

Gunnedah Landfill

Location: Quia Road, Gunnedah NSW 2380 Environment Protection Licence (EPL) Number: 5940

Activities: Waste disposal to land and waste processing

Licensee under Protection of Environment Operations Act 1997 (POEO Act): Gunnedah Shire Council, PO Box 63, Gunnedah NSW 2380

The internet link to Licence No. 5940 is <https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=5940&id=5940&option=licence&searchrange=general&range=POEO%20licence&prp=no&status=Issued>

Council is required to monitor groundwater, surface water, leachate and methane at various sampling points. This document details recent results. To meet its obligation under Section 66 (6) of the POEO Act, a link to the current version of this document is available on Council's website.

Sampling points locations from January 2019 are shown on the adjacent figure. Historical names are used: GL = Gunnedah Landfill; OV = Overflow; GL03-GL11 refers to groundwater monitoring wells; L = Leachate; T = Tannery well; BORR = Borrow Pits. The corresponding Environment Protection Authority (EPA) Identification Numbers are provided in white for those required to be sampled under EPL 5940. A few EPA ID numbers are missing due to changes since initial licensing of the landfill.



Monitoring results for sampling points listed under EPL 5940 updated 20 April 2020 are presented on the following pages for the last four years – as required in the EPA publishing requirements.

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

The left hand table provides the field test results. The field tests are conducted on the same date that a sample is collected.

The right hand table provides analytical results from the NATA registered laboratory. The date the laboratory issued the results is first, followed by the date by which results were placed on the Gunnedah Shire Council website.

Abbreviations made in the tables are provided here in alphabetical order:

Alk = Alkalinity measured as mg/L CaCO₃ equivalent; Cl = Chloride; Cr = Chromium; D = Depth to groundwater from top of internal well PVC casing; DO = Dissolved Oxygen; EC = Electrical Conductivity also called conductivity; Eh = Redox Potential; Fe = Iron; Mn = Manganese; ND = Nil Detected; NH₃ = Ammonia as a measure of ammonium ions; NO_x = Nitrite + Nitrate; NR = Not required; OC & OP = Organochlorine and Organophosphorus; RL = water level converted to Reduced Level relative to mean sea level; SO₄ = Sulphate; SS = Total suspended solids; Temp = Temperature; TKN = Total Kjeldahl Nitrogen (organic nitrogen + ammonia); TN = Total Nitrogen; TOC = Total Organic Carbon.

Measures:

mg/L = milligram per litre (equivalent to ppm); µS/cm = microSiemens per centimetre; mV = millivolts; °C= degrees Celsius; ppm = parts per million; < = less than.

Choice of water quality analytes:

Some analytes are tested because they give a general understanding of groundwater, surface water and leachate quality. Often 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, groundwater has particular characteristics that need to be taken into account so that false conclusions are not made. For example, groundwater may have naturally high salt levels due to the clay strata in which it resides. EC is an indicator of salt levels. The EC of the Gunnedah Landfill groundwater is a case in point. Its high EC levels (Table 1) are not due to landfill leachate because they were these concentrations before any solid waste was accepted at the Gunnedah Landfill. They are due to the clay strata.

Other analytes give us more 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 definitely 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. A general rule of thumb is that total nitrogen (TKN + NO_x) should be <5 mg/L.
- Iron and manganese above 10 mg/L is an indicator that landfill leachate may be present in groundwater. However, these groundwater analytes may have increased due to leaching of iron and manganese from the soil after excessive rainfall or flood water infiltration.
- Organic analytes such as Benzene, Toluene, Ethylbenzene, Xylene (BTEX) compounds are most likely to indicate landfill leachate, especially if they haven't been detected before.

So it is important to monitor on a regular basis to note any changes in water quality analyte concentrations and to judiciously review the results. Increases in groundwater and surface water analyte concentrations due to landfill leachate intrusion are often at least three to four times the previous concentrations.

Comments on water quality monitoring results: Nitrate concentrations in on-site wells GL03, GL09 and GL10 are too high, but the nitrate concentrations in the most downgradient well GL11 are low. Leachate in the sump is saline and often high in ammonium ions.

Table 1a: Groundwater quality & depth (GL03, GL04A)

Frequency required by licence	DO	EC	pH	Eh	Temp	D	RL	Alk
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L
GL03 3 monthly								
09/01/19	0.73	4863	7.24	+153	23.1	1.92	270.74	613
08/03/19	0.34	4850	6.76	+117	22.5	2.09	270.57	607
19/06/19	0.52	4798	6.32	+201	20.0	1.80	270.86	500
23/09/19	0.45	4978	6.61	+101	21.1	2.09	270.57	560
06/02/20	0.40	4755	6.85	+127	21.8	2.38	270.28	600
13/05/20	0.42	4933	6.92	+143	20.4	1.98	270.68	573
26/08/20	0.42	5065	6.92	+112	18.9	2.10	270.56	487
14/12/20	0.35	4948	6.79	+166	23.3	2.01	270.65	613
28/03/21	0.44	4945	6.80	+123	27.3	1.34	271.32	620
21/06/21	0.75	4925	6.78	+119	19.9	1.24	271.42	620
16/09/21	0.52	4853	6.70	+106	21.0	0.85	271.81	613
12/01/22	0.33	4655	6.79	+52	22.3	0.43	272.23	627
21/04/22	0.38	4803	6.65	+192	22.1	0.85	271.81	627
29/06/22	0.56	4578	6.52	+88	19.3	0.98	271.68	607
10/12/22	0.55	4113	6.69	+106	21.1	0.30	272.36	607
05/03/23	0.33	4265	6.53	+113	23.6	0.73	271.93	620
GL04A 6 monthly								
09/01/19	DRY							
19/06/19	DRY							
07/02/20	DRY							
13/05/20	DRY							
26/08/20	7.60	17610	7.51	+128	14.5	3.16	269.75	927
14/12/20	DRY							
28/03/21	2.24	10605	6.90	-117	27.0	1.98	270.93	653
21/06/21	5.13	4595	7.36	-29	17.3	1.67	271.24	188
12/01/22	2.30	5790	6.77	-209	23.7	1.37	271.54	560
29/06/22	3.00	4915	7.09	+134	17.3	2.11	270.80	427
10/12/22	3.55	4650	6.78	-152	22.7	1.29	271.62	400

Received from laboratory	Accessible on Council website by	SO ₄	Cl	Cr	Mn	Fe	NH ₃	NO _x	TKN	TN	TOC	OC/OP Pesticides
		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
GL03												Annually
22/01/19	22/02/19	310	1030	<0.001	0.065	<0.05	0.05	21.5	1.4	22.9	<1	NR
18/03/19	05/04/19	329	1080	<0.001	0.064	<0.05	0.02	15.4	1.9	17.3	6	NR
28/06/19	18/07/19	334	1100	<0.001	0.057	<0.05	<0.01	18.7	1.7	20.4	9	ND
02/10/19	18/10/19	341	1110	<0.001	0.060	<0.05	<0.01	16.6	1.9	18.5	5	NR
24/02/20	13/03/20	362	1180	<0.001	0.064	<0.05	<0.01	18.6	1.9	20.5	10	NR
20/05/20	09/06/20	336	1140	<0.001	0.047	<0.05	0.02	18.6	2.4	21.0	2	NR
09/09/20	29/09/20	384	1180	<0.001	0.057	0.07	<0.01	19.9	1.7	21.6	14	ND
23/12/20	11/01/21	377	1260	<0.001	0.074	<0.05	0.14	20.3	1.1	21.4	11	NR
09/04/21	29/04/21	384	1230	<0.001	0.050	<0.05	<0.01	19.6	2.9	22.5	10	ND
30/06/21	21/07/21	383	1200	<0.001	0.049	<0.05	0.01	19.3	2.1	21.4	6	NR
28/09/21	19/10/21	373	1220	0.001	0.050	<0.05	0.10	21.1	2.2	23.3	10	NR
24/01/22	14/02/22	377	1260	<0.001	0.049	<0.05	<0.01	22.4	1.6	24.0	4	NR
09/05/22	27/05/22	366	1240	<0.001	0.053	<0.05	0.06	22.9	1.8	24.7	9	ND
13/07/22	02/08/22	407	1270	<0.001	0.052	<0.05	0.07	24.7	3.8	28.5	7	NR
30/12/22	25/01/23	367	1150	<0.001	0.056	<0.05	<0.01	21.7	2.9	24.6	1	NR
15/03/23	04/04/23	390	1290	<0.001	0.057	<0.05	<0.01	29.4	0.6	30.0	7	NR
GL04A												Annually
09/09/20	29/09/20	96	6750	<0.001	7.73	<0.05	0.35	0.15	3.4	3.6	18	ND
09/04/21	29/04/21	41	4080	<0.001	1.78	8.66	0.06	<0.01	1.1	1.1	19	ND
30/06/21	21/07/21	61	1480	<0.001	0.880	0.66	<0.01	0.01	0.4	0.4	6	NR
24/01/22	14/02/22	33	2000	<0.001	2.87	3.61	0.12	<0.01	0.5	0.5	9	ND
13/07/22	02/08/22	22	1840	<0.001	0.687	0.27	0.02	<0.01	0.7	0.7	9	NR
30/12/22	25/01/23	42	1810	<0.001	5.21	2.49	0.10	0.02	0.6	0.6	8	NR

Table 1b: Groundwater quality & depth (GL05A, GL06, T7)

Frequency required by licence									Received from laboratory	Accessible on Council website by	SO ₄	Cl	Cr	Mn	Fe	NH ₃	NO _x	TKN	TN	TOC	OC/OP Pesticides	
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	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	
GL05A 6 monthly									GL05A Annually													
08/01/19	3.86	4680	6.99	-185	32.7	4.87	276.52	1267	22/01/19	22/02/19	107	867	<0.001	0.694	0.10	0.14	0.01	0.5	0.5	2	NR	
19/06/19	Insuffi cient water																					
07/02/20	DRY																					
13/05/20	DRY																					
26/08/20	DRY																					
14/12/20	DRY																					
28/03/21	DRY																					
21/06/21	DRY																					
16/09/21	3.13	4250	7.12	-98	25.9	4.74	276.65	1027	28/09/21	19/10/21	211	950	0.002	1.22	10.6	0.12	<0.01	3.3	3.3	39	ND	
12/01/22	2.12	3730	7.68	-236	25.8	3.85	277.54	533	24/01/22	14/02/22	156	944	<0.001	1.23	0.47	0.08	<0.01	0.2	0.2	5	ND	
29/06/22	2.63	4425	7.15	-85	20.1	4.00	277.39	1007	13/07/22	02/08/22	69	1110	<0.001	1.14	0.05	<0.01	<0.01	0.3	0.3	1	NR	
10/12/22	2.77	4440	7.06	-181	22.6	2.39	279.00	827	30/12/22	25/01/23	145	1200	<0.001	1.37	1.30	0.03	<0.01	0.3	0.3	4	NR	
GL06 6 monthly									GL06 Annually													
08/01/19	0.20	19150	6.60	+145	26.8	4.00	272.99	1280	22/01/19	22/02/19	49	6640	0.003	13.50	0.13	0.35	0.01	6.0	6.0	75	NR	
20/06/19	0.40	18105	5.82	+130	21.5	4.02	272.97	2293	28/06/19	18/07/19	51	6520	0.003	11.70	0.09	0.20	0.07	5.8	5.9	79	ND	
06/02/20	0.17	17223	6.27	+78	23.2	4.35	272.64	1176	24/02/20	13/03/20	53	6350	0.003	15.20	0.10	0.29	0.03	6.9	6.9	64	NR	
26/08/20	0.25	15375	6.71	+116	23.1	4.10	272.89	773	09/09/20	29/09/20	59	5660	0.002	7.15	<0.05	0.10	2.33	4.2	6.5	30	ND	
28/03/21	0.19	11385	6.81	+97	23.9	3.31	273.68	940	09/04/21	29/04/21	66	3900	0.001	2.83	<0.05	0.05	0.90	3.0	3.9	39	ND	
16/09/21	0.37	10825	6.74	+84	19.5	3.02	273.97	813	28/09/21	19/10/21	46	3760	0.001	2.65	0.05	0.02	0.94	2.7	3.6	36	NR	
21/04/22	0.31	10735	6.71	+142	24.4	2.87	274.12	800	09/05/22	27/05/22	39	4070	0.001	4.72	<0.05	0.08	0.30	2.7	3.0	41	ND	
10/12/22	0.34	9168	6.68	+122	22.2	2.12	274.87	820	30/12/22	25/01/23	44	3880	0.001	4.01	<0.05	<0.01	0.40	2.1	2.5	20	NR	
T7 6 monthly									T7 Annually													
08/01/19	0.18	11713	6.71	+472	23.0	3.39	269.47	700	22/01/19	22/02/19	204	3810	<0.001	0.194	<0.05	0.08	9.98	<0.5	10.0	<1	NR	
19/06/19	0.29	11540	6.45	+548	22.08	3.08	269.78	1107	28/06/19	18/07/19	218	3860	<0.001	0.176	<0.05	0.01	7.64	0.4	8.0	16	ND	
06/02/20	0.16	11120	6.45	+132	20.5	3.76	269.10	680	24/02/20	13/03/20	184	3710	<0.001	0.229	<0.05	0.01	7.73	1.2	8.9	5	NR	
27/08/20	1.00	10613	6.82	+568	22.9	3.37	269.49	787	09/09/20	29/09/20	200	3750	<0.001	0.038	<0.05	0.01	7.67	1.0	8.7	17	ND	
29/03/21	0.41	10693	6.68	+87	22.70	2.23	270.63	747	09/04/21	29/04/21	218	3650	<0.001	0.576	<0.05	0.44	5.70	1.3	7.0	14	ND	
17/09/21	1.03	10050	6.84	+547	19.50	1.37	271.49	673	28/09/21	19/10/21	191	3470	<0.001	0.090	<0.05	0.10	5.76	1.1	6.9	12	NR	
22/04/22	0.18	9215	6.71	+143	22.85	2.07	270.79	753	09/05/22	27/05/22	196	3610	<0.001	0.581	<0.05	0.90	5.50	2.1	7.6	17	ND	
09/12/22	0.17	8060	6.56	+48	21.78	0.88	271.98	740	30/12/22	25/01/23	197	3660	<0.001	0.613	<0.05	<0.01	6.10	0.3	6.4	4	NR	

Table 1c: Groundwater quality & depth (GL09, GL10, GL11)

Frequency required by licence									Received from laboratory	Accessible on Council website by	SO ₄	Cl	Cr	Mn	Fe	NH ₃	NO _x	TKN	TN	TOC	OC/OP Pesticides
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	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
GL09 3 monthly									GL09 Annually												
08/01/19	1.90	5920	6.92	+328	24.9	0.00	274.75	533	22/01/19	05/04/19	416	1330	<0.001	0.013	<0.05	0.04	38.7	2.8	41.5	<1	NR
08/03/19	1.45	5890	6.87	+149	23.8	0.00	274.75	553	18/03/19	05/04/19	454	1330	<0.001	0.019	<0.05	0.03	28.4	4.6	33.0	<1	NR
19/06/19	1.79	5763	6.50	+236	18.3	0.00	274.75	473	28/06/19	18/07/19	430	1290	<0.001	0.128	<0.05	<0.01	28.9	2.6	31.5	4	ND
23/09/19	2.20	5790	6.77	+261	18.6	0.00	274.75	527	02/10/19	18/10/19	435	1300	<0.001	0.089	<0.05	<0.01	26.5	3.6	30.1	5	NR
06/02/20	0.85	5688	6.84	+157	20.7	0.00	274.75	613	24/02/20	13/03/20	446	1330	<0.001	0.434	<0.05	<0.01	23.9	2.0	25.9	4	NR
12/05/20	2.13	5638	7.07	+174	20.4	0.00	274.75	600	20/05/20	09/06/20	380	1290	<0.001	0.201	<0.05	0.02	25.0	2.1	27.1	<2	NR
27/08/20	2.61	5975	6.89	+138	20.7	0.00	274.75	587	09/09/20	29/09/20	510	1470	<0.001	0.002	<0.05	<0.01	35.9	4.3	40.2	11	ND
14/12/20	1.21	5835	6.77	+187	21.5	0.00	274.75	573	23/12/20	11/01/21	486	1500	<0.001	0.369	<0.05	<0.01	30.6	<0.5	30.6	9	NR
29/03/21	3.24	5630	6.89	+134	23.1	0.00	274.75	593	09/04/21	29/04/21	488	1440	<0.001	0.253	<0.05	0.02	29.3	5.4	34.7	7	ND
21/06/21	2.17	5678	6.84	+191	20.7	0.00	274.75	584	30/06/21	21/07/21	480	1440	<0.001	0.016	<0.05	<0.01	31.9	<0.5	31.9	3	NR
17/09/21	2.77	5770	6.93	+135	16.8	0.00	274.75	547	28/09/21	19/10/21	484	1510	<0.001	0.017	<0.05	<0.01	35.4	4.7	40.1	8	NR
11/01/22	4.47	5370	6.95	+61	25.7	0.00	274.75	547	24/01/22	14/02/22	557	1660	<0.001	0.013	<0.05	0.08	56.1	5.0	61.1	4	NR
22/04/22	4.00	5288	7.21	+173	21.9	0.00	274.75	553	09/05/22	27/05/22	547	1600	<0.001	0.024	<0.05	0.02	58.1	<0.5	58.1	12	ND
30/09/22	3.09	4980	7.26	+120	20.1	0.00	274.75	573	13/07/22	02/08/22	558	1590	<0.001	0.020	<0.05	<0.01	63.9	9.6	73.5	<1	NR
09/12/22	1.90	4295	6.66	+114	20.9	0.00	274.75	533	30/12/22	25/01/23	593	1450	<0.001	0.007	<0.05	<0.01	56.2	6.6	62.8	2	NR
06/03/23	1.76	4013	6.63	+148	23.0	0.00	274.75	533	15/03/23	04/04/23	552	1510	<0.001	0.014	<0.05	<0.01	64.1	0.8	64.9	7	NR
GL10 3 monthly									GL10 Annually												
08/01/19	0.53	6775	6.96	+513	24.0	4.11	269.27	633	22/01/19	05/04/19	278	1740	<0.001	0.062	<0.05	0.05	25.7	1.6	27.3	4	NR
08/03/19	0.25	6815	6.93	+143	24.8	4.24	269.14	687	18/03/19	05/04/19	298	1740	<0.001	0.184	<0.05	0.03	19.2	2.7	21.9	4	NR
19/06/19	0.26	6728	6.55	+156	21.2	4.13	269.25	580	28/06/19	18/07/19	272	1730	<0.001	0.216	<0.05	0.04	21.1	1.6	22.7	12	ND
23/09/19	0.20	6658	6.80	+118	20.7	4.38	269.00	900	02/10/19	18/10/19	265	1740	<0.001	0.207	<0.05	<0.01	18.6	2.3	20.9	<5	NR
06/02/20	0.21	6710	6.79	+138	18.7	4.72	268.66	640	24/02/20	13/03/20	240	1760	<0.001	0.236	<0.05	0.02	19.9	1.8	21.7	12	NR
12/05/20	0.17	6483	6.97	+118	23.9	4.56	268.82	687	20/05/20	09/06/20	245	1680	<0.001	0.227	<0.05	0.02	20.0	1.9	21.9	2	NR
27/08/20	0.20	6363	6.86	+119	21.9	4.61	268.77	773	09/09/20	29/09/20	248	1720	<0.001	0.251	<0.05	<0.01	21.7	1.2	22.9	15	ND
14/12/20	0.35	6363	6.90	+294	22.1	4.68	268.70	720	23/12/20	11/01/21	294	1680	<0.001	0.101	<0.05	<0.01	22.9	0.8	23.7	8	NR
29/03/21	0.42	6328	6.84	+80	23.0	3.91	269.47	700	09/04/21	29/04/21	301	1650	<0.001	0.237	<0.05	<0.01	21.9	3.1	25.0	9	ND
21/06/21	0.27	6280	6.81	+120	22.5	3.79	269.59	693	30/06/21	21/07/21	272	1620	<0.001	0.238	<0.05	0.01	21.5	1.6	23.1	<1	NR
17/09/21	1.40	5600	6.90	+123	17.8	2.50	270.88	633	28/09/21	19/10/21	395	1420	<0.001	0.033	<0.05	<0.01	26.6	2.3	28.9	8	NR
11/01/22	0.50	5318	6.80	+33	23.4	2.17	271.21	687	24/01/22	14/02/22	387	1530	<0.001	0.071	<0.05	0.07	28.3	1.8	30.1	6	NR
22/04/22	0.31	5395	6.86	+64	22.4	2.91	270.47	720	09/05/22	27/05/22	339	1530	<0.001	0.092	<0.05	0.02	26.8	1.5	28.3	14	ND
30/09/22	0.40	5193	6.84	+91	20.9	2.92	270.46	680	13/07/22	02/08/22	382	1550	<0.001	0.079	<0.05	<0.01	28.1	3.6	31.7	<1	NR
09/12/22	0.49	4328	6.66	+151	21.8	1.76	271.62	593	30/12/22	25/01/23	369	1560	0.001	0.098	<0.05	<0.01	26.0	4.6	30.6	2	NR
06/03/23	0.64	4100	6.60	+122	23.5	2.81	270.56	587	15/03/23	04/04/23	361	1760	<0.001	0.020	<0.05	<0.01	26.5	0.9	27.4	6	NR

Table 1d: Groundwater quality & depth GL11

Frequency required by licence	DO	EC	pH	Eh	Temp	D	RL	Alk
Measure	mg/L	µS/cm	1-14	mV	°C	m	m	mg/L
GL11 6 monthly								
08/01/19	4.01	5323	6.98	+194	26.0	2.99	268.95	867
08/03/19	0.27	5155	6.91	+116	25.3	3.07	268.87	833
19/06/19	0.38	5008	6.48	+209	21.6	2.96	268.98	693
23/09/19	0.36	5008	6.67	+8	22.2	3.23	268.71	693
07/02/20	0.26	4890	6.74	-46	22.7	3.44	268.50	873
27/08/20	0.32	4918	6.86	-23	21.9	3.41	268.53	1000
29/03/21	0.27	4913	6.85	-37	24.3	2.87	269.07	920
17/09/21	0.28	4800	6.88	-45	18.0	2.30	269.64	887
22/04/22	0.29	4550	6.79	-50	23.2	2.18	269.76	893
09/12/22	1.09	2205	10.66	-29	25.6	1.54	270.40	267

Received from laboratory	Accessible on Council website by	SO ₄	Cl	Cr	Mn	Fe	NH ₃	NO _x	TKN	TN	TOC	OC/OP Pesticides
		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
GL11												Annually
22/01/19	05/04/19	419	1080	<0.001	0.594	0.31	0.19	8.28	0.7	9.0	13	NR
18/03/19	05/04/19	482	1050	<0.001	0.515	<0.05	0.02	4.42	0.8	5.2	13	NR
28/06/19	18/07/19	471	1060	<0.001	0.554	<0.05	<0.01	0.39	0.3	0.7	17	ND
02/10/19	18/10/19	466	1020	<0.001	0.752	0.32	<0.01	0.32	0.3	0.6	8	NR
24/02/20	13/03/20	483	1040	<0.001	1.340	2.77	<0.01	0.06	0.2	0.3	5	NR
09/09/20	29/09/20	488	1020	<0.001	1.330	3.52	0.04	0.02	0.1	0.1	19	ND
09/04/21	29/04/21	490	1040	<0.001	1.010	4.05	0.01	0.04	0.2	0.2	18	ND
28/09/21	19/10/21	448	1020	<0.001	1.110	3.87	0.01	0.02	0.2	0.2	15	NR
09/05/22	27/05/22	428	1060	<0.001	0.779	2.47	0.03	0.15	0.2	0.4	22	ND
30/12/22	25/01/23	125	695	0.004	<0.001	<0.05	0.14	1.13	0.4	1.5	3	NR

Table 2: Surface water quality (GLOV1 on overflow)

Frequency required by licence	EC	pH	Alk	SS	Received from laboratory	Accessible on Council website by	SO ₄	Cl	Mn	Fe	Cr	NH ₃	TKN	NO _x	TN	TOC	OC/OP Pesticides	
Measure	µS/cm	1-14	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	
GLOV1 overflow, then wklly					GLOV1													
30/03/19	81	6.98	22	238	10/04/19	30/04/19	3	10	0.58	32.3	0.032	0.26	2.5	0.62	3.1	7	ND	
22/12/20	140	7.33	33	111	05/01/21	11/01/21	5	15	0.16	12.3	0.008	0.08	1.3	0.51	1.8	6	ND	
08/11/21	490	7.63	50	91	16/11/21	06/12/21	17	107	0.08	6.39	0.007	0.26	1.9	1.71	3.6	12	ND	
24/11/21	2080	7.67	130	12	06/12/21	24/12/21	99	539	0.04	0.20	0.001	0.40	3.8	12.6	16.4	24	ND	
09/12/21	2960	7.88	135	13	23/12/21	14/01/22	162	854	0.11	0.07	0.002	0.53	3.6	6.51	10.1	31	ND	
22/09/22	2250	7.81	89	<5	07/10/22	27/10/22	56	693	0.27	0.03	0.001	0.37	2.8	4.23	7.0	14	ND	
21/10/22	3240	7.93	103	6	01/11/22	21/11/22	97	904	0.04	0.45	0.006	0.20	2.1	4.20	6.3	20	ND	

Table 3: Leachate quality (GLL1)

Frequency required by licence	DO	EC	pH	Eh	Temp	Alk	Received from laboratory	Accessible on Council website by	SO ₄	Cl	Cr	Mn	Fe	NH ₃	NO _x	TKN	TN	TOC	OC&OP Pesticides	
Measure	mg/L	µS/cm	1-14	mV	°C	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	
GLL1 6 monthly							GLL1													
26/01/18	1.97	563	7.43	+111	26.5	91	06/02/18	26/02/18	9	85	0.004	0.632	0.46	1.5	6.46	4.0	10.5	10	ND	
05/08/18	0.79	18740	6.99	-192	16.4	2360	20/08/18	07/09/18	<1	1070	0.168	5.65	31.3	428.0	0.03	417.0	417.0	309	ND	
09/01/19	1.74	5925	7.33	-100	27.1	580	22/01/19	22/02/19	5	1420	0.036	2.22	8.36	112.00	9.43	112.0	121.0	80	ND	
20/06/19	3.28	3015	6.37	+193	17.9	110	28/06/19	18/07/19	12	841	0.003	1.58	0.37	2.93	13.8	6.0	19.8	15	ND	
07/02/20	0.53	16675	7.05	-157	24.1	2560	24/02/20	13/03/20	<20	4640	0.363	2.72	21.9	473.00	2.15	538.0	540.0	434	ND	
26/08/20	1.59	13800	7.59	-74	21.8	1800	09/09/20	29/09/20	<20	4070	0.228	4.41	26.3	355.00	0.54	368.0	368.0	210	ND	
29/03/21	3.16	430	6.89	+88	21.8	350	09/04/21	29/04/21	10	50	0.004	0.086	0.86	6.68	0.43	9.6	10.0	12	ND	
16/09/21	1.05	14785	7.23	-107	22.6	3200	28/09/21	19/10/21	57	3680	0.408	2.37	15.2	583.0	1.38	678.0	679.0	374	ND	
22/04/22	0.24	13640	6.96	-129	26.5	2400	09/05/22	27/05/22	<20	5270	0.374	5.83	36.4	469.0	0.15	520.0	520.0	326	ND	
05/03/23	0.22	12015	7.04	-122	29.6	2800	15/03/23	04/04/23	11	5000	0.422	4.18	32.5	498.0	<0.05	536.0	536.0	353	ND	

Methane is a colourless, odourless gas that is flammable and explosive. It is generated approximately three months after the deposition of putrescible solid waste and once oxygen is depleted. Testing is conducted above ground surfaces to assure than none is escaping to air, and in buildings to assure against asphyxiation and explosion.

Comments on methane monitoring results: Methane is rarely detected at the Gunnedah Landfill or surrounds. When detected, remediation is promptly undertaken.

Table 4: Methane detections (surface or building)

Frequency required by licence	Detection locations	Methane (CH ₄) by volume in air	Methane (CH ₄) by volume in air	Methane (CH ₄) as % LEL (Lower Explosive Limit)	Accessible on Council website by
Measure		ppm CH ₄ in air	% CH ₄ in air	% LEL	
3 monthly					
26/01/18	no reportable detections at any sampling location				26/02/18
29/03/18	no reportable detections at any sampling location				01/05/18
05/08/18	no reportable detections at any sampling location				07/09/18
11&12/9/18	no reportable detections at any sampling location				10/10/18
8&9/01/19	no reportable detections at any sampling location				22/02/19
08/03/19	no reportable detections at any sampling location				05/04/19
19&20/6/19	no reportable detections at any sampling location				18/07/19
22&23/09/19	no reportable detections at any sampling location				18/10/19
6&7/02/20	no reportable detections at any sampling location				13/03/20
12&13/05/20	no reportable detections at any sampling location				09/06/20
26&28/08/20	no reportable detections at any sampling location				29/09/20
15/12/20	no reportable detections at any sampling location				11/01/21
28&29/03/21	no reportable detections at any sampling location				29/04/21
21/06/21	no reportable detections at any sampling location				21/07/21
16&17/09/21	no reportable detections at any sampling location				19/10/21
11&12/01/22	no reportable detections at any sampling location				14/02/22
21&22/04/22	no reportable detections at any sampling location				27/05/22
29&30/06/22	no reportable detections at any sampling location				02/08/22
9&10/01/22	no reportable detections at any sampling location				25/01/23
06/03/22	no reportable detections at any sampling location				04/04/23

Note: 500 ppm CH₄ by volume in air = 0.05% CH₄ by volume in air = 1% LEL