



Inverell Landfill

Sampling Point: All Monitoring Points		EPL No. 7463							
Licence Period 19 November 2019 to 18 November 2020		Licensee: Inverell Shire Council							
http://www.environment.nsw.gov.au/prpoeoapp/Detail.aspx?Instid=/463&id=/463&option=licence&searchrange=licence&range=POEO		144 Otho Street, Inverell							
licence&prp=no&status=Issued		Monitoring Frequency - Quarterly							
Date Sampled	16 and 17 March 2020								
Date Reported	20-Apr-20								
Date Published	22-Apr-20								
Sampling Notes:									
The laboratory and field analysis results indicate that landfill leachate does not appear to be impacting groundwater at the monitoring locations. All groundwater monitoring bores were sampled. A leachate sample was collected from the leachate pond.									
Concentrations of nitrate (43 mg/L) were detected in the up-gradient/ cross-gradient groundwater monitoring bore BH1 above the adopted screening criteria. While the L/N ratio (ratio of leachate to non-leachate indicators) is high (17.19) no other landfill leachate indicators were detected.									
The continuing elevated nitrate and sulphate levels detected in monitoring well BH1 is not associated with any other landfill leachate indicators. Bores down gradient of the landfill did not have these characteristics. As this monitoring well is situated up gradient of the landfill, the elevated level of nitrate could be representative of an outside regional/local influence such as agriculture.									
Sampling point	BH1	BD1 (BH1)	BH2a	BH2b	BH3a	BH3b	BH4	BH5	LP1
EPA Identification Numbers	6	-	7	8	9	10	11	12	1
pH (field)	6.88	-	6.88	6.9	6.76	6.82	6.83	6.82	8.08
Conductivity	1,246	-	3,232	3,071	1,708	1258	4,837	1225	748
Standing Water Level	607.49	-	589.38	587.74	589.64	584.22	592.76	609.29	-
pH (lab)	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	8.06
TDS	800	790	1930	1950	1100	840	3060	900	587
BOD	<2	<2	<2	<2	<2	<2	2	2	12
TOC	4	4	12	9	7	3	17	5	16
Total Phenols	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Sodium	38	36	280	370	135	105	280	65	58
Calcium	115	110	110	66	105	110	220	135	50
Potassium	2	1.9	1.2	1.3	1	3.2	2.3	2.4	16
Magnesium	110	115	260	250	145	78	450	65	52
Ammonia as N	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.09
Chloride	16	15	360	340	120	22	1120	36	73
Fluoride	0.18	0.16	0.22	0.18	0.11	<0.1	0.12	<0.1	0.2
Nitrate	43	42	0.53	1.7	<0.1	<0.1	0.35	200	0.93
Sulfate	19	18	11	8	3	8	27	150	111
Bicarbonate	900	910	1780	1890	1180	985	1740	460	285
Phosphate	15	0.14	0.21	0.21	<0.1	<0.1	0.12	0.14	<0.1
Nitrite	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	0.59
Total Alkalinity	740	745	1460	1550	965	805	1430	375	234
L/N	17.19	16.9	0.3	0.47	0.34	1.19	0.3	76.46	11.01
TKN	-	-	-	-	-	-	-	-	5.8
Dissolved Iron	0.06	0.04	0.01	0.08	0.06	0.03	0.02	0.03	<0.05
Dissolved Manganese	<0.01	<0.01	0.09	0.01	0.07	0.24	0.66	0.03	0.001
Dissolved Copper	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.009
Dissolved Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Zinc	0.005	0.007	0.01	0.011	0.004	0.003	0.009	0.007	<0.005
Dissolved Cadmium	<0.0002	<0.0002	<0.0002	<0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001

Dissolved Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001
Dissolved Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.003
Dissolved Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Table notes:

1. All measurements are in mg/L unless stated otherwise;
2. BD1 = blind field duplicate of BH3b;
3. TDS = Total Dissolved Solids; and
4. BOD = Biological Oxygen Demand; and
5. TOC = Total Organic Carbon.
6. Values with < are below the limit of reporting (LOR)

Dissolved Chromium	-	-	-	-	-	-	-	-	-
Dissolved Arsenic	-	-	-	-	-	-	-	-	-
Dissolved Mercury	-	-	-	-	-	-	-	-	-

Table notes:

1. All measurements are in mg/L unless stated otherwise;
2. BD1 = blind field duplicate of BH1;
3. Values preceded with < are below the limit of reporting (LOR);
4. Values in bold exceed threshold criteria;
5. *Threshold concentration derived from background aquifer chemistry;
6. (A1) Threshold concentration derived ANZG (2018); and
7. (H) Hardness Modified Trigger Value adjusted as per ANZG (2018) Table 3.

8. n.d not detected as various detection limites (reported in the laboratory results in the letter report)
9. - not analysed or measured
10. Blanck cell means that there is no threshold value.
11. ~~For~~ for samples taken on the 26th, the pH calibration on the YSI was outside of the range (BH1, BH2b, BH5 and LP1) and field pH should be viewed with caution. Laboratory pH for these samples are more reliable.



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licence&prp=no&status=Issued					144 Otho Street, Inverell				
					Monitoring Frequency - Quarterly				
Date Sampled	6-Jul-20								
Date Reported	29-Jul-20								
Date Published	25-Aug-20								
Sampling Notes:									
The laboratory and field analysis results indicate that landfill leachate does not appear to be impacting groundwater at the monitoring locations. All groundwater monitoring bores were sampled, however the leachate dam was dry this round, so no sample was collected. Groundwater from the up gradient monitoring well BH1 exceeded the established threshold levels for nitrate (at 82 mg/L) and the L/N ratio (29.28). The continuing elevated nitrate and sulphate levels detected in monitoring well BH1 is not associated with any other landfill leachate indicators. Bores down gradient of the landfill did not have these characteristics. As this monitoring well is situated up gradient of the landfill, the elevated level of nitrate could be representative of an outside regional/local influence such as agriculture.									
Sampling point	BH1	BH2a	BH2b	BD1 (BH2b)	BH3a	BH3b	BH4	BH5	LP1
EPA Identification Numbers	6	7	8	-	9	10	11	12	1
pH (field)	7.8	9.72	8.38	-	8.21	7.59	6.66	8.35	10.58
Conductivity	1,302	2,709	2,946	-	1,895	1225	3,472	994	439.5
Static Water Level	13.3	5.34	7.28	-	7.38	13.72	13.04	10.72	-
pH (lab)	7.1	6.9	7	7	7	7.1	6.9	7	7.8
TDS	855	1830	1960	1980	1270	825	2070	715	405
BOD	3	3	4	4	3	2	5	3	3
TOC	3	10	7	8	5	2	9	3	20
Total Phenols	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Iron	0.05	0.06	0.03	0.02	0.05	0.08	0.58	0.17	0.06
Dissolved Manganese	0.01	0.38	0.01	0.02	0.25	0.24	1	0.02	0.03
Sodium	42	275	360	355	165	110	175	73	40
Calcium	120	100	68	66	120	105	160	100	49
Potassium	2.4	1.6	1.9	2.1	1.5	3.6	2.3	2.4	15
Magnesium	115	255	270	270	165	81	325	47	36
Ammonia	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3
Chloride	21	320	340	350	150	23	645	27	44
Fluoride	0.15	0.18	0.15	0.14	<0.1	<0.1	<0.1	<0.1	0.15
Nitrate	56	<0.1	0.31	0.31	<0.1	<0.1	<0.1	140	1.2
Sulfate	19	17	7	6	4	10	11	120	47
Bicarbonate	945	1720	1890	1870	1340	965	1510	420	325
Phosphate	0.12	<0.1	0.18	0.18	<0.1	<0.1	<0.1	0.12	0.15
Nitrite	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.33	<0.1
Total Alkalinity	775	1410	1550	1530	1100	790	1240	345	265
L/N	21.16	0.3	0.35	0.38	0.4	1.32	0.39	64.92	13.28
Total Phosphorus	<0.1	0.11	0.14	0.18	0.46	0.13	0.18	0.12	0.49
TKN	-	-	-	-	-	-	-	-	2.5

Table notes:

1. All measurements are in mg/L unless stated otherwise;

2. BD1 = blind field duplicate of BH2b;
3. Values preceded with < are below the limit of reporting (LOR);
4. Values in bold exceed threshold criteria;
5. * Threshold concentration derived from background aquifer chemistry;
6. (A1) Threshold concentration derived ANZG (2018); and
7. (H) Hardness Modified Trigger Value adjusted as per ANZG (2018) Table 3.
8. n.d not detected as various detection limits (reported in the laboratory results in the Letter report)
9. – not analysed or measured
10. Blank cell means that there is no threshold value.
11. † field pH should be viewed with caution, as although it calibrated, the pH measurements were consistently around 2 pH units higher than the expected pH. Laboratory pH for these samples are more reliable



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licence&prp=no&status=Issued					Monitoring Frequency - Quarterly				
Date Sampled	1-Oct-20								
Date Reported	15-Dec-20								
Date Published	17-Dec-20								
Sampling Notes:									
All groundwater monitoring bores (BH1-BH5) were sampled on the 1 October 2020. The leachate pond was dry at the time of sampling, no sample was collected from LP1 this monitoring round. The Laboratory and field analysis indicate that landfill leachate does not appear to be impacting groundwater at the monitoring locations and results remain consistent with historical data.									
Sampling point	BH1	BH2a	BH2b	FD1 (BH2b)	BH3a	BH3b	BH4	BH5	LP1
EPA Identification Numbers	6	7	8	-	9	10	11	12	1
pH (field)	6.7	6.6	6.72	-	6.71	6.78	6.63	6.66	dry
Conductivity	1,623	3,551	3,649	-	2,352	1545	4,157	1006	-
Standing Water Level	12.87	5.97	7.6	-	7.41	13.38	13.39	10.38	-
pH (lab)	7	7	7.1	7	7.1	7.2	7	7.1	-
TDS	845	1730	1960	1980	1210	825	2420	610	-
BOD	3	3	3	4	3	2	7	6	-
TOC	3	11	8	10	3	1	11	3	-
Total Phenols	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Dissolved Iron	0.02	0.03	0.05	0.04	0.04	0.04	0.23	0.01	-
Dissolved Manganese	<0.01	0.45	0.02	0.02	0.22	0.27	1.7	0.03	-
Sodium	43	265	380	385	145	110	220	65	-
Calcium	120	97	68	67	120	115	185	86	-
Potassium	2.6	1.7	2.5	2.7	1.9	4.6	3.1	3.9	-
Magnesium	120	245	250	240	160	76	360	41	-
Ammonia	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Chloride	23	280	315	320	130	23	815	18	-
Fluoride	0.15	0.2	0.17	0.17	<0.1	<0.1	0.12	<0.1	-
Nitrate	73	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	90	-
Sulfate	18	10	7	6	<2	8	23	105	-
Bicarbonate	955	1680	1880	1890	1350	985	1550	390	-
Phosphate	0.12	0.15	0.18	0.16	<0.1	<0.1	<0.1	0.1	-
Nitrite	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.49	-
Total Alkalinity	785	1380	1540	1550	1110	805	1270	320	-
L/N	26.78	0.33	0.4	-	0.52	1.63	0.44	49.21	-
Total Phosphorus	<0.1	0.15	0.14	0.16	0.27	0.85	0.72	0.61	-

Table notes:

1. The leachate pond was dry this monitoring round and no sample was taken;
2. All measurements are in mg/L unless stated otherwise;
3. FD1 = blind field duplicate of BH3b;
4. Values preceded with < are below the limit of reporting (LOR);
5. Values in bold exceed threshold criteria;
- 6.* Threshold concentration derived from background aquifer chemistry;

7. (A1) Threshold concentration derived ANZG (2018); and
8. (H) Hardness Modified Trigger Value adjusted as per ANZG (2018) Table 3.
9. – not analysed or measured
10. Blank cell means that there is no threshold value.