositional dust

Date range	Insoluble matter/solids	Combustible matter/solids	Ash content	Received from laboratory	Accessible on Council website
	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth		
03/12/2020-05/01/2021	0.6	0.3	0.3	15/01/2021	01/02/2021
05/01/2021-01/02/2021	0.6	0.5	0.1	12/02/2021	01/04/2021
01/02/2021-02/03/2021	0.3	0.2	0.1	12/03/2021	01/04/2021
02/03/2021-01/04/2021	0.4	0.3	0.1	15/04/2021	05/05/2021
01/04/2021-05/05/2021	2.0	1.1	0.9	14/05/2021	04/06/2021
05/05/2021-07/06/2021	0.2	0.1	0.1	21/06/2021	09/07/2021
07/06/2021-06/07/2021	0.1	<0.1	0.1	16/07/2021	05/08/2021
06/07/2021-05/08/2021	0.1	<0.1	0.1	16/08/2021	03/09/2021
05/08/2021-01/09/2021	0.1	0.1	<0.1	13/09/2021	01/10/2021
01/09/2021-07/10/2021	0.1	<0.1	0.1	19/10/2021	08/11/2021
07/10/2021-02/11/2021	0.3	0.1	0.2	12/11/2021	02/12/2021
02/11/2021-07/12/2021	0.2	<0.1	0.2	17/12/2021	10/01/2022
07/12/2021-07/01/2022	0.8	0.6	0.2	21/01/2022	11/02/2022
07/01/2022-08/02/2022	0.2	<0.1	0.2	21/02/2022	11/03/2022
08/02/2022-08/03/2022	0.2	0.1	0.1	22/03/2022	11/04/2022
08/03/2022-10/05/2022	0.1	<0.1	0.1	23/05/2022	14/06/2022
10/05/2022-10/06/2022	0.1	<0.1	0.2	01/07/2022	14/07/2022
10/06/2022-12/07/2022	0.1	<0.1	0.1	22/07/2022	11/07/2022
12/07/2022-10/08/2022	0.1	<0.1	0.1	23/08/2022	12/09/2022
10/08/2022-08/09/2022	0.3	0.3	<0.1	21/09/2022	11/10/2022
08/09/2022-11/10/2022	0.1	<0.1	0.1	24/10/2022	11/11/2022
11/10/2022-08/11/2022	0.1	<0.1	0.1	21/11/2022	09/12/2022
08/11/2022-06/12/2022	0.2	0.1	0.1	22/12/2022	16/01/2023
06/12/2022-10/01/2023	0.1	<0.1	0.1	24/01/2023	14/02/2023
10/01/2023-15/02/2023	0.3	0.2	0.1	28/02/2023	20/03/2023
15/02/2023-09/03/2023	0.2	<0.1	0.2	22/03/2023	04/04/2023
09/03/2023-05/04/2023	0.2	0.2	<0.1	25/04/2023	08/05/2023

Table 24: ADSW-EPA30 Depositional dust

Date range	Insoluble matter/solids	Combustible matter/solids	Ash content	Received from laboratory	Accessible on Council website
	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth	g/m <sup>2</sup> /mth		
03/12/2020-05/01/2021	0.8	0.5	0.3	15/01/2021	01/02/2021
05/01/2021-01/02/2021	5.8	4.7	1.1	12/02/2021	01/04/2021
01/02/2021-02/03/2021	0.4	0.1	0.3	12/03/2021	01/04/2021
02/03/2021-01/04/2021	0.2	0.2	<0.1	15/04/2021	05/05/2021
01/04/2021-05/05/2021	0.3	0.2	0.1	14/05/2021	04/06/2021
05/05/2021-07/06/2021	0.3	0.2	0.1	21/06/2021	09/07/2021
07/06/2021-06/07/2021	0.2	0.1	0.1	16/07/2021	05/08/2021
06/07/2021-05/08/2021	4.8	2.0	2.8	16/08/2021	03/09/2021
05/08/2021-01/09/2021	0.6	0.2	0.4	13/09/2021	01/10/2021
01/09/2021-07/10/2021	0.8	0.4	0.4	19/10/2021	08/11/2021
07/10/2021-02/11/2021	0.6	0.3	0.3	12/11/2021	02/12/2021
02/11/2021-07/12/2021	0.3	0.2	0.1	17/12/2021	10/01/2022
07/12/2021-07/01/2022	0.5	0.3	0.2	21/01/2022	11/02/2022
07/01/2022-08/02/2022	0.4	0.2	0.2	21/02/2022	11/03/2022
08/02/2022-08/03/2022	0.3	0.1	0.2	22/03/2022	11/04/2022
08/03/2022-10/05/2022	0.1	<0.1	0.1	23/05/2022	14/06/2022
10/05/2022-10/06/2022	0.2	<0.1	0.2	01/07/2022	14/07/2022
10/06/2022-12/07/2022	0.1	<0.1	0.1	22/07/2022	11/07/2022
12/07/2022-10/08/2022	0.5	<0.1	0.5	23/08/2022	12/09/2022
10/08/2022-08/09/2022	0.9	0.4	0.5	21/09/2022	11/10/2022
08/09/2022-11/10/2022	0.2	0.1	0.1	24/10/2022	11/11/2022
11/10/2022-08/11/2022	0.2	<0.1	0.2	21/11/2022	09/12/2022
08/11/2022-06/12/2022	0.2	0.1	0.1	22/12/2022	16/01/2023
06/12/2022-10/01/2023	0.4	0.3	0.1	24/01/2023	14/02/2023
10/01/2023-15/02/2023	0.6	0.2	0.4	28/02/2023	20/03/2023
15/02/2023-09/03/2023	0.2	<0.1	0.2	22/03/2023	04/04/2023
09/03/2023-05/04/2023	0.2	0.1	0.1	25/04/2023	08/05/2023

Note: Under EPA Notice Number 1628072, dated 24 May 2023, dust monitoring was to cease until construction of a new cell is undertaken and for two months thereafter.