



Whytes Gully Waste Disposal Facility
(Wollongong Waste And Resource Recovery Park)
Environment Protection Licence 5862

Annual Report
Period 29 May 2014 – 28 May 2015

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ABBREVIATIONS

Al	Aluminium
ANZECC	Australian and New Zealand Environment Conservation Council
Ar	Arsenic
Ba	Barium
Ca	Calcium
CaCO ₃	Calcium Carbonate
Cd	Cadmium
CH ₄	Methane
Cl	Chloride
Co	Cobalt
Cr	Chromium
Cu	Copper
DC	Development Consent
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
F	Fluoride
K	Potassium
LEMP	Landfill Environmental Management Plan
Mg	Magnesium
Mn	Manganese
Na	Sodium
NH ₃	Ammonia
NO ₃	Nitrate
NO ₂	Nitrite
ppm	Parts per Million
SO ₄	Sulfate
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
WWARRP	Wollongong Waste And Resource Recovery Park
Zn	Zinc

1 INTRODUCTION

1.1 BACKGROUND

The City of Wollongong is located 80 kilometres south of Sydney and is Australia's 9th largest city. The Wollongong City Council (Council) governance area occupies a relatively narrow coastal strip bordered by the Royal National Park to the north, the Windang Bridge and Yallah to the south, the Tasman Sea to the east and the escarpment to the west.

Council owns and operates the Wollongong Waste and Resource Recovery Park (the Site), which is located on Reddalls Road at Kembla Grange. The Site is situated south west of Wollongong's central business district on approximately 50 hectares and is comprised of Lots 50, 52 and 53 of DP 1022266 and Lot 2 of DP 240557.

Council holds an Environmental Protection Licence (EPL) number 5862, for "Waste Disposal – Application to Land" for the Site. Council currently operates in accordance with the sites Landfill Environmental Management Plan (LEMP) and in accord with the requirements of the Sites EPL and Development Consent (DC).

1.2 OBJECTIVES OF THE ANNUAL REPORT

Condition R1.8 of the EPL specifies that Council must provide an Annual Report to accompany the Annual Return for the Site. The objective of this report is to provide that review.

1.3 SITE HISTORY

Whytes Gully was developed in the early 1980's as the principal landfill site for Wollongong's domestic and commercial waste streams. Initially, the 'western gully' section was landfilled. The western gully is unlined by modern standards and was used from 1982 to 1993. Initially coal wash refuse was used to provide daily cover, then around 1988/89 steel furnace slag was introduced because of its stability in wet weather and Council's inability to source local clean fill in sufficient quantities. The leachate collection from the western gully is through a series of rock drains at the centre of each lift. The rock drains connect with a riser and the leachate flows from riser to riser, and then to the leachate collection well at the base of the western gully. The western gully section of the landfill has been capped with clay to varying depths between 1m and 4m.

The 'eastern gully' section development received consent in 1992/93, following extensive public consultation. The eastern gully section is lined with a single layer of HDPE smooth liner, over a subsoil drainage layer of 5mm gravel and a corrugated groundwater drainage system. The eastern gully was excavated to rock and was developed in two stages, beginning with the first stage 80 to 100m above the slope from the current toe of the landfill embankment. The leachate is drained from the first stage of the eastern gully via a 300mm corrugated drainage pipe at the base and a 300mm thick sand layer above the liner.

The second stage of the eastern gully operates in front and above the first stage, with extended leachate drains and HDPE liner. The eastern gully has intermediate cover of varying quality on the embankments.

The new third stage of the eastern gully commenced construction in August 2013 and was completed in 2014. Waste commenced being placed in Cell 1a in March 2015. Council is currently awaiting approval from the Environment Protection Authority to place waste in Cell 1b.

Leachate is collected from all landfilled areas at the site and treated in a 3 stage process. The leachate is initially collected in a primary holding pond that uses a biological process and aeration primarily to strip the leachate of ammonia. The leachate is then pumped to a smaller pond with a greater surface area to increase the speed of this process. From the smaller pond the leachate is then pumped to a sequence batch reactor that in conjunction with a filtration system eliminates the residual contaminants in the leachate suitable for acceptance by sewer under the sites Trade Wastewater Agreement with Sydney Water.

1.4 RELEVANT DOCUMENTS

This annual report refers to and / or draws upon information and data from the following documents;

- Whytes Gully Waste Disposal Facility – Annual Return for Period 29 May 2013 to 28 May 2014. By Wollongong City Council July 2014
- Whytes Gully Waste Disposal Facility – Annual Return for Period 01 June 2012 to 31 May 2013. By Wollongong City Council July 2013
- Whytes Gully Waste Disposal Facility – Annual Return for Period 01 June 2011 to 31 May 2012. By Wollongong City Council July 2012
- Whytes Gully Waste Disposal Facility – Annual Return for Period 01 June 2010 to 31 May 2011. By Wollongong City Council July 2011.
- Whytes Gully Waste Disposal Facility – Annual Report for Period 01 June 2009 to 31 May 2010. By GHD July 2010.

2 KEY LICENCE ISSUES

2.1 ENVIRONMENTAL PROTECTION LICENCE ANNUAL RETURNS

The Environment Protection Authority (EPA) has issued an *Environmental Protection Licence* (Licence No. 5862) for the landfill and related operations on the Whytes Gully site. The licence, issued under the *Protection of the Environment Operations Act 1997*, requires an annual return and report to be submitted to the EPA, detailing;

- a) Statement of compliance; and
- b) Monitoring and complaints summary.
- c) Tabulated results of all monitoring data required by the licence from at least the last three years (if available).
- d) A graphical presentation of the data for at least three years (if available).
- e) Notations made regarding any statistically significant variations or anomalies.
- f) An analysis and interpretation of all monitoring data.
- g) An analysis of and response to any complaints received.
- h) Identification of any deficiencies in environmental performance and remedial action taken or proposed to be taken.
- i) Recommendations on improving the sites environmental performance.

The EPL Annual Returns for 2008 to 2014 reporting periods were reviewed to provide a background to this report. These Annual Returns can be summarised as follows:

01 June 2008 to 31 May 2009

B1. Pollution complaints - Nine

B2. Concentration monitoring summary – Complete.

B3. Volume or mass monitoring summary - None required.

C1. Compliance with licence condition – Ten non compliances.

C2. Details of non-compliance

- 1. Stormwater pH measurement > 8.5*
- 2. Four missed stormwater conductivity measurements*
- 3. Stormwater suspended solids > 50mg/L twice*
- 4. Four missed potassium groundwater measurements*
- 5. One missed groundwater redox, coliforms and dissolved oxygen measurements*
- 6. Three missed groundwater alkalinity measurements*
- 7. One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium tests*
- 8. One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test*

9. One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test
10. One missed groundwater calcium, chloride, magnesium, sodium, sulphate and potassium test

01 June 2009 to 31 May 2010

- B1. Pollution complaints - Twelve*
- B2. Concentration monitoring summary – Complete.*
- B3. Volume or mass monitoring summary - None required.*
- C1. Compliance with licence condition – Five non compliances.*
- C2. Details of non-compliance*
 - 1. Two missed stormwater temperature measurements*
 - 2. Missed stormwater filterable iron measurement*
 - 3. One round of groundwater monitoring missed*
 - 4. One round of groundwater monitoring missed*
 - 5. One round of landfill gas monitoring missed*

01 June 2010 to 31 May 2011

- B1. Pollution complaints – Twelve*
- B2. Concentration monitoring summary – Complete.*
- B3. Volume or mass monitoring summary - None required.*
- C1. Compliance with licence condition – Zero non-compliance.*
- C2. Details of non-compliance – N/A*

01 June 2011 to 31 May 2012

- B1. Pollution complaints – Forty Eight*
- B2. Concentration monitoring summary – Complete.*
- B3. Volume or mass monitoring summary - None required.*
- C1. Compliance with licence condition – Zero non-compliance.*
- C2. Details of non-compliance – N/A*

01 June 2012 to 31 May 2013

- B1. Pollution complaints – Fifty nine*
- B2. Concentration monitoring summary – Complete.*
- B3. Volume or mass monitoring summary - None required.*
- C1. Compliance with licence condition – Zero non-compliance.*
- C2. Details of non-compliance – N/A*

29 May 2013 to 28 May 2014

- B1. Pollution complaints – forty eight*
- B2. Concentration monitoring summary – Complete.*
- B3. Volume or mass monitoring summary - None required.*
- C1. Compliance with licence condition – Zero non-compliance.*
- C2. Details of non-compliance – ~~N/A~~ One (1) Penalty received against licence condition O6.4 – Report corrected 8/4/2016.*

In summary, compliance issues have generally been restricted to minor exceedances of pH and suspended solids in the sediment pond, and these issues are covered by ongoing monitoring provisions.

A potential problem existed prior to June 2010 with seemingly regular missed analytical testing regimes over the previous two years. Subsequently, Council formally tendered for the environmental testing at the site, which now ensures regular testing routines are in place under contract performance requirements.

The EPL has had several variations applied to it in recent years. These changes include:

- Approval granted to dispose of waste in Cell 1A on 28 October 2014.
- Site boundaries updated to excise the previous Solid Waste to Energy Recovery Facility from the landfill licence to allow Visy to gain their own licence for the retrofit of the building as a Materials Recovery Facility. Also addition of a Potential Offensive Odour clause and analytical unit measures amended on 08 July 2014.
- Wording amendments and consolidation of various clauses as well as monitoring point updates in 23 August 2013.
- Inclusion of further enhanced and upgraded environment sampling points on 23 August 2013 for the Stage 3 (new landfill cell development).
- Overhauled and reformatted licence resulting from Council's request to modernise environmental testing requirements and to formally recognise the increased environmental sampling points and standards adopted by Council for the site. The request formed Annexure B of the 2010/2011 Annual Environmental Management Report and was formally approved and adopted by the EPA on 16 April 2012.
- Tidy up of various incremental site changes including lot and boundary amendments, sampling point review and update including location detail, removal of redundant trial and reporting details and various other updates in line with EPA reformatting and internal software and consistency changes 16 April 2012.
- Addition of pollution studies and reduction programs added on 28 November 2008.
- Scheduled Activity and Waste Classification structure changed on 17 October 2008.
- Reformatted licence including specification for cover material, litter control and other operational processes 20 November 2007.
- Clarification of water pollution prevention requirements on 11 October 2005.

3 REVIEW OF LANDFILL MONITORING DATA

3.1 GROUNDWATER MONITORING

Site investigations resulting from Council's Environment Application lodged with the State Government on 01 April 2012, have confirmed a predominant approximate south-southwest groundwater flow direction. The groundwater flow direction should be used to contextualise monitoring bore locations and any elevated results, please refer to the sites Environmental Monitoring Locations located in Annexure A of this document.

3.1.1 Tabulated Results

Table 3.1.1(a) Quarterly analyte testing results for 28 August 2014 *Note: Bore destroyed #Note: no access

Analyte		Monitoring Points																	
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Alkalinity	mg/L	*	1100	756	365	454	#	389	145	17	dry	183	429	503	627	480	246	779	
Calcium	mg/L	*	349	396	109	92	#	156	20	5	dry	25	118	216	208	101	83	123	
Chloride	mg/L	*	1220	1370	708	227	#	349	42	58	dry	36	616	238	902	531	407	120	
Conductivity	µS/cm	*	5330	5490	2960	3140	#	2160	520	283	dry	508	3200	2140	4070	2510	1660	5040	
Magnesium	mg/L	*	212	222	69	83	#	60	14	3	dry	11	87	66	165	80	46	135	
Nitrogen	mg/L	*	0.02	0.02	<0.01	<0.01	#	0.02	0.01	0.02	dry	0.02	0.01	0.78	0.01	0.02	0.01	0.13	
Potassium	mg/L	*	3	2	<1	<1	#	<1	<1	<1	dry	3	<1	5	2	1	2	<1	
Sodium	mg/L	*	682	544	445	502	#	160	48	35	dry	53	401	202	520	412	194	825	
Water Level	m	*	5.12	0.65	2.02	2.5	#	7.36	7.41	7.46	dry	2.66	2.26	2.7	4.05	6.36	2.74	1.56	
Sulfate	mg/L	*	174	201	209	227	#	122	32	13	dry	18	202	398	294	111	407	315	
TDS	mg/L	*	3040	3540	1710	1770	#	1180	280	192	dry	320	1810	1430	2430	1340	904	2820	
TOC	mg/L	*	6	5	1	1	#	2	2	4	dry	11	2	2	2	<1	<1	5	
pH	pH	*	6.7	6.6	7.1	7.2	#	7.1	7.1	5.6	dry	7.3	6.8	6.5	6.7	7	7.4	6.9	

Table 3.1.1(b) Quarterly analyte testing results for 24 November 2014 *Note: Bore destroyed

Analyte		Monitoring Points																	
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Alkalinity	mg/L	*	1120	761	376	454	278	440	284	44	dry	566	505	365	634	475	248	794	
Calcium	mg/L	*	347	400	117	97	59	234	40	6	dry	136	134	104	210	96	90	130	
Chloride	mg/L	*	1260	1390	704	698	14	553	53	36	dry	709	710	252	923	523	424	1150	
Conductivity	µS/cm	*	5250	5290	2890	3080	578	240	1090	251	dry	3670	3140	1510	4020	2560	1640	4940	
Magnesium	mg/L	*	198	211	67	81	20	75	22	3	dry	99	88	37	153	68	45	130	
Nitrogen	mg/L	*	0.02	0.03	0.02	0.02	0.02	0.05	0.03	0.03	dry	0.02	0.02	1.69	0.02	0.02	0.04	0.09	
Potassium	mg/L	*	3	2	1	<1	<1	<1	<1	<1	dry	<1	<1	4	2	1	2	<1	
Sodium	mg/L	*	618	506	449	499	37	178	84	38	dry	420	423	163	459	338	188	790	
Water Level	m	*	5	0.63	1.9	2.4	11.7	7.73	7.49	10.9	dry	2.73	2.26	3.5	4.15	6.33	3.07	1.51	
Sulfate	mg/L	*	187	222	225	246	24	155	42	15	dry	220	223	93	326	116	28	329	
TDS	mg/L	*	3220	3450	1630	1750	406	1620	455	213	dry	1880	1800	776	2430	1350	1000	2710	
TOC	mg/L	*	<1	<1	<1	<1	<1	<1	<1	<1	dry	<1	<1	1	<1	<1	<1	<1	
pH	pH	*	6.6	6.6	6.8	7	7.2	6.9	7.2	5.8	dry	6.8	6.9	6.4	6.7	7	7.1	6.8	

Table 3.1.1(c) Quarterly analyte testing results for 13 February 2015 *Note: Bore destroyed

Analyte		Monitoring Points																
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	*	1050	714	353	428	84	430	186	39	dry	614	483	409	596	111	240	716
Calcium	mg/L	*	295	337	94	77	10	176	22	4	dry	136	114	109	177	72	79	110
Chloride	mg/L	*	1180	1320	644	648	16	416	40	29	dry	753	676	256	875	472	398	1030
Conductivity	µS/cm	*	5220	5370	2840	2990	245	2280	579	243	dry	3220	3080	1650	3910	2300	1690	4050
Magnesium	mg/L	*	194	208	61	75	4	67	16	2	dry	116	87	45	154	66	46	120
Nitrogen	mg/L	*	<0.0 1	0.01	0.05	0.01	0.02	0.04	0.06	<0.0 1	dry	0.02	<0.0 1	1.28	<0.0 1	<0.0 1	0.01	0.22
Potassium	mg/L	*	3	2	<1	<1	<1	<1	<1	<1	dry	<1	<1	3	1	<1	2	1
Sodium	mg/L	*	744	614	497	569	34	214	66	42	dry	554	524	202	580	400	228	916
Water Level	m	*	5.02	0.57	1.9	2.38	4.55	7.53	7.39	11	dry	2.56	2.12	3.05	4	6.28	2.58	1.34
Sulfate	mg/L	*	165	172	171	220	13	127	31	12	dry	215	192	104	278	96	25	262
TDS	mg/L	*	2960	3230	1620	1600	296	1110	299	198	dry	1940	1630	912	2250	1220	968	2400
TOC	mg/L	*	7	4	<1	1	7	<2	2	<1	dry	<3	<1	8	<1	<1	<1	5
pH	pH	*	6.6	6.6	6.6	6.9	6	6.8	6.7	5.4	dry	6.6	6.7	6.3	6.6	6.8	6.8	6.7

Table 3.1.1(d) Quarterly analyte testing results for 25 May 2015 *Note: Bore destroyed

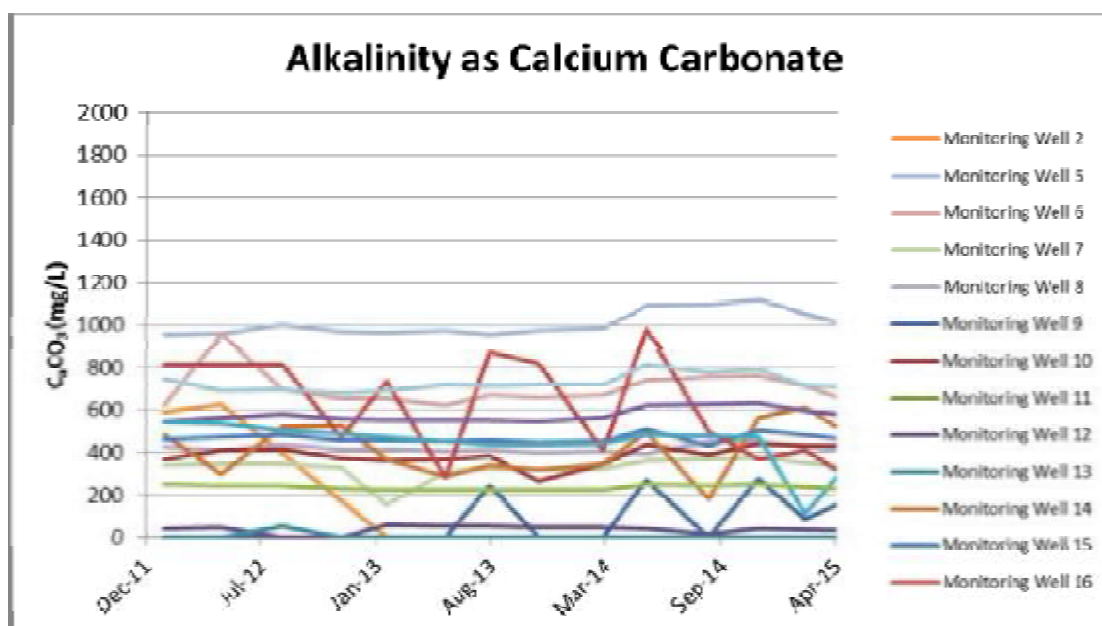
Analyte		Monitoring Points																	
	Units	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Alkalinity	mg/L	*	987	617	327	398	210	432	159	32	dry	440	453	239	566	430	218	707	
Calcium	mg/L	*	302	338	104	91	62	181	26	7	dry	37	153	77	220	97	104	120	
Chloride	mg/L	*	1070	1200	559	586	19	320	34	42	dry	109	615	228	816	473	388	986	
Conductivity	µS/cm	*	5440	5450	2830	3120	516	2530	529	282	dry	1590	3030	1380	4100	1300	1750	4980	
Magnesium	mg/L	*	199	214	62	80	14	64	19	4	dry	22	100	42	170	77	52	125	
Nitrogen	mg/L	*	0.03	0.03	0.04	0.02	0.04	0.05	0.06	0.14	dry	0.04	0.01	0.54	<0.0 1	0.02	0.13	0.1	
Potassium	mg/L	*	3	2	<1	<1	<1	<1	<1	<1	dry	3	3	2	2	1	1	<1	
Sodium	mg/L	*	602	496	391	452	27	176	57	40	dry	230	433	158	494	347	187	780	
Water Level	m	*	4.77	0.49	1.7	2.2	10.5 9	7.25	6.95	10.1 6	dry	2.52	2.02	3.04	3.93	6.08	2.74	1.36	
Sulfate	mg/L	*	174	207	178	218	13	129	30	15	dry	42	205	100	319	112	25	298	
TDS	mg/L	*	2900	3130	1400	1600	300	988	260	221	dry	692	1660	686	2160	1300	834	2540	
TOC	mg/L	*	6	5	<1	2	2	2	2	1	dry	6.8	2	7	5	2	<1	<5	
pH	pH	*	6.6	6.9	7.3	7.4	7.10	7	7.1	5.7	dry	9	7.4	6.3	6.8	7.1	7.4	6.8	

Table 3.1.1(e) Annual analyte testing 13 February 2015 results *Note: Bore destroyed

Analyte	Units	Monitoring Points																
		2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Aluminium	mg/L	*	1.7	0.19	0.08	0.12	8.087	0.06	0.07	0.34	Dry	0.52	0.03	2.31	0.81	0.26	0.29	0.33
Arsenic	mg/L	*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	Dry	<0.001	<0.001	0.003	0.001	<0.001	<0.001	0.002
Barium	mg/L	*	0.006	0.015	0.005	0.09	0.043	0.015	0.002	<0.001	Dry	0.051	0.012	0.263	0.005	0.016	0.144	0.047
Benzene	µg/L	*	<1	<1	<1	<1	<1	<2	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/L	*	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	Dry	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0002	<0.0001
Chromium (hex.)	mg/L	*	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	Dry	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01
Chromium (total)	mg/L	*	0.001	<0.01	<0.001	<0.001	0.001	0.001	<0.001	<0.001	Dry	0.002	0.001	0.003	<0.001	<0.001	0.001	<0.001
Cobalt	mg/L	*	<0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	Dry	0.002	<0.001	0.024	<0.001	<0.001	<0.001	0.008
Copper	mg/L	*	0.003	0.003	0.003	0.006	0.012	0.002	0.001	<0.001	Dry	<0.001	0.002	0.022	0.004	0.012	0.016	0.007
Ethyl Benzene	µg/L	*	<2	<2	<2	<2	<2	<2	0.001	2	Dry	<2	<2	<2	<2	<2	<2	<2
Fluoride	mg/L	*	0.5	0.5	0.5	0.9	0.2	0.4	0.7	0.3	Dry	0.7	0.7	0.2	0.4	0.5	0.4	0.9
Lead	mg/L	*	0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	Dry	<0.001	0.001	0.007	0.002	<0.001	0.004	0.002
Manganese	mg/L	*	0.045	0.302	0.006	0.057	0.059	0.28	0.019	0.007	Dry	0.125	0.003	4.38	0.043	0.077	0.526	1.68
Mercury	mg/L	*	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	Dry	<0.0001	0.0001	<0.0001	0.0001	0.0001	0.0001	<0.0001
Nitrate	mg/L	*	<0.01	<0.01	<0.01	0.07	0.33	<0.01	0.02	4.82	Dry	<0.01	0.01	0.06	0.11	<0.01	0.3	0.6
Nitrite	mg/L	*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01
OCP	µg/L	*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Dry	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
OPP	µg/L	*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Dry	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH	µg/L	*	<1	<1	<1	<1	<1	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	*	<2	<2	<2	<2	<2	<2	<2	<2	Dry	<2	<2	<2	<2	<2	<2	<2
TPH	µg/L	*	<50	<50	<50	<50	<50	<50	<50	<50	Dry	<50	<50	<50	<50	<50	<50	<50
Total Phenolics	mg/L	*	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	Dry	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05
Xylene	µg/L	*	<2	<2	<2	<2	<2	<2	<2	<2	Dry	<2	<2	<2	<1	<2	<2	<2
Zinc	mg/L	*	0.011	0.008	0.005	0.009	0.021	0.008	0.01	<0.005	Dry	<0.005	0.006	0.109	0.015	0.009	0.018	0.025

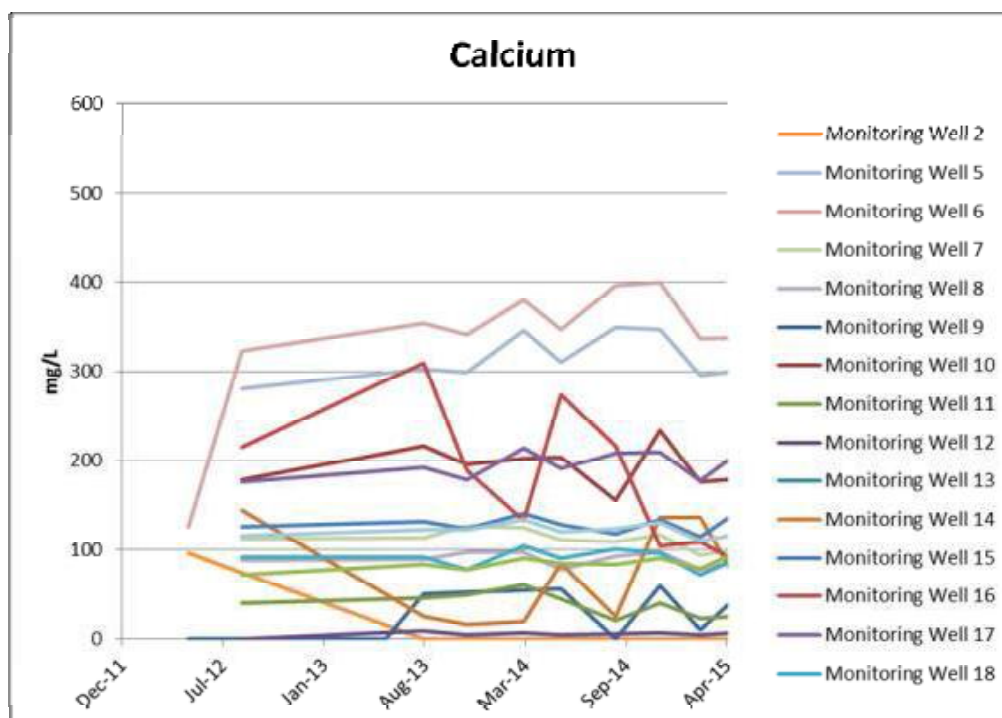
3.1.2 Data Presentation – Quarterly Monitoring

Alkalinity results presentation



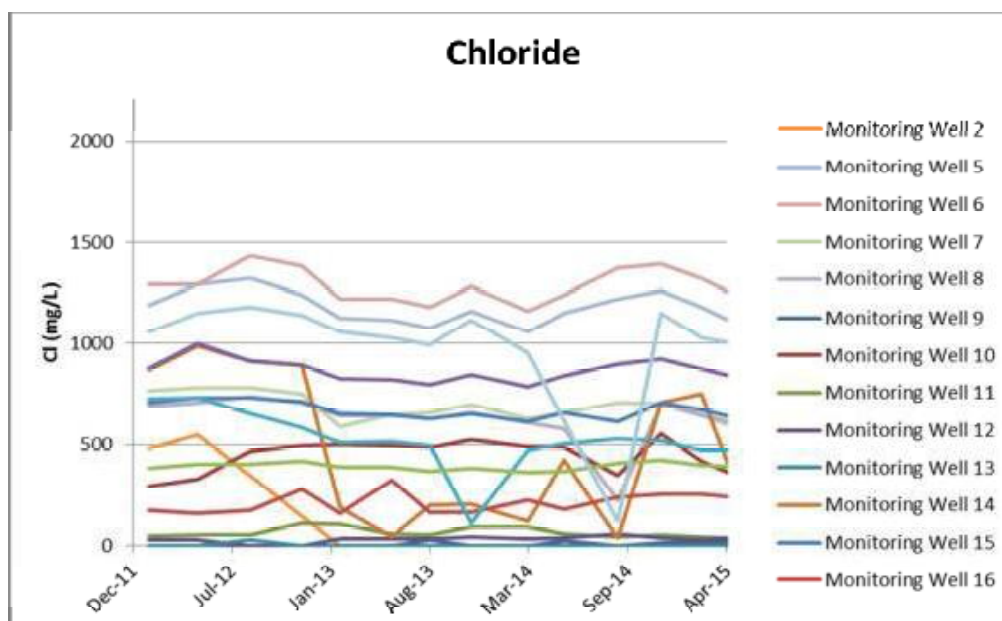
Increased alkalinity levels can be caused by many chemical processes including the denitrification process common in landfill leachate. Denitrification is the anaerobic biological reduction of nitrate (NO₃) to nitrogen (N₂) in its gaseous form. Under anoxic conditions microorganisms consume the oxygen in the nitrate and liberate the nitrogen. This process produces calcium carbonate as a by-product. The stability of the calcium carbonate in the groundwater monitoring wells over the sample period shows that it is unlikely that the denitrification process caused by leachate ingress is taking place in the groundwater around the site. Nonetheless, the calcium carbonate levels are relatively high and quite “hard” in plumbing terms and continued monitoring is necessary to scrutinise for any increased value trends. It should be noted that many natural groundwater sources often contain much higher alkalinity levels than this site.

Calcium results presentation



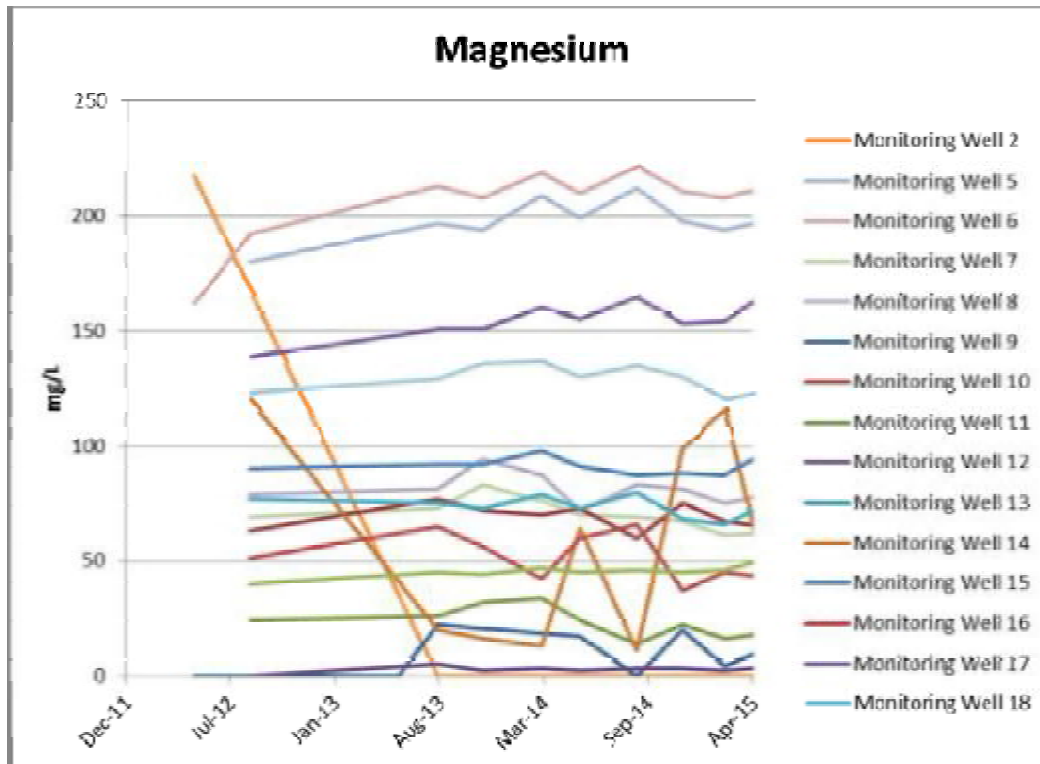
The groundwater monitoring wells show a consistent stable trend for calcium levels. The calcium levels sampled would be considered "hard" water in the region of 120-180mg/L. This is consistent with the presented results for alkalinity.

Chloride results presentation



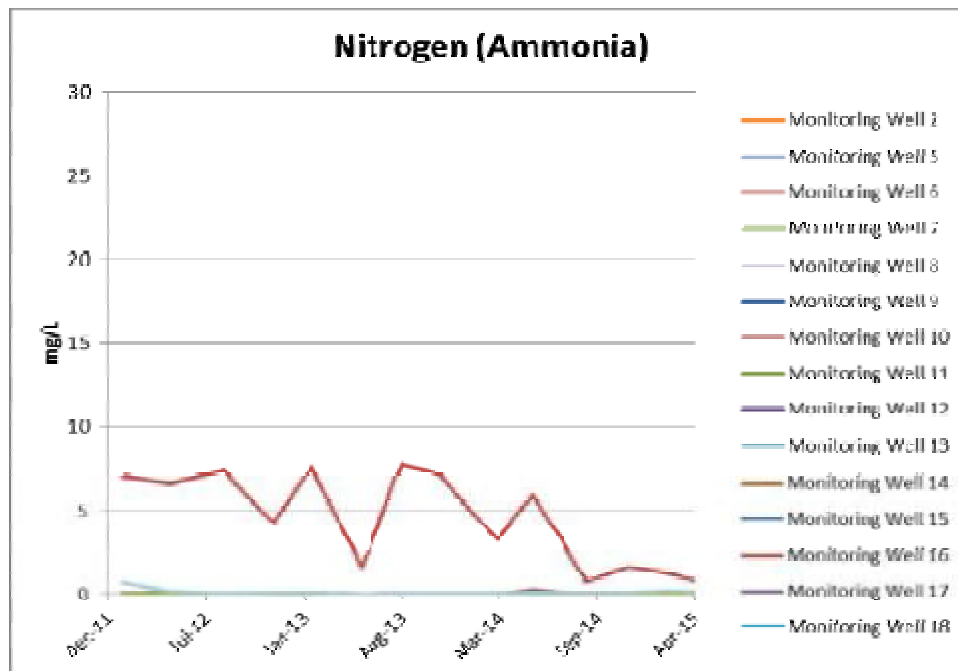
The trends realised through chloride monitoring have been in line with the historical levels over the data range available. Large quantities of inorganic ions such as chloride can be an indicator of leachate contamination of groundwater. A sudden increase in these ions can act as early warning system. The sampling history for chloride suggests that no significant spikes have occurred that has not returned to normal or historical levels and therefore leachate is not indicated in the groundwater network.

Magnesium results presentation



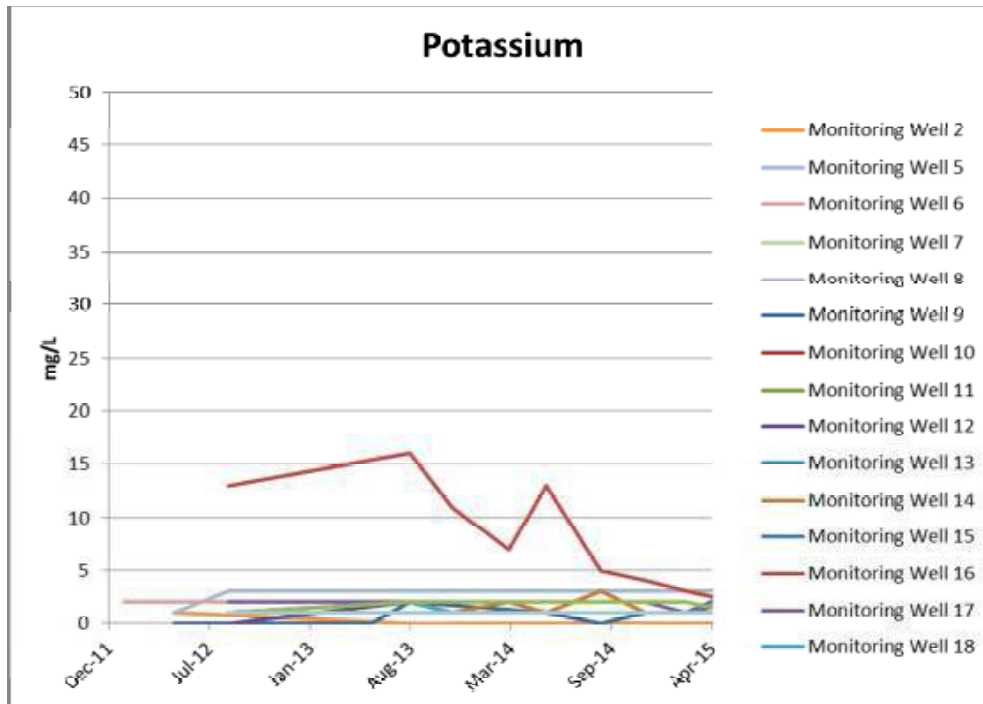
Groundwater monitoring well results are in line with historical levels and have maintained consistent levels. The magnesium levels sampled would be considered quite “hard” and consistent with other typical water hardness measures such as alkalinity and calcium.

Nitrogen as ammonia results presentation



The groundwater monitoring wells indicate that ammonia levels in the groundwater are extremely low and often beneath the testing limits. However, monitoring point 16 has indicated a relatively higher result level, it is trending down, particularly in this reporting period. Considering that monitoring points 16 and 19 are arguably the most relevant with regard to groundwater movement from the site, the result must be monitored closely. Ammonia is perhaps the clearest indicator of leachate contamination and the results from monitoring point 16 should continue to be monitored in future sampling events to be sure that the relative higher levels are not indicative of leachate migration.

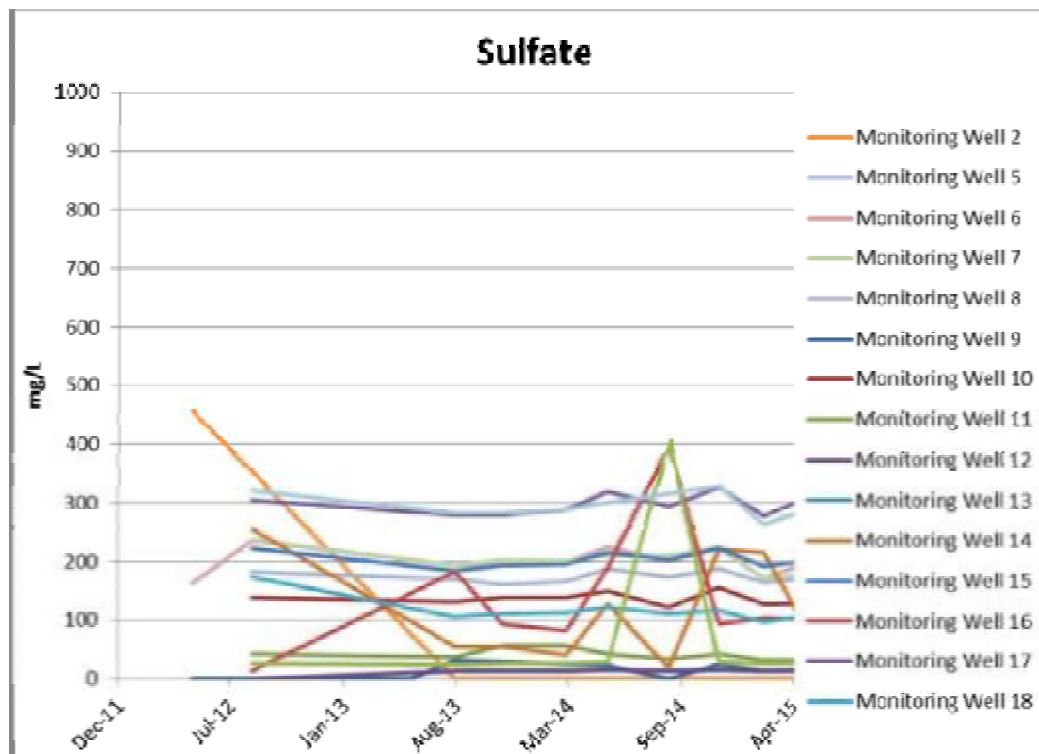
Potassium results presentation



Potassium is present in groundwater systems outside coastal areas generally through weathering of clays and as a result of agriculture (leaching of fertiliser). Potassium may also be present in the breakdown of glass and especially cathode ray tubes. Groundwater monitoring wells indicate that potassium levels in the ground water are generally low over the available results period. Monitoring point 16 was reading higher than all other bores, but again is showing a positive downward trend.

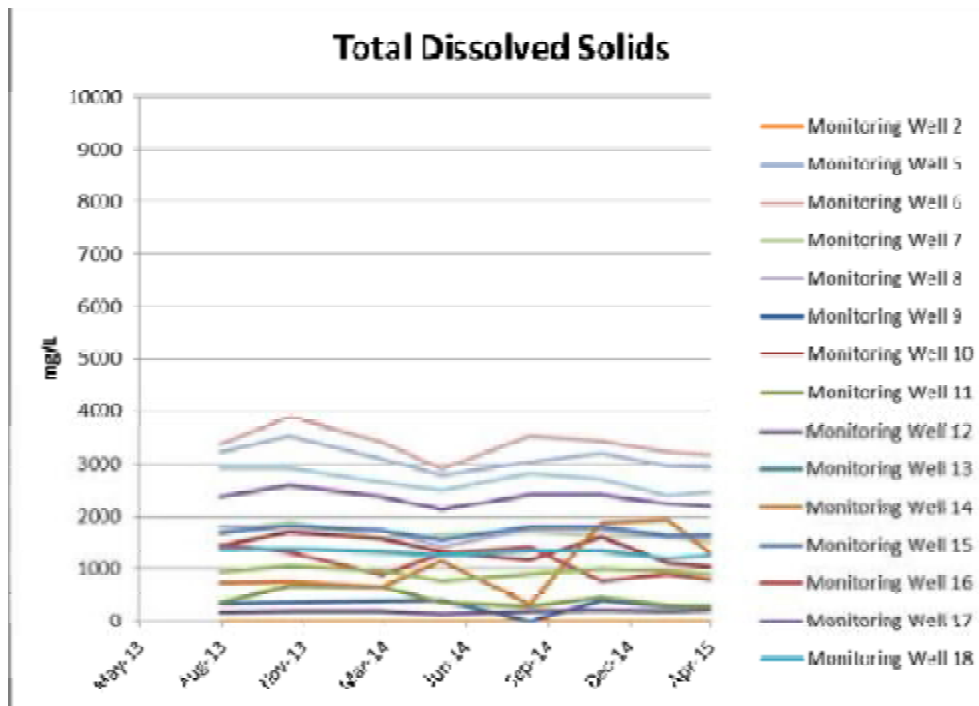
Groundwater level trends have been fairly stable, with the fluctuation over the 4 year testing period. It should be noted that some bores have run dry at periods.

Sulfate results presentation



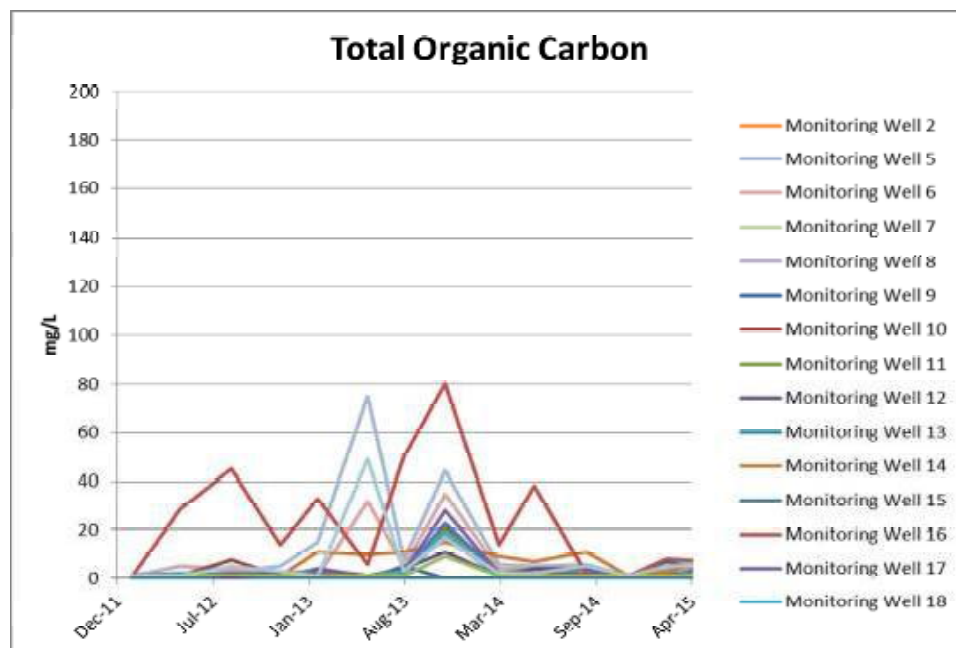
The 2011 Australian Drinking Water Guidelines 6 sets maximum sulfate levels in drinking water as 500mg/L. The sulfate levels in the groundwater monitoring wells are in line with the historical levels and are generally below the drinkable water standard. Inorganic ions such as sulfate provide a good indication of groundwater contamination by landfill leachate. A sudden increase in these ions can act as early warning system, monitoring point 11 and 16 did spike, however they have returned to historic trends in subsequent sampling rounds.

Total dissolved solids results presentation



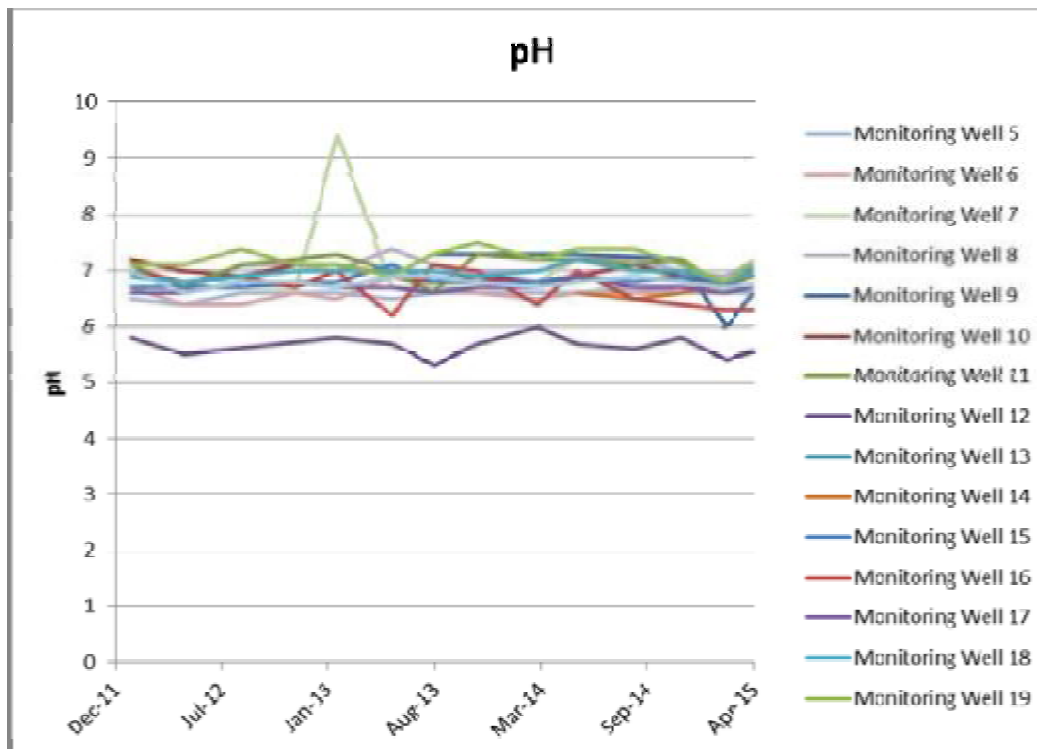
The trend for the quantity of dissolved solids has been fairly stable for the ground water monitoring wells over the reporting period, in line with historical trends. High levels of dissolved solids can be sourced from salts derived from leachate infiltration.

Total organic carbon results presentation



Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of groundwater contamination by organic compounds derived from the landfilling of organic matter. The amount of total organic carbon has remained relatively stable over the three year results period. Monitoring point 16 has also stabilised during this reporting period.

pH results presentation

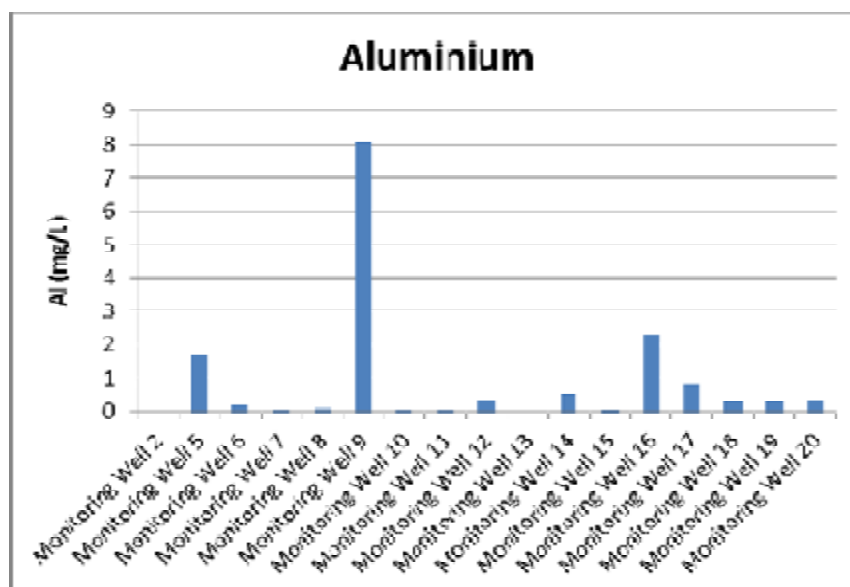


The pH levels indicated in the groundwater monitoring wells have been extremely stable over the three year sample period. The fluctuations have been very small except with minor anomalies that invariably return to a stable trend. The groundwater monitoring wells indicate that the historical pH of the groundwater has been maintained over the sample period.

3.1.3 Data Presentation – Annual Monitoring

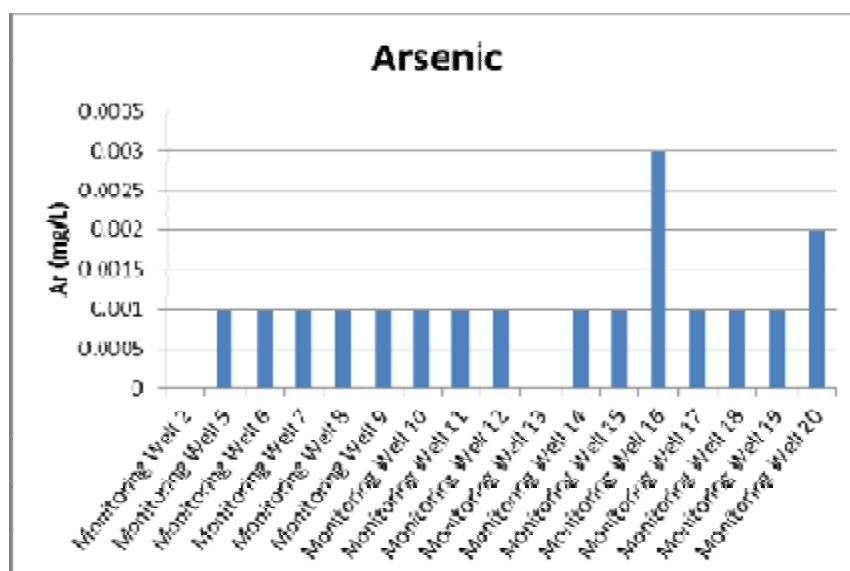
Note: Monitoring Point 2 is damaged and is scheduled for repair and Monitoring Point 13 was dry for the round of annual testing.

Aluminium results presentation



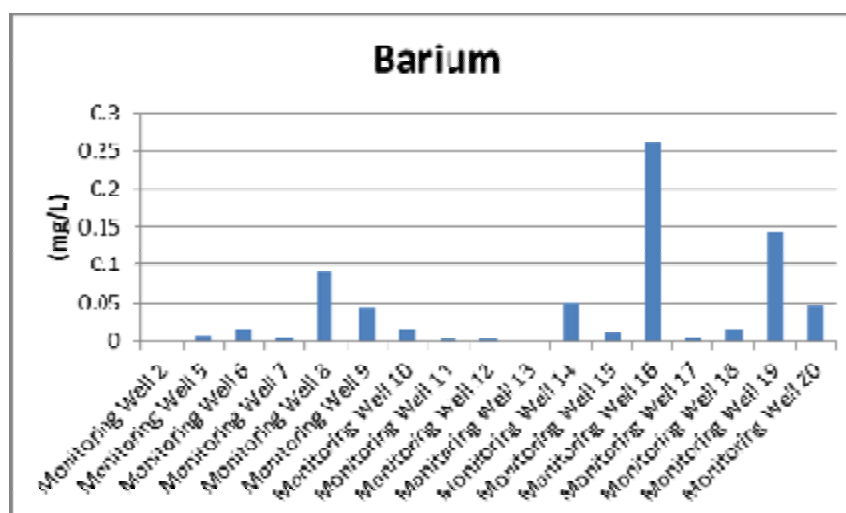
Aluminium levels in the sampled groundwater monitoring points 5, 9, and 16 are relatively higher than the other point's onsite. Anthropogenic sources of aluminium in groundwater are generally related to low pH runoff and colliery based leachate.

Arsenic results presentation



The US EPA sets the maximum contaminant level of arsenic in groundwater at 0.05mg/L. Therefore amount of arsenic found in the groundwater monitoring bores over the reporting period is extremely low. In fact arsenic levels are below detectable limits in almost all of the test results, the only exceptions being monitoring point 16 and 20.

Barium results presentation

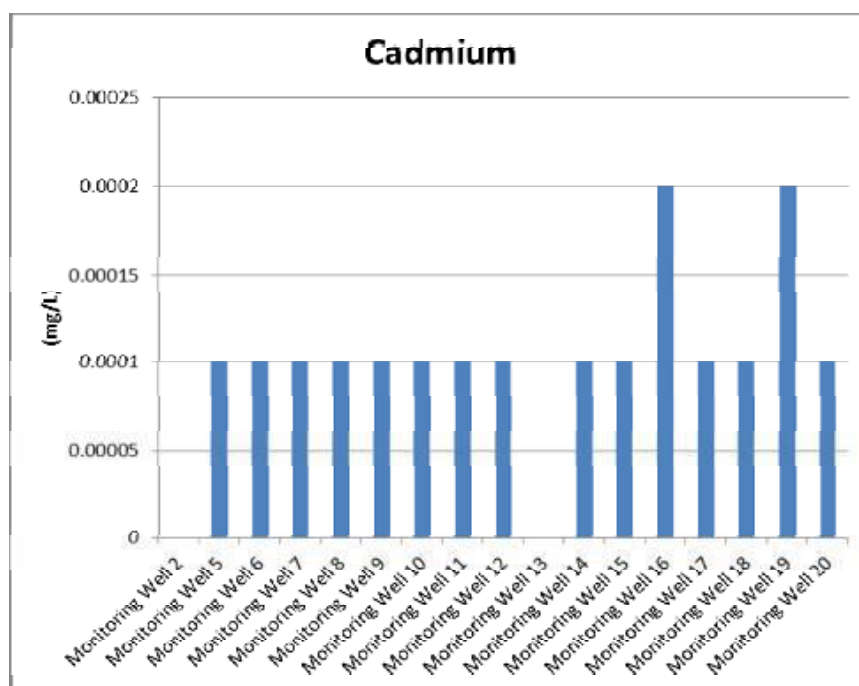


The 2011 Australian Drinking Water Guidelines 6 states that a maximum of 2 mg/L of barium is safe for consumption. Anthropogenic sources of barium in groundwater include bleaches, dyes and drillers mud. Barium levels are therefore extremely low and stable in the sites groundwater.

Benzene results presentation

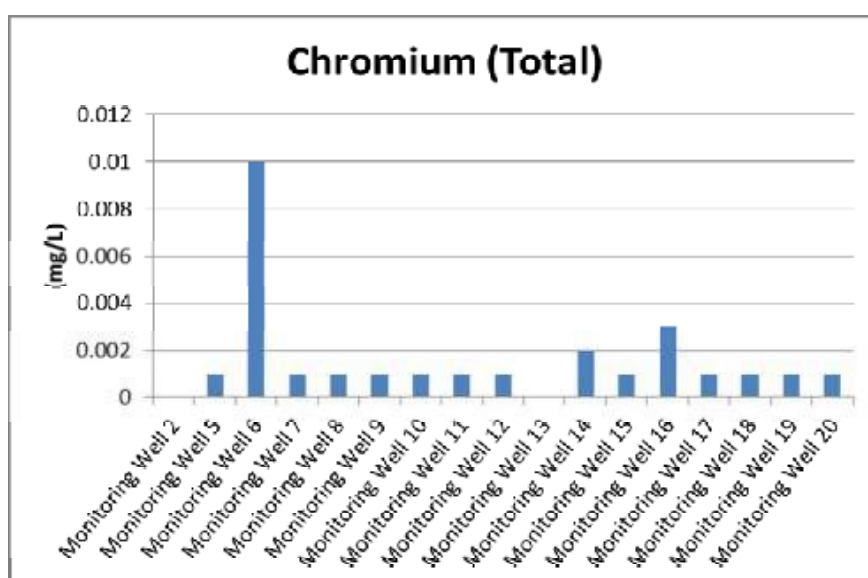
Benzene has not been modelled as every instance of sampling has not provided a result due to the concentration of benzene being below laboratory testing thresholds.

Cadmium results presentation



The US EPA sets the maximum contaminant level of cadmium in groundwater at 0.01mg/L. Cadmium levels present in the ground water monitoring bores is extremely small. Cadmium levels are always below 0.01 mg/L and below detectable limits in the majority of readings taken during the reporting period.

Chromium results presentation

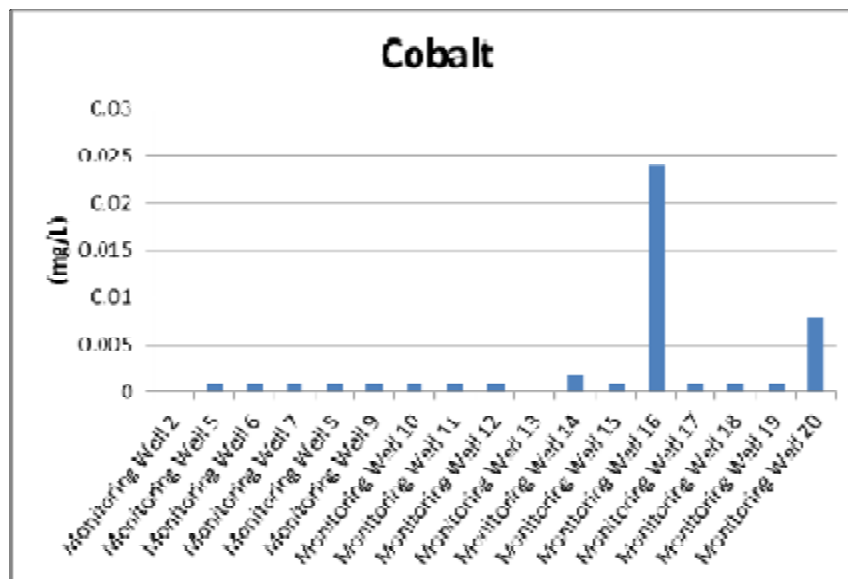


The US EPA sets the maximum contaminant level of chromium in groundwater at 0.05mg/L. The levels of chromium detected in the ground water monitoring wells over the reporting period have been extremely low. Chromium levels are below detectable limits in the majority of the samples.

Chromium (hexavalent) results presentation

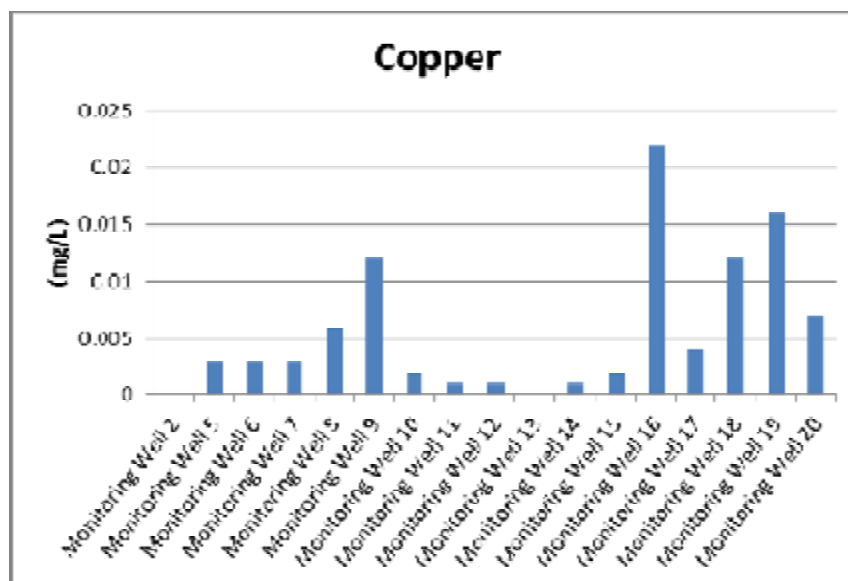
Hexavalent chromium has not been modelled as every instance of sampling has not provided a result due to the concentration of hexavalent chromium being below laboratory testing thresholds.

Cobalt results presentation



Anthropogenic sources of cobalt in the environment include agricultural runoff and sewage effluent.

Copper results presentation

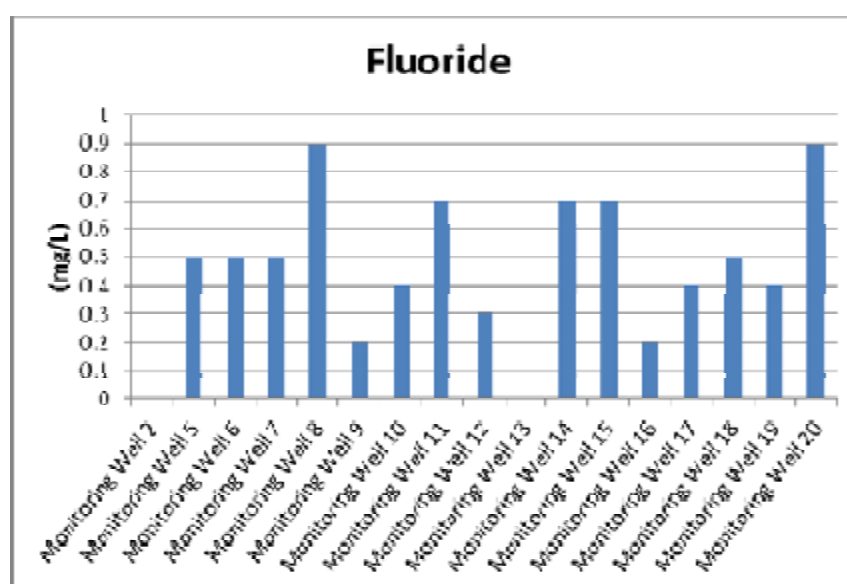


Tested results from the ground water monitoring wells show an extremely small amount of copper. The *2011 Australian Drinking Water Guidelines* 6 prescribes an aesthetic limit of 1 mg/L of copper in drinking water. Clearly, the results therefore indicate that copper contamination is not evident.

Ethyl Benzene results presentation

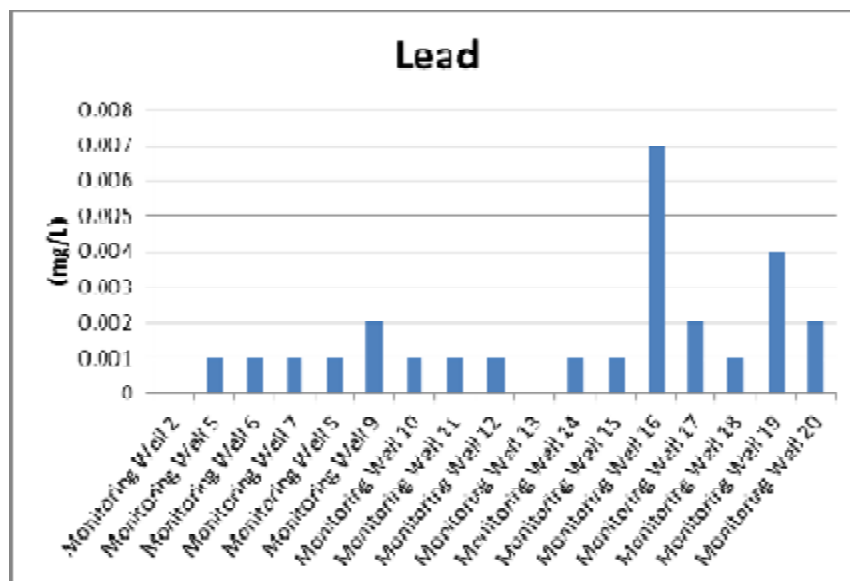
Ethyl benzene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

Fluoride results presentation



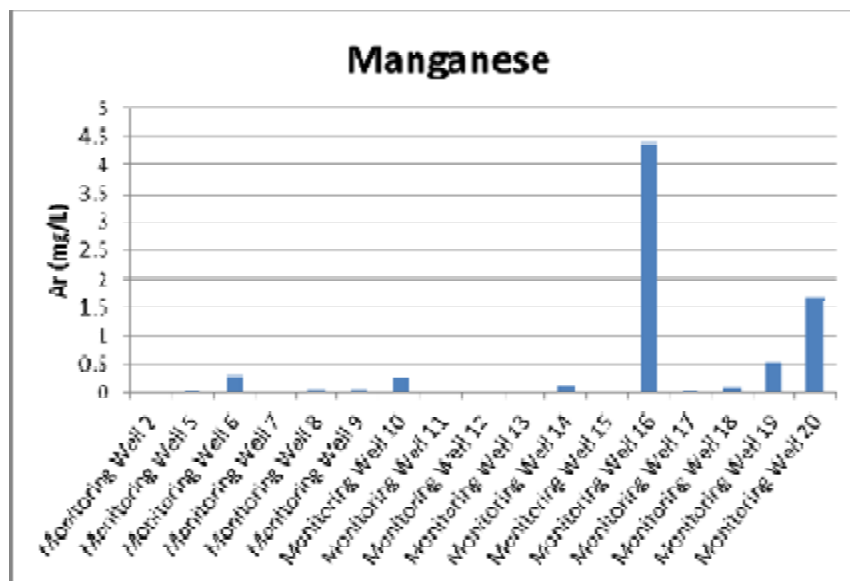
Industrial emissions are understood to be the primary anthropogenic pathway for fluoride to enter the environment. The US EPA sets the maximum contaminant level of fluoride in groundwater at 4 mg/L. Fluoride occurs in Australian drinking water at levels up to 1.5 mg/L.

Lead results presentation



Heavy metal contamination in the groundwater in the form of lead is at very low levels.

Manganese results presentation

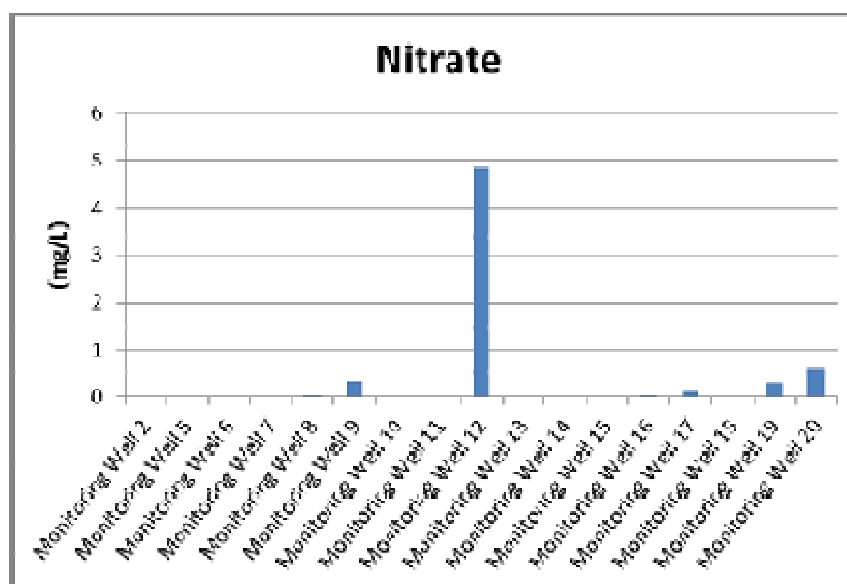


The 2011 Australian Drinking Water Guidelines 6 states that a maximum of 0.5 mg/L of manganese is safe for consumption. Manganese can be a strong indicator of landfill leachate in groundwater leached from hazardous waste sites and often derived from battery disposal. Monitoring points 16 and 20 should continue to be closely monitored in future sampling events.

Mercury results presentation

Mercury was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

Nitrate results presentation



The 2011 Australian Drinking Water Guidelines 6 states that a maximum of 50 mg/L of nitrate is safe for consumption. Denitrification is a process common in leachate treatment where the anaerobic biological reduction of nitrate (NO_3) to nitrogen (N_2) in its gaseous form occurs. Under anoxic conditions microorganisms consume the oxygen in the nitrate and liberate the nitrogen. The relatively low levels of nitrate sampled, indicate that the denitrification process is not evident and landfill leachate is not present in the groundwater.

Nitrite results presentation

Nitrification is a twostep aerobic biological process where bacteria known as nitrosomonas convert ammonia and ammonium to nitrite. Next, bacteria called nitrobacter finish the conversion of nitrite to nitrate. The conversion of nitrite to nitrate is generally very fast and nitrite levels are therefore invariably quite low. More toxic than nitrate, nitrite is an indicator of ammonia (major constituent of landfill leachate) that has not been biologically processed (into nitrate). Nitrite levels above 3 mg/L are considered potentially harmful by the *2011 Australian Drinking Water Guidelines* 6.

Nitrite levels found in the ground water monitoring wells are extremely small and below detectable limits in almost all of the samples taken. Monitoring points 15 and 16 were the only two points with detectable levels at 0.01 mg/L, all other monitoring points presented < 0.01mg/L.

Organochlorine Pesticides results presentation

Organochlorine pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. Therefore historical comparison is futile.

Organophosphate Pesticides results presentation

Organophosphate pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. Therefore historical comparison is futile.

Polycyclic Aromatic Hydrocarbons results presentation

Polycyclic aromatic hydrocarbons were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. Therefore historical comparison is futile.

Toluene results presentation

Toluene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

Total Petroleum Hydrocarbons results presentation

Total petroleum hydrocarbons were not detected at any level in the ground water monitoring points during the reporting period.

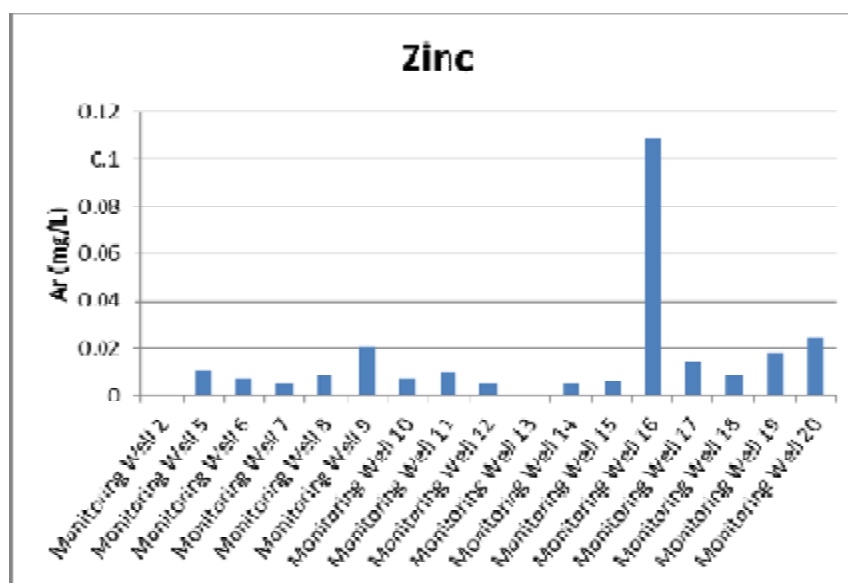
Total Phenolics results presentation

Total phenolics were detected at minimal levels of 0.05mg/L at monitoring point 18 and Point 20 the ground water monitoring wells during the reporting period. No other monitoring points detected this analyte.

Xylene results presentation

Xylene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. Therefore historical comparison is futile.

Zinc results presentation



The 2011 Australian Drinking Water Guidelines 6 states that for aesthetic reasons a maximum of 3 mg/L of zinc is desirable for consumption. Landfill sites can be an anthropogenic source of zinc in groundwater, however despite the extremely low levels of zinc detected monitoring point 16 should be further monitored due to the display of levels higher than the other surrounding points.

3.1.4 Groundwater Testing Results Interpretation

Results indicate that there has been no definitive increase in concentration levels for any of the analytes detailed when compared to the historical results and trends. The following table indicates the analytes that should be closely monitored for developing trends over the next twelve months:

Analyte	Monitoring Point	Regime	Next Sample
Cadmium	16, 19	Annual	February 2016
Barium	16	Annual	February 2016
Manganese	16, 19, 20	Annual	February 2016

On reflection, key indicators of landfill leachate's potential ingress into ground water including ammonia, nitrate, nitrite levels and other less poignant indicators as tested do not conclude that that landfill leachate is entering the surrounding ground water system. However, the potentially anomalous results presenting in monitoring point 16 warrant continued scrutiny.

3.2 SURFACE WATER MONITORING

3.2.1 Tabulated Results

As per the sites EPL, annual sampling and sampling of each stormwater overflow event was undertaken with the following results:

Table 3.2.1 Stormwater overflow monitoring results for the reporting period

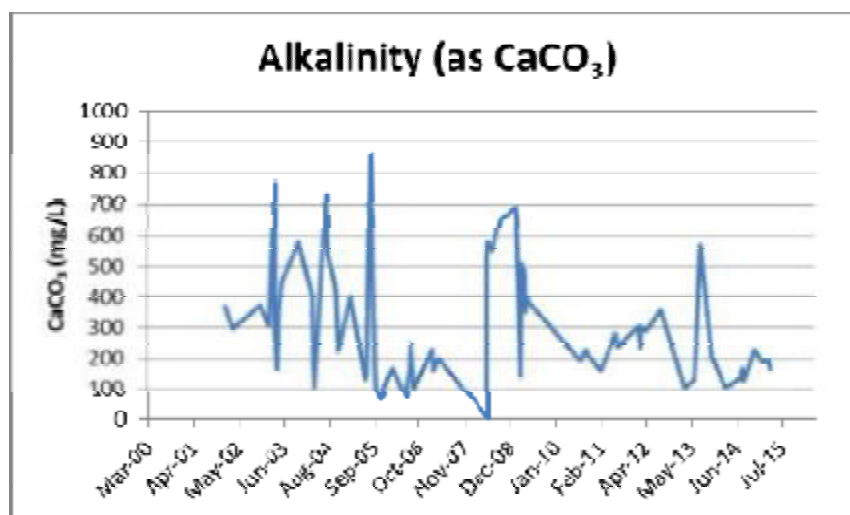
Analyte	Feb 2015	EPA Monitoring Location		
	Units	1	33	34
Alkalinity	mg/L	190	167	153
Ammonia	mg/L	0.07	0.02	0.01
Calcium	mg/L	28	41	31
Chloride	mg/L	71	37	45
Conductivity	µS/cm	670	499	481
Dissolved O ₂	mg/L	6.14	8.12	3.33
Iron	mg/L	0.11	0.11	0.33
Fluoride	mg/L	0.4	0.2	0.2
Magnesium	mg/L	16	19	15
Nitrate	mg/L	1.39	0.07	<0.01
Potassium	mg/L	13	4	6
Sodium	mg/L	100	34	52
Sulfate	mg/L	29	27	14
Temperature	°C	22.9	21.3	21.5
TOC	mg/L	11	2	6
TP	mg/L	<0.05	<0.05	<0.05
TSS	mg/L	10	464	93.3
pH	pH	7.5	7.5	7.4

Additionally, overflow events were also sampled as per the sites EPL. With the following results:

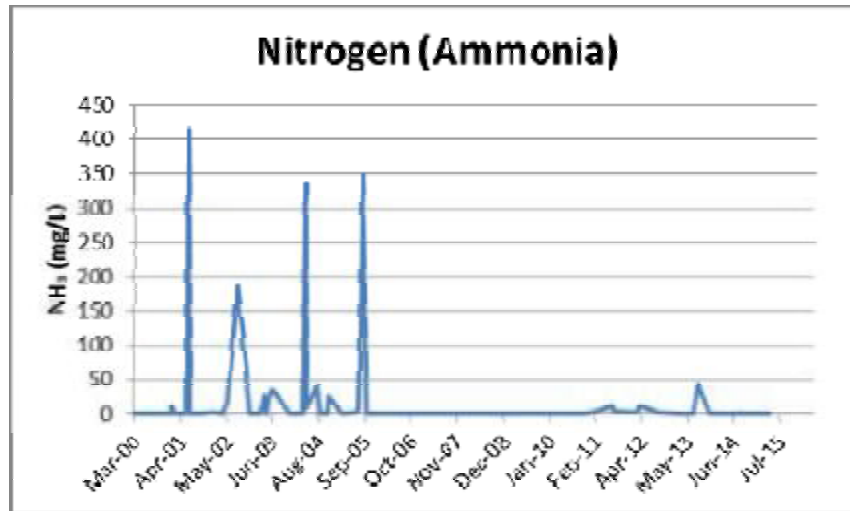
Analyte	Units	EPA Monitoring Point 1							
		29 July 14	19 Aug 14	27 Aug 14	5 Dec 14	29 Jan 15	13 Feb 15	8 Apr 15	21 Apr 15
Alkalinity	mg/L	134	166	126	229	202	190	193	162
Ammonia	mg/L	0.1	2.74	1.62	0.22	0.61	0.07	0.46	0.44
Calcium	mg/L	35	23	23	35	22	28	23	31
Chloride	mg/L	127	80	55	119	92	71	94	50
Conductivity	µS/cm	756	663	522	845	749	670	732	504
Dissolved O ₂	mg/L	9.78	9	7.97	8.12	7.92	6.14	7.53	8.69
Iron	mg/L	<0.05	<0.61	0.38	0.07	0.09	0.11	0.14	0.18
Fluoride	mg/L	1.1	0.4	0.4	0.4	0.6	0.4	0.5	0.4
Magnesium	mg/L	20	14	13	20	16	16	16	14
Nitrate	mg/L	0.11	4.37	2.87	0.59	0.74	1.39	1.3	1.46
Potassium	mg/L	2	15	9	16	13	13	15	10
Sodium	mg/L	85	88	53	118	104	100	88	54
Sulfate	mg/L	41	25	<27	<33	34	29	24	24
Temperature	°C	12.8	13.9	17.5	25.5	20.1	22.9	18.4	14.9
TP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TOC	mg/L	4	19	21	13	15	11	12	10
TSS	mg/L	10	80	88	20	17	10	39	5
pH	pH	8.1	8.2	7.8	7.1	7.8	7.5	8	8

3.2.2 Data Presentation

Alkalinity results presentation

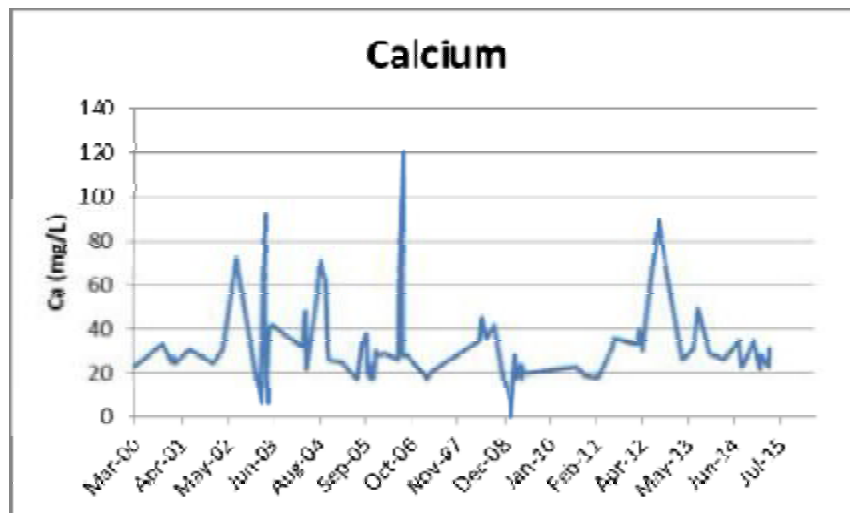


Ammonia results presentation

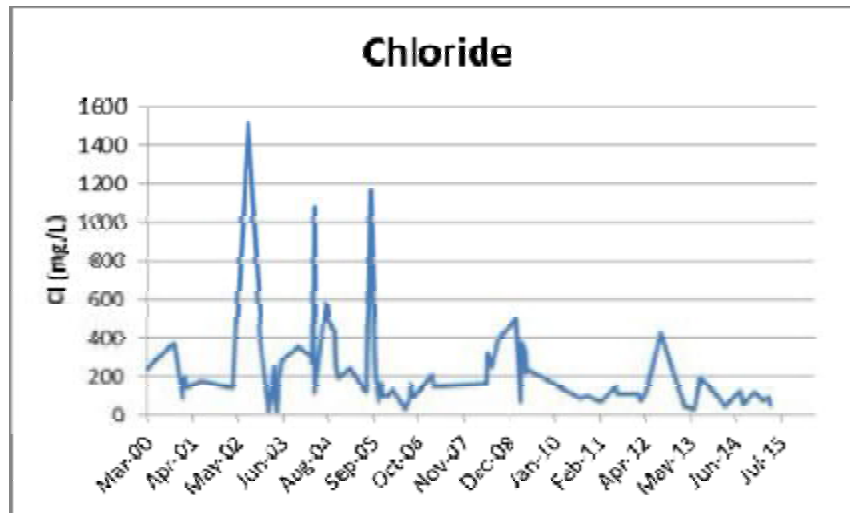


Increased alkalinity and ammonia levels can be caused by biological reactions in landfill leachate. The stability of results, particularly in regard to the reporting period indicates that leachate does not appear to be affecting the stormwater pond. The relatively high alkalinity levels coincide with natural groundwater levels in the area.

Calcium results presentation

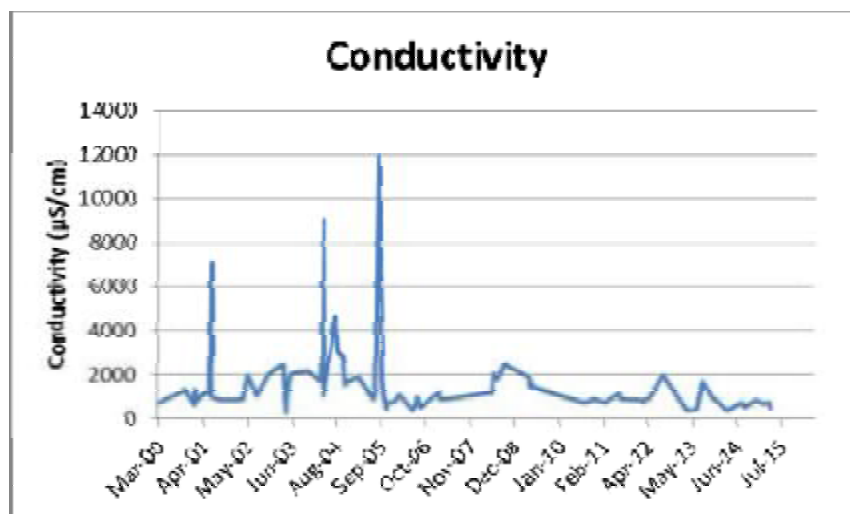


Chloride results presentation

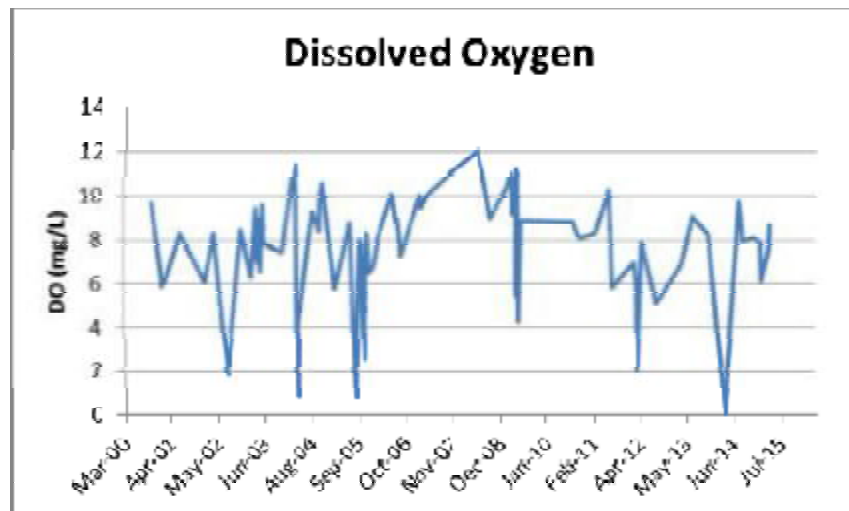


The calcium and chloride levels in the stormwater pond are invariably better than historical results. The levels sampled are also in line with the results sampled throughout the surrounding groundwater system.

Conductivity results presentation

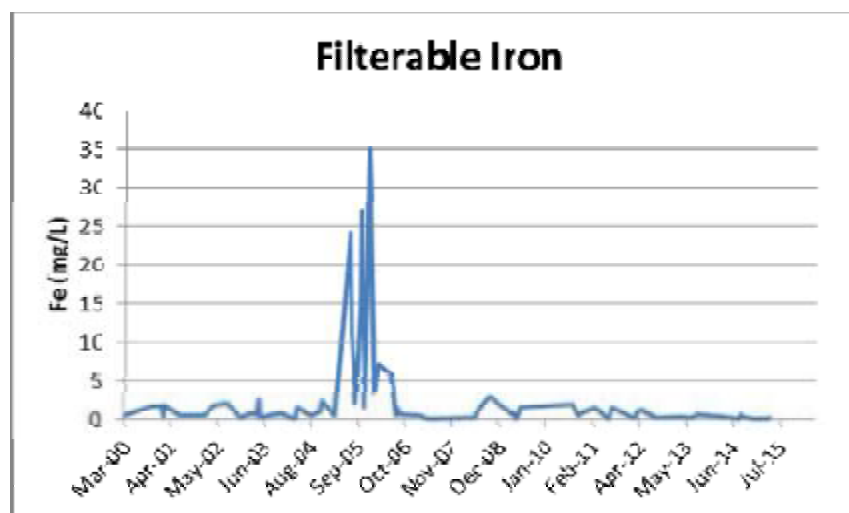


Dissolved oxygen results presentation

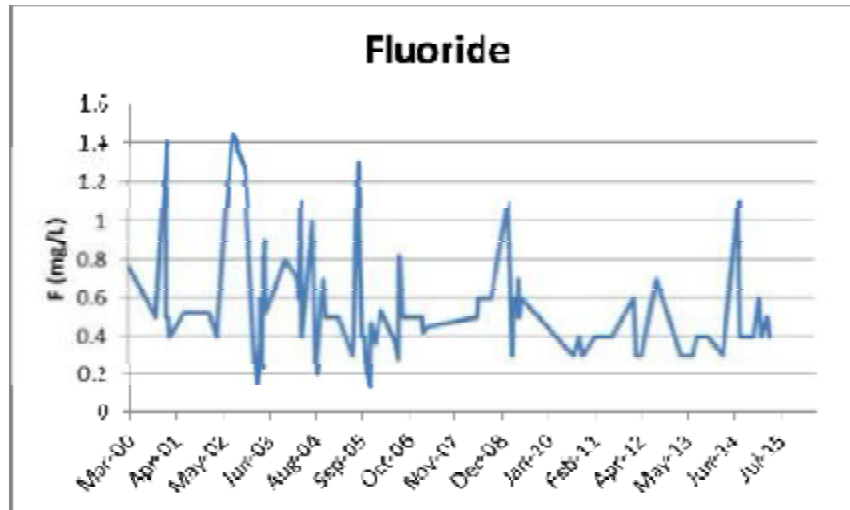


Conductivity is a measure of the water's ability to pass electrical current, usually through positively or negatively charged inorganic dissolved solids (e.g. sodium, magnesium, calcium, iron). The conductivity results for the stormwater detention pond have been stable and trending downwards. Dissolved oxygen levels can be depleted by biological activity associated with the nitrification process. The dissolved oxygen levels have been stable over the history of available results.

Filterable iron results presentation



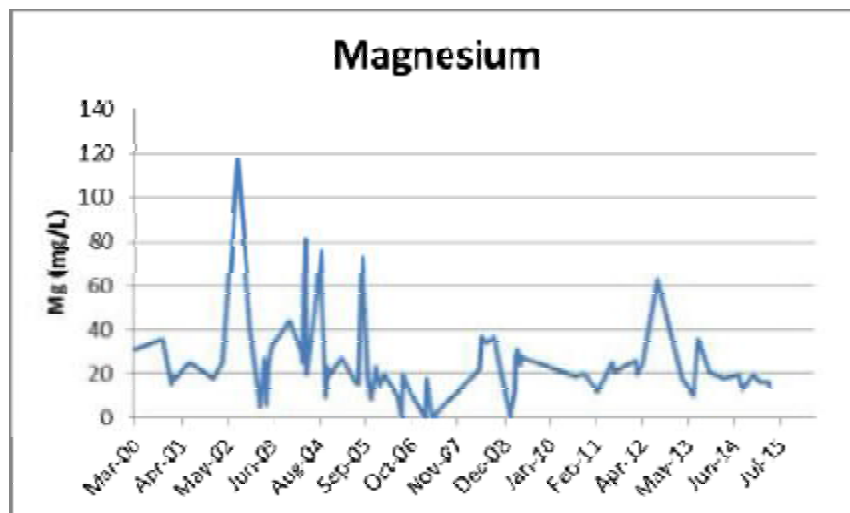
Fluoride results presentation



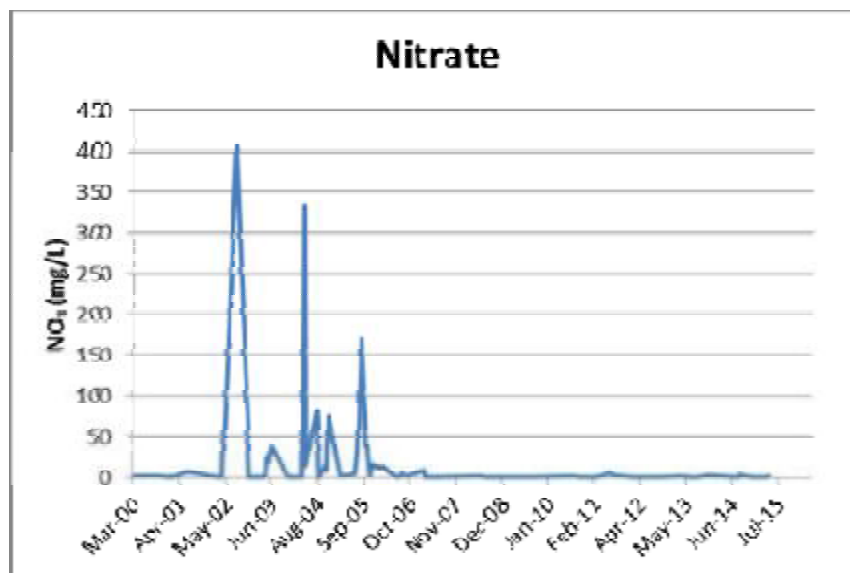
Filterable iron and fluoride have continued to trend at very low levels, especially with regard to the reporting period.

Fluoride occurs in Australian drinking water at levels up to 1.5 mg/L. The level of fluoride found in the stormwater detention pond is therefore relatively low and displays a consistent trend over the twelve year sampling period.

Magnesium results presentation

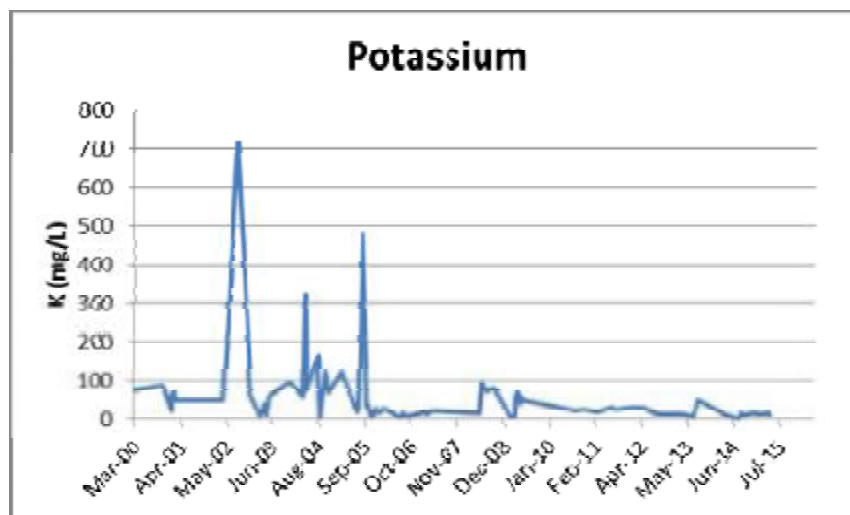


Nitrate results presentation

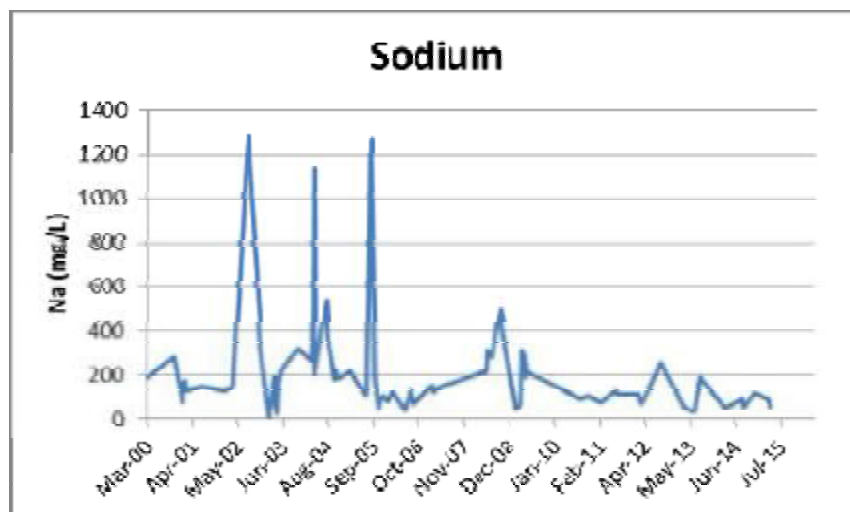


The 2011 Australian Drinking Water Guidelines 6 states that a maximum of 50 mg/L of nitrate is safe for consumption, whilst magnesium is considered as “soft” in the range of 0-60 mg/L. The relatively low levels of nitrate and magnesium sampled indicate that landfill leachate is probably not present in the stormwater detention pond.

Potassium results presentation

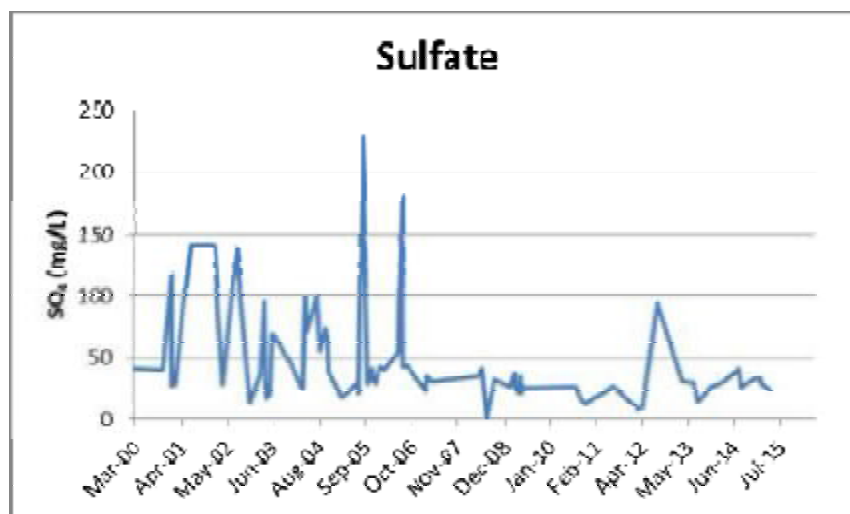


Sodium results presentation



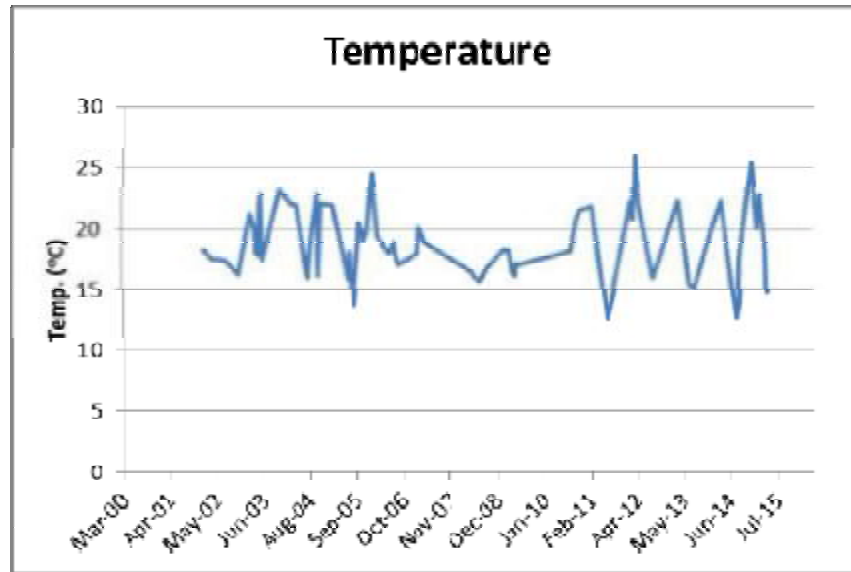
Potassium and sodium concentrations have been in line with recent trends and with the naturally occurring groundwater levels of these analytes around the site. Both analytes have trended downwards in recent years.

Sulfate results presentation



The 2011 Australian Drinking Water Guidelines 6 sets maximum sulfate levels in drinking water as 500 mg/L. The sulfate levels in the stormwater detention pond are in line with the historical levels and are better than the drinkable water standard. Inorganic ions such as sulfate provide a potential indicator of groundwater contamination by landfill leachate. A sudden increase in these ions can act as early warning system.

Temperature results presentation

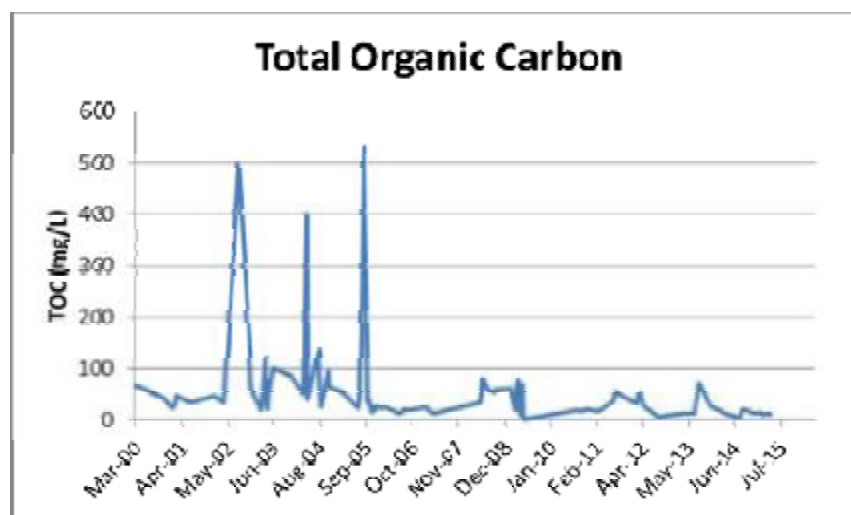


Temperature, as expected has generally been indicative of the season in which the stormwater detention pond has been sampled.

Total phenolics results presentation

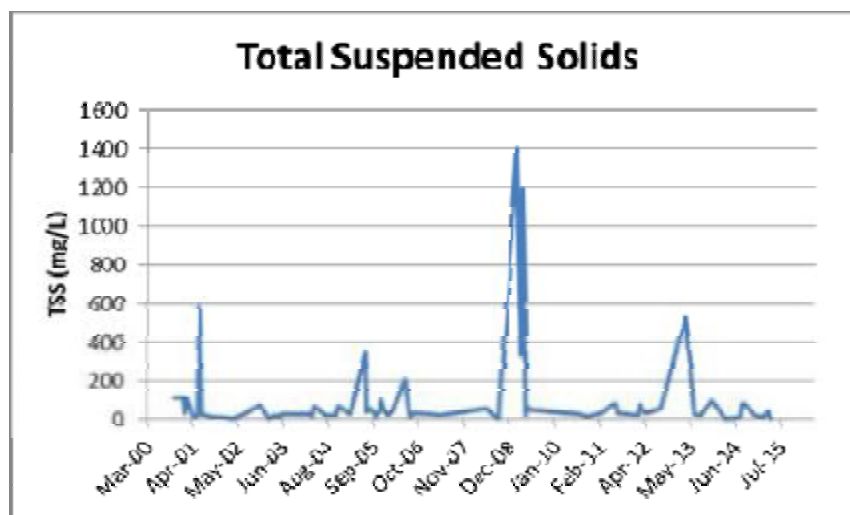
Total phenols are widely used in the manufacture of resins, plastics, insecticides, explosives, dyes, and detergents. It is also used as a raw material for the production of medicinal drugs such as aspirin. Historical results for total phenols have been extremely low and more often than not, below detectable limits in the stormwater detention pond. In fact, all samples taken during the reporting period were below detectable limits.

Total organic carbon results presentation

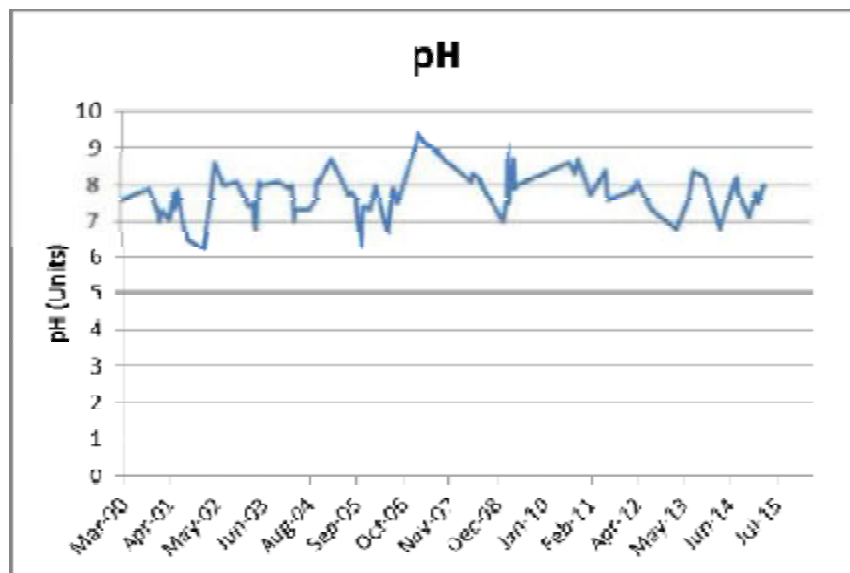


Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of water contamination by natural compounds derived from the landfilling of organic matter. The amount of total organic carbon has remained consistently stable over the last ten years.

Total suspended solids results presentation



pH results presentation



The detention pond analytes measured at the site show relatively low levels of suspended solids and consistent pH levels in the surface water. The suspended solids levels were somewhat inconsistent in the 2008-2009 period, with the amount of solids suspended in the stormwater fluctuating. More

modern results indicate that the stormwater pond is functioning effectively with the exception of a peak in March 2013.

Surface Water Results Interpretation

From the analytical results it can be demonstrated that the sites sediment and stormwater pond infrastructure are performing adequately and as desired.

3.3 AIR EMISSIONS MONITORING

3.3.1 Tabulated Results

Table 3.3.1 Methane monitoring results for the reporting period

Date	Results Above Recommended Threshold 500ppm	Accumulation Above Recommended Threshold 1250ppm
Jun-14	0	0
Jul-14	0	0
Aug-14	0	0
Sep-14	0	0
Oct-14	0	0
Nov-14	0	0
Dec-14	0	0
Jan-15	0	0
Feb-15	0	0
Mar-15	0	0
Apr-15	0	0
May-15	0	0

Presented results are the number of individual sample results derived from monthly testing that are above the EPA Benchmark Technique recommended threshold levels for further action regarding surface emissions (500 ppm) and accumulation levels (1,250 ppm).

3.3.2 Data Presentation

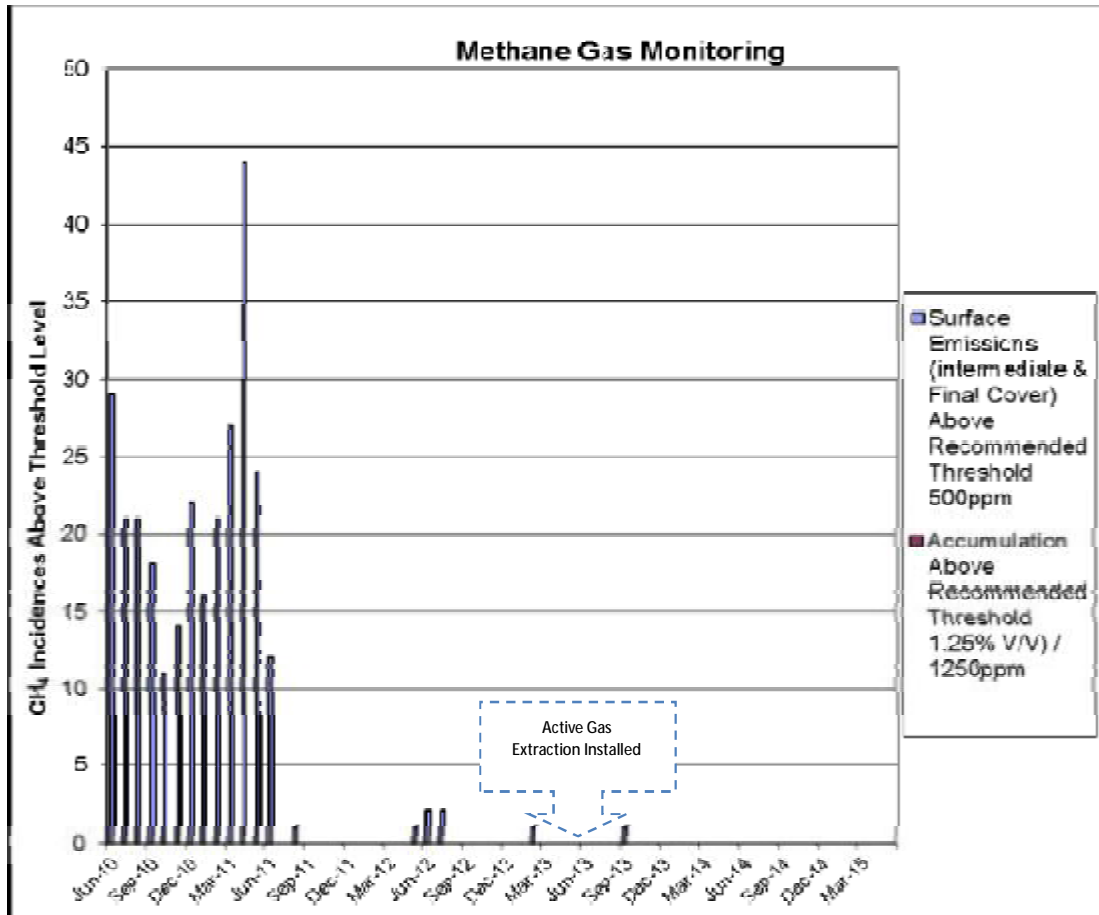


Figure 3.3.2 Air emissions test results above benchmark recommended threshold levels presentation

There is no evident trend for methane gas emissions from the landfill surface. No accumulation levels above the recommended benchmark threshold were found.

3.3.3 Air Emissions Monitoring Results Interpretation

During the period 2011-2012 results sampled by GHD showed continued occurrences of surface methane emissions above the EPA recommended threshold levels. A more recent contract awarded to a NATA approved laboratory (ALS Environmental) has shown that the GHD recorded levels were potentially overstated. Both companies state that the accumulation monitoring clearly shows that the methane is not migrating offsite.

Despite the differences in sample results, the site has the potential to generate relatively high amounts of landfill gas, namely methane that must be dealt with. Accordingly, Council commenced installation of methane gas extraction infrastructure. Phase 1 (covering the older western gully) of the landfill gas management is in place and connected to a flaring unit. Phase 2 (capturing the newer and current eastern gully) has been fully constructed and has been commissioned. The final Phase 3

gas collection system will include infrastructure within the waste filling of the new landfill cell at the WWARRP. Contract procurement is currently underway.

It should be noted that Council has not attempted to rehabilitate the areas prone to surface gas emissions as it would increase the possibility of those somewhat controlled emissions finding a new path of least resistance and becoming uncontrolled.

3.4 ENVIRONMENTAL COMPLAINTS

3.4.1 Tabulated Results

Year	Environmental Complaints
2000/2001	0
2001/2002	99
2002/2003	66
2003/2004	19
2004/2005	36
2005/2006	19
2006/2007	22
2007/2008	21
2008/2009	9
2009/2010	12
2010/2011	12
2011/2012	48
2012/2013	59
2013/2014	48
2014/2015	10

3.4.2 Data Presentation

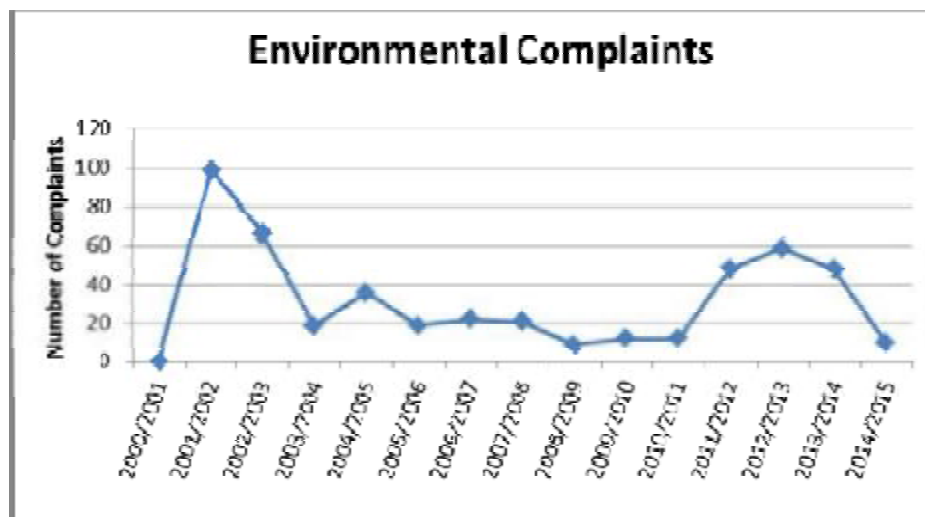


Figure 3.4.2 Environmental complaints results

Environmental complaints have generally trended downwards until the previous three reporting periods where a spike has occurred.

3.4.3 Environmental Complaints Results Interpretation

The overlying trend for environmental complaints had been downward after closure of the solid waste energy recovery facility in 2004. However, the previous three reporting periods have given rise to a spike of approximately 150 complaints, invariably regarding perceived odour from the WWARRP. It should be noted that Council commenced community engagement over a new landfill cell development at Whytes Gully coinciding with the 2011/12 year complaints spike.

For additional clarity of the potential causes in the spike of complaints over the previous reporting periods, Figure 3.4.3 is provided.

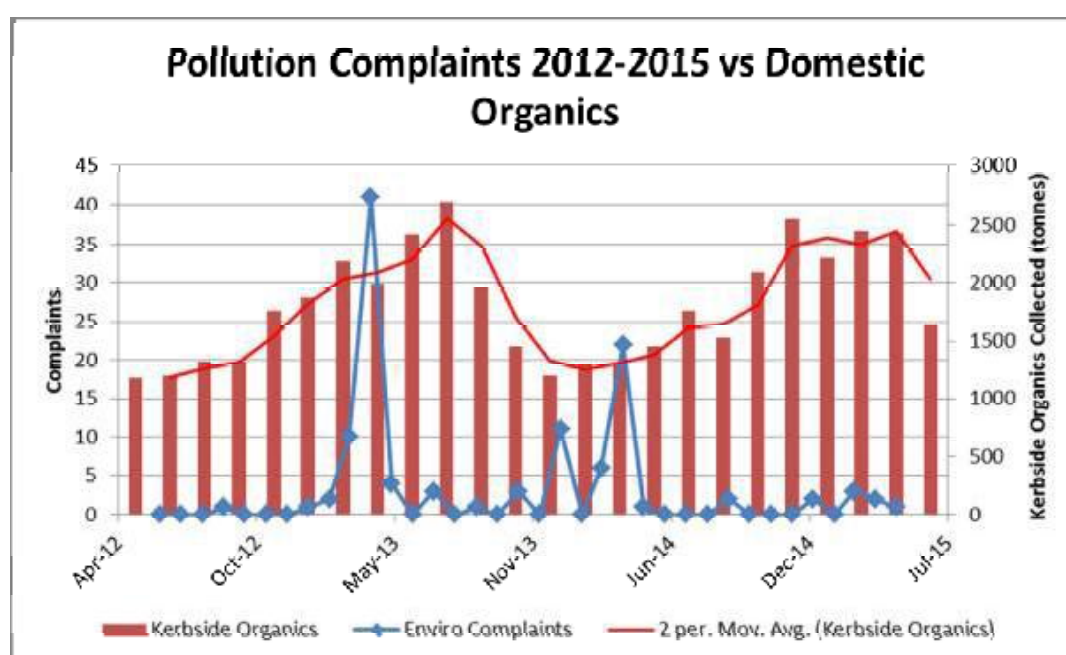


Figure 3.4.3. Pollution Complaints (Odour) vs Domestic Organic Waste Production

As detailed by a blue line in the Figure 3.4.3 (over a two year period), the majority of complaints have been received during late summer and into the autumn season.

The chart also demonstrates in red columns the tonnage of organic waste collected by Wollongong City Council in the kerbside collections. The red line above the columns indicates a non-linear fitted trend curve.

It can be noted from Figure 3.4.3 that complaints align almost perfectly with the increase trend for kerbside organic waste collected. It is also worthy of noting that the green waste is not received at the WWARRP and is instead received at a nearby site also located on Reddalls Road at Kembla Grange.

4 SITE SUMMATION

4.1 DEFICIENCY IDENTIFICATION & REMEDIATION

4.1.1 Surface Methane Emissions above Recommended Benchmark Threshold Levels

As discussed in Section 3.3.3, the site has historically possessed some previously landfilled areas that emit methane gas above the EPA's recommended benchmark level for further investigation into surface gas emissions. Council has not attempted to cap these areas so that the peak emissions locations are identified and so that the possibility of offsite migration is nullified. Council has trialled a biofiltration type system to attempt to reduce the methane emissions from identified peak areas. However, in February 2013 Council commenced installation of a gas extraction system. The gas management system and its future developments are expected to continue to address the gas emission issues that have historically arisen from time to time at the WWARRP. In conjunction with the gas extraction system, additional subsurface sampling points have been recently installed. These points are now included in sampling regimes.

4.1.2 Boreholes Indicating Potentially Imperfect Trend Stability

As discussed in Section 3.1.4, borehole 16 has provided individual and incidental analytical results that require a continued level of scrutiny upon future measurements to ensure negative trends are not establishing. Whilst it is common for individual analytical results to vary from time to time, the prudent course of action is to provide an increased level of vigilance for these analyte and borehole combinations until such time the results return to historic levels or further action is required.

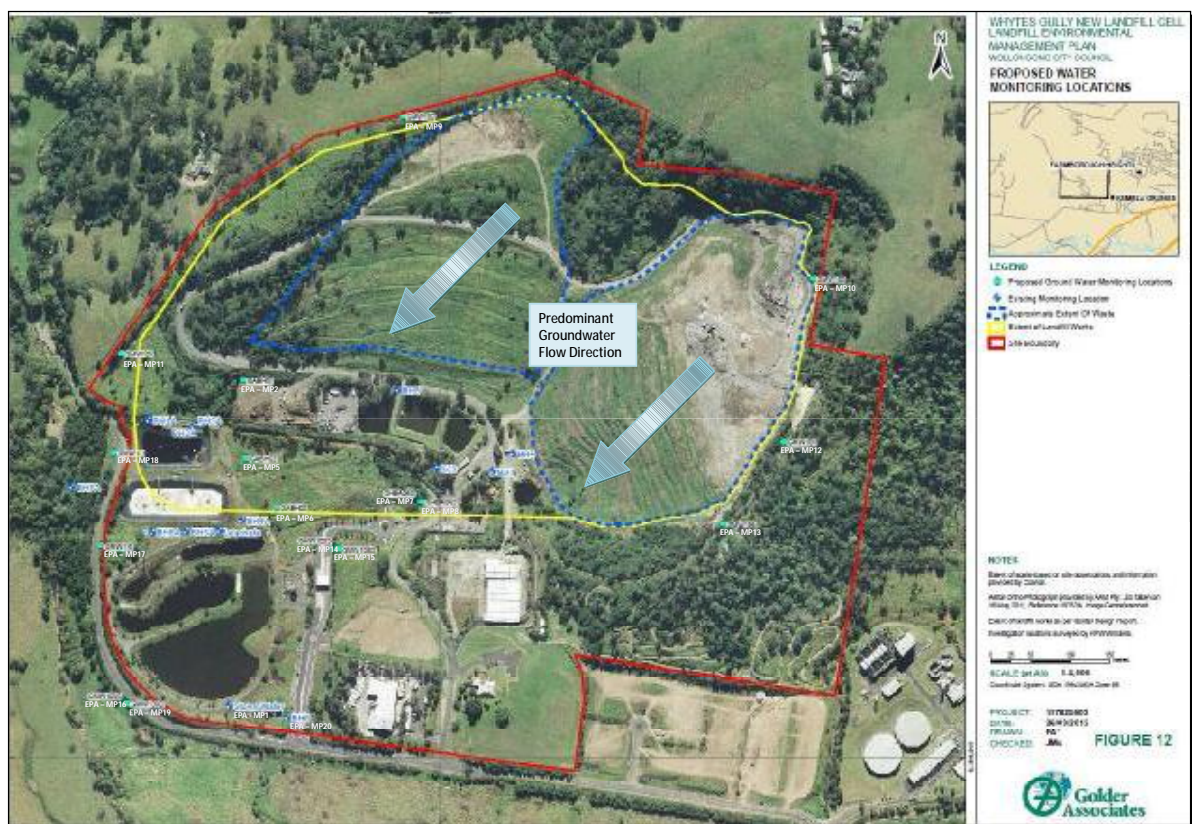
4.2 CONCLUSION

The site is performing well within the individual criteria and limits assigned to it in regard to environmental performance. The low number of deficiencies and nil non compliances shows that Council has maintained satisfactory environmental performance. Actions have already commenced to improve the sites performance in regard to the identified deficiency in Section 4.1.1, which will ensure Council's goal of continuous environmental improvement at Whytes Gully is achieved.

Further, modernised test regimes already implemented, along with the completion of the new cell development will provide a far better reflection of the state of the environment affected by the site. Consequently, environmental performance trend analysis and analytical results will be more pertinent as the new cell develops, however, observations made in this years annual return indicate that there has already been some stabilisation/improvement observed in the sites environmental performance.

Annexure A

Environmental Monitoring Locations



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ANNUAL RETURN

LICENCE NO	5862
LICENCE HOLDER	WOLLONGONG CITY COUNCIL
REPORTING PERIOD	29-May-2014 to 28-May-2015

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates above and specify the new dates to which this Annual Return relates below:

REVISED REPORTING PERIOD ____ / ____ / ____ to ____ / ____ / ____

(Note: the revised reporting period also needs to be entered in Section E)

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 28-Jul-2015

Your Annual Return must be completed, including certification in Section E, and submitted to the EPA no later than 60 Days after the end of the reporting period for your licence.

Failure to submit this Annual Return within 60 days after the reporting period ends may result in:

- the issue of a Penalty Notice for \$1500 (individuals) or \$3000 (corporations);
- OR
- prosecution.

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232**

It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

THERE IS A MAXIMUM PENALTY OF \$250,000 FOR A CORPORATION OR \$120,000 FOR AN INDIVIDUAL.

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the *Protection of the Environment Operations Act 1997*.

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Use the checklist below to ensure that you have completed your Annual Return correctly.
(✓ the boxes)

CHECKLIST	
<input checked="" type="checkbox"/> Section A:	All licence details are correct
<input checked="" type="checkbox"/> Section B1:	You have entered the correct number in the complaints table
<input checked="" type="checkbox"/> Section B2 – B3:	If there are tables, you have provided the required details
<input checked="" type="checkbox"/> Section C	You have answered question 1, and 2 if applicable
<input checked="" type="checkbox"/> Section D	If applicable, you have completed all load calculation worksheets
<input checked="" type="checkbox"/> Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
<input checked="" type="checkbox"/> Section F:	You have answered question 1, 2 and 3 if applicable
<input checked="" type="checkbox"/> Section G	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
<input checked="" type="checkbox"/>	Make a copy of the completed Annual Return and keep it with your licence records
<input checked="" type="checkbox"/>	Attach a cheque (unless you have paid separately) for the payment of the administrative fee for the next licence fee period EFT

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232**

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A Statement of Compliance - Licence Details

ALL licence holders must check that the licence details in Section A are correct

If there are changes to any of these details you must advise the EPA and apply as soon as possible for a variation to your licence or for a licence transfer.

Licence variation and transfer application forms are available on the EPA website at: <http://www.epa.nsw.gov.au/licensing>, or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

A1 Licence Holder

Licence Number 5862
Licence Holder WOLLONGONG CITY COUNCIL
Trading Name (if applicable)
ABN 63 139 525 939

A2 Premises to which Licence Applies (if applicable)

Common Name (if any) WHYTES GULLY WASTE DISPOSAL FACILITY
Premises REDDALLS ROAD KEMBLA GRANGE NSW 2526

A3 Activities to which Licence Applies

Waste Disposal (application to land)

A4 Other Activities (if applicable)

A5 Fee-Based Activity Classifications

Note that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure
Waste disposal by application to land		annual capacity

A6 Assessable Pollutants (Not Applicable)

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B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

<p>Number of complaints recorded by the licensee during the reporting period.</p> <p>If no complaints were received enter nil in the attached box, otherwise complete the table below.</p>	0
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Pollution Complaint Category	Number of Complaints
Air	10
Water	\
Noise	\
Waste	\
Other	\

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by your licence, **no tables** will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

Discharge & Monitoring Point 1

Stormwater monitoring and discharge point, Outlet at Reddalls Road - Monitoring point labelled 1 on Figure 13 titled "Proposed Surface Water Monitoring Locations" dated 28 March 2012 (Whyte's Gully New Landfill Cell EA - Volume IV). E297777 N6183972

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	1	8	126	175-25	229

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Ammonia	milligrams per litre	1	8	0.07	0.78	2.74
Calcium	milligrams per litre	1	8	22	27.5	35
Chloride	milligrams per litre	1	8	50	86	127
Conductivity	microsiemens per centimetre	1	8	504	680.13	845
Dissolved Oxygen	milligrams per litre	1	8	6.14	8.14	9.78
Filterable iron	milligrams per litre	1	8	0.05	0.204	0.61
Fluoride	milligrams per litre	1	8	0.4	0.53	1.1
Magnesium	milligrams per litre	1	8	13	16.13	20
Nitrate	milligrams per litre	1	8	0.11	1.604	4.37
pH	pH	1	8	7.1	7.81	8.2
Potassium	milligrams per litre	1	8	2	11.63	16
Sodium	milligrams per litre	1	8	53	86.25	118
Sulfate	milligrams per litre	1	8	24	29.63	41
Temperature	degrees Celsius	1	8	12.8	18.25	25.5
Total organic carbon	milligrams per litre	1	8	4	13.63	21
Total Phenolics	milligrams per litre	1	8	0.05	0.05	0.05

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Total suspended solids	milligrams per litre	1	8	5	33-63	88
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Monitoring Point 2

Groundwater quality monitoring, Monitoring point labelled GABH01 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297751.8 N6184474

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4				
Aluminium	milligrams per litre	1				
Arsenic	milligrams per litre	1				
Barium	milligrams per litre	1				
Benzene	milligrams per litre	1				
Cadmium	milligrams per litre	1				
Calcium	milligrams per litre	4				
Chloride	milligrams per litre	4				
Chromium (hexavalent)	milligrams per litre	1				
Chromium (total)	milligrams per litre	1				
Cobalt	milligrams per litre	1				
Conductivity	microsiemens per centimetre	4				

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Copper	milligrams per litre	1				
Ethyl benzene	micrograms per litre	1				
Fluoride	milligrams per litre	1				
Lead	milligrams per litre	1				
Magnesium	milligrams per litre	4				
Manganese	micrograms per litre	1				
Mercury	milligrams per litre	1				
Nitrate	milligrams per litre	1				
Nitrite	milligrams per litre	1				
Nitrogen (ammonia)	milligrams per litre	4				
Organochlorine pesticides	milligrams per litre	1				
Organophosphate pesticides	milligrams per litre	1				
pH	pH	4				
Polycyclic aromatic hydrocarbons	milligrams per litre	1				
Potassium	milligrams per litre	4				
Sodium	milligrams per litre	4				

DESTROYED

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Standing Water Level	metres	4				
Sulfate	milligrams per litre	4				
Toluene	milligrams per litre	1				
Total dissolved solids	milligrams per litre	4				
Total organic carbon	milligrams per litre	4				
Total Phenolics	milligrams per litre	1				
TPH	milligrams per litre	1				
Xylene	milligrams per litre	1				
Zinc	milligrams per kilogram	1				

DESTROYED

Monitoring Point 3

Surface gas monitoring, Areas where intermediate or final cover has been placed.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	12	0	0.00089	0.0384

Monitoring Point 4

Gas accumulation monitoring, inside all buildings within 250 metres of deposited waste.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value

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Methane	percent by volume	12	12	0	0.000233	0.00263
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Monitoring Point 5

Groundwater quality monitoring. Monitoring point labelled GABH02 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297764.9 N6184377

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	987	1064-25	1120
Aluminium	milligrams per litre	1	1	1.7	1.7	1.7
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.006	0.006	0.006
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.001	<0.001	<0.001
Calcium	milligrams per litre	4	4	295	323-25	349
Chloride	milligrams per litre	4	4	1070	1182-5	1260
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	5220	5310	5440

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Copper	milligrams per litre	1	1	0.003	0.003	0.003
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	0.001	0.001	0.001
Magnesium	milligrams per litre	4	4	194	200-75	212
Manganese	micrograms per litre	1	1	0.045	0.045	0.045
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.02	0.03
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.6	6.63	6.7
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	3	3	3
Sodium	milligrams per litre	4	4	602	661.5	744

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Standing Water Level	metres	4	4	4-77	4-98	5-12
Sulfate	milligrams per litre	4	4	165	175	187
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	2900	3030	3220
Total organic carbon	milligrams per litre	4	4	1	5	7
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2
Zinc	milligrams per kilogram	1	1	0.011	0.011	0.011

Monitoring Point 6

Groundwater quality monitoring. Monitoring point labelled GABH03 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E287793.8 N6184315

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	617	712	761
Aluminium	milligrams per litre	1	1	0.19	0.19	0.19
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.015	0.015	0.015

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.001	<0.001	<0.001
Calcium	milligrams per litre	4	4	337	367-75	400
Chloride	milligrams per litre	4	4	1200	1320	1390
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	5290	5400	5490
Copper	milligrams per litre	1	1	0.003	0.003	0.003
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	208	213-75	222
Manganese	micrograms per litre	1	1	0.302	0.302	0.302
Mercury	milligrams per litre	1	1	0.0001	0.0001	0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.02	0.03
Organochlorine pesticides	milligrams per litre	1	1	<0.05	<0.05	<0.05
Organophosphate pesticides	milligrams per litre	1	1	<0.05	<0.05	<0.05
pH	pH	4	4	6.6	6.68	6.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	2	2	2
Sodium	milligrams per litre	4	4	496	540	614
Standing Water Level	metres	4	4	0.49	0.59	0.65
Sulfate	milligrams per litre	4	4	172	200.5	222
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	3130	3337.5	3540
Total organic carbon	milligrams per litre	4	4	1	3.75	5
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

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Zinc	milligrams per kilogram	1	1	0.008	0.008	0.008
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Monitoring Point 7

Groundwater quality monitoring, Monitoring point labelled GABH06D on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297975.6 N6184322

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	327	355-25	376
Aluminium	milligrams per litre	1	1	0.08	0.08	0.08
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.005	0.005	0.005
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	-0.0001	-0.0001	-0.0001
Calcium	milligrams per litre	4	4	94	106	117
Chloride	milligrams per litre	4	4	559	653-75	708
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	2830	2880	2960

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Copper	milligrams per litre	1	1	0.003	0.003	0.003
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	61	64-75	69
Manganese	micrograms per litre	1	1	<0.006	0.006	0.006
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.03	0.05
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.6	6.95	7.3
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	391	445.5	497

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Standing Water Level	metres	4	4	1.7	1.88	2.02
Sulfate	milligrams per litre	4	4	171	195.75	225
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1400	1590	1710
Total organic carbon	milligrams per litre	4	4	1	1	1
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	2	2	2
Zinc	milligrams per kilogram	1	1	0.005	0.005	0.005

Monitoring Point 8

Groundwater quality monitoring, Monitoring point labelled GABH06S on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297977 N6184322

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	398	433.5	454
Aluminium	milligrams per litre	1	1	0.12	0.12	0.12
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.09	0.09	0.09

Annual Return

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	1	77	77	77
Chloride	milligrams per litre	4	4	227	539-75	698
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	2990	3082-5	3140
Copper	milligrams per litre	1	1	0.006	0.006	0.006
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.9	0.9	0.9
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	75	75	75
Manganese	micrograms per litre	1	1	0.057	0.057	0.057
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.07	0.07	0.07

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.015	0.02
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6-9	7-13	7-4
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	452	505.5	569
Standing Water Level	metres	4	4	2-2	2-37	2-5
Sulfate	milligrams per litre	4	4	218	227-75	246
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1600	1680	1770
Total organic carbon	milligrams per litre	4	4	1	1-25	2
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

Annual Return

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Zinc	milligrams per kilogram	1	1	0.009	0.009	0.009
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Monitoring Point 9

Groundwater quality monitoring, Monitoring point labelled GMW102 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297952.6
N6184807

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	84	190.67	278
Aluminium	milligrams per litre	1	1	8.087	8.087	8.087
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.043	0.043	0.043
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	10	43.67	62
Chloride	milligrams per litre	4	4	14	16.33	19
Chromium (hexavalent)	milligrams per litre	1	1	<0.1	<0.1	<0.1
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	245	446.33	578

Annual Return

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Copper	milligrams per litre	1	1	0.012	0.012	0.012
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.2	0.2	0.2
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	4	12-67	20
Manganese	micrograms per litre	1	1	0.059	0.059	0.059
Mercury	milligrams per litre	1	1	0.0001	0.0001	0.0001
Nitrate	milligrams per litre	1	1	0.33	0.33	0.33
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.02	0.03	0.04
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6	6.77	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	27	32-67	37

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Standing Water Level	metres	4	4	4.55	8.95	11.7
Sulfate	milligrams per litre	4	4	13	16.67	24
Toluene	milligrams per litre	1	1	22	22	22
Total dissolved solids	milligrams per litre	4	4	296	334	406
Total organic carbon	milligrams per litre	4	4	1	3.33	7
Total Phenolics	milligrams per litre	1	1	0.05	0.05	0.05
TPH	milligrams per litre	1	1	250	250	250
Xylene	milligrams per litre	1	1	22	22	22
Zinc	milligrams per kilogram	1	1	0.021	0.021	0.021

Monitoring Point 10

Groundwater quality monitoring, Monitoring point labelled GMW103 on Figure 16 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298470.2 N6184603

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	389	422.75	440
Aluminium	milligrams per litre	1	1	0.06	0.06	0.06
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.015	0.015	0.015

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Benzene	milligrams per litre	1	1	<2	<2	<2
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	156	186.75	234
Chloride	milligrams per litre	4	4	320	409.5	553
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	240	1802.5	2530
Copper	milligrams per litre	1	1	0.002	0.002	0.002
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.4	0.4	0.4
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	60	66.5	75
Manganese	micrograms per litre	1	1	0.28	0.28	0.28
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.02	0.04	0.05
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6-8	6-9.5	7-1
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	160	182	214
Standing Water Level	metres	4	4	7.25	7.47	7.73
Sulfate	milligrams per litre	4	4	122	133-25	155
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	988	1224-5	1620
Total organic carbon	milligrams per litre	4	4	1	1-75	2
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

Annual Return

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Zinc	milligrams per kilogram	1	1	0.008	0.008	0.008
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Monitoring Point 11

Groundwater quality monitoring, Monitoring point labelled GMW104 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297597.9 N6184508

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	145	199-5	284
Aluminium	milligrams per litre	1	1	0.07	0.07	0.07
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.002	0.002	0.002
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.001	<0.001	<0.001
Calcium	milligrams per litre	4	4	20	27	40
Chloride	milligrams per litre	4	4	34	42-25	53
Chromium (hexavalent)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	520	679-5	1090

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Copper	milligrams per litre	1	1	0.001	0.001	0.001
Ethyl benzene	micrograms per litre	1	1	0.001	0.001	0.001
Fluoride	milligrams per litre	1	1	0.7	0.7	0.7
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	14	17.75	22
Manganese	micrograms per litre	1	1	0.019	0.019	0.019
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.02	0.02	0.02
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.04	0.06
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.7	7.03	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	48	63.75	84

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Standing Water Level	metres	4	4	6-95	7-31	7-49
Sulfate	milligrams per litre	4	4	30	33-75	42
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	260	323-5	455
Total organic carbon	milligrams per litre	4	4	1	1-75	2
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2
Zinc	milligrams per kilogram	1	1	0.01	0.01	0.01

Monitoring Point 12

Groundwater quality monitoring, Monitoring point labelled GMW105 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298433.3 N6184397

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	17	33	44
Aluminium	milligrams per litre	1	1	0.34	0.34	0.34
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	<0.001	<0.001	<0.001

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	4	5.5	7
Chloride	milligrams per litre	4	4	29	41-25	58
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	243	264-75	283
Copper	milligrams per litre	1	1	<0.001	<0.001	<0.001
Ethyl benzene	micrograms per litre	1	1	2	2	2
Fluoride	milligrams per litre	1	1	0.3	0.3	0.3
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	2	3	4
Manganese	micrograms per litre	1	1	0.007	0.007	0.007
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	4.82	4.82	4.82

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.05	0.14
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	5.4	5.63	5.8
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	35	38-75	42
Standing Water Level	metres	4	4	7.46	9.88	11
Sulfate	milligrams per litre	4	4	12	13.75	15
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	192	206	221
Total organic carbon	milligrams per litre	4	4	1	1.75	4
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

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Zinc	milligrams per kilogram	1	1	<0.005	<0.005	<0.005
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Monitoring Point 13

Groundwater quality monitoring, Monitoring point labelled GWW106 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298356.8 N6184294

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre					
Aluminium	milligrams per litre					
Arsenic	milligrams per litre					
Barium	milligrams per litre					
Benzene	milligrams per litre					
Cadmium	milligrams per litre					
Calcium	milligrams per litre					
Chloride	milligrams per litre					
Chromium (hexavalent)	milligrams per litre					
Chromium (total)	milligrams per litre					
Cobalt	milligrams per litre					
Conductivity	microsiemens per centimetre					

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Copper	milligrams per litre					
Ethyl benzene	micrograms per litre					
Fluoride	milligrams per litre					
Lead	milligrams per litre					
Magnesium	milligrams per litre					
Manganese	micrograms per litre					
Mercury	milligrams per litre					
Nitrate	milligrams per litre					
Nitrite	milligrams per litre					
Nitrogen (ammonia)	milligrams per litre					
Organochlorine pesticides	milligrams per litre					
Organophosphate pesticides	milligrams per litre					
pH	pH					
Polycyclic aromatic hydrocarbons	milligrams per litre					
Potassium	milligrams per litre					
Sodium	milligrams per litre					

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Standing Water Level	metres					
Sulfate	milligrams per litre					
Toluene	milligrams per litre					
Total dissolved solids	milligrams per litre					
Total organic carbon	milligrams per litre					
Total Phenolics	milligrams per litre					
TPH	milligrams per litre					
Xylene	milligrams per litre					
Zinc	milligrams per kilogram					

Monitoring Point 14

Groundwater quality monitoring, Monitoring point labelled GMW108S on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297870.2 N6184262

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	183	450.75	614
Aluminium	milligrams per litre	1	1	0.52	0.52	0.52
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.051	0.051	0.051

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.001	<0.001	<0.001
Calcium	milligrams per litre	4	4	25	83.5	136
Chloride	milligrams per litre	4	4	36	401-75	753
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.002	0.002	0.002
Cobalt	milligrams per litre	1	1	0.002	0.002	0.002
Conductivity	microsiemens per centimetre	4	4	508	22.47	3670
Copper	milligrams per litre	1	1	<0.001	<0.001	<0.001
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.7	0.7	0.7
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	11	62	116
Manganese	micrograms per litre	1	1	0.125	0.125	0.125
Mercury	milligrams per litre	1	1	<0.001	<0.001	<0.001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.02	0.025	0.04
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6-6	7-43	9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	2	3
Sodium	milligrams per litre	4	4	53	314-25	554
Standing Water Level	metres	4	4	2-52	2-62	2-73
Sulfate	milligrams per litre	4	4	18	123.75	220
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	320	1208	1940
Total organic carbon	milligrams per litre	4	4	1	5.45	11
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

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Zinc	milligrams per kilogram	1	1	<0.005	<0.005	<0.005
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Monitoring Point 15

Groundwater quality monitoring, Monitoring point labelled GMW108D on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E287871.4 N6184262

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	429	467.5	505
Aluminium	milligrams per litre	1	1	0.03	0.03	0.03
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.012	0.012	0.012
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	114	129.75	153
Chloride	milligrams per litre	4	4	615	654.25	710
Chromium (hexavalent)	milligrams per litre	1	1	0.01	0.01	0.01
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	3030	3112.5	3200

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Copper	milligrams per litre	1	1	0.002	0.002	0.002
Ethyl benzene	micrograms per litre	1	1	≤2	≤2	≤2
Fluoride	milligrams per litre	1	1	0.7	0.7	0.7
Lead	milligrams per litre	1	1	0.001	0.001	0.001
Magnesium	milligrams per litre	4	4	87	91.33	100
Manganese	micrograms per litre	1	1	0.003	0.003	0.003
Mercury	milligrams per litre	1	1	0.0001	0.0001	0.0001
Nitrate	milligrams per litre	1	1	0.01	0.01	0.01
Nitrite	milligrams per litre	1	1	0.01	0.01	0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.012	0.02
Organochlorine pesticides	milligrams per litre	1	1	≤0.5	≤0.5	≤0.5
Organophosphate pesticides	milligrams per litre	1	1	≤0.5	≤0.5	≤0.5
pH	pH	4	4	6-7	6-9.5	7-4
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	≤1	≤1	≤1
Potassium	milligrams per litre	4	4	1	1-5	3
Sodium	milligrams per litre	4	4	401	445-25	524

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Standing Water Level	metres	4	4	2.02	2.17	2.26
Sulfate	milligrams per litre	4	4	192	205.5	223
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1630	1725	1810
Total organic carbon	milligrams per litre	4	4	1	1.5	2
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2
Zinc	milligrams per kilogram	1	1	0.006	0.006	0.006

Monitoring Point 16

Groundwater quality monitoring, Monitoring point labelled GMW109S on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297605.7 N6184068

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	239	379	503
Aluminium	milligrams per litre	1	1	2.31	2.31	2.31
Arsenic	milligrams per litre	1	1	0.003	0.003	0.003
Barium	milligrams per litre	1	1	0.263	0.263	0.263

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Calcium	milligrams per litre	4	4	77	126.5	216
Chloride	milligrams per litre	4	4	228	243.5	256
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.003	0.003	0.003
Cobalt	milligrams per litre	1	1	0.024	0.024	0.024
Conductivity	microsiemens per centimetre	4	4	1380	1670	2140
Copper	milligrams per litre	1	1	0.022	0.022	0.022
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.2	0.2	0.2
Lead	milligrams per litre	1	1	0.007	0.007	0.007
Magnesium	milligrams per litre	4	4	37	47.5	66
Manganese	micrograms per litre	1	1	4.38	4.38	4.38
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.06	0.06	0.06

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Nitrite	milligrams per litre	1	1	0.01	0.01	0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.54	1.07	1.69
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.3	6.375	6.5
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	2	3.5	5
Sodium	milligrams per litre	4	4	158	181.25	202
Standing Water Level	metres	4	4	2.7	3.07	3.5
Sulfate	milligrams per litre	4	4	93	173.75	398
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	686	951	1430
Total organic carbon	milligrams per litre	4	4	1	4.5	8
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

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Zinc	milligrams per kilogram	1	1	0.109	0.109	0.109
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Monitoring Point 17

Groundwater quality monitoring, Monitoring point labelled GMW110 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297572.6 N8184266

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	566	605.75	634
Aluminium	milligrams per litre	1	1	0.81	0.81	0.81
Arsenic	milligrams per litre	1	1	0.001	0.001	0.001
Barium	milligrams per litre	1	1	0.005	0.005	0.005
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	177	203.75	220
Chloride	milligrams per litre	4	4	816	879	923
Chromium (hexavalent)	milligrams per litre	1	1	177	177	177
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	3910	4025	4100

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Copper	milligrams per litre	1	1	0.004	0.004	0.004
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.4	0.4	0.4
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	153	160.5	170
Manganese	micrograms per litre	1	1	0.043	0.043	0.043
Mercury	milligrams per litre	1	1	0.0001	0.0001	0.0001
Nitrate	milligrams per litre	1	1	0.11	0.11	0.11
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.013	0.02
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.6	6.7	6.8
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1.75	2
Sodium	milligrams per litre	4	4	459	513-25	580

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Standing Water Level	metres	4	4	3.93	4.03	4-15
Sulfate	milligrams per litre	4	4	278	304-25	326
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	2160	2317.5	2430
Total organic carbon	milligrams per litre	4	4	1	2-25	5
Total Phenolics	milligrams per litre -	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<1	<1	<1
Zinc	milligrams per kilogram	1	1	0.015	0.015	0.015

Monitoring Point 18

Groundwater quality monitoring, Monitoring point labelled GMW111 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297588.6 N6184385

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	111	374	480
Aluminium	milligrams per litre	1	1	0.26	0.26	0.26
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.016	0.016	0.016

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	4	4	72	91-5	101
Chloride	milligrams per litre	4	4	472	499.75	531
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	<0.001	<0.001	<0.001
Conductivity	microsiemens per centimetre	4	4	1300	2167.5	2560
Copper	milligrams per litre	1	1	0.012	0.012	0.012
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.5	0.5	0.5
Lead	milligrams per litre	1	1	<0.001	<0.001	<0.001
Magnesium	milligrams per litre	4	4	66	72-75	80
Manganese	micrograms per litre	1	1	0.077	0.077	0.077
Mercury	milligrams per litre	1	1	0.0001	0.0001	0.0001
Nitrate	milligrams per litre	1	1	<0.01	<0.01	<0.01

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.018	0.02
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6-8	6-9.8	7-1
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	338	374-25	412
Standing Water Level	metres	4	4	6.08	6.2	6.36
Sulfate	milligrams per litre	4	4	96	108-75	116
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1220	1302.5	1350
Total organic carbon	milligrams per litre	4	4	1	1-25	2
Total Phenolics	milligrams per litre	1	1	0.05	0.05	0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

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Zinc	milligrams per kilogram	1	1	6-8	6-8	6-8
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Monitoring Point 19

Groundwater quality monitoring, Monitoring point labelled GMW109D on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297804.9 N6184088

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	218	238	248
Aluminium	milligrams per litre	1	1	0.29	0.29	0.29
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.144	0.144	0.144
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	0.0002	0.0002	0.0002
Calcium	milligrams per litre	4	4	79	89	104
Chloride	milligrams per litre	4	4	388	404-25	424
Chromium (hexavalent)	milligrams per litre	1	1	0.01	0.01	0.01
Chromium (total)	milligrams per litre	1	1	0.001	0.001	0.001
Cobalt	milligrams per litre	1	1	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	1640	1685	1750

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Copper	milligrams per litre	1	1	0.016	0.016	0.016
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.4	0.4	0.4
Lead	milligrams per litre	1	1	0.004	0.004	0.004
Magnesium	milligrams per litre	4	4	45	47-25	52
Manganese	micrograms per litre	1	1	0.526	0.526	0.526
Mercury	milligrams per litre	1	1	0.001	0.001	0.001
Nitrate	milligrams per litre	1	1	0.3	0.3	0.3
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.048	0.13
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6-8	7-18	7-4
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1-75	2
Sodium	milligrams per litre	4	4	187	199-25	228

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Standing Water Level	metres	4	4	2.58	2.78	3.07
Sulfate	milligrams per litre	4	4	25	121.25	407
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	834	926.5	1000
Total organic carbon	milligrams per litre	4	4	1	1	1
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2
Zinc	milligrams per kilogram	1	1	0.018	0.018	0.018

Monitoring Point 20

Groundwater quality monitoring, Monitoring point labelled BH6 on Figure 15 titled "Current Site Investigation Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E297807.4 N6184052

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	4	4	707	749	794
Aluminium	milligrams per litre	1	1	0.33	0.33	0.33
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.047	0.047	0.047

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Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Calcium	milligrams per litre	45	4	110	120-75	130
Chloride	milligrams per litre	4	4	120	821-5	1150
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	<0.001	<0.001	<0.001
Cobalt	milligrams per litre	1	1	0.008	0.008	0.008
Conductivity	microsiemens per centimetre	4	4	4050	4752.5	5040
Copper	milligrams per litre	1	1	0.007	0.007	0.007
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.9	0.9	0.9
Lead	milligrams per litre	1	1	0.002	0.002	0.002
Magnesium	milligrams per litre	4	4	129	127-5	135
Manganese	micrograms per litre	1	1	1.68	1.68	1.68
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.6	0.6	0.6

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Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.09	0.135	0.22
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6-7	6-8	6-9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	780	827-75	916
Standing Water Level	metres	4	4	1.34	1.44	1.56
Sulfate	milligrams per litre	4	4	262	301	329
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	2400	2617-5	2820
Total organic carbon	milligrams per litre	4	4	1	4	5
Total Phenolics	milligrams per litre	()	0.05	0.05	0.05
TPH	milligrams per litre	1	1	<50	<50	<50
Xylene	milligrams per litre	1	1	<2	<2	<2

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Zinc	milligrams per kilogram	1	1	0.025	0.025	0.025
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Monitoring Point 21

Subsurface gas monitoring, Monitoring point labelled LFG MW1 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298084 N6184278

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0.0001	0.00357	0.0007

Monitoring Point 22

Subsurface gas monitoring, Monitoring point labelled LFG MW2 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298202 N6184228

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0	0.00386	0.0009

Monitoring Point 23

Subsurface gas monitoring, Monitoring point labelled LFG MW3 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298297 N6184244

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0	0.00214	0.0004

Monitoring Point 24

Subsurface gas monitoring, Monitoring point labelled LFG MW4 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0	0.000214	0.0004

Monitoring Point 25

Subsurface gas monitoring, Monitoring point labelled LFG MW5 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298438
N6184381

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0	0.000529	0.0012

Monitoring Point 26

Subsurface gas monitoring, Monitoring point labelled LFG MW6 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376
N6184303

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0	0.001000	0.0019

Monitoring Point 27

Subsurface gas monitoring, Monitoring point labelled LFG MW7 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298470
N6184553

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0.0012	0.003271	0.0056

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Monitoring Point 28

Subsurface gas monitoring, Monitoring point labelled LFG MW8 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298376 N6184303

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0.0008	0.002143	0.0036

Monitoring Point 29

Subsurface gas monitoring, Monitoring point labelled LFG MW9 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298465 N6184645

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0.0014	0.004633	0.0079

Monitoring Point 30

Subsurface gas monitoring, Monitoring point labelled LFG MW10 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298448 N6184684

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0	0.000643	0.0014

Monitoring Point 31

Subsurface gas monitoring, Monitoring point labelled LFG MW11 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV). E298400 N6184695

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value

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Methane	percent by volume	12	7	0.0005	0.000857	0.0014
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Monitoring Point 32

Subsurface gas monitoring, Monitoring point labelled LFG MW12 on Figure 14 titled "Proposed Landfill Gas Monitoring Locations" dated 6 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV), E298361 N6184701

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Methane	percent by volume	12	7	0.0003	0.022157	0.0853

Monitoring Point 33

Stormwater monitoring point, Downstream monitoring point labelled 4 on Figure 13 titled "Proposed Surface Water Monitoring Locations" dated 26 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV), E297767 N6183396

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	1	8	50	107	186
Ammonia	milligrams per litre	1	8	0.02	6.11	0.37
Calcium	milligrams per litre	1	8	13	23.75	41
Chloride	milligrams per litre	1	8	26	41-25	62
Conductivity	microsiemens per centimetre	1	8	240	380-25	598
Dissolved Oxygen	milligrams per litre	1	8	2-28	7.22	8.98
Filterable iron	milligrams per litre	1	8	0.03	6.85	5.02

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Fluoride	milligrams per litre	1	8	0.1	0.25	0.5
Magnesium	milligrams per litre	1	8	7	11.5	19
Nitrate	milligrams per litre	1	8	0.01	0.53	1.83
pH	pH	1	8	6.9	7.33	7.5
Potassium	milligrams per litre	1	8	3	4	5
Sodium	milligrams per litre	1	8	20	33.88	55
Sulfate	milligrams per litre	1	8	2	16.63	27
Temperature	degrees Celsius	1	8	13.8	17.45	23.5
Total organic carbon	milligrams per litre	1	8	2	7.38	12
Total Phenolics	milligrams per litre	1	8	0.05	0.05	0.05
Total suspended solids	milligrams per litre	1	8	5	81.84	464

Monitoring Point 34

Stormwater monitoring point, Upstream monitoring point labelled 6 on Figure 13 titled "Proposed Surface Water Monitoring Locations" dated 26 March 2012 (Whytes Gully New Landfill Cell EA - Volume IV).
E297495 N6184504

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	1	8	43	105.63	192
Ammonia	milligrams per litre	1	8	0.01	0.021	0.06

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Calcium	milligrams per litre	1	8	12	26-88	54
Chloride	milligrams per litre	1	8	25	41-25	56
Conductivity	microsiemens per centimetre	1	8	21.5	379-88	644
Dissolved Oxygen	milligrams per litre	1	8	3.33	8.44	9.96
Filterable iron	milligrams per litre	1	8	0.05	0.25	0.38
Fluoride	milligrams per litre	1	8	0.1	0.138	0.2
Magnesium	milligrams per litre	1	8	6	12-25	24
Nitrate	milligrams per litre	1	8	0.01	0.66	2.87
pH	pH	1	8	7	7.55	8
Potassium	milligrams per litre	1	8	2	3.38	6
Sodium	milligrams per litre	1	8	15	30.88	52
Sulfate	milligrams per litre	1	8	14	21.5	41
Temperature	degrees Celsius	1	8	13.5	17.35	23.9
Total organic carbon	milligrams per litre	1	8	2	6.38	10
Total Phenolics	milligrams per litre	1	8	0.05	0.05	0.05
Total suspended solids	milligrams per litre	1	8	5	20.51	93.3

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B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by your licence, no tables will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

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C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☒ the boxes)

- 1 Were all conditions of the licence complied with (including monitoring and reporting requirements)?

☒ Yes ☐ No

(☒ a box)

- 2 If you answered 'No' to question 1, please supply the following details for each non-compliance in the format, or similar format, provided on the following page.

Please use a separate page for each licence condition that has not been complied with.

- a) What was the specific licence condition that was not complied with?
- b) What were the particulars of the non-compliance?
- c) What were the date(s) when the non-compliance occurred, if applicable?
- d) If relevant, what was the precise location where the non-compliance occurred?

Attach a map or diagram to the Statement to show the precise location.

- e) What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?
- f) What was the cause of the non-compliance?
- g) What action has been, or will be, taken to mitigate any adverse effects of the non-compliance?
- h) What action has been, or will be, taken to prevent a recurrence of the non-compliance?

3. How many pages have you attached?

Each attached page must be initialled by the person(s) who signs Section G of this Annual Return

0

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C2 Details of Non-Compliance with Licence

Licence condition number not complied with
Summary of particulars of the non-compliance (NO MORE THAN 50 WORDS)
If required, further details on particulars of non-compliance
Date(s) when the non-compliance occurred, if applicable
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
Cause of non-compliance
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Action taken or that will be taken to prevent a recurrence of the non-compliance

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D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are not required to monitor assessable pollutants by your licence, no worksheets will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

Loads of assessable pollutants must be calculated using any of the methods provided in the EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been sent to you with your licence. If you require additional copies you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

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E Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan (PIRMP) Under Section 153A of the POEO Act 1997

1 Have you prepared a PIRMP as required under s153A of the Protection of the Environment Operations Act 1997?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Is the PIRMP available at the premises?

(✓ a box)

☒ Yes

☐ No

3 Is the PIRMP available in a prominent position on a publicly accessible web site?

(✓ a box)

☒ Yes

☐ No

If the PIRMP is available on a publicly accessible web site please indicate clearly below the address of the web site where the PIRMP can be accessed:

Web site Address

www.wollongong.nsw.gov.au/services/household/pages/wastewateranalyticalmonitoringdata.aspx

4 Has the PIRMP been tested?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 4 please indicate clearly below the date that the PIRMP was last tested:

The PIRMP was last tested on

19 May 2015

5 Has the PIRMP been updated?

(✓ a box)

☐ Yes

☒ No

If you answered 'Yes' to question 5 please indicate clearly below the date that the PIRMP was last updated:

The PIRMP was last updated on

6 How many times has the PIRMP been activated in this reporting period?

0

If the PIRMP has been activated, please indicate clearly below the date/s when the PIRMP was activated:

The PIRMP was activated on

The EPA's guidelines for preparation of pollution incident response management plans are available at

<http://www.epa.nsw.gov.au/legislation/20120227eqpreppirmp.htm>

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F Statement of Compliance - Requirement to Publish Pollution Monitoring Data Under Section 66(6) of the POEO Act 1997

1 Are there any conditions attached to your licence that require pollution monitoring to be undertaken?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Do you operate a web site?

(✓ a box)

☒ Yes

☐ No

3 Is the pollution monitoring data published on your web site in accordance with the EPA's written requirements for publishing pollution monitoring data?

(✓ a box)

☒ Yes

☐ No

If you publish pollution monitoring data on a web site please indicate clearly below the address of the web site where the pollution monitoring data can be accessed:

Web site address

www.wollongong.nsw.gov.au/services/household/pages/
notices/analytical/monitoringdata.aspx

The EPA's written requirements for publishing pollution monitoring data are available at
<http://www.epa.nsw.gov.au/legislation/20120263reqsubpmdata.htm>

Note - if you do not maintain a web site, you must provide a copy of any monitoring data that relates to pollution, to any person requests a copy of the data at no charge to the person requesting the data.

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G Signature and Certification

This Annual Return may only be signed by a person(s) with legal authority to sign it as set out in the categories below. Please tick (✓) the box next to the category that describes how this Annual Return is being signed.

If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700.

If the licence holder is:	the Annual Return must be signed and certified:
an individual	<input type="checkbox"/> by the individual licence holder, or <input type="checkbox"/> by a person approved in writing by the EPA to sign on the licence holder's behalf
a company	<input type="checkbox"/> by affixing the common seal in accordance with Corporations Act 2001, or <input type="checkbox"/> by 2 directors, or <input type="checkbox"/> by a director and a company secretary, or <input type="checkbox"/> if a proprietary company that has a sole director who is also the sole company secretary – by that director, or <input type="checkbox"/> by a person delegated to sign on the company's behalf in accordance with the Corporations Act 2001 and approved in writing by the EPA to sign on the company's behalf.
a public authority (other than a council)	<input type="checkbox"/> by the Chief Executive Officer of the public authority, or <input type="checkbox"/> by a person delegated to sign on the public authority's behalf in accordance with its legislation and approved in writing by the EPA to sign on the public authority's behalf.
a local council	<input type="checkbox"/> by the General Manager in accordance with s.377 of the Local Government Act 1993, or <input type="checkbox"/> by affixing the seal of the council in a manner authorised under that Act.

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation or \$120,000 for an individual.

I/We

- declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and
- certify that the information in the Statement of Compliance in sections A, C, D, E and F and any pages attached to Section C is correct and not false or misleading in a material respect.

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates below and specify the new dates to which this Annual Return relates below:

For the reporting period 29-May-2014 to 28-May-2015 or ___/___/___ to ___/___/___

SIGNATURE

NAME

(printed)

POSITION

DATE

SIGNATURE

NAME

(printed)

POSITION

DATE

SEAL(if signing under seal)

PLEASE ENSURE THAT ALL APPROPRIATE BOXES HAVE BEEN COMPLETED AND THAT THE CHECKLIST ON PAGE 2 OF THE ANNUAL RETURN HAS BEEN COMPLETED