Wollongong Waste & Resource Recovery Park (Whytes Gully Waste Disposal Depot)
Environment Protection Licence 5862

Annual Report
Period 29 May 2016 – 28 May 2017

Reference Z17/136791

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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 (Whytes Gully)
Zn	Zinc

1 INTRODUCTION

1.1 BACKGROUND

The City of Wollongong is located 80 kilometres south of Sydney. 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 by 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. From 2014 to 2016 the eastern gully underwent extensive surface reshaping works

in order to reduce rainwater infiltration, increase surface water diversion, ensure consistent cover depths and to prepare the surface for the new landfill cell base liner.

The new stage 3 landfill development commenced with construction below the eastern gully in August 2013, with the first cell 1A completed in 2014. Waste commenced being placed in Cell 1A in March 2015. Council has since constructed Cell 1B (2015) and commenced filling. Cell 2 is currently being constructed.

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 to strip the leachate of ammonia. The leachate is then pumped to a smaller pond with a larger surface area to increase the speed of this process on a batch by batch basis. From the smaller pond the leachate is then pumped to a sequential 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 2015 to 28 May 2016. By Wollongong City Council July 2016
- Whytes Gully Waste Disposal Facility – Annual Return for Period 29 May 2014 to 28 May 2015. By Wollongong City Council July 2015
- 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, including;

i. Statement of Compliance
ii. Monitoring and Complaints Summary
iii. Statement of Compliance – Licence Conditions
iv. Statement of Compliance - Load-Based Fee
v. Statement of Compliance – Requirement to Prepare Pollution Incident Response Management Plan
vi. Statement of Compliance – Requirement to publish Pollution Monitoring Data
vii. Statement of Compliance – Environmental Management Systems and Practices

The EPL Annual Returns for 2008 to 2016 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 – Two penalty notices issued.

C2. Details of non-compliance – Both penalty notices issues were associated with processes that Council did not undertake in accordance with the Whytes Gully Environment Protection Licence conditions. The first penalty notice was associated with excavating into waste to dispose of large flood related debris. Any waste excavation requires EPA pre-approval. The second penalty notice was associated with a major construction contractor not complying with the defined approved odour management plan for the works undertaken. Specifically, the maximum trench distance for the installation of a gas drainage pipe was exceeded. Both of these circumstances have been identified by the EPA as generating odour.

29 May 2014 to 28 May 2015

B1. Pollution complaints – Ten

B2. Concentration monitoring summary – Complete.

B3. Volume or mass monitoring summary - None required.

C1. Compliance with licence condition – Zero
C2. Details of non-compliance – N/A

29 May 2015 to 28 May 2016

B1. Pollution complaints – Thirty Eight
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – One
*C2. Details of non-compliance – Suspended solids overflow from sediment pond that measured > 50 mg/*L.

Other Disclosure - One Official Caution dated 21 March 2016 was received during the reporting period for failing to identify the 2013-14 issued penalty notices within the Statement of Compliance section of the 2013-14 Annual Environment Management Report

29 May 2016 to 28 May 2017

B1. Pollution complaints – Twenty Seven
B2. Concentration monitoring summary – Complete.
B3. Volume or mass monitoring summary - None required.
C1. Compliance with licence condition – Two non-compliance
*C2. Details of non -compliance – In June and July 2016 during significant rainfall events, surface water overflowed from the Whytes Gully site sediment ponds. The value of suspended solids measured 78 mg/L in June and 88 mg/L in July, which are higher than that specified in the EPL of 50 mg/*L

Licence Variations

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

- Removal of requirement to monitor redundant or removed environment monitoring points MP2, MP6, MP7 & MP8 on 22 June 2017.
- Approval to construct Package 2 & 3 Landfill Cells/Deep Leachate Drainage System 20 January 2017.
- Approval granted to construct and operate the new contingency leachate pond 23 November 2016.
- Approval to reinstate cover material descriptions and allow specific material types. Additional conditions regarding the management of onsite sediment basin/s at the premises. Streamline, add and update waste management conditions 14 October 2016.
- Approval granted to dispose of waste in Cell 1B on 01 September 2015
- 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 SURFACE WATER MONITORING

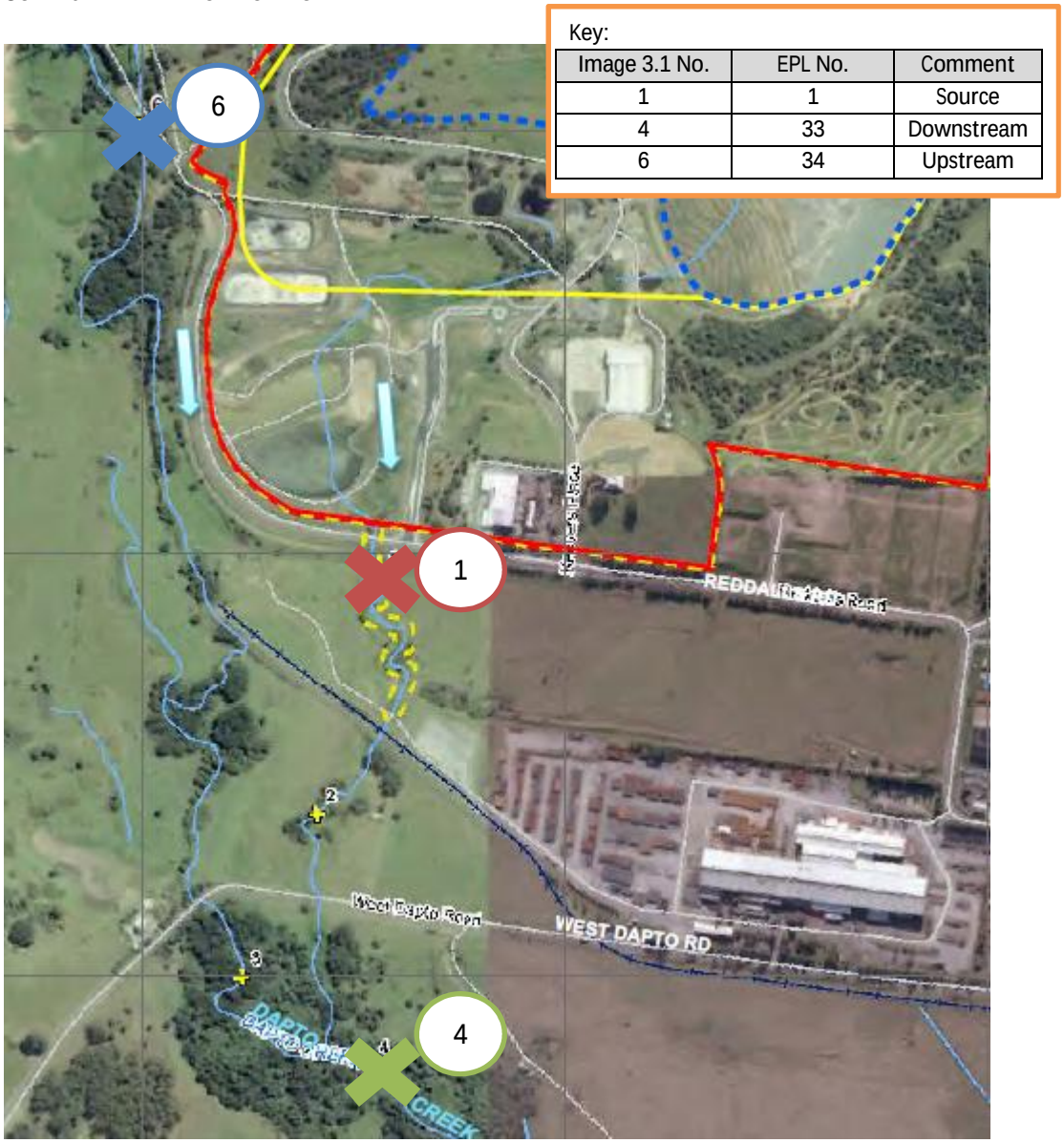


Image 3.1: Surface Water Flow Paths and EPL Sample Point Locations.

3.1.1 Tabulated Results (Annual Sample)

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

Table 3.1.1. Annual stormwater monitoring results for the reporting period

	Feb 2017	EPA Monitoring Location		
Analyte	Units	1	33	34
Alkalinity	mg/L	203	96	63
Ammonia	mg/L	0.24	0.03	0.04
Calcium	mg/L	38	30	19
Chloride	mg/L	78	36	26
Conductivity	µS/cm	755	388	269
Dissolved O_2	mg/L	7.66	8.87	7.71
Iron	mg/L	0.08	0.12	0.26
Fluoride	mg/L	0.4	0.2	0.1
Magnesium	mg/L	20	13	8
Nitrate	mg/L	0.61	0.53	0.47
Potassium	mg/L	16	3	4
Sodium	mg/L	97	31	26
Sulfate	mg/L	30	24	17
Temperature	^{o}C	21.6	19.6	21
TOC	mg/L	17	4	6
TP	mg/L	<0.05	<0.05	<0.05
TSS	mg/L	19	5	24
pH	pH	7.7	7.2	7

3.1.2 Tabulated Results (Discharge or Overflow Events)

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

Table 3.1.2.1 Overflow stormwater monitoring results for the reporting period

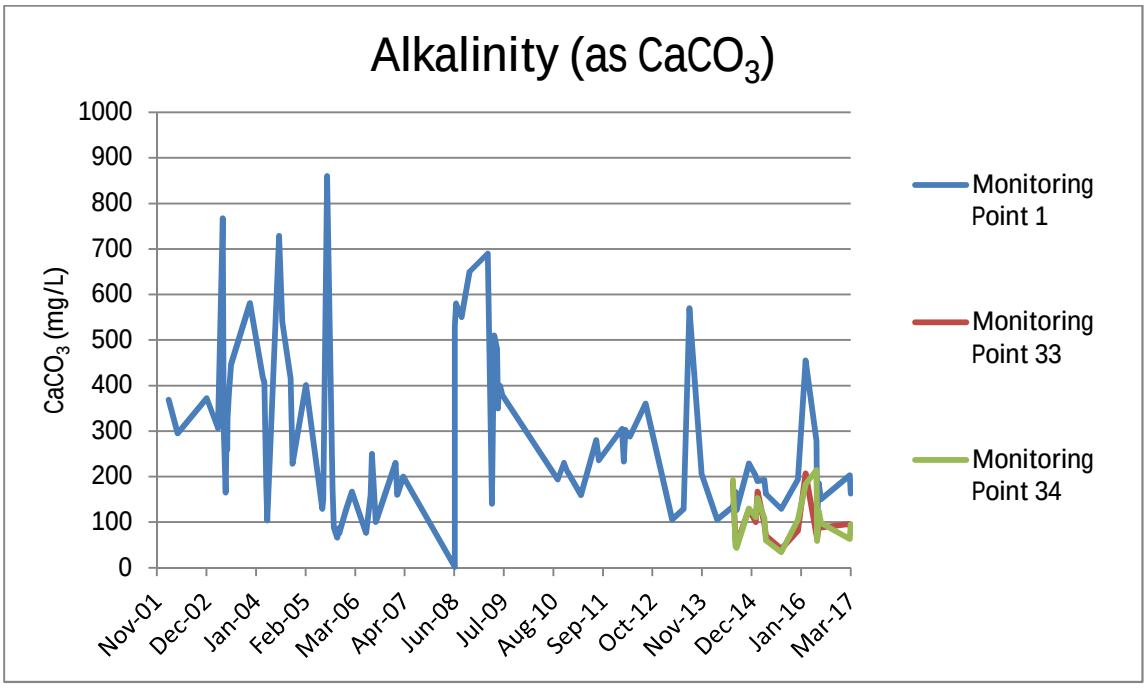
Analyte	Units	EPA Monitoring Point 1				
		3/6/2016	7/6/2016	20/6/2016	8/7/2016	7/3/2017
Alkalinity	mg/L	278	103	186	150	163
Ammonia	mg/L	0.05	1.3	0.61	0.2	0.66
Calcium	mg/L	35	20	25	34	27
Chloride	mg/L	175	33	54	55	48
Conductivity	µS/cm	1160	367	566	532	523
Dissolved O_2	mg/L	9.59	7.33	8.13	8.08	5.79
Iron	mg/L	<0.05	0.16	0.12	0.14	0.25
Fluoride	mg/L	0.5	0.2	0.3	0.3	0.2
Magnesium	mg/L	27	10	14	16	14
Nitrate	mg/L	0.35	1.07	1.36	0.2	0.66
Potassium	mg/L	18	7	9	9	12
Sodium	mg/L	150	34	59	58	58
Sulfate	mg/L	42	41	23	31	20
Temperature	°C	14.4	15.2	16.7	13.7	22.1
TP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TOC	mg/L	14	16	2	11	18
TSS	mg/L	7	78	27	88	28
pH	pH	7.9	7.7	8.1	7.5	7.3

Analyte	Units	EPA Monitoring Point 33				
		3/6/2016	7/6/2016	20/6/2016	8/7/2016	7/3/2017
Alkalinity	mg/L	72	63	90	88	88
Ammonia	mg/L	0.02	0.02	0.03	0.07	0.06
Calcium	mg/L	20	16	17	22	20
Chloride	mg/L	42	32	29	37	31
Conductivity	µS/cm	405	265	291	357	307
Dissolved O_2	mg/L	5.29	9.76	8.42	9.73	8.25
Iron	mg/L	0.22	0.16	0.3	0.22	0.14
Fluoride	mg/L	0.1	<0.1	0.1	0.1	<0.1
Magnesium	mg/L	11	7	7	9	9
Nitrate	mg/L	0.03	0.7	0.45	0.32	0.02
Potassium	mg/L	6	3	3	4	4
Sodium	mg/L	37	23	21	32	28
Sulfate	mg/L	47	16	21	26	18
Temperature	°C	14.5	14	15	14.4	20.9
TP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TOC	mg/L	6	7	8	7	6
TSS	mg/L	12	19	53	47	19
pH	pH	6.4	7.5	7.5	7.7	7

Analyte	Units	EPA Monitoring Point 34				
		3/6/2016	7/6/2016	20/6/2016	8/7/2016	7/3/2017
Alkalinity	mg/L	214	59	124	98	95
Ammonia	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
Calcium	mg/L	52	18	22	27	26
Chloride	mg/L	51	31	33	27	36
Conductivity	µS/cm	633	249	328	383	348
Dissolved O_2	mg/L	8.14	10	8.24	10.2	8.59
Iron	mg/L	0.07	0.17	0.2	0.2	0.07
Fluoride	mg/L	0.2	<0.1	0.2	0.1	<0.1
Magnesium	mg/L	24	8	10	12	12
Nitrate	mg/L	0.05	0.46	0.46	0.37	0.16
Potassium	mg/L	3	2	2	3	3
Sodium	mg/L	39	20	21	26	25
Sulfate	mg/L	38	16	20	24	21
Temperature	°C	15	14.8	16.5	13.5	20.3
TP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TOC	mg/L	4	6	7	5	3
TSS	mg/L	24	8	16	12	6
pH	pH	7.6	7.7	7.9	7.9	7

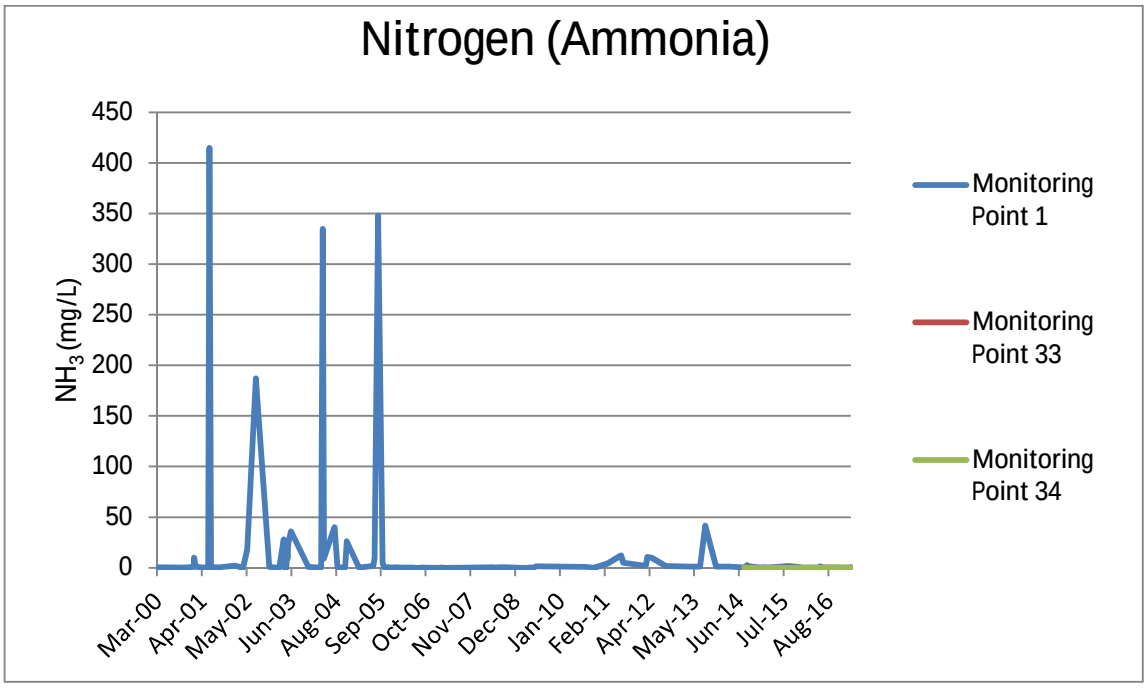
3.1.3 Data Presentation

Figure 3.1.3.1 Alkalinity results presentation



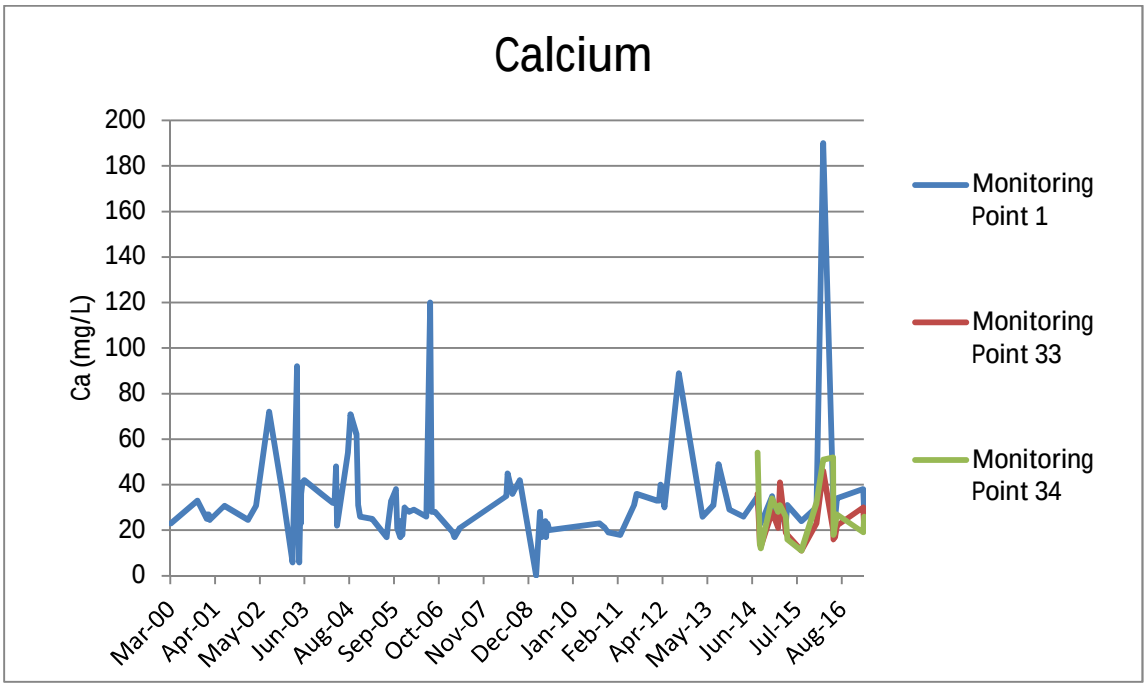
Alkalinity is a measure of waters capacity to resist changes in pH that would make the water more acidic (reduce pH). Therefore alkalinity is inextricably linked to pH values and should be further analysed if pH problems were evident. However, pH values have been maintained within the normal range for water bodies (6.5-8.5).

Figure 3.1.3.2 Ammonia results presentation



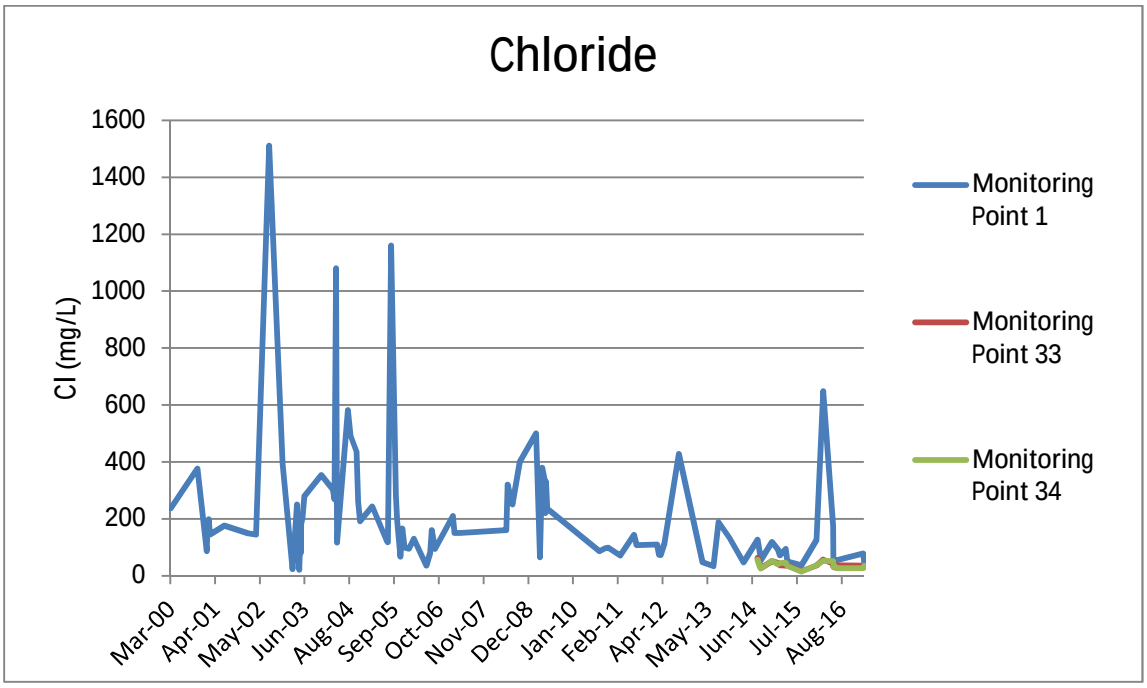
Ammonia is a by-product of the decomposition of organic matter. Therefore, increased ammonia levels can be a good indicator of environmental contamination sourced from landfill leachate. The low ammonia levels indicated suggests that leachate does not appear to be infiltrating the stormwater pond.

Figure 3.1.3.3 Calcium results presentation



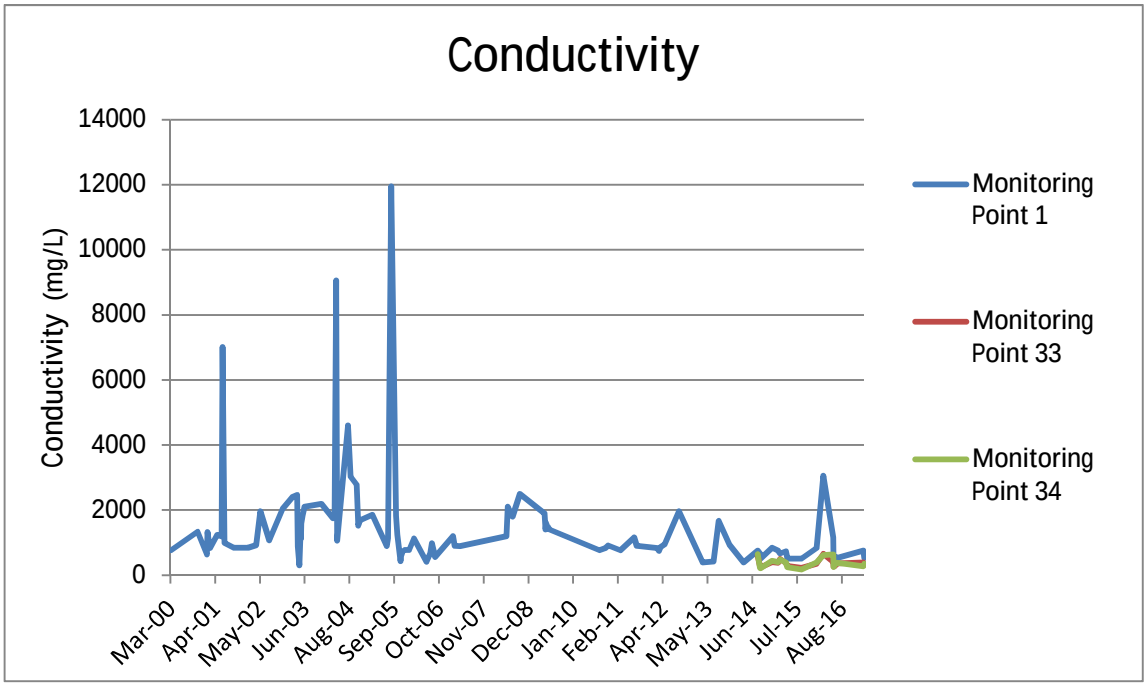
Calcium is an abundant element that is generally found in water through the erosion of rocks. However it is also common in construction materials, such as cement, brick lime and concrete. In March 2016 the annual (not an overflow event) sample resulted in an elevated result for calcium of 190 mg/L which is approximately three times the background trend. As Whytes Gully does not accept construction and demolition waste materials, there are very few anthropogenic sources of calcium into the sediment ponds. Throughout the reporting period calcium levels have returned to historical levels.

Figure 3.1.3.4 Chloride results presentation



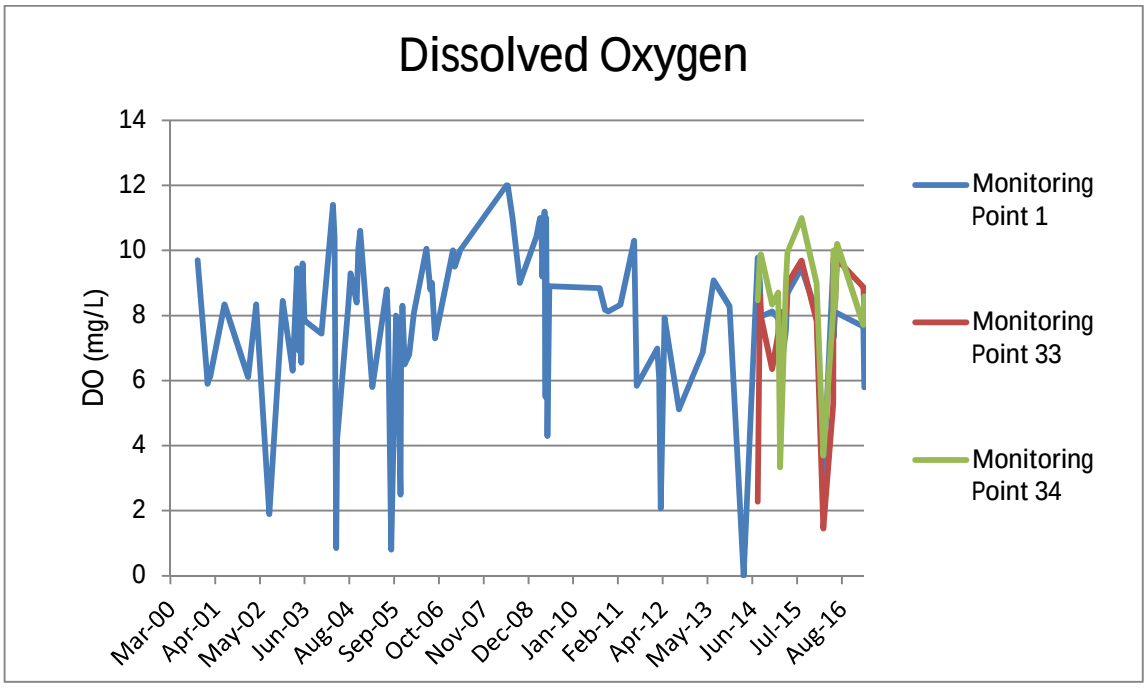
Chloride is present in landfill leachate and is therefore considered to be an indicator of uncontrolled leachate release. The chloride levels in the stormwater pond are consistent with historical results.

Figure 3.1.3.5 Conductivity results presentation



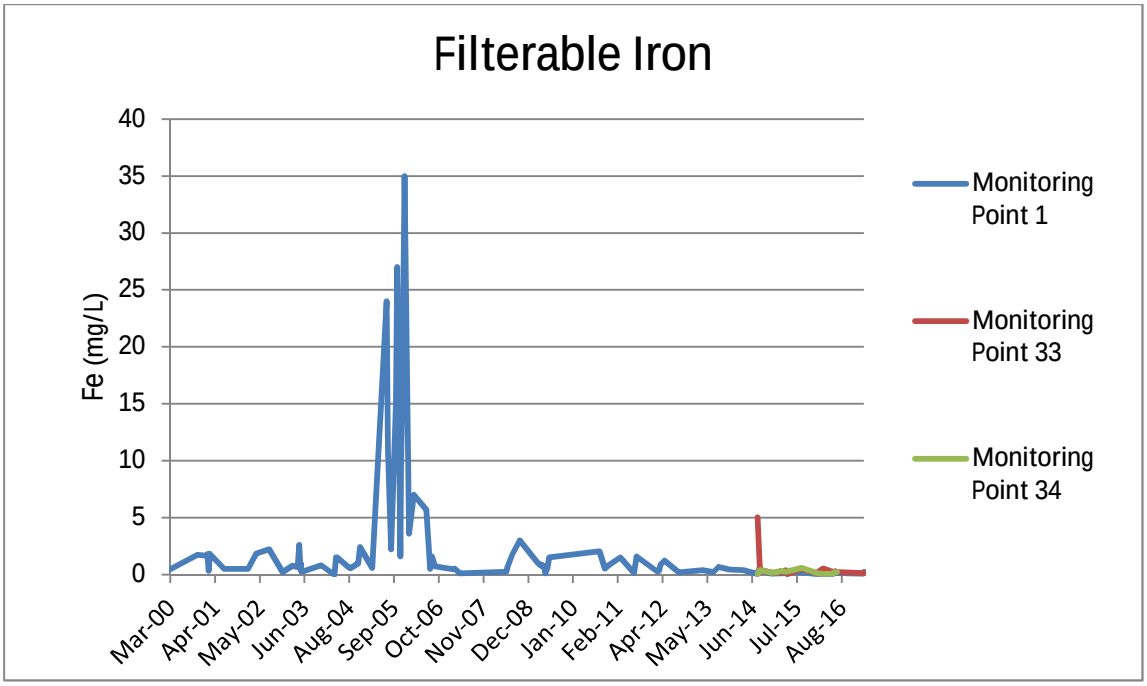
Conductivity is a measure of the waters ability to pass electrical current, usually though positively or negatively charged inorganic dissolved solids. It therefore indirectly measures the presence of inorganic materials including calcium, bicarbonate, nitrogen, phosphorus, iron, sulphur and other ions dissolved in a water body. Low levels of inorganic materials have been found in the sediment pond during the reporting period.

Figure 3.1.3.6 Dissolved oxygen results presentation



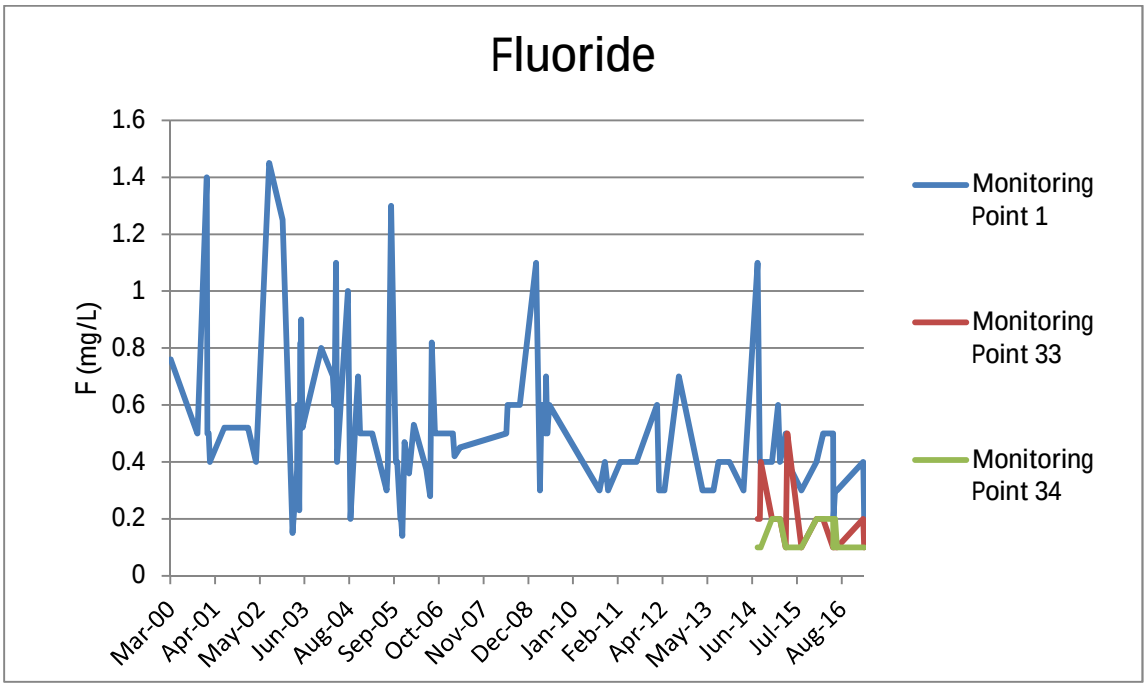
Dissolved oxygen levels can be depleted by biological activity associated with the nitrification process common in landfill leachate. Dissolved oxygen levels have historically fluctuated in the sediment pond. More recent sampling of upstream and downstream locations indicate that the fluctuations experienced over the reporting period are typical of the water body and not impacted by the sediment ponds at the Site.

Figure 3.1.3.7 Filterable iron results presentation



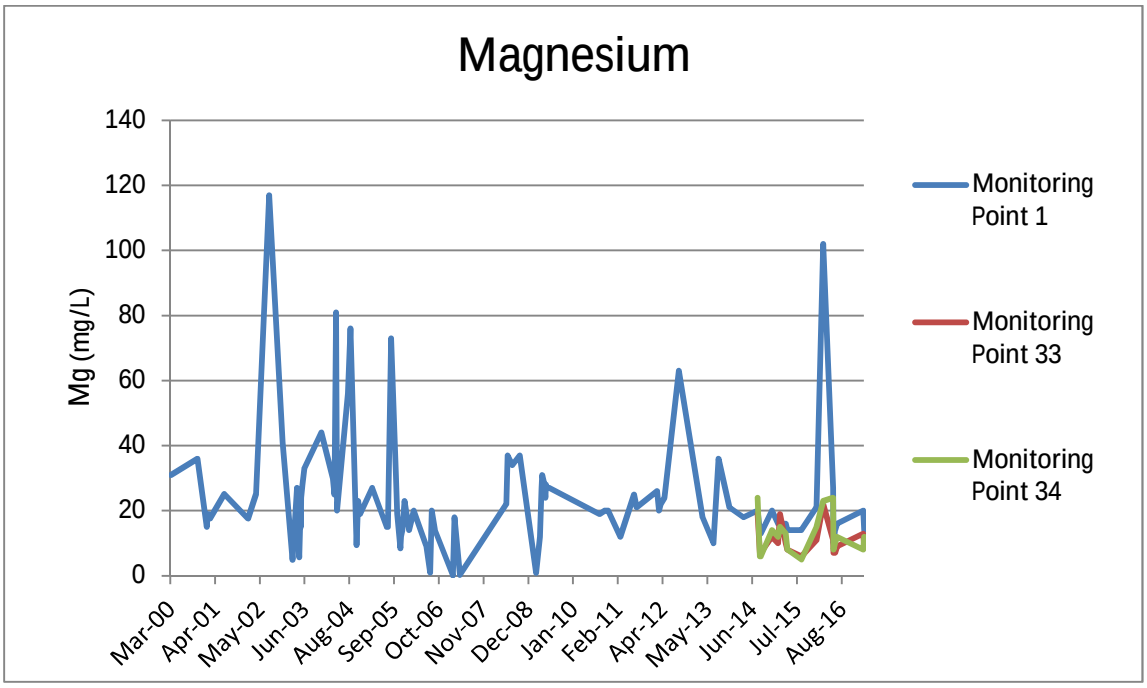
Filterable iron has continued to trend at very low levels, especially with regard to the reporting period.

Figure 3.1.3.8 Fluoride results presentation



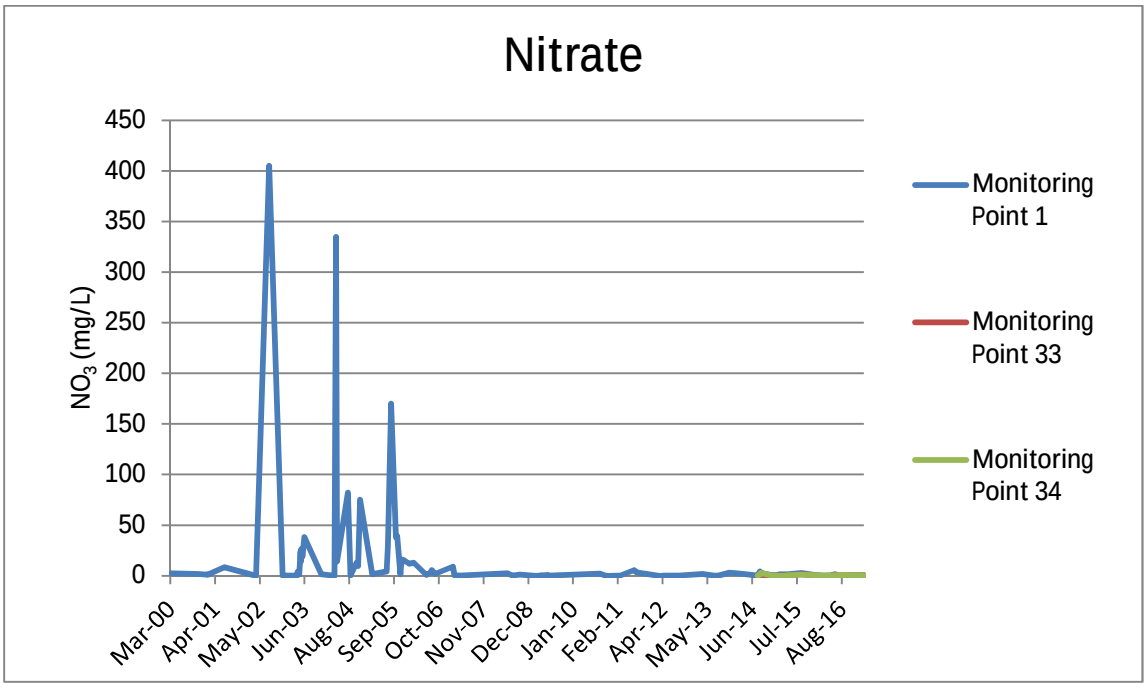
Fluoride occurs in Australian drinking water at levels up to 1.5 mg/L. The level of fluoride found in the stormwater detention pond is therefore by comparison relatively low and displays a consistent trend over the twelve year sampling period. Fluctuations evident are very low actual levels, up to 0.6 mg/L.

Figure 3.1.3.9 Magnesium results presentation



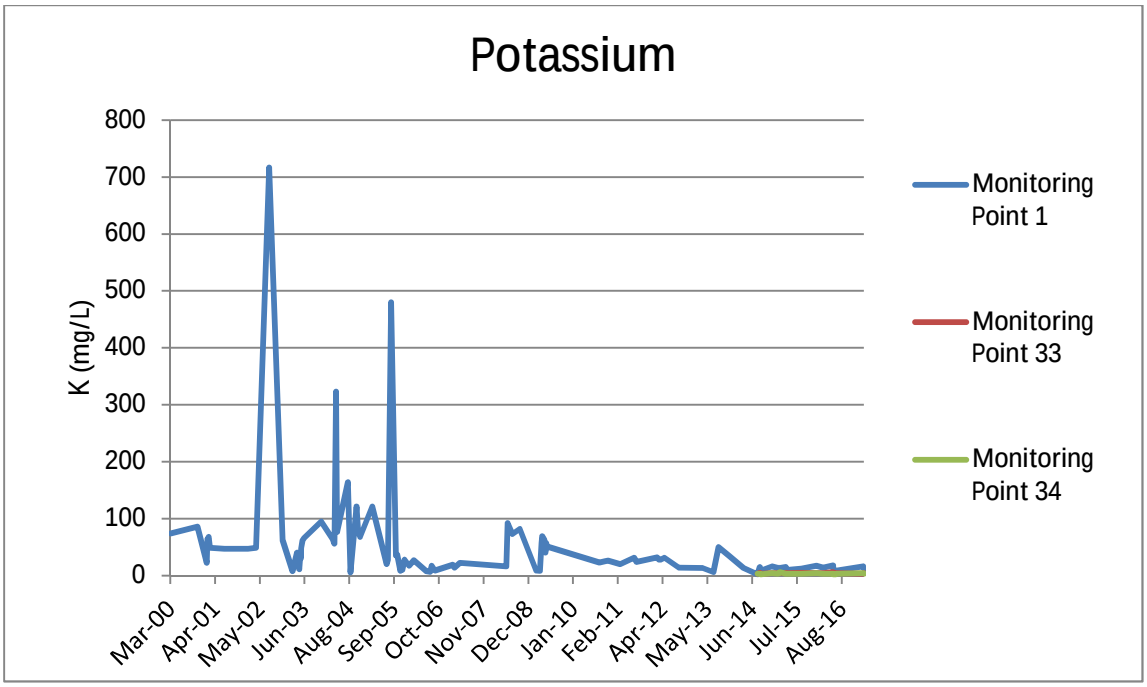
March 2016 the annual (not an overflow event) sample resulted in an elevated result for magnesium of 102 mg/L which is approximately three times the background trend. As Whytes Gully does not accept construction and demolition waste materials, there are very few anthropogenic sources of magnesium into the sediment ponds. Throughout the reporting period magnesium levels have returned to historical levels. The elevated magnesium result is linked with the spike in Calcium (another inorganic dissolved solid common in building and construction materials). Follow up samples have been taken and each indicates that magnesium and calcium levels in the sediment pond have since returned to historic levels.

Figure 3.1.3.10 Nitrate results presentation



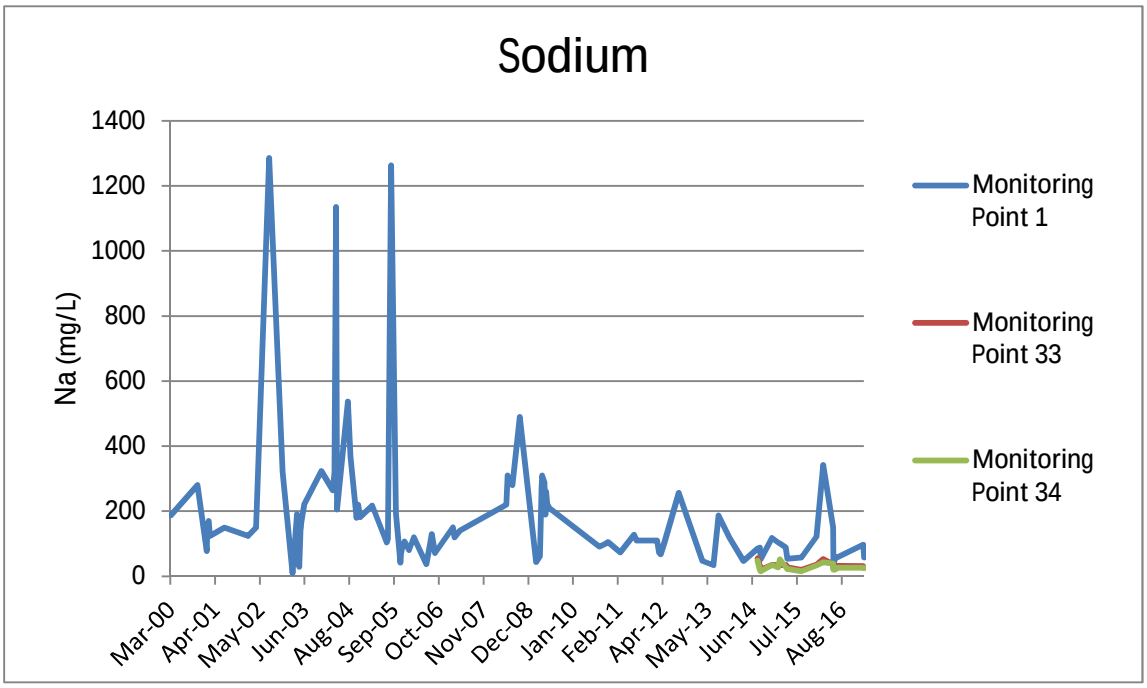
Nitrate and nitrite are naturally occurring ions that are part of the nitrogen cycle that includes the decomposition of organic matter, such as what takes place in landfills. The World Health Organisation suggests that nitrate concentration in surface water is normally up to 18 mg/L. The samples analysed during the reporting period indicate that landfill leachate is unlikely to be intersecting with the sediment ponds.

Figure 3.1.3.11 Potassium results presentation



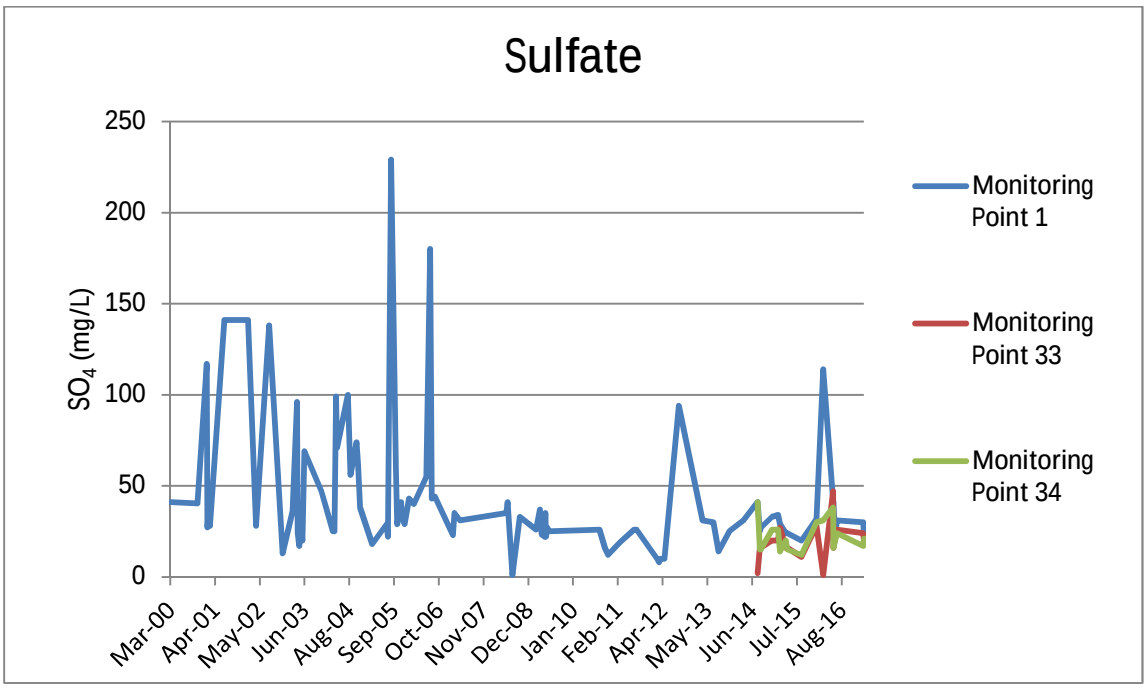
Potassium concentrations have been in line with recent trends and with the naturally occurring groundwater levels of these analytes around the site. Elevated potassium concentrations are typically associated with weathering of rocks.

Figure 3.1.3.12 Sodium results presentation



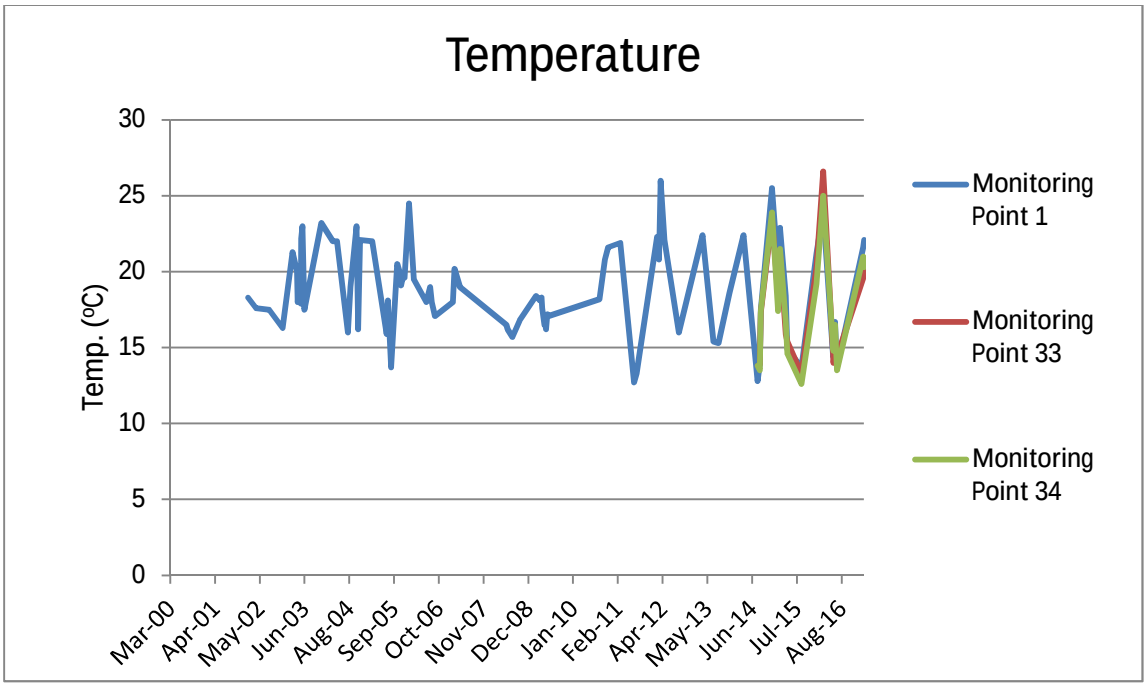
Sodium is common in water bodies due to its high solubility and abundance in rocks and soils. Sodium can provide a potential indicator of groundwater contamination by landfill leachate.

Figure 3.1.3.13 Sulfate results presentation



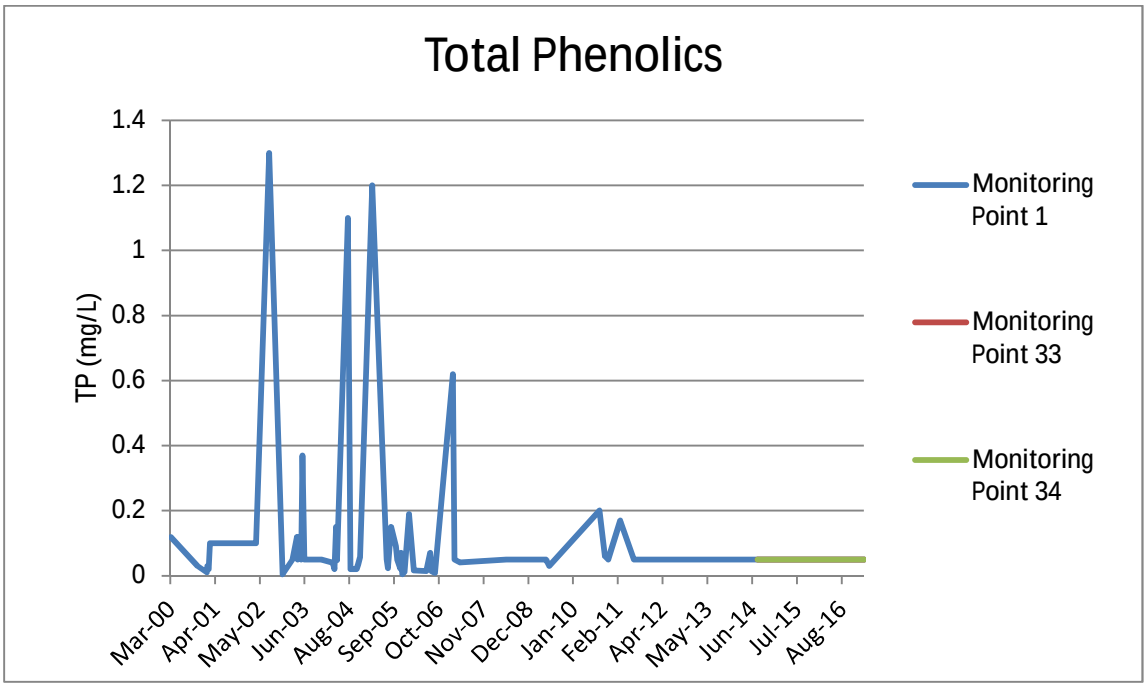
The *2011 Australian Drinking Water Guidelines 6* sets maximum sulfate levels in drinking water as 500 mg/L. The sulfate levels in the stormwater detention pond are in line with the historical levels and are better than the drinkable water standard. Inorganic ions such as sulfate provide a potential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

Figure 3.1.3.14 Temperature results presentation



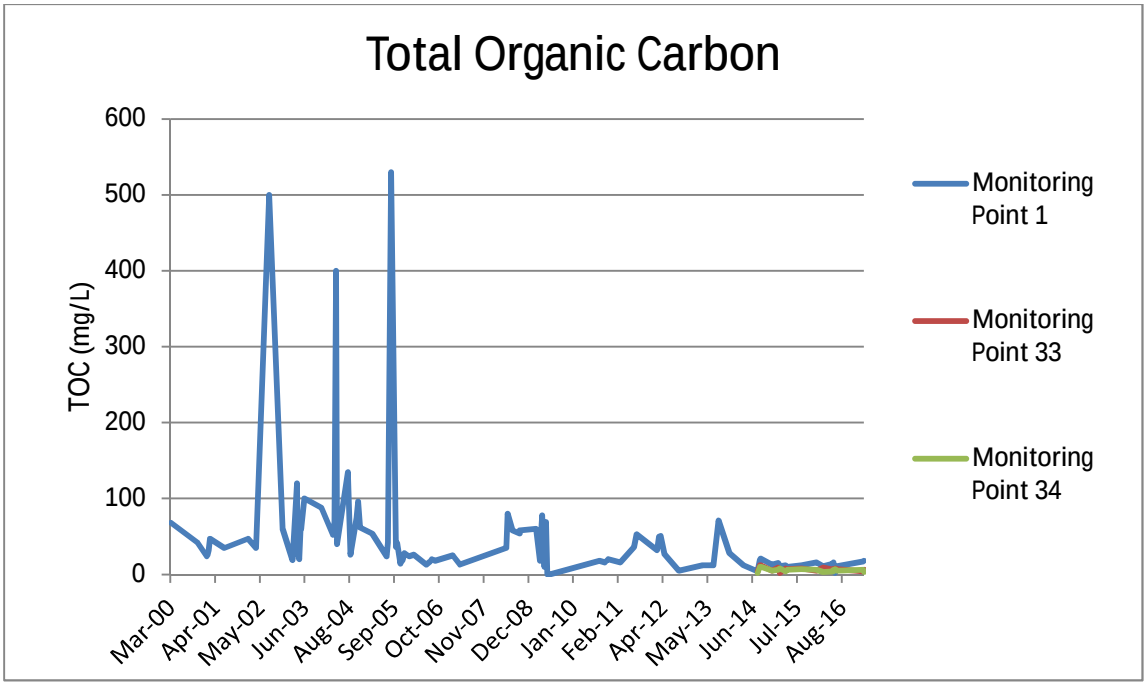
Temperature, as expected has generally been indicative of the season in which the stormwater detention pond has been sampled and mirrors the external environment results upstream and downstream.

Figure 3.1.3.15 Total phenolics results presentation



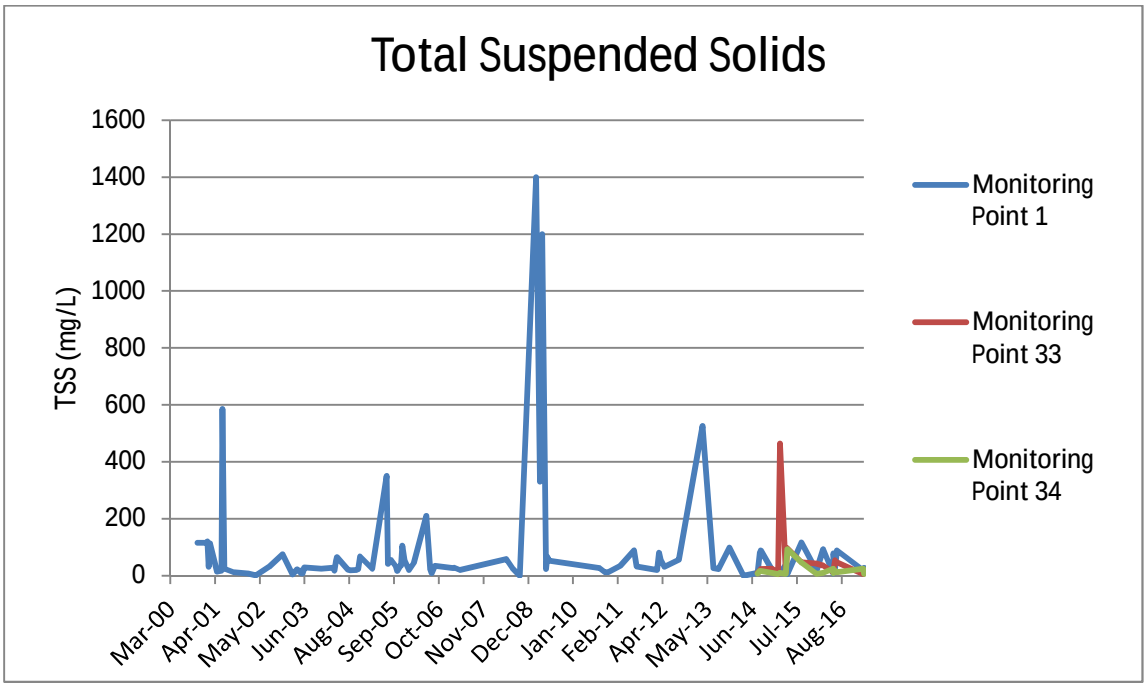
Phenols are widely used in the manufacture of resins, plastics, insecticides, explosives, dyes, and detergents. It is also used as a raw material for the production of medicinal drugs such as aspirin. Recent trend results for total phenols have been extremely low and more often than not, below detectable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

Figure 3.1.3.16 Total organic carbon results presentation



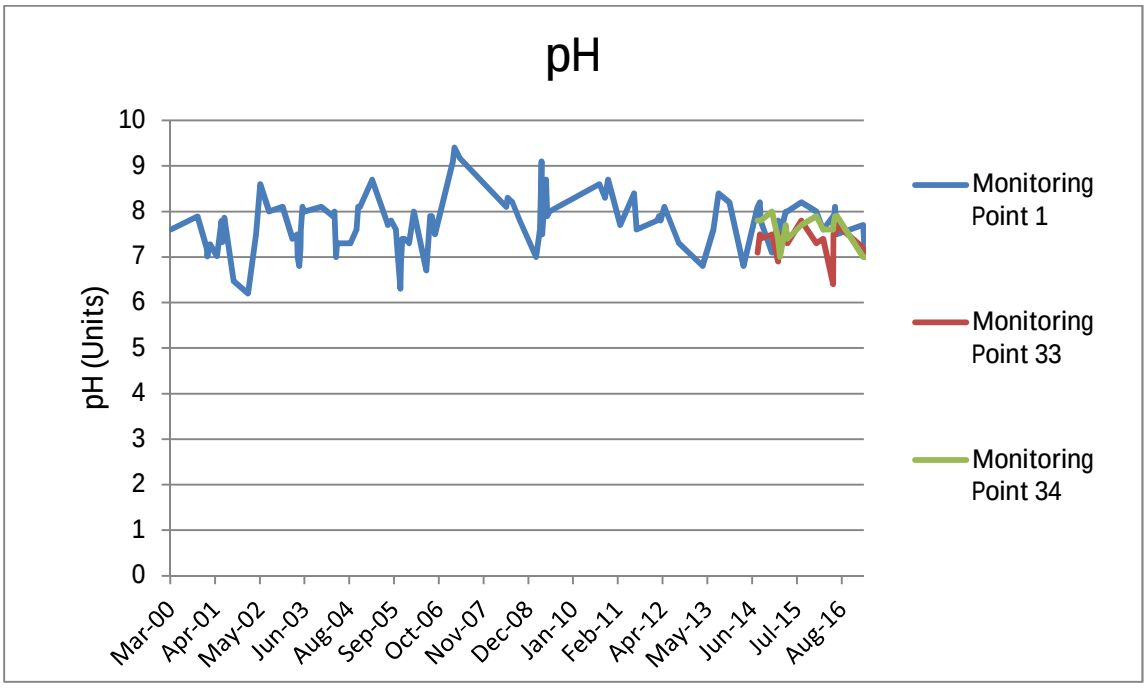
Microbial degradation of organic matter can increase the total organic carbon content in water and may provide evidence of water contamination by natural compounds derived from the landfilling of organic matter. The amount of total organic carbon has remained consistently stable over the last ten years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

Figure 3.1.3.17 Total suspended solids results presentation



Samples for Total Suspended solids indicate that during the reporting period indicate that there has been two (2) non compliances occurred on 7 June 2016 with a result of 78mg/L and 8 July 2016 (88mg/L). Refer to section 4.1 Deficiency identification and remediation.

Figure 3.1.3.18 pH results presentation



Samples during the reporting period for pH show that the values have between the normal ranges of 6.5 – 8.5.

3.1.4 Surface Water Results Interpretation

Whilst the majority of analytical samples taken during the reporting period indicate low contamination levels in the sediment ponds, there has been two (2) non compliances with Environmental Protection Licence requirements associated with higher than acceptable suspended solids exiting the site during heavy rainfall. Whilst not a chemical or biological contamination issue, the result shows that the sediment ponds need additional care and maintenance moving forward. Section 4.1 Deficiency Identification and Remediation further explains the improvements implemented to monitor and manage stormwater on site.

3.2 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 well locations and any elevated results, please refer to the sites Environmental Monitoring Locations located in Annexure A of this document.

3.2.1 Tabulated Results

Table 3.2.1.1 Quarterly analyte testing results for 8 August 2016

Analyte		Monitoring Points															
	Units	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	1200	772	370	495	107	486	318	45	Dry	288	567	263	677	555	256	814
Calcium	mg/L	313	354	96	86	22	174	39	5	Dry	46	126	94	207	119	90	123
Chloride	mg/L	1130	1300	604	621	14	348	50	24	Dry	32	659	368	870	639	434	1090
Conductivity	µS/cm	5200	5160	2660	2880	262	1650	553	212	Dry	620	3080	1540	3970	2990	1710	4810
Magnesium	mg/L	190	214	55	74	6	56	24	2	Dry	17	84	51	152	91	46	119
Nitrogen	mg/L	0.03	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	Dry	0.02	0.01	0.3	<0.01	<0.01	<0.01	0.08
Potassium	mg/L	3	2	<1	<1	1	<1	<1	<1	Dry	5	1	2	1	1	1	<1
Sodium	mg/L	639	530	401	464	20	171	106	31	Dry	68	432	173	486	418	190	818
Water Level	m	4.99	0.5	1.73	2.24	2.5	7.1	7.24	10.8	Dry	2.6	2.1	3.03	4.06	6.27	2.92	1.46
Sulfate	mg/L	156	184	113	193	10	124	39	12	Dry	19	172	103	276	166	24	238
TDS	mg/L	3390	3930	1580	1740	215	1180	422	173	Dry	369	1880	1010	2660	1770	1080	5460
TOC	mg/L	98	10	2	3	2	1	2	1	Dry	10	2	5	2	1	1	9
pH	pH	7.4	7.5	7.6	7.6	7	7.5	7.1	7	Dry	7.5	7.9	5.9	7.7	7.5	7.2	7.5

Table 3.2.1.2 Quarterly analyte testing results for 28 November 2016

Analyte		Monitoring Points															
	Units	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	1060	671	420	336	247	444	453	Dry	594	414	473	358	603	494	218	725
Calcium	mg/L	311	351	81	98	65	164	55	Dry	64	50	125	84	194	116	91	128
Chloride	mg/L	1220	1390	640	645	20	374	90	Dry	408	360	675	247	902	670	438	1170
Conductivity	µS/cm	5620	5640	2980	2800	545	1950	1260	Dry	3550	1870	3140	1540	4340	2320	1780	5100
Magnesium	mg/L	189	206	73	59	17	68	38	Dry	65	42	84	38	150	93	47	127
Nitrogen	mg/L	<0.01	0.03	0.02	<0.01	0.04	0.01	0.22	Dry	0.04	0.04	0.01	1.16	<0.01	0.03	0.05	0.21
Potassium	mg/L	2	2	<1	<1	<1	<1	<1	Dry	3	<1	<1	2	1	1	2	<1
Sodium	mg/L	622	515	465	414	29	159	176	Dry	635	312	422	164	463	418	190	819
Water Level	m	5.1	0.69	2.5	1.97	7	7.9	7.8	Dry	5.3	2.79	2.28	3.7	4.21	6.4	3.23	1.53
Sulfate	mg/L	150	123	119	189	13	114	45	Dry	596	83	175	45	262	152	22	47
TDS	mg/L	3330	3500	1530	1650	628	1150	809	Dry	2100	1100	1760	858	2510	1690	948	3060
TOC	mg/L	7	5	<1	4	5	3	3	Dry	4	6	14	14	4	25	6	10
pH	pH	7.8	7.1	6.8	6.7	7	6.7	7.4	Dry	8.2	6.7	7.1	6.4	6.9	7	7	6.6

Table 3.2.1.3 Quarterly analyte testing results for 6 February 2017

Analyte		Monitoring Points															
	Units	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	1160	809	362	448	Dry	479	523	39	Dry	576	512	227	638	571	239	771
Calcium	mg/L	300	369	97	77	Dry	224	55	8	Dry	140	124	90	198	126	92	121
Chloride	mg/L	1150	1330	605	606	Dry	525	83	37	Dry	686	646	376	875	669	437	1100
Conductivity	µS/cm	5700	5940	3000	3200	Dry	2700	1300	289	Dry	3620	3330	1780	4400	3470	1810	5350
Magnesium	mg/L	192	214	58	72	Dry	75	39	3	Dry	125	84	51	154	100	47	121
Nitrogen	mg/L	0.02	0.02	0.02	0.02	Dry	0.05	0.18	0.12	Dry	0.04	0.01	0.51	0.01	0.06	0.05	0.26
Potassium	mg/L	3	2	<1	<1	Dry	<1	<1	<1	Dry	<1	<1	2	2	1	1	<1
Sodium	mg/L	609	491	399	456	Dry	184	176	36	Dry	441	417	169	457	421	187	755
Water Level	m	5.36	0.92	2.28	2.72	Dry	7.4	7.8	10.9	Dry	1.88	2.5	4.01	4.4	6.5	3.46	1.65
Sulfate	mg/L	168	193	174	206	Dry	149	74	14	Dry	204	189	100	288	210	24	244
TDS	mg/L	3840	4390	1620	1920	Dry	2140	1180	543	Dry	2540	2020	1820	3080	2230	1340	3210
TOC	mg/L	7	6	2	2	Dry	2	3	4	Dry	3	2	13	3	3	2	11
pH	pH	6.6	6.9	6.7	7	Dry	7	7.5	5.9	Dry	6.8	6.9	6.1	6.8	6.9	6.9	6.7

Table 3.2.1.4 Quarterly analyte testing results for 8 May 2017

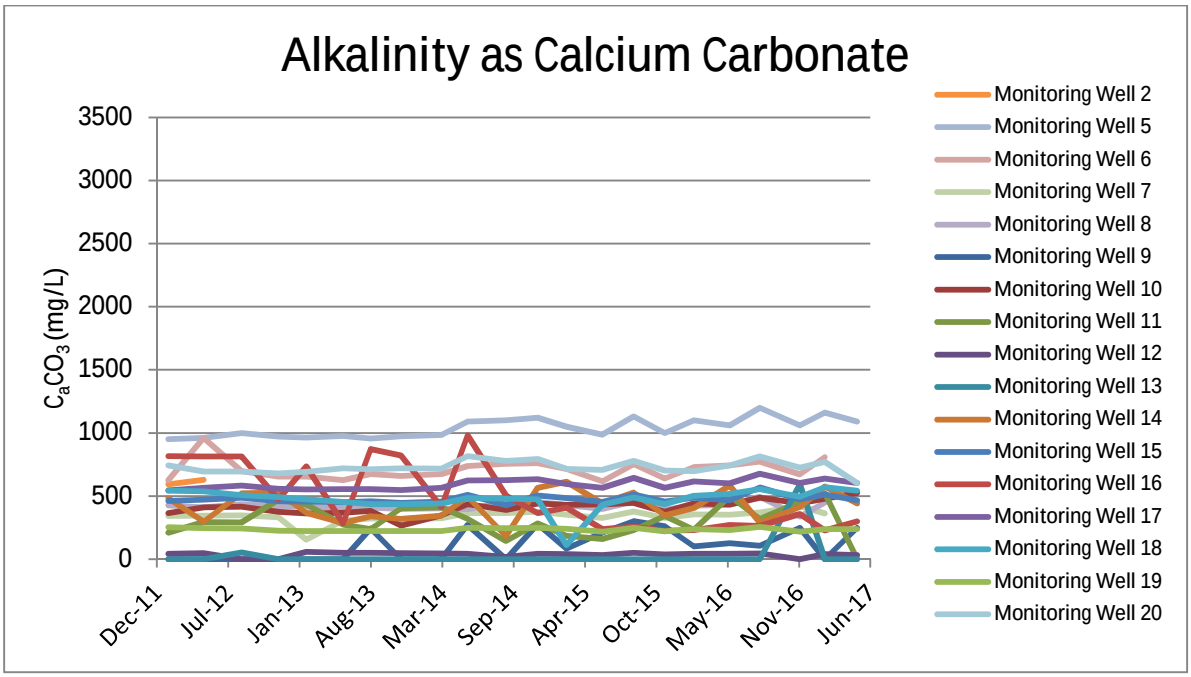
Analyte		Monitoring Points															
	Units	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Alkalinity	mg/L	1090	*	*	*	248	237	<1	32	DRY	442	466	300	602	542	238	604
Calcium	mg/L	360	*	*	*	60	162	40	7	DRY	147	111	95	228	130	92	91
Chloride	mg/L	1180	*	*	*	22	237	250	41	DRY	548	621	319	917	667	413	902
Conductivity	µS/cm	5710	*	*	*	559	1840	893	271	DRY	2560	3060	1620	4440	3400	1690	3930
Magnesium	mg/L	170	*	*	*	15	50	18	3	DRY	82	81	47	138	86	40	100
Nitrogen	mg/L	0.02	*	*	*	0.05	<0.01	<0.01	0.01	DRY	0.1	0.04	0.5	<0.01	0.01	0.04	0.16
Potassium	mg/L	2	*	*	*	<1	<1	<1	<1	DRY	3	2	2	1	1	1	<1
Sodium	mg/L	558	*	*	*	26	156	74	33	DRY	246	397	154	434	389	164	687
Water Level	m	10.9	*	*	*	11.68	7.59	7.04	10.65	DRY	2.5	2.03	3.21	3.97	6.7	2.9	1.39
Sulfate	mg/L	152	*	*	*	9	120	250	14	DRY	132	159	105	262	157	24	171
TDS	mg/L	3390	*	*	*	505	998	456	300	DRY	1380	1680	840	2570	1720	758	2180
TOC	mg/L	6	*	*	*	3	1	2	2	DRY	4	3	7	4	2	<1	10
pH	pH	6.8	*	*	*	7.1	7.2	6.3	5.7	DRY	6.9	6.6	6.4	6.8	7.1	7.1	6.5

*Note: Well decommissioned 28 February 2017

3.2.2 Data Presentation – Quarterly Monitoring

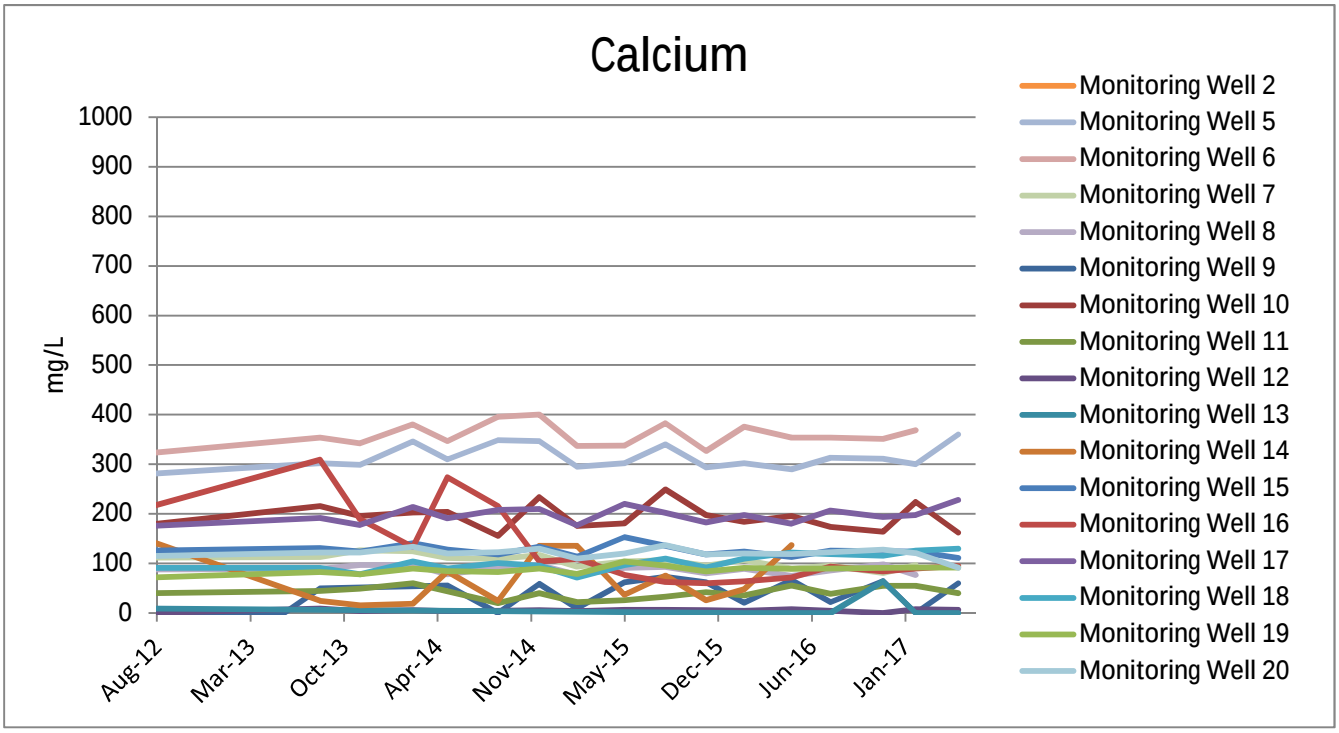
NOTE: Monitoring points 2, 6, 7 and 8 were decommissioned in February 2017.

Figure 3.2.2.1 Alkalinity results presentation



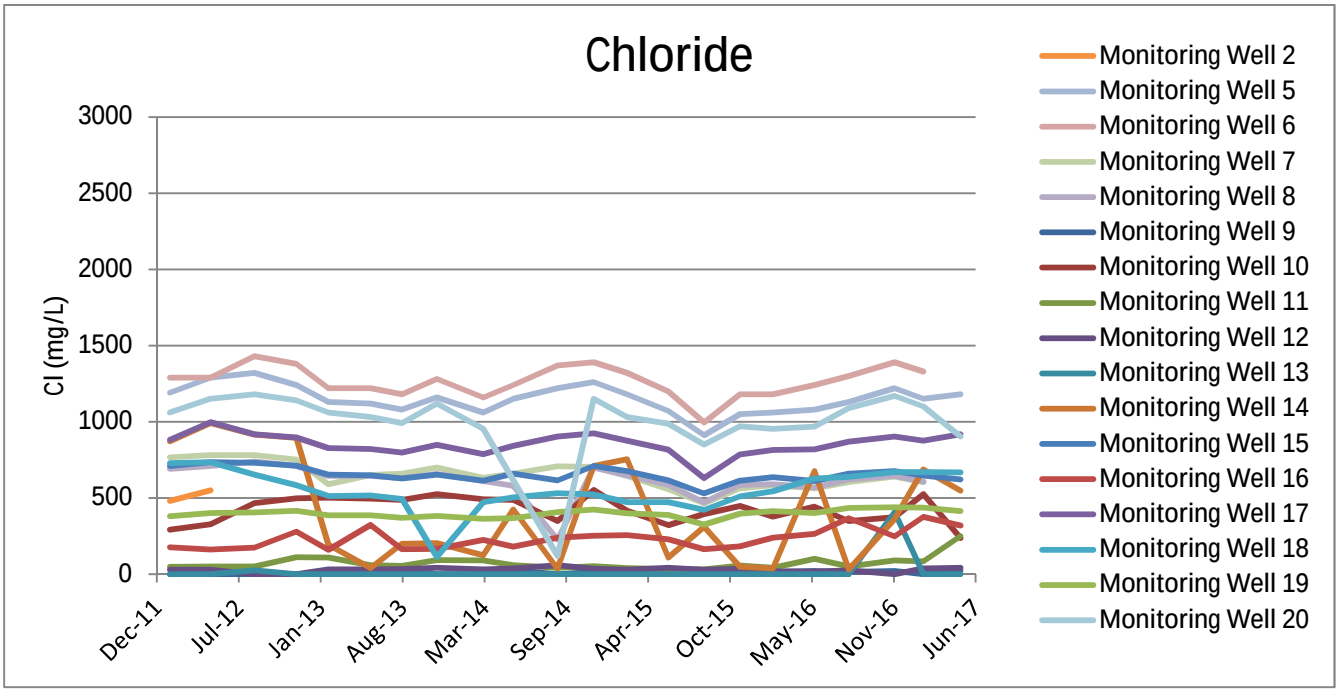
Increased alkalinity levels can be caused by many chemical processes including the denitrification process common in landfill leachate. Denitrification is the anaerobic biological reduction of nitrate (NO_3) to nitrogen (N_2) in its gaseous form. Under anoxic conditions microorganisms consume the oxygen 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.

Figure 3.2.2.2 Calcium results presentation



The groundwater monitoring wells show a consistent 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.

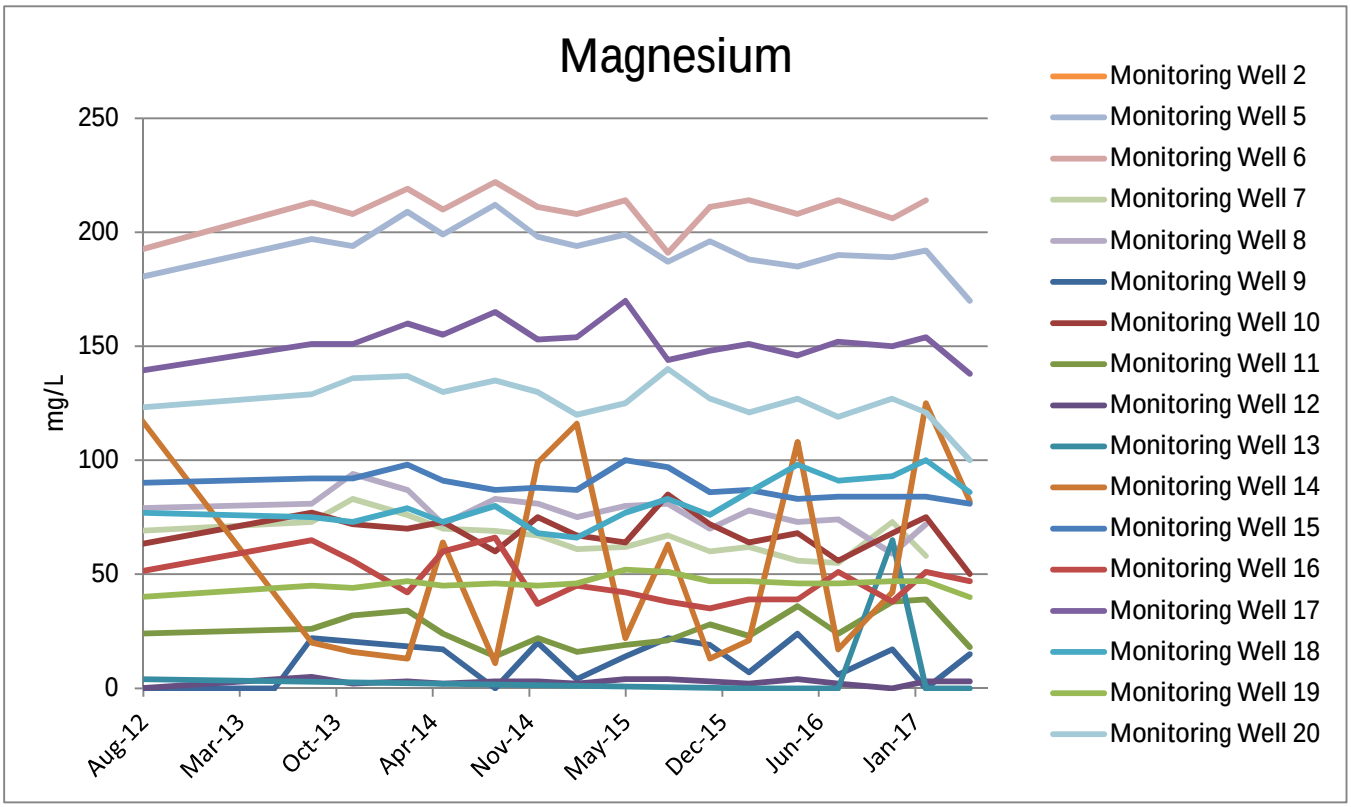
Figure 3.2.2.3 Chloride results presentation



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 are not within historical fluctuation levels and therefore leachate is not indicated in the groundwater network.

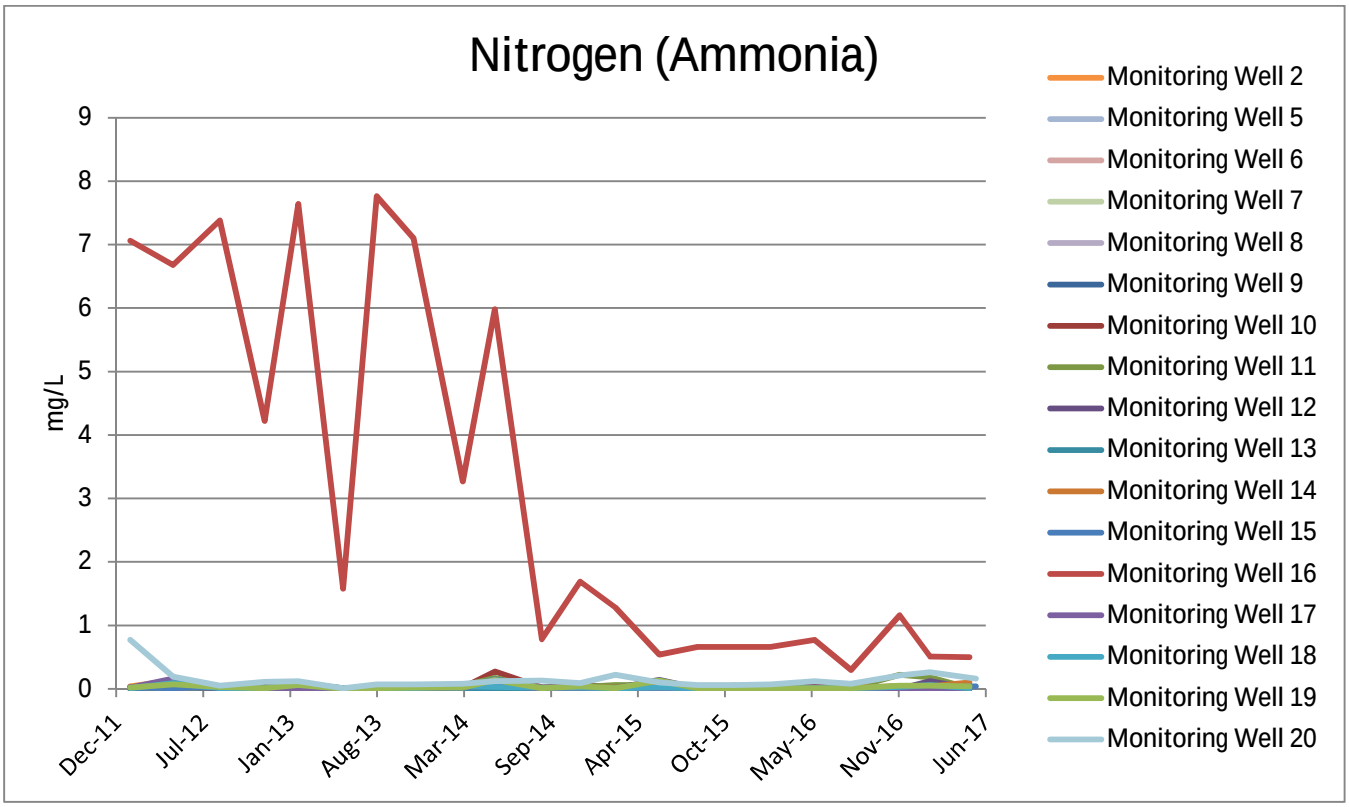
Figure 3.2.2.4 Magnesium results presentation



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.

Monitoring well 14 has demonstrated the most instability over the five year sampling period. However, all other wells appear relatively stable.

Figure 3.2.2.5 Nitrogen as ammonia results presentation

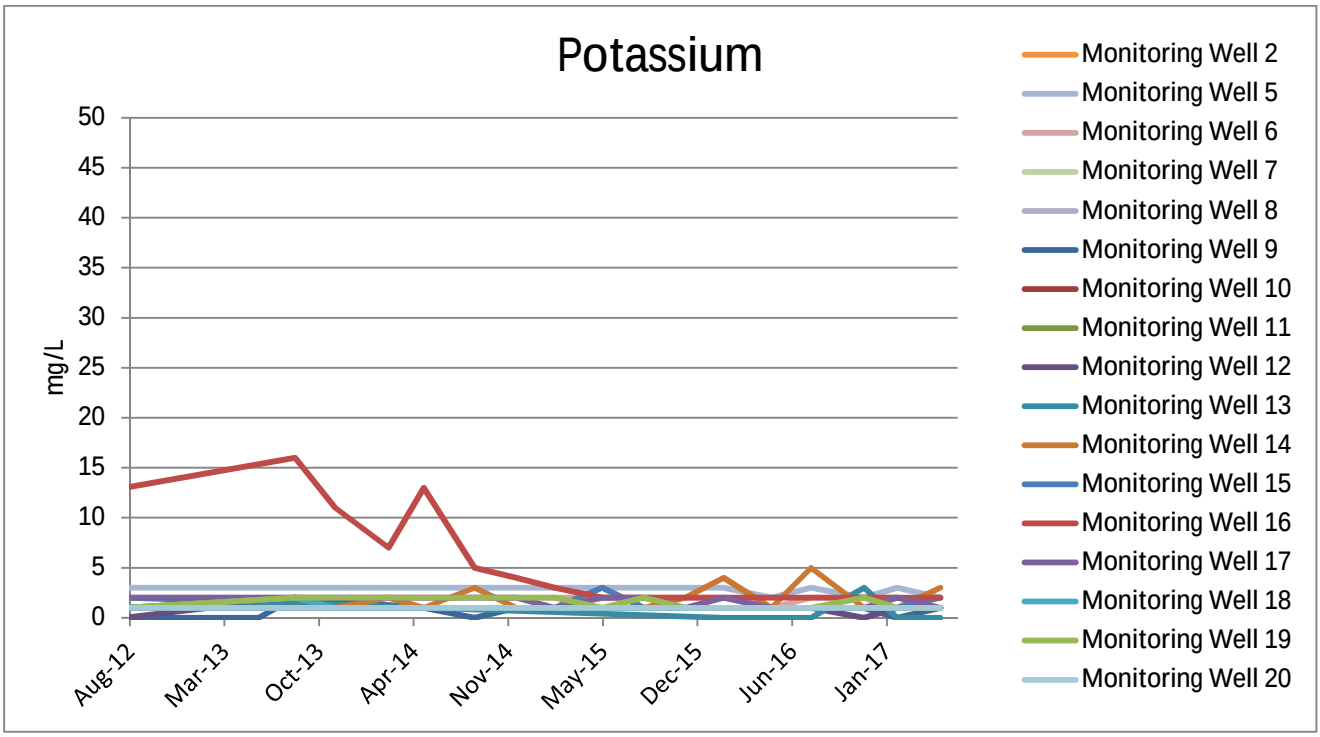


Ammonia is found in the environment, in the air, soil and water; in plants and animals. It is formed naturally by the decomposition of urine and manure. It is a source of nitrogen which is needed by plants and animals.

The 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. Considering that monitoring points 16 and 19 are arguably the most relevant with regard to groundwater movement away from the site, the result must continue to be monitored closely. Ammonia is arguably the clearest indicator of leachate contamination and the results from well 16 should continue to be monitored in future sampling events to be sure that the relative higher levels found prior to September 2014 are not indicative of leachate migration.

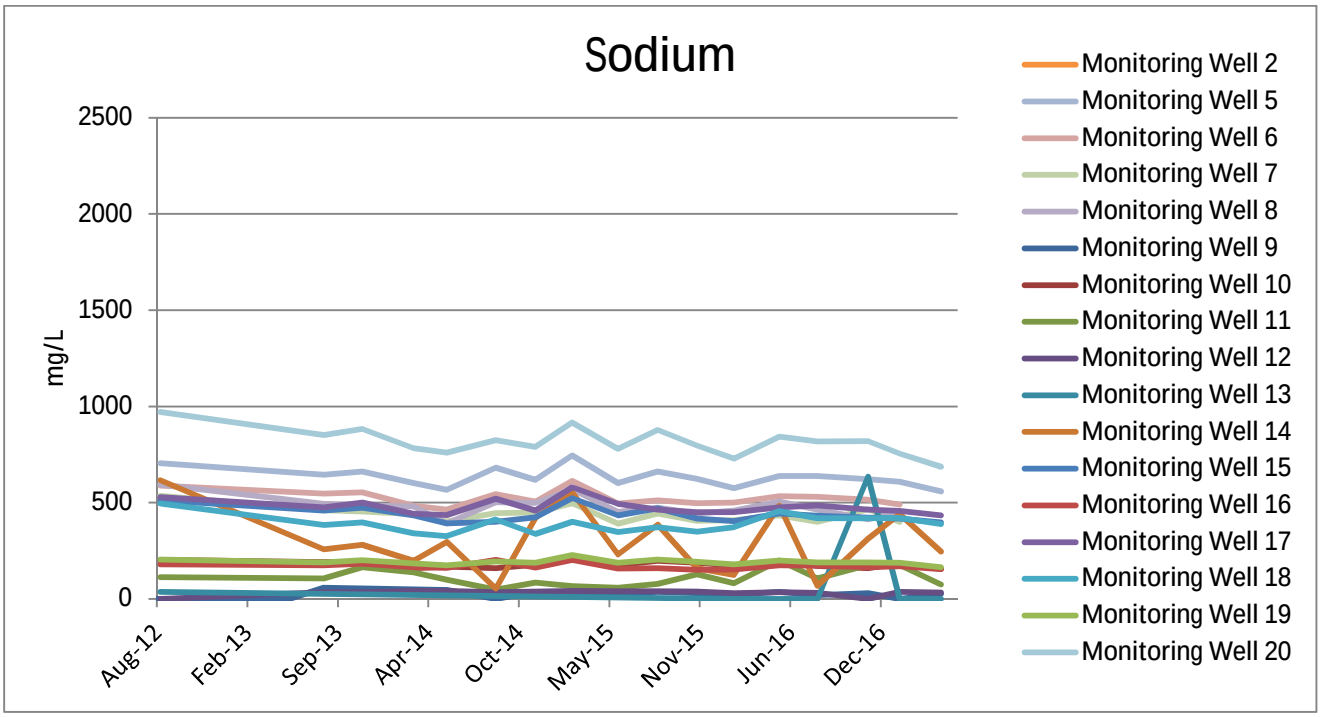
The data established over the reporting period indicates that ammonia levels in well 16 have started to stabilise at a low level of less than 1 mg/L, noting that up to 0.5 mg/L is considered suitable in drinking water.

Figure 3.2.2.6 Potassium results presentation



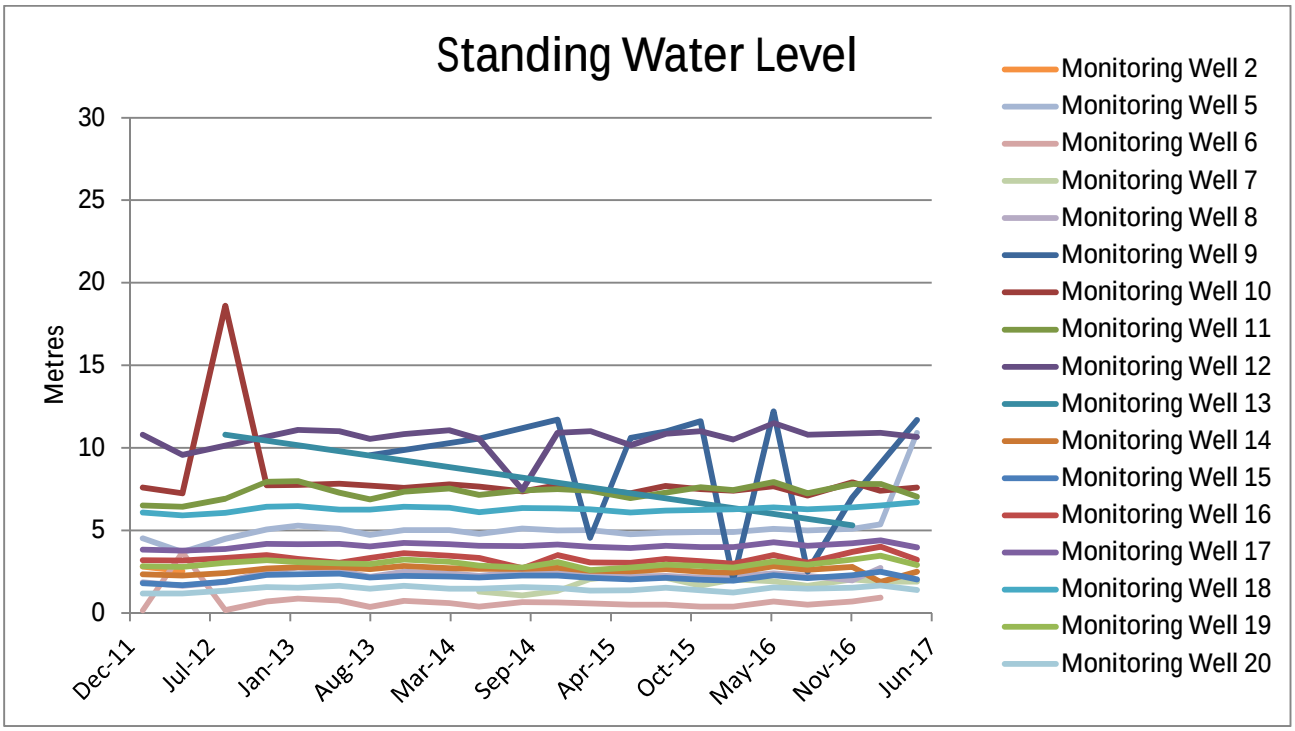
Potassium is present in groundwater systems outside coastal areas generally through weathering of clays and as a result of agriculture (leaching of fertiliser). Potassium may also be present in the breakdown of glass and especially cathode ray tubes. Groundwater monitoring wells indicate that potassium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

Figure 3.2.2.7 Sodium results presentation



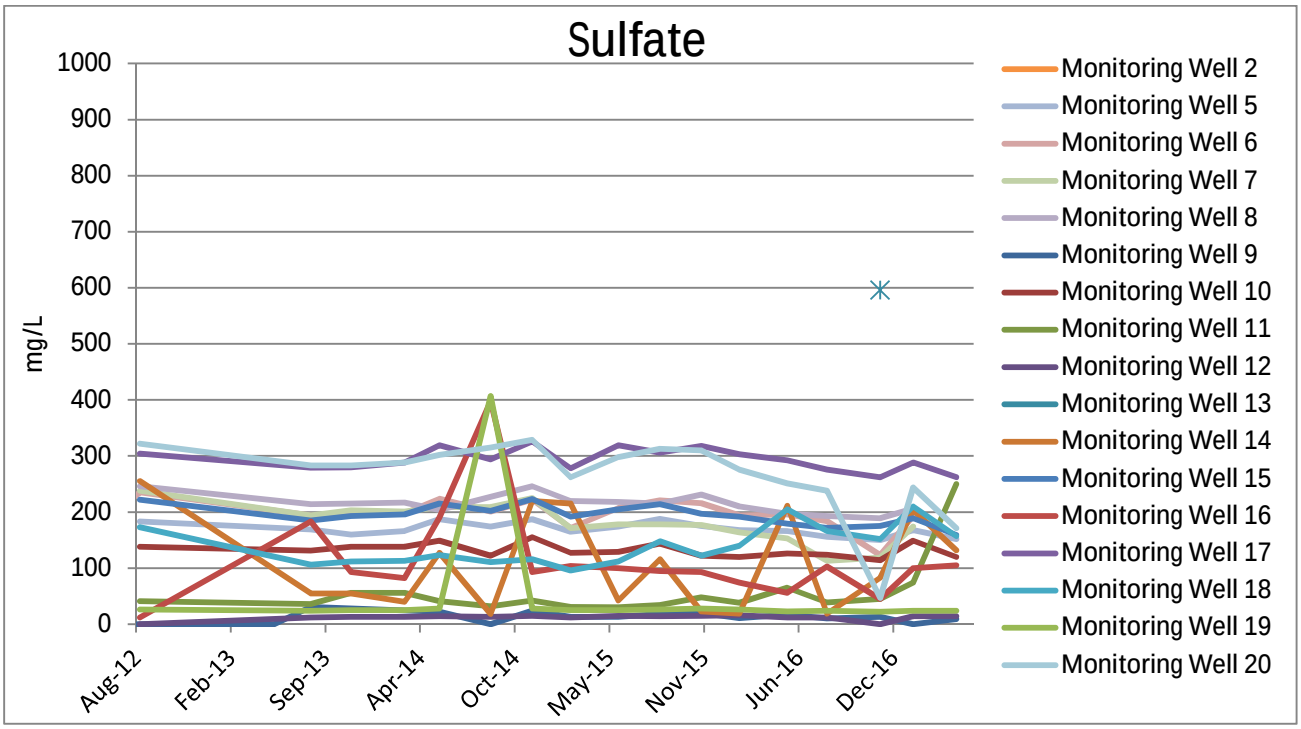
High sodium levels can be indicative of leachate contamination infiltrating the groundwater. As presented, results for sodium over the reporting period have been in line with historical fluctuations experienced throughout the history of data available.

Figure 3.2.2.8 Standing water level presentation



Groundwater level trends have been fairly stable, with the fluctuation over the six year testing period. It should be noted that some wells have run dry at periods, whilst well 13 appears to be permanently dry.

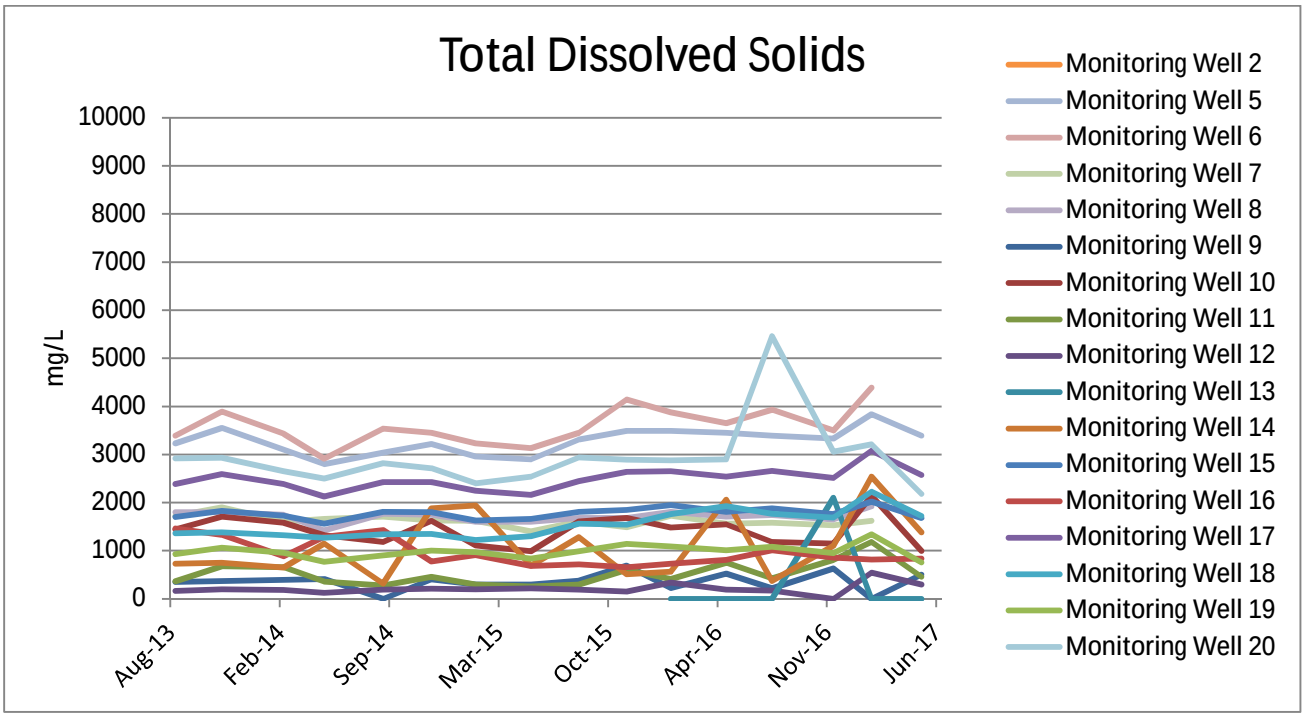
Figure3.2.2.9 Sulfate results presentation



For context the *2011 Australian Drinking Water Guidelines 6* sets maximum sulfate levels in drinking water as 500 mg/L. The sulfate levels in the groundwater monitoring wells are in line with the historical levels experienced at the Site and are generally better than the drinkable water standard. Inorganic ions such as sulfate provide a good indication of groundwater contamination by landfill leachate.

Monitoring point 13 spiked in November 2016. Further sampling in February and May 2017 shows that Monitoring Point 13 has stabilised and the November 2016 result was potentially an anomaly.

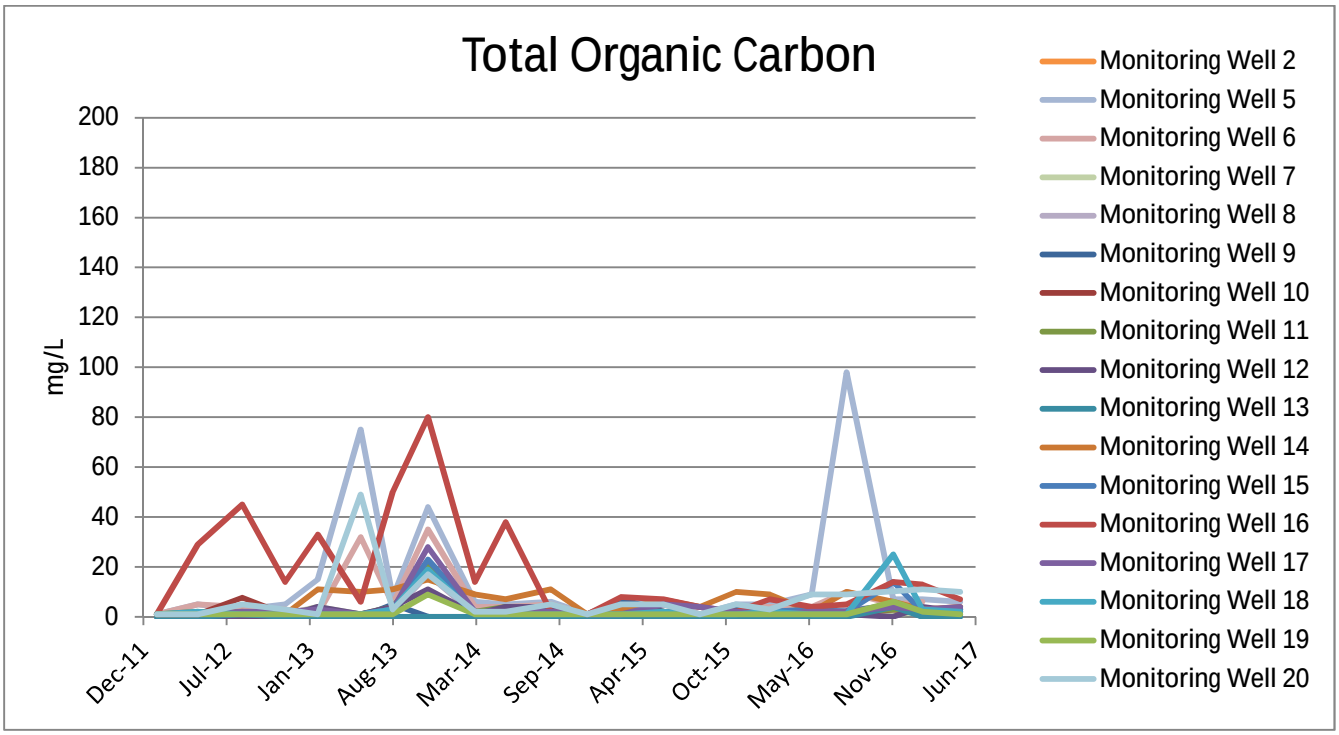
Figure 3.2.2.10 Total dissolved solids results presentation



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.

Monitoring Point 20 spiked in August 2016. Further testing has seen the results within historical data records.

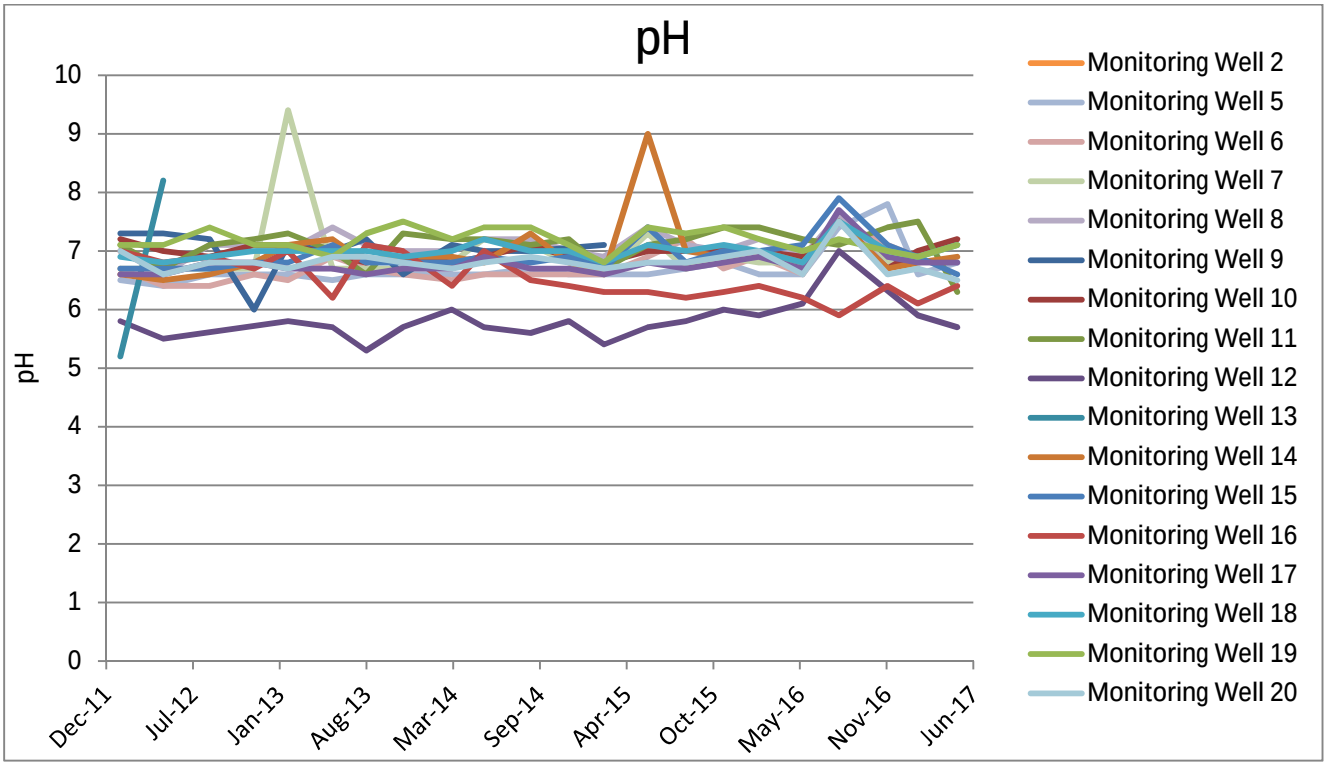
Figure 3.2.2.11 Total organic carbon results presentation



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 materials. The amount of total organic carbon has remained relatively stable over recent years.

Monitoring Point 5 spiked in August 2016. Further sampling in November 2016, February and May 2017 indicates that TOC levels have since returned to be in line with historical data for this bore.

Figure 3.2.2.12 pH results presentation



The pH levels indicated in the groundwater monitoring wells have been extremely stable over the review 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 for over approximately six years.

3.2.3 Tabulated Results – Annual Monitoring

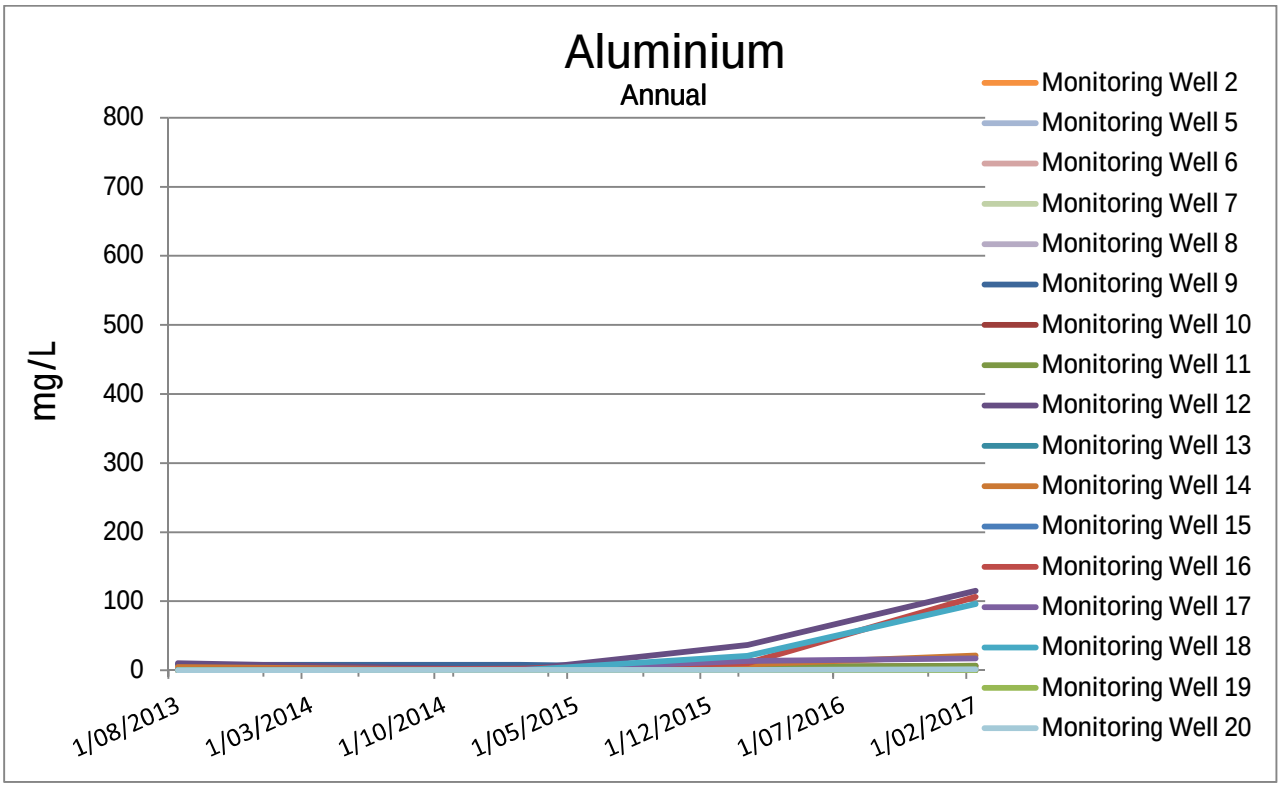
Note: Monitoring Point 2 was located in a construction zone and did not exist on site during the monitoring period. It has been removed from the sites Environment Protection. Monitoring Point 13 was dry and unable to produce a sample.

Table 3.2.3.1 Annual analyte testing results for 6 February 2017. *Note: Well destroyed

Analyte	Units	Monitoring Points															
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Aluminium	mg/L	3.37	0.13	1.44	2.73	Dry	6.34	673	115	Dry	21.4	0.12	106	17	96.2	0.24	1.44
Arsenic	mg/L	<0.001	<0.001	0.002	<0.001	Dry	0.001	0.018	0.006	Dry	0.001	<0.001	0.013	0.001	0.018	<0.001	0.002
Barium	mg/L	0.016	0.012	0.073	0.099	Dry	0.052	0.624	0.501	Dry	0.22	0.013	1.65	0.051	0.198	0.145	0.073
Benzene	µg/	<1	<1	<1	<1	Dry	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<2	<1
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	Dry	<0.0001	0.002	0.0004	Dry	<0.0001	<0.0001	0.0033	<0.0001	0.0006	<0.0001	<0.0001
Chromium (hex.)	mg/L	<0.01	<0.01	<0.01	<0.01	Dry	<0.01	<0.01	<0.01	Dry	<0.01	<0.0001	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (total)	mg/L	0.003	<0.001	<0.001	0.002	Dry	0.007	0.305	0.068	Dry	0.017	<0.001	0.17	0.012	0.045	<0.001	0.002
Cobalt	mg/L	0.001	0.002	<0.001	0.005	Dry	0.009	0.448	0.048	Dry	0.009	<0.0001	0.195	0.01	0.075	<0.001	0.019
Copper	mg/L	0.01	0.002	0.002	0.011	Dry	0.028	0.962	0.179	Dry	0.041	0.003	0.474	0.022	0.209	0.004	0.004
Ethyl Benzene	µg/L	<2	<2	<2	<2	Dry	<2	<2	<2	Dry	<2	<2	<2	<2	<2	<2	<2
Fluoride	mg/L	0.5	0.4	0.4	0.9	Dry	0.3	0.7	0.2	Dry	0.6	0.6	<0.1	0.4	0.4	0.4	0.9
Lead	mg/L	0.003	<0.001	<0.001	0.003	Dry	0.014	0.23	0.073	Dry	0.013	<0.001	0.19	0.008	0.082	0.002	0.01
Manganese	mg/L	0.096	0.335	0.011	0.241	Dry	0.517	21.2	2.42	Dry	0.315	0.006	7.32	0.434	2.98	0.352	2.84
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	Dry	<0.0001	<0.0001	0.0004	Dry	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001
Nitrate	mg/L	<0.01	<0.01	<0.01	<0.01	Dry	<0.01	0.02	0.85	Dry	0.01	<0.01	<0.01	0.35	<0.01	0.13	<0.010.02
Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	Dry	<0.01	0.02	0.03	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	0.13	<0.01
OCP	µg/	<0.5	<0.5	<0.5	<0.5	Dry	<0.5	<0.5	<0.5	Dry	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
OPP	µg/	<0.5	<0.5	<0.5	<0.5	Dry	<0.5	<0.5	<0.5	Dry	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH	µg/	<1	<1	<1	<1	Dry	<1	<1	<1	Dry	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/	<2	<2	<2	<2	Dry	<2	<2	<2	Dry	<2	<2	<2	<2	<2	<2	<2
TPH	µg/	<50	<50	<50	<50	Dry	<50	<50	<50	Dry	<50	<50	<50	<50	<50	<50	<50
Total Phenolics	mg/L	<0.05	<0.05	<0.05	<0.05	Dry	<0.05	<0.05	<0.05	Dry	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene	µg/	<2	<2	<2	<2	Dry	<2	<2	<2	Dry	<2	<2	<2	<2	<2	<2	<2
Zinc	mg/L	0.024	0.006	0.01	0.019	Dry	0.045	1.7	0.31	Dry	0.053	0.005	1.03	0.051	0.376	0.019	0.01

3.2.4 Data Presentation – Annual Monitoring

Figure 3.2.4.1 Aluminium results presentation

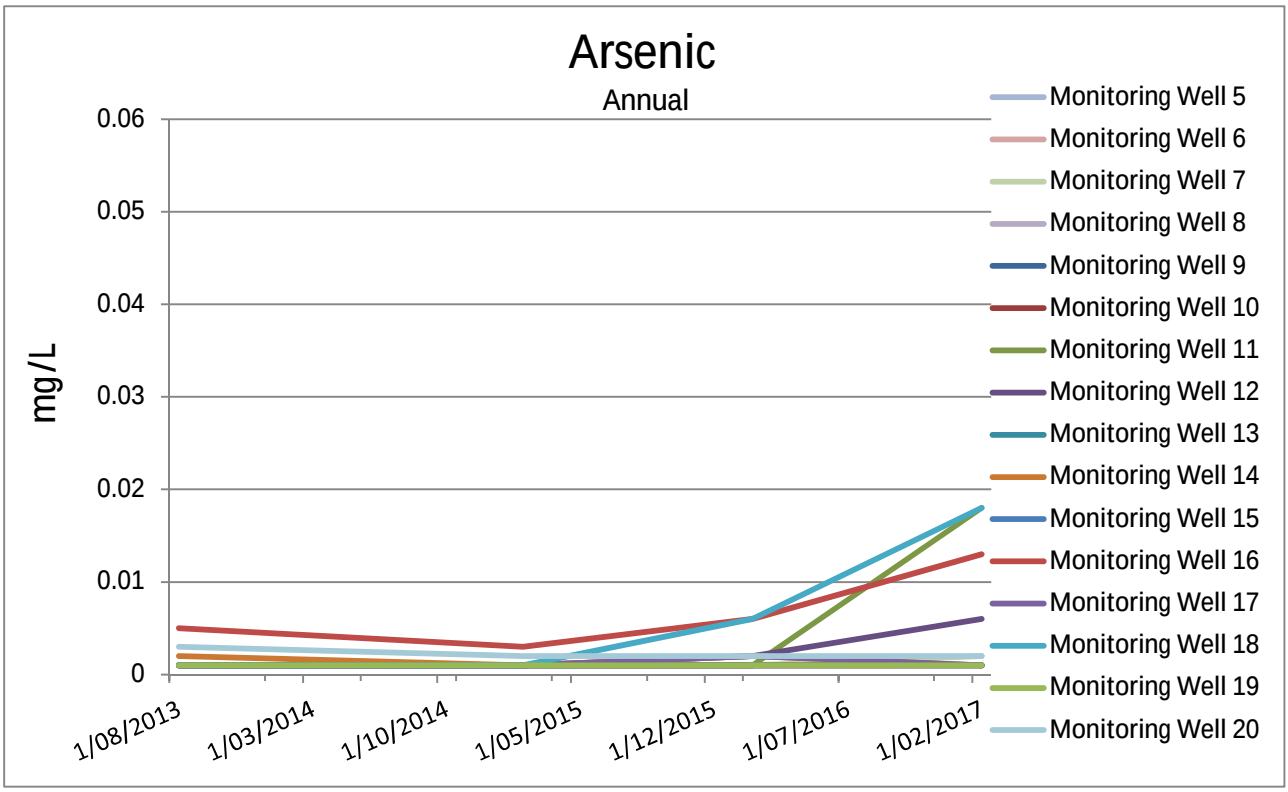


Aluminium levels in the sampled groundwater monitoring points 12 (115mg/l), 16 (106mg/l) and 18 (96.2mg/L) are relatively higher than the other point's on site. Whilst aluminium is naturally abundant in rocks and soil (third most abundant element in the earth's crust), anthropogenic releases are typically in the form of air emissions, waste water effluents, and solid waste primarily associated with industrial processes, such as aluminium production.

Monitoring well 12 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing.

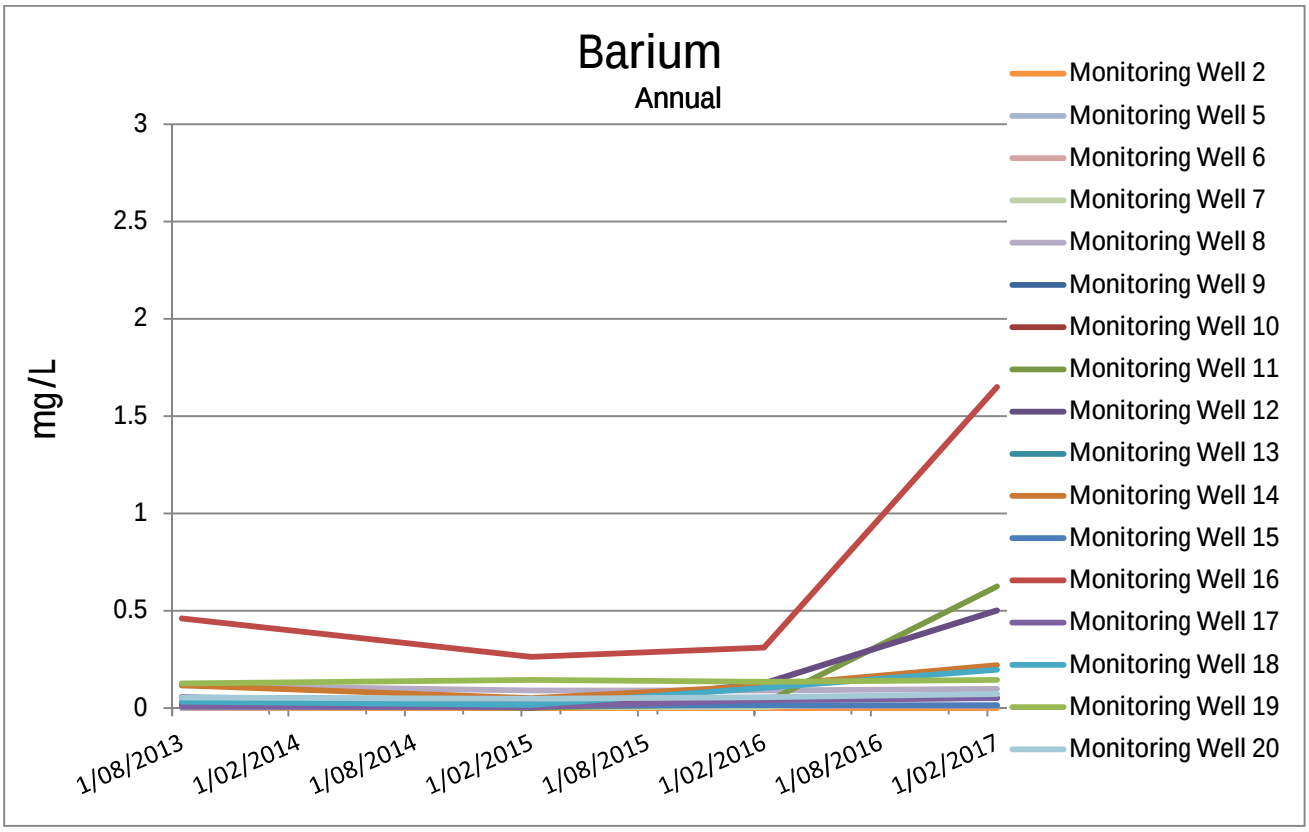
Monitoring well 16 & 18 are located outside the Western boundary of the site, but will be further monitored in the next sampling period.

Figure 3.2.4.2 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 wells over the reporting period is considered to be extremely low. In fact arsenic levels are below detectable limits (0.001 mg/L) in the majority of the test results.

Figure 3.2.4.3 Barium results presentation

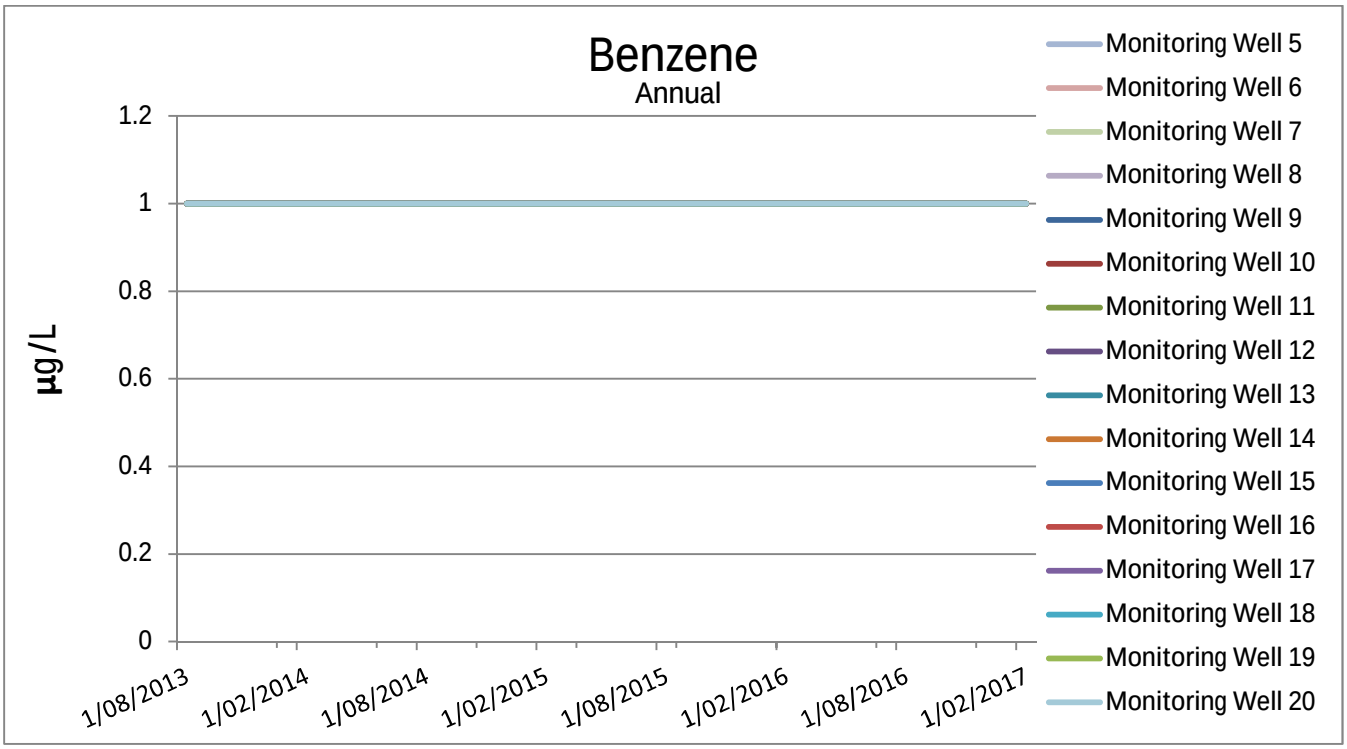


Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 2 mg/L of barium is safe for consumption. Barium levels are therefore extremely low overall in the sites groundwater.

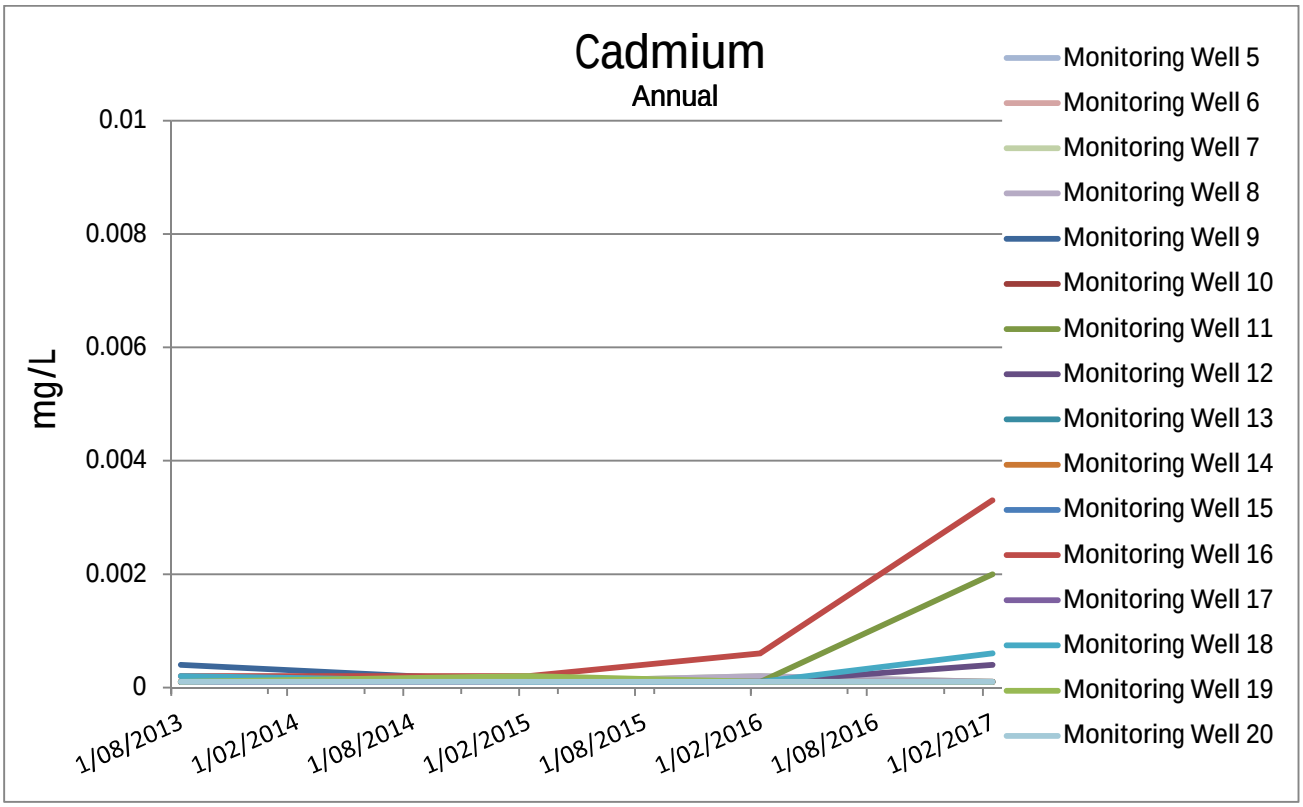
The February 2017 result whilst relatively high is still quite low when compared to Drinking Water Guidelines. Future rounds of testing will be used to determine if the result is anomalous or not.

Figure 3.2.4.4 Benzene results presentation



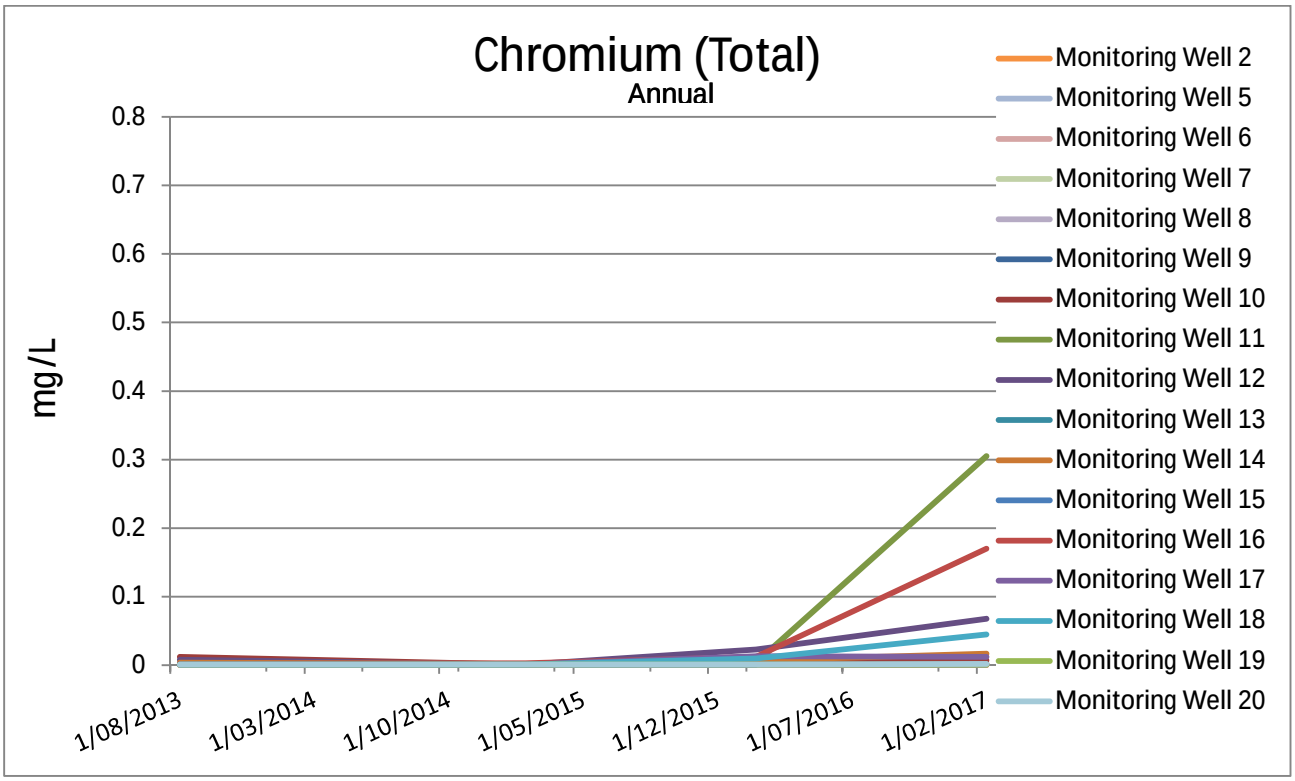
Benzene concentrations are non-existent at the Site. Every instance of benzene sampling has not yielded a result due to the concentration of benzene being below laboratory testing thresholds.

Figure 3.2.4.5 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 wells are extremely low. Cadmium levels are always well below 0.01 mg/L and below detectable limits in the majority of readings taken during the reporting period.

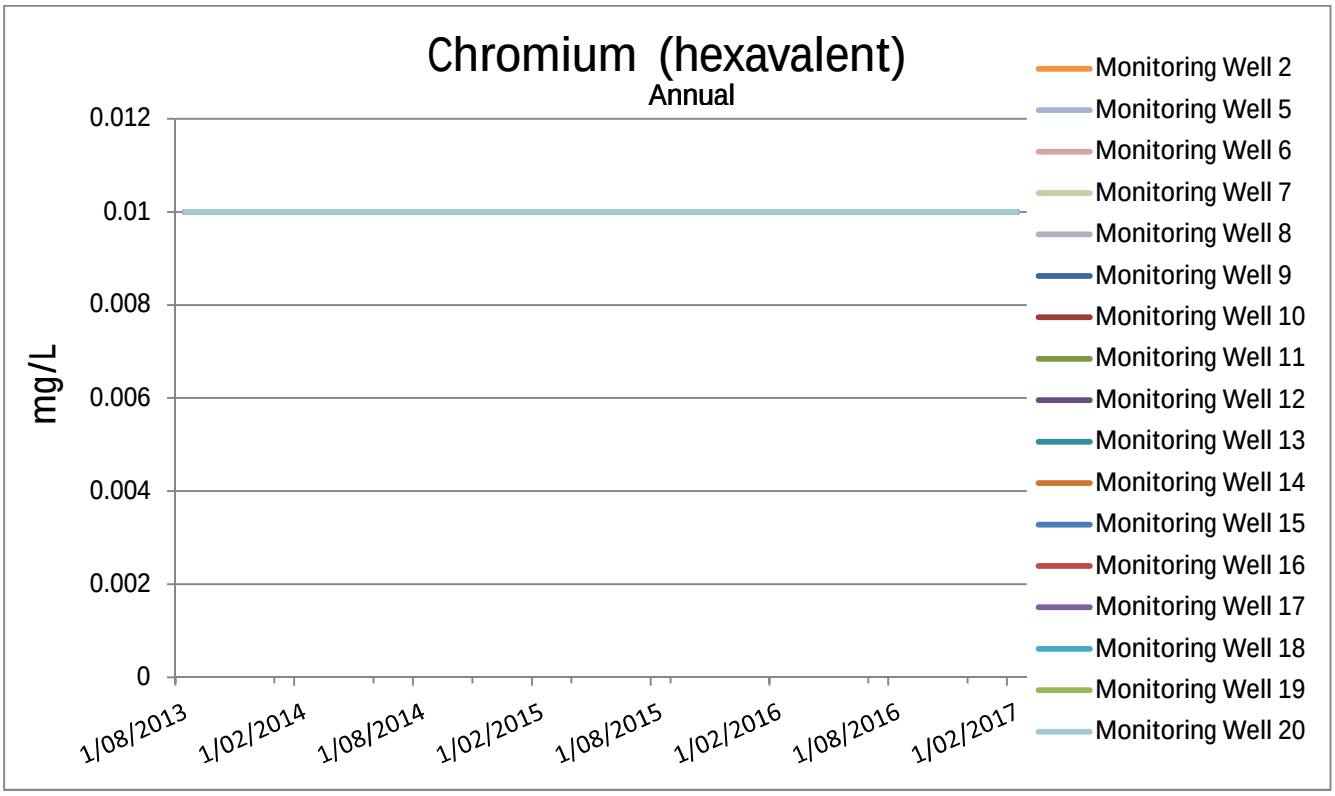
Figure 3.2.4.6 Chromium results presentation



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.

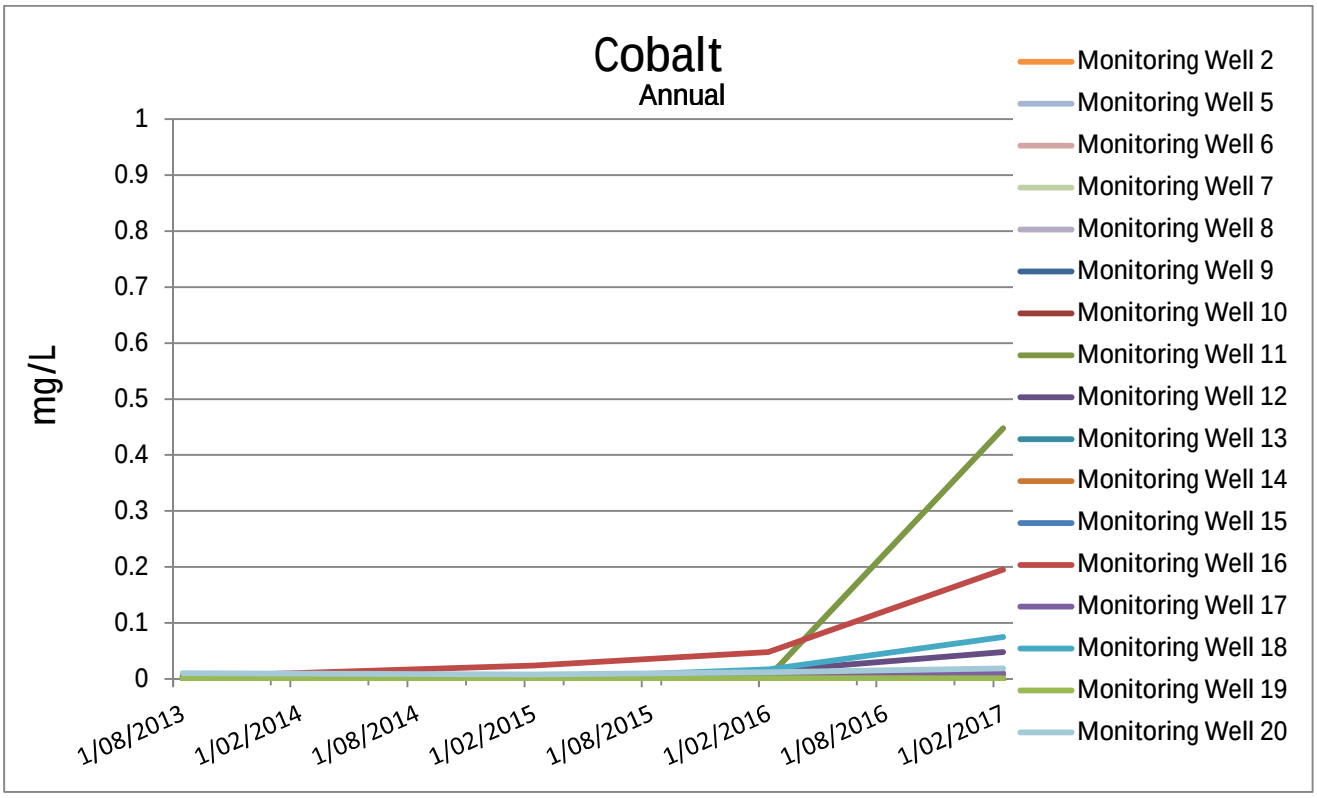
Monitoring point 11 is located in an up gradient location and representative of groundwater flow into the WWARRP from adjacent land used for cattle grazing, will be closely monitored in future sampling rounds.

Figure 3.2.4.7 Chromium (hexavalent) results presentation



Hexavalent chromium has not been detected in any samples taken for the Site. The demonstrated model shows that the concentration of hexavalent chromium results received is below laboratory testing thresholds.

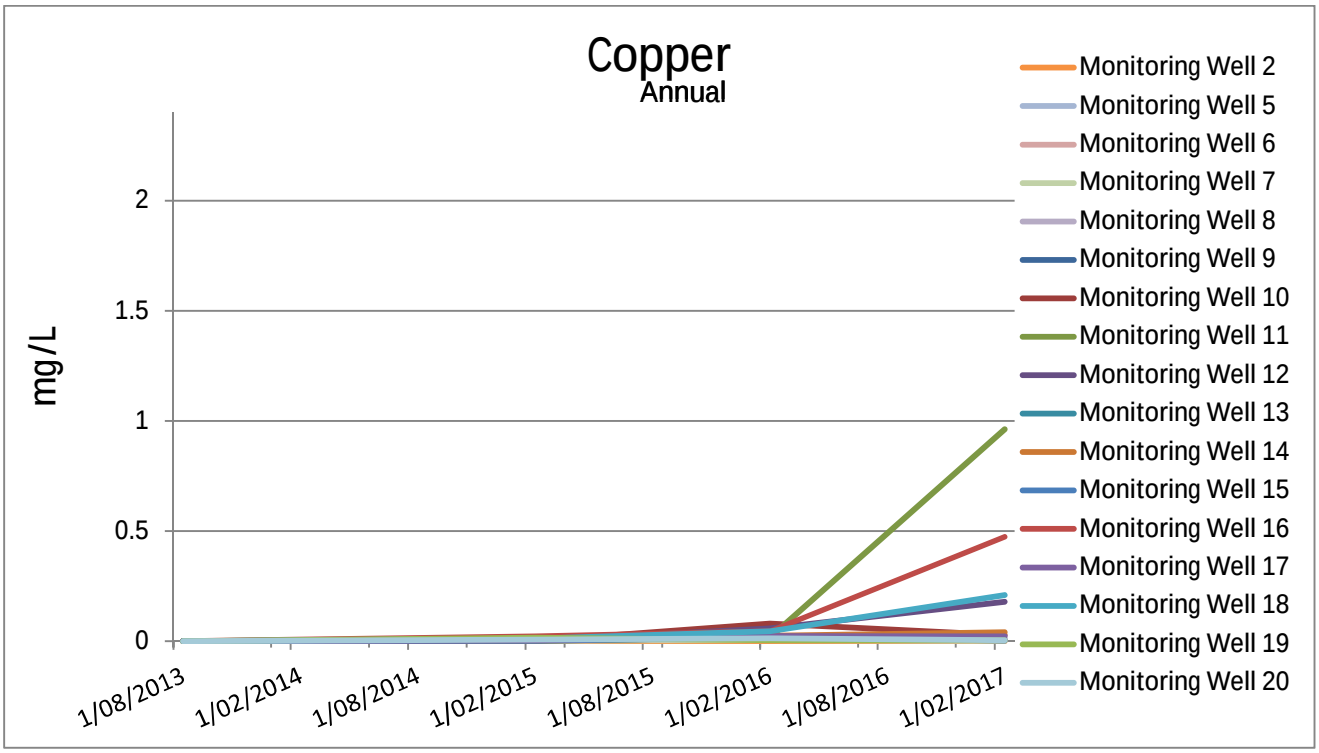
Figure 3.2.4.8 Cobalt results presentation



Anthropogenic sources of cobalt in the environment include agricultural runoff (trace amounts), sewage effluent, paints, inks and from electroplating in batteries. Worksafe Australia limits cobalt exposure to 0.05 mg/m^3 over 8 hours. The relatively higher level of cobalt in well 16, whilst still low, is noteworthy and should be re-reviewed during the next round of annual testing. Monitoring point 11 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing. Accumulation is not thought to be an issue due to cobalt's small half-life.

Monitoring point 11 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing. This monitoring point is to be closely monitored in future sampling events.

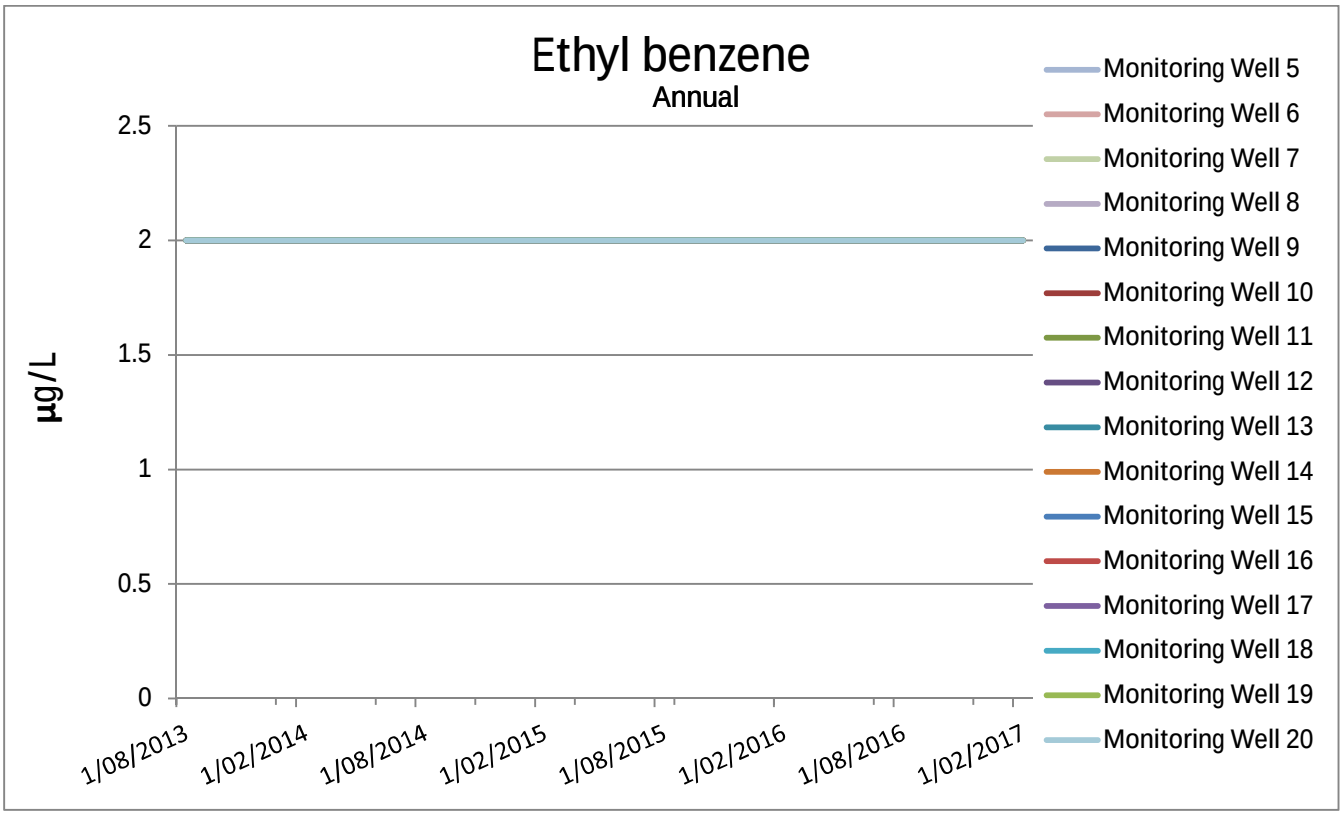
Figure 3.2.4.9 Copper results presentation



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 or at extreme low levels.

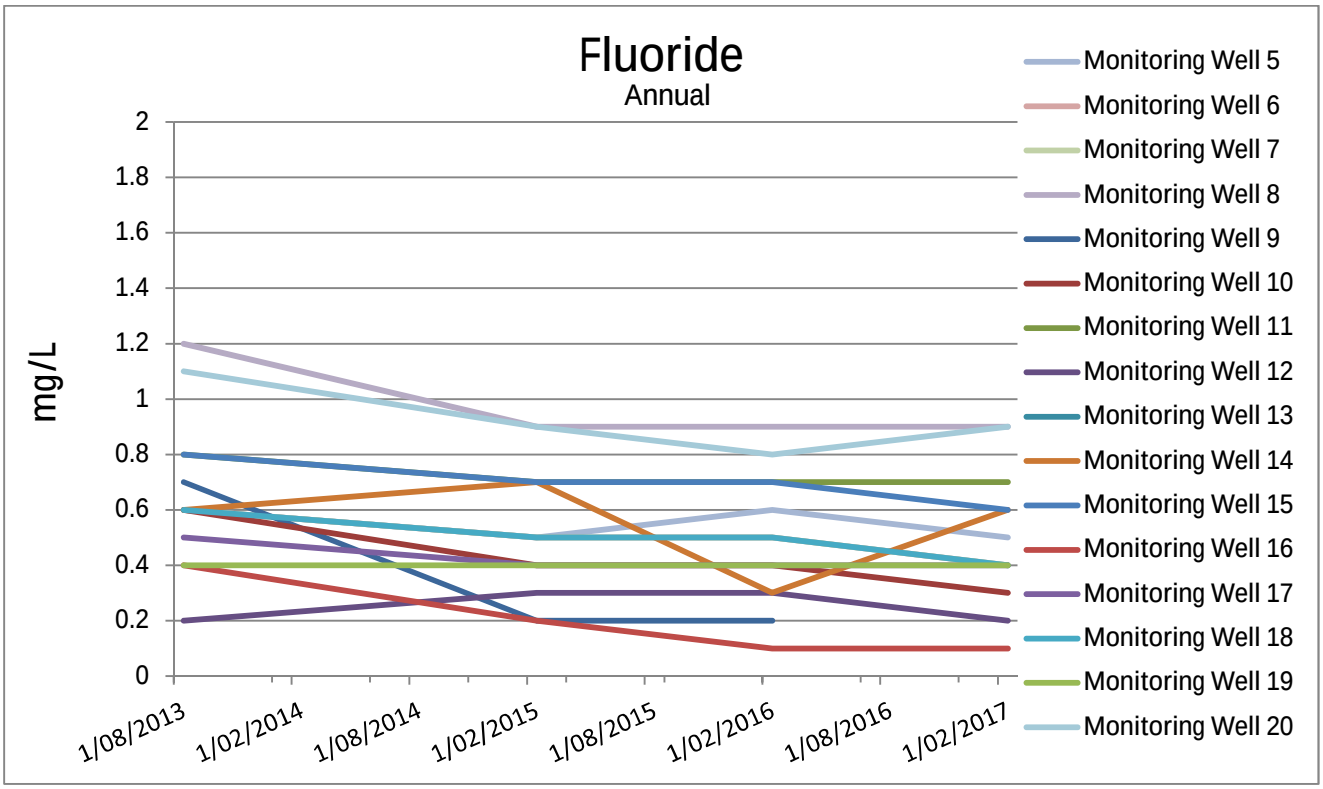
Monitoring wells located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing. Whilst the level appears relatively high, the actual concentration is still considered as very low.

Figure 3.2.4.10 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 above laboratory testing limits.

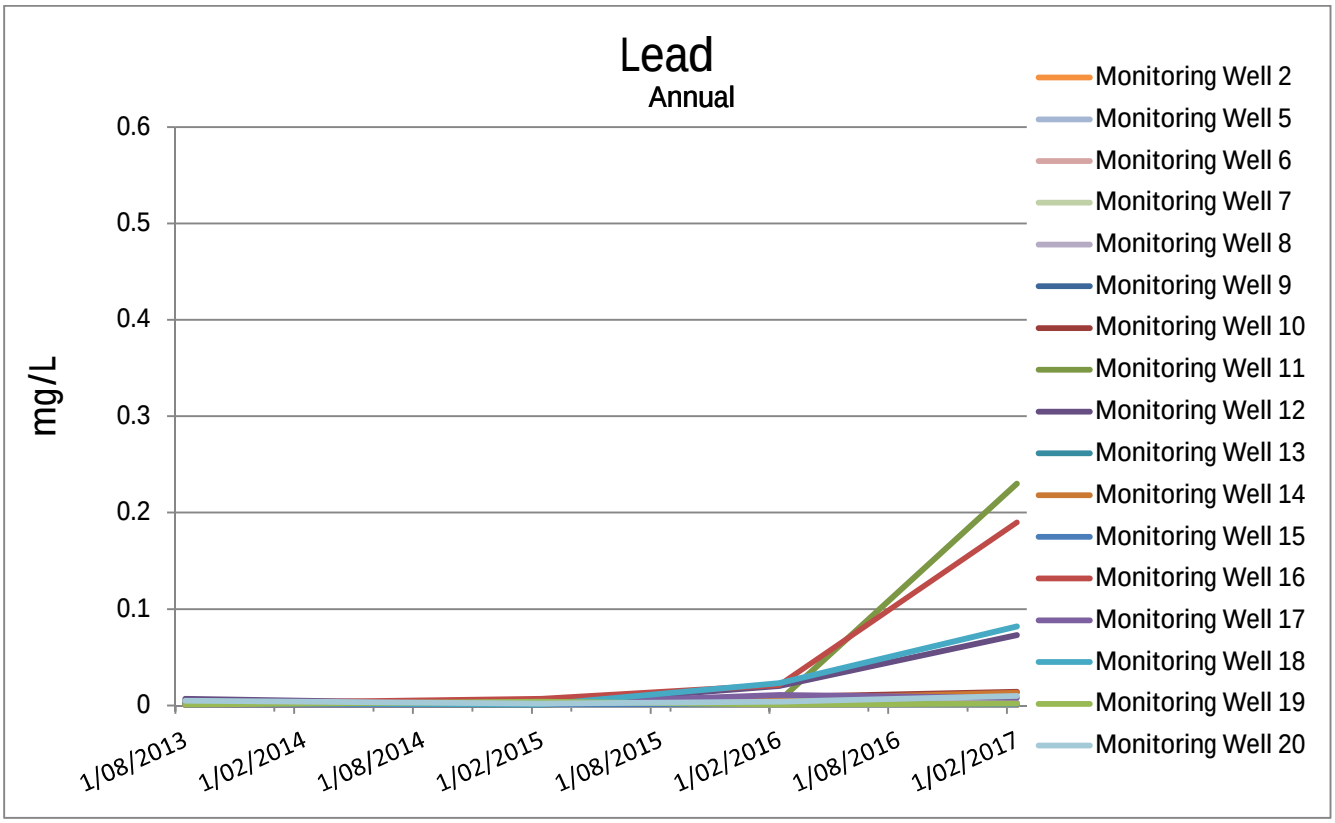
Figure 3.2.4.11 Fluoride results presentation



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.

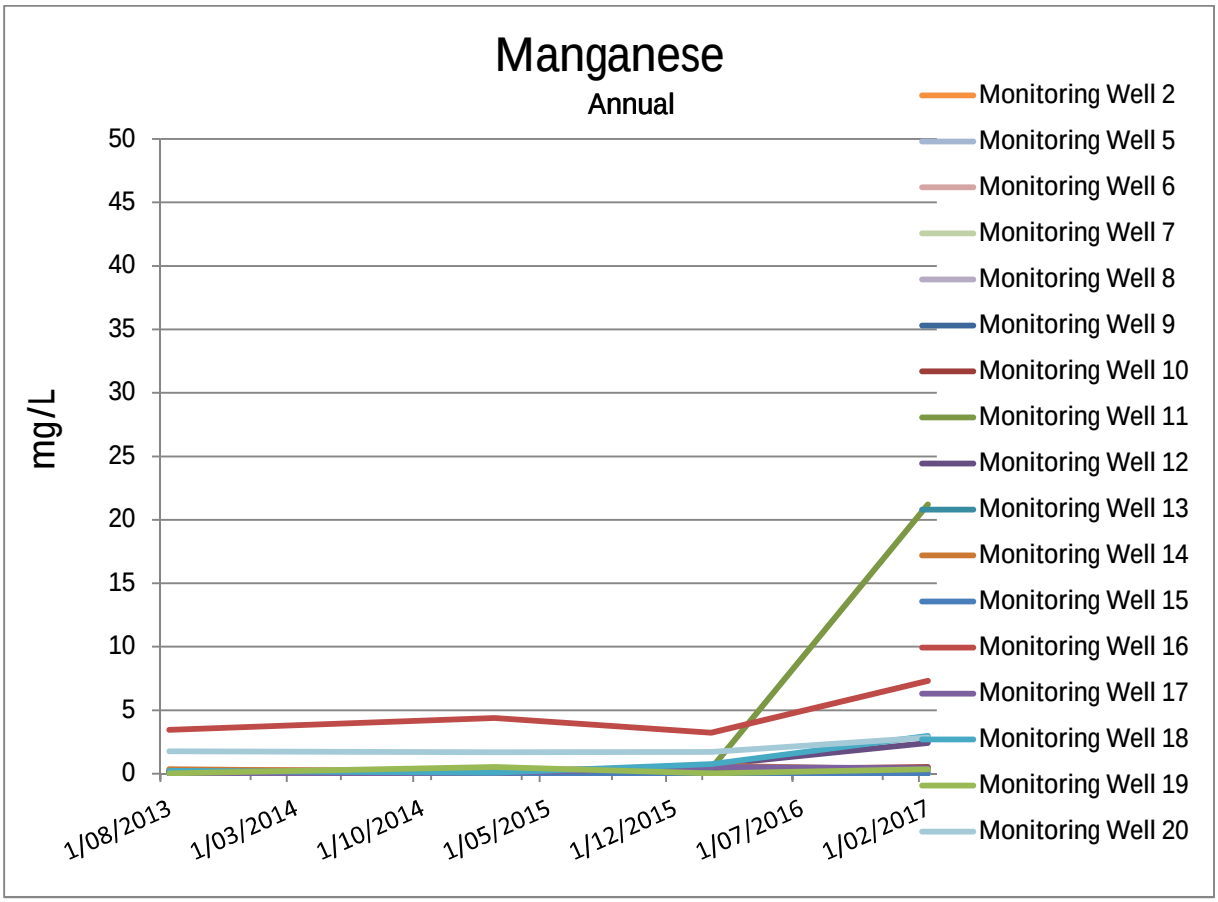
The fluoride concentrations found in the Sites groundwater are considered to be quite stable.

Figure 3.2.4.12 Lead results presentation



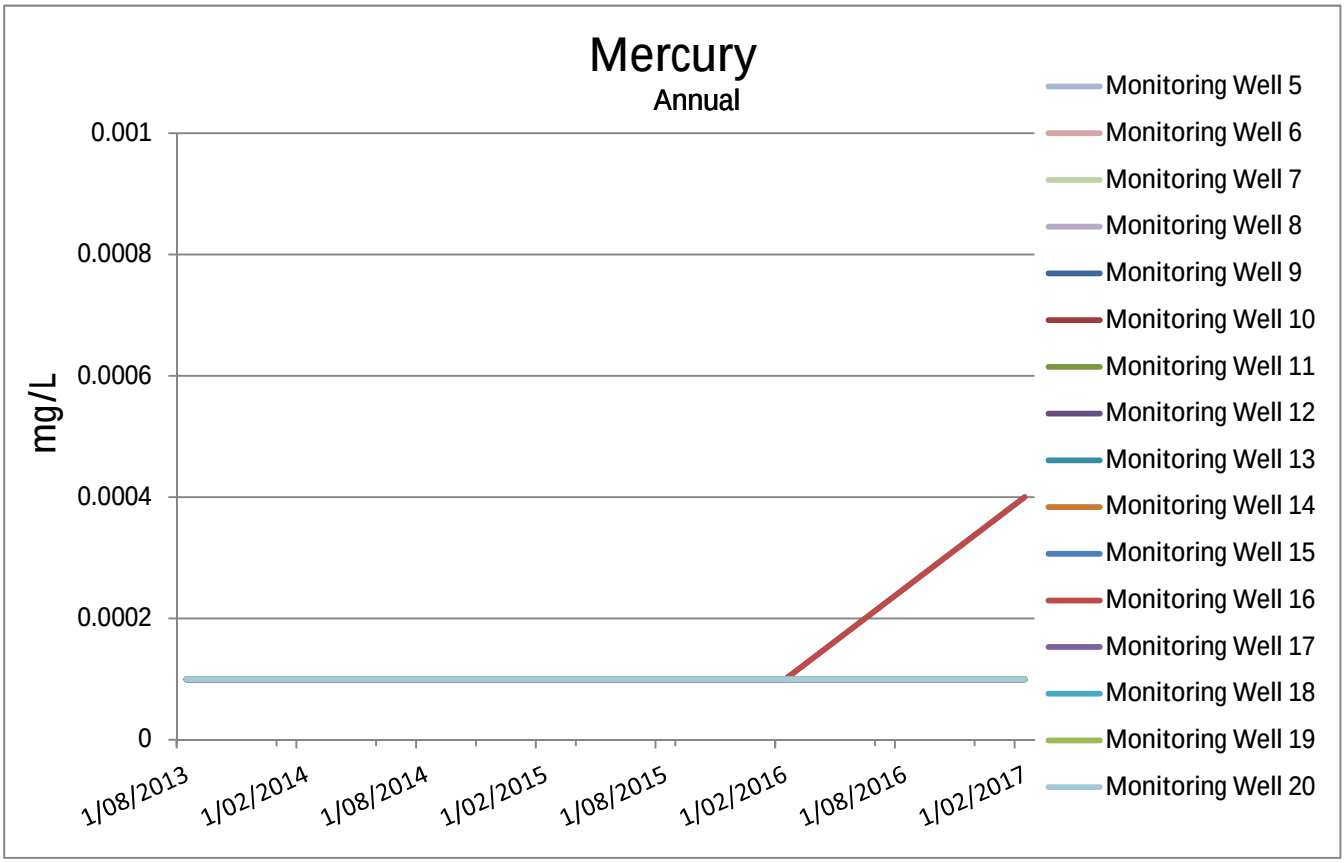
Heavy metal contamination in the groundwater in the form of lead is at very low levels. The presented data on the surface appears to indicate a steep climb of most locations during the reporting period. However, the results are extremely close to the testing limits achievable in a laboratory. For perspective, 95% of the samples taken indicate that lead levels are safe for human consumption.

Figure 3.2.4.13 Manganese results presentation



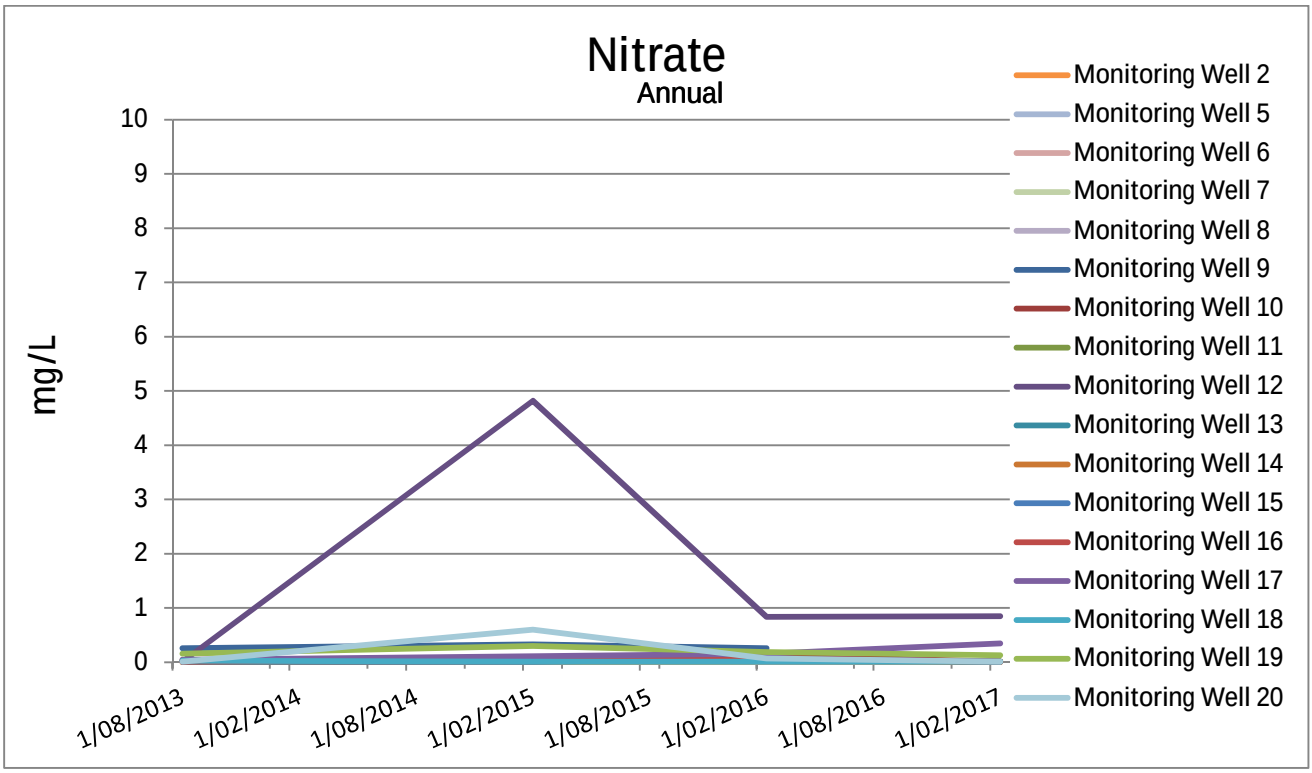
Manganese can be a strong indicator of landfill leachate in groundwater leached from hazardous waste sites and commonly derived from battery disposal. Monitoring point 11 has demonstrated relatively higher levels of manganese over the reporting period. This result is at odds with surrounding monitoring wells. Continued annual monitoring will help determine the stability of manganese concentration in these locations.

Figure 3.2.4.14 Mercury results presentation



Most results provide concentrations below the limit of laboratory testing for mercury. The exception is Well 16 which whilst still at low actual levels, should be monitored closely during the next round of testing.

Figure 3.2.4.15 Nitrate results presentation



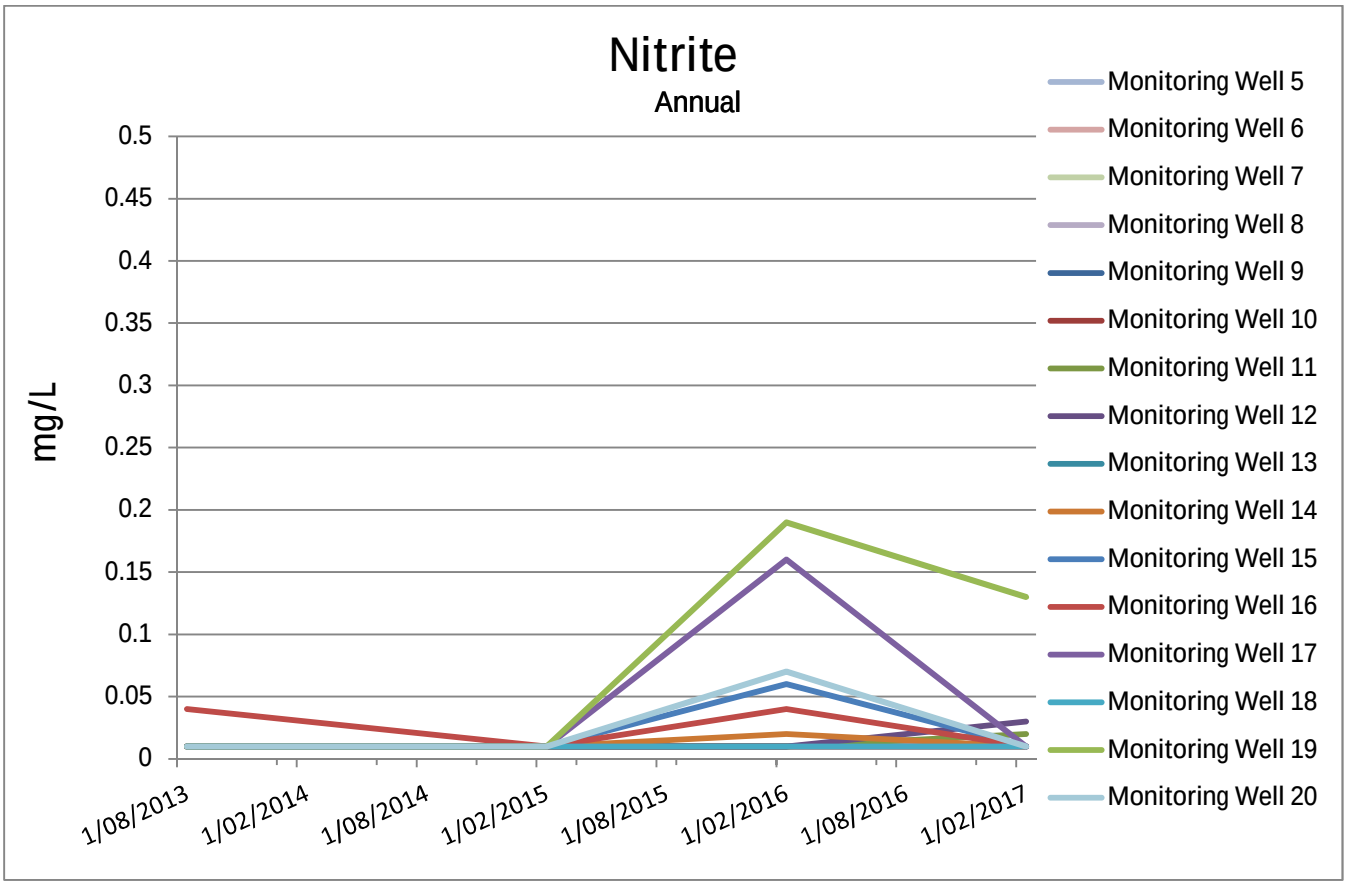
The *2011 Australian Drinking Water Guidelines 6* states that a maximum of 50 mg/L of nitrate is safe for consumption.

Nitrate and nitrite are naturally occurring ions that are part of the nitrogen cycle that includes the decomposition of organic matter, such as what takes place in landfills. 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 World Health Organisation suggests that nitrate concentration in surface water is normally between up to 18 mg/L, therefore the levels found in the monitoring wells on Site are considered to be relatively low.

Monitoring wells 12 is located in an up gradient location and represents groundwater flow into the WWARRP from adjacent land used for cattle grazing. The elevated 2015 result has more recently started to return to similar concentrations found in other monitoring wells.

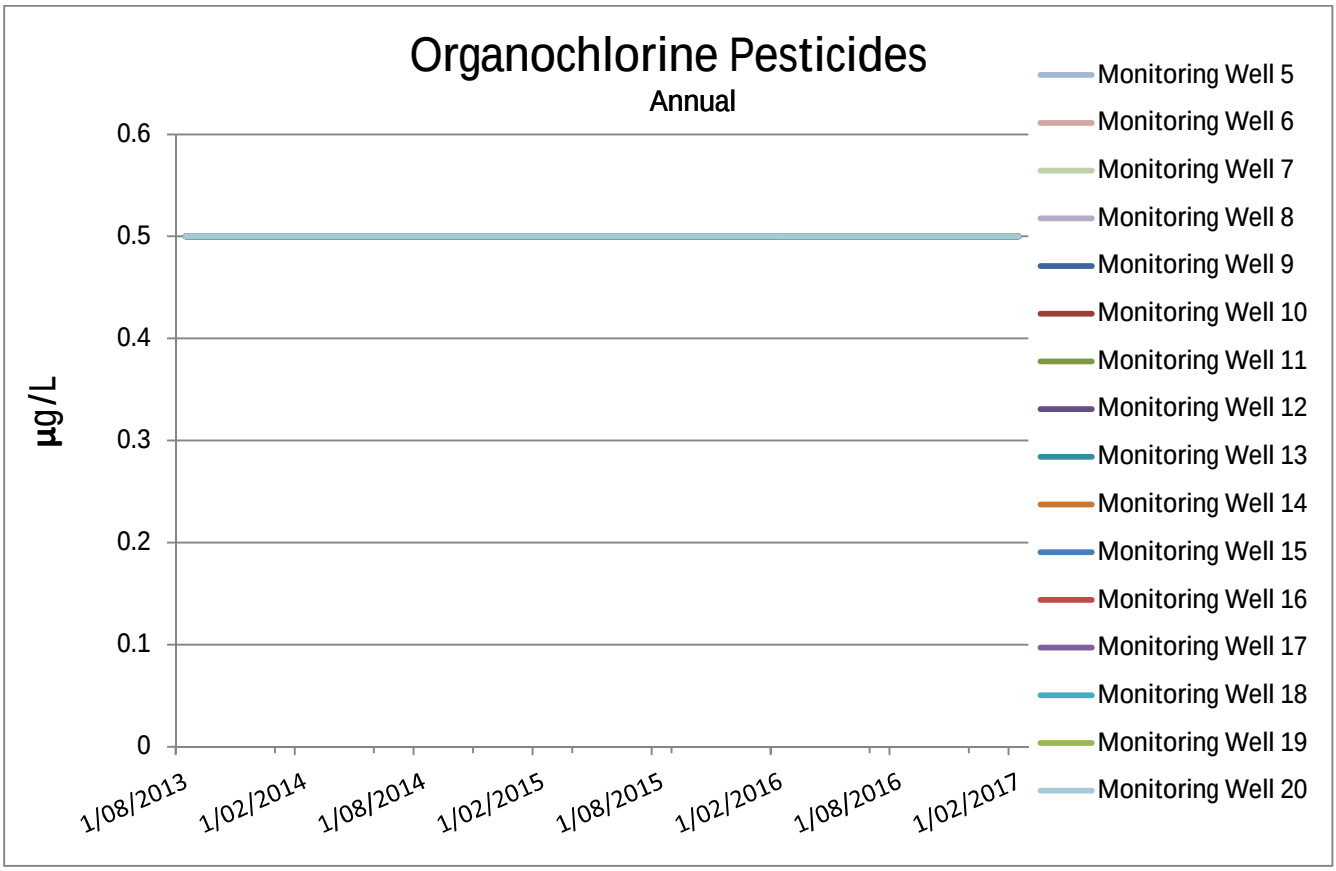
Figure 3.2.4.16 Nitrite results presentation



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*.

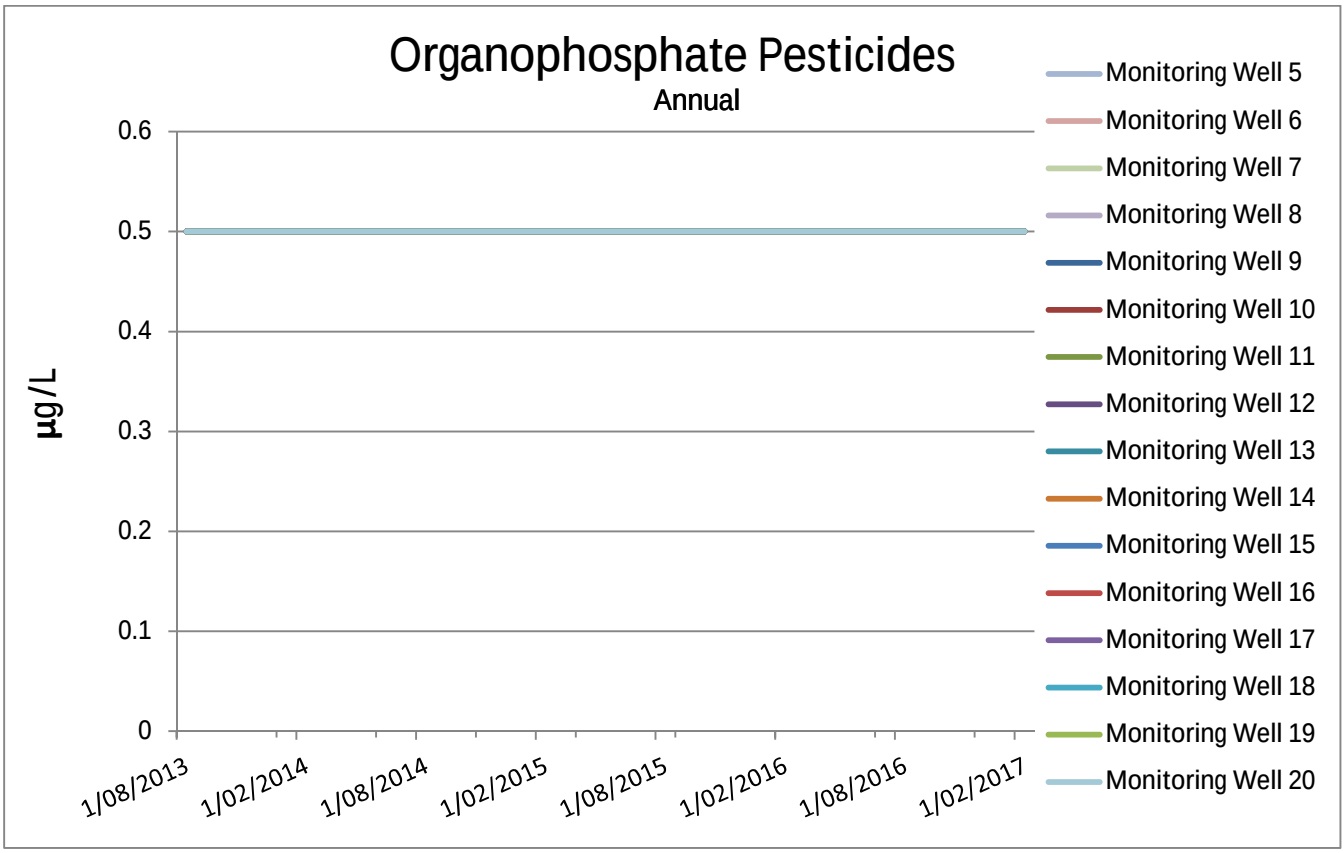
Nitrite levels found in the ground water monitoring wells are extremely small and below detectable limits in almost all of the samples taken. However, the slight increase in wells 17 and 19 in the previous reporting period have started to return to lower levels in the current reporting period.

Figure 3.2.4.17 Organochlorine Pesticides results presentation



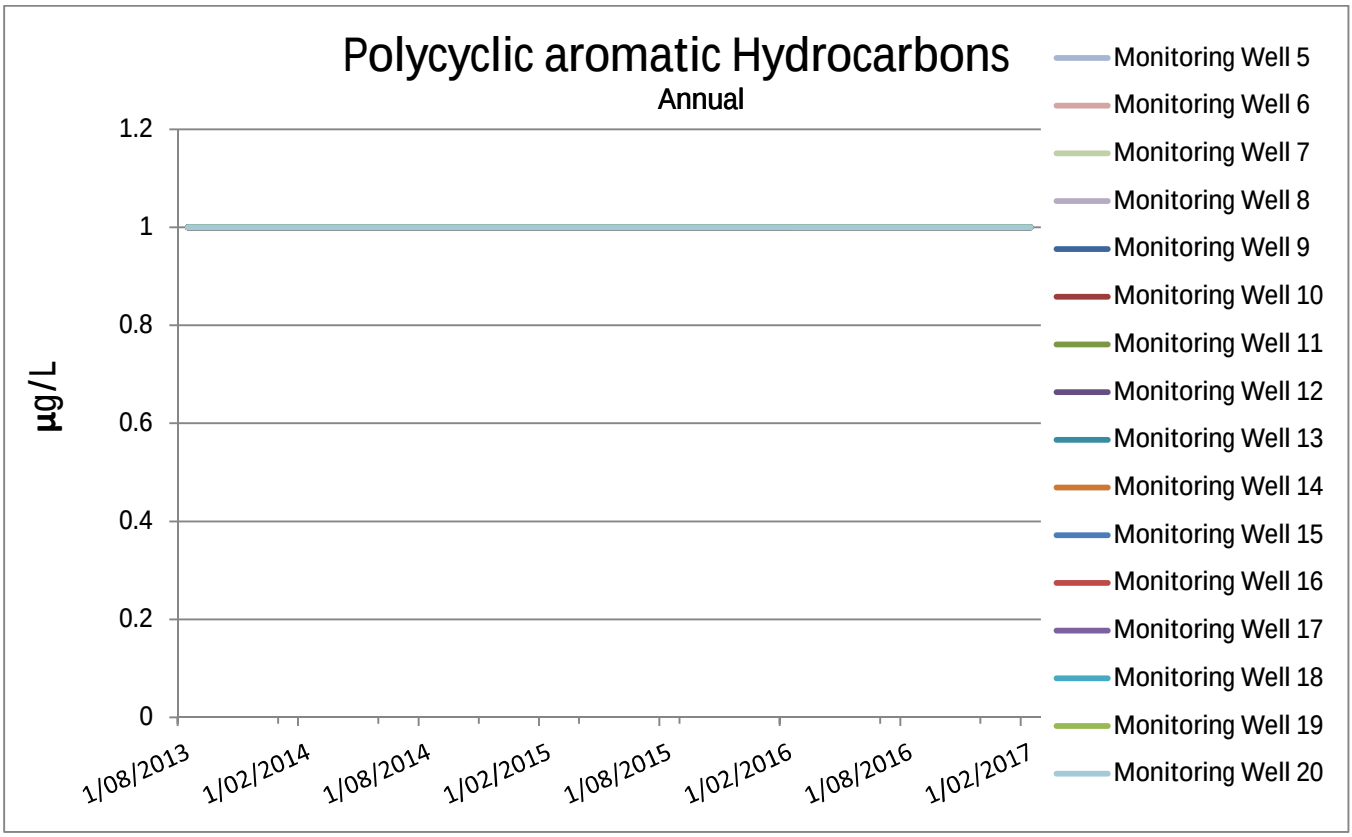
Organochlorine pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.18 Organophosphate Pesticides results presentation



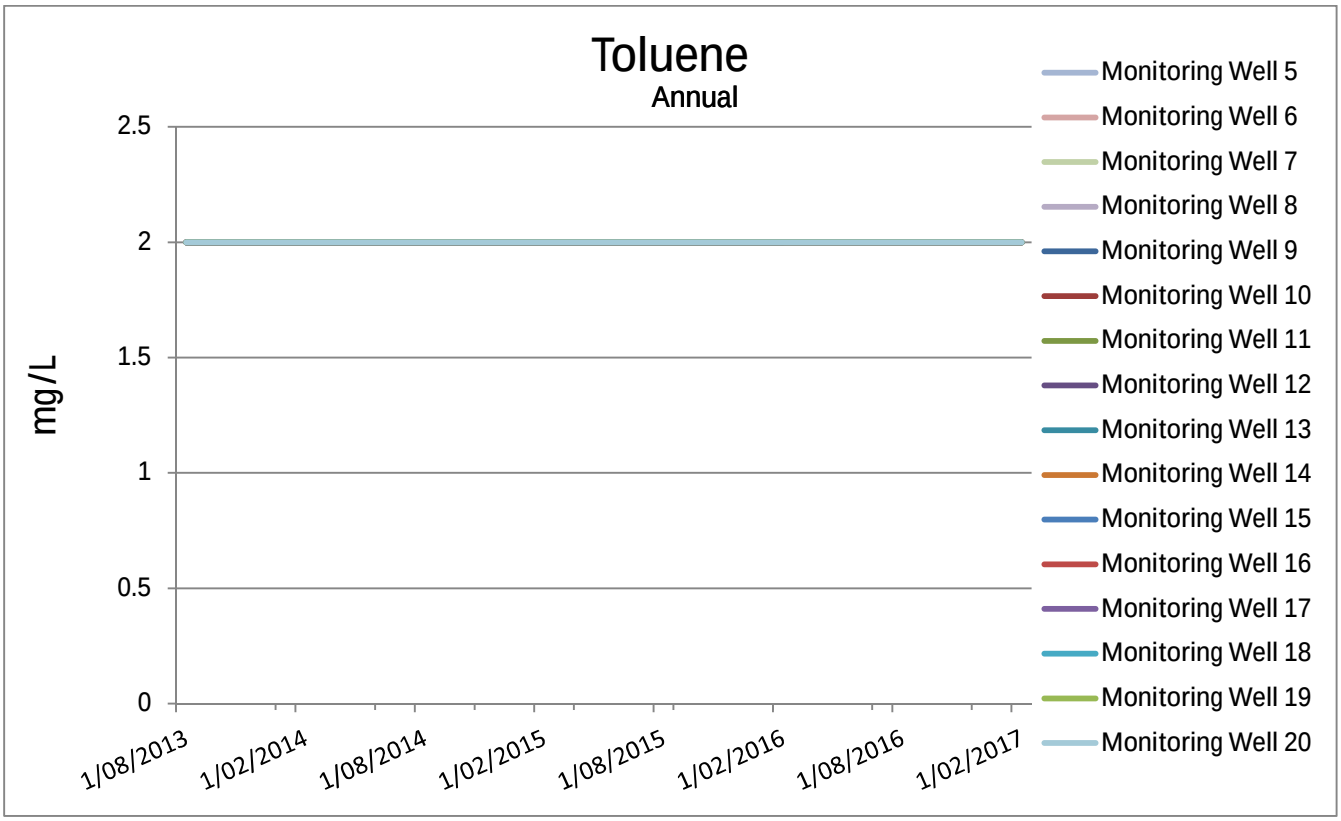
Organophosphate pesticides were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.19 Polycyclic Aromatic Hydrocarbons results presentation



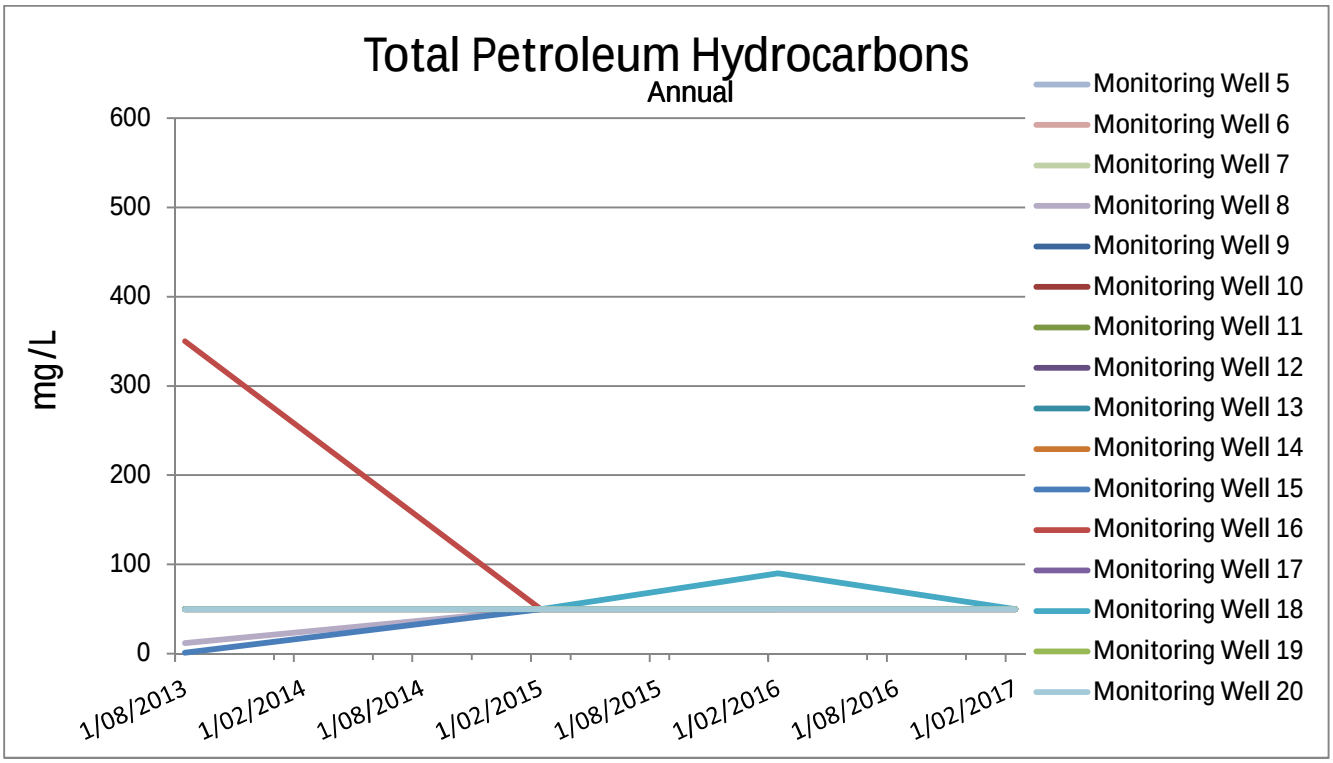
Polycyclic aromatic hydrocarbons were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.20 Toluene results presentation



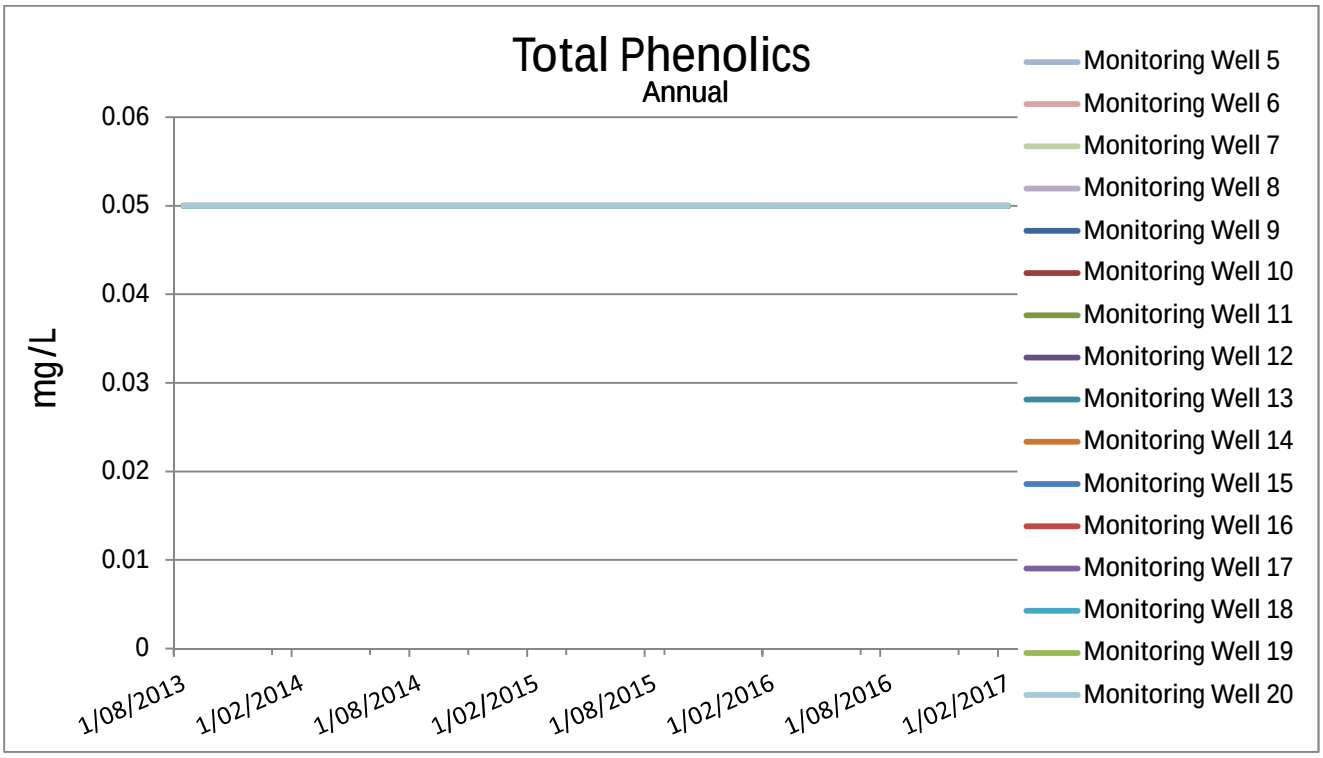
Toluene was not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.21 Total Petroleum Hydrocarbons results presentation



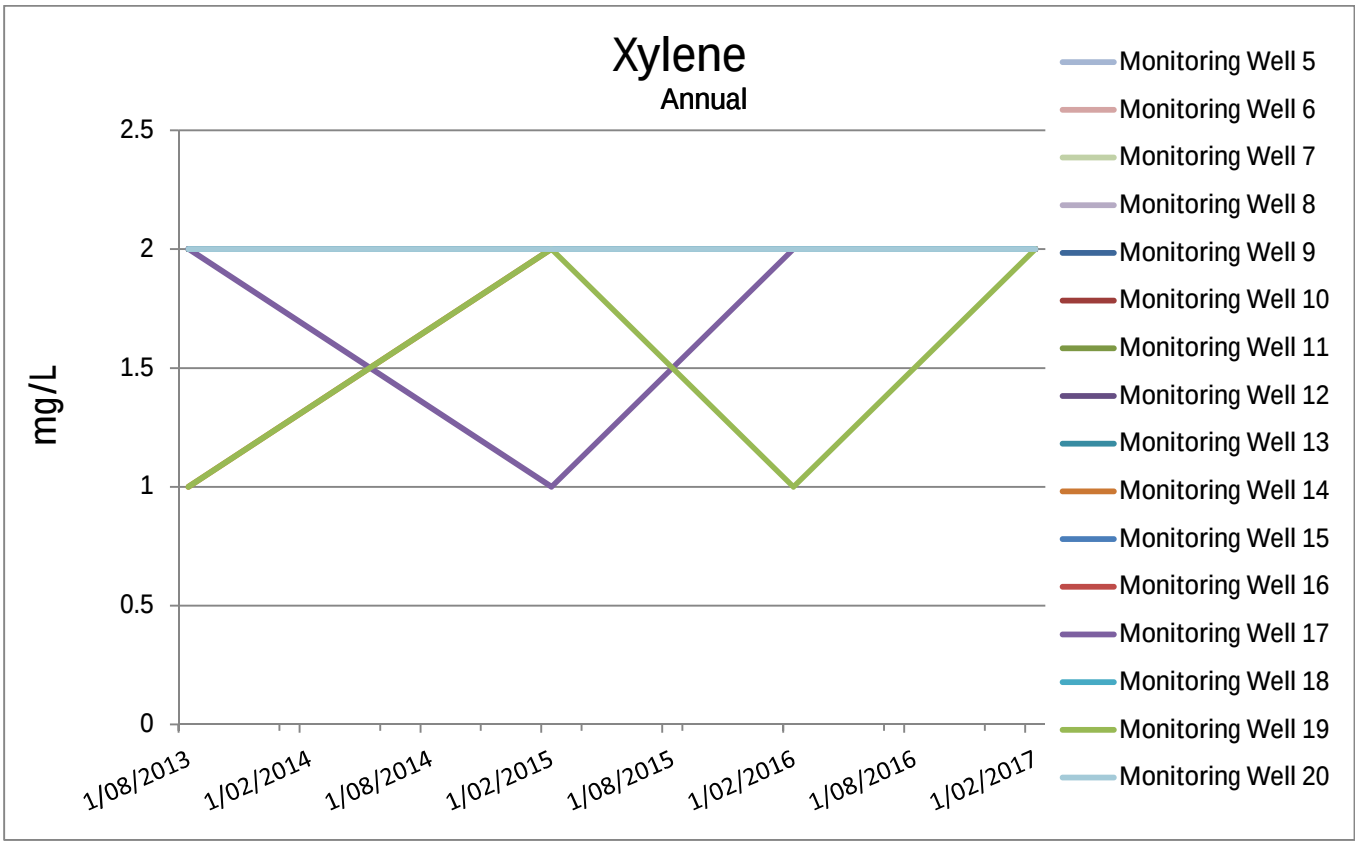
Total petroleum hydrocarbons are generally at concentrations below detectable limits in the monitoring wells. The initial spike in well 16 has since returned to low levels, whilst well 18 had exhibited a slight increase but has now returned to levels below detection limits. Continued annual monitoring will help identify any continued trends.

Figure 3.2.4.22 Total Phenolics results presentation



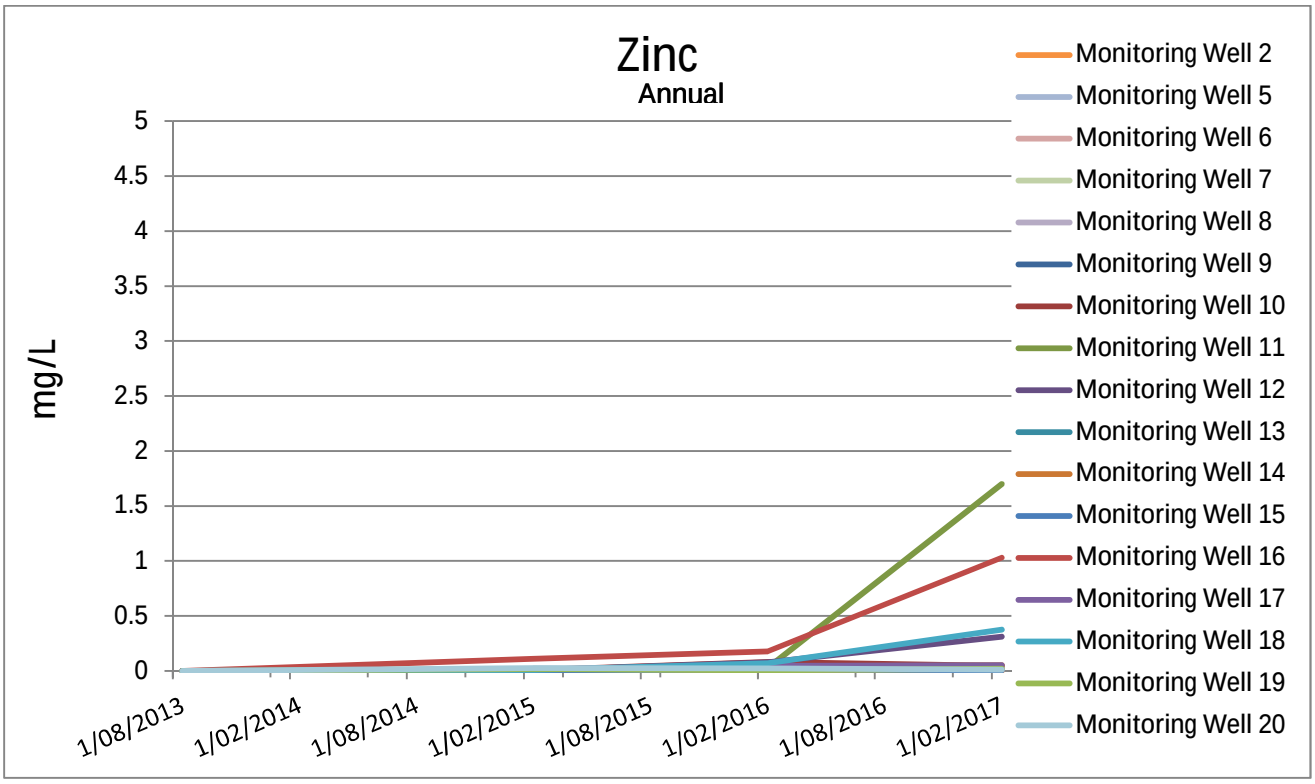
Total phenolics were not detected at any level in the ground water monitoring wells during the reporting period and have never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories.

Figure 3.2.4.23 Xylene results presentation



Xylene has not detected at any level in the ground water monitoring wells during the reporting period and has never been detected at any quantity. All results to date have been at concentrations below the limits detectable by laboratories. Only the inconsistency in the applied laboratory standard (Note: laboratory is NATA accredited) between 1 mg/L and 2 mg/L as prescribed detectable limits has changed.

Figure 3.2.4.24 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 well 11 & 16 should be further monitored in future annual sampling regimes due to the display of levels higher than the other surrounding points.

3.2.5 Groundwater Testing Results Interpretation

Results indicate that there has been no conclusive and significant 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 at the next scheduled round of testing:

Table 3.2.5 Analytes that require closer scrutiny on future sampling

2016/2017

Analyte	Monitoring Point	Regime	Next Sample
Nitrogen (Ammonia)	16	Quarterly	August 2017
Aluminium	12,16,18	Annual	February 2018
Barium	16	Annual	February 2018
Cadmium	11,16	Annual	February 2018
Chromium (total)	11,16	Annual	February 2018
Cobalt	11,16	Annual	February 2018
Copper	11,16	Annual	February 2018
Lead	16, 18	Annual	February 2018
Manganese	11,16	Annual	February 2018
Zinc	11,16	Annual	February 2018

Key indicators of landfill leachate's potential ingress into groundwater particularly 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 results presenting in monitoring wells 11 and 16 in particular warrant continued scrutiny.

Therefore, monitoring for a select group of samples will be quadrupled for the new reporting period. See 4.1.2 for more details.

3.3 AIR EMISSIONS MONITORING

3.3.1 Tabulated Results

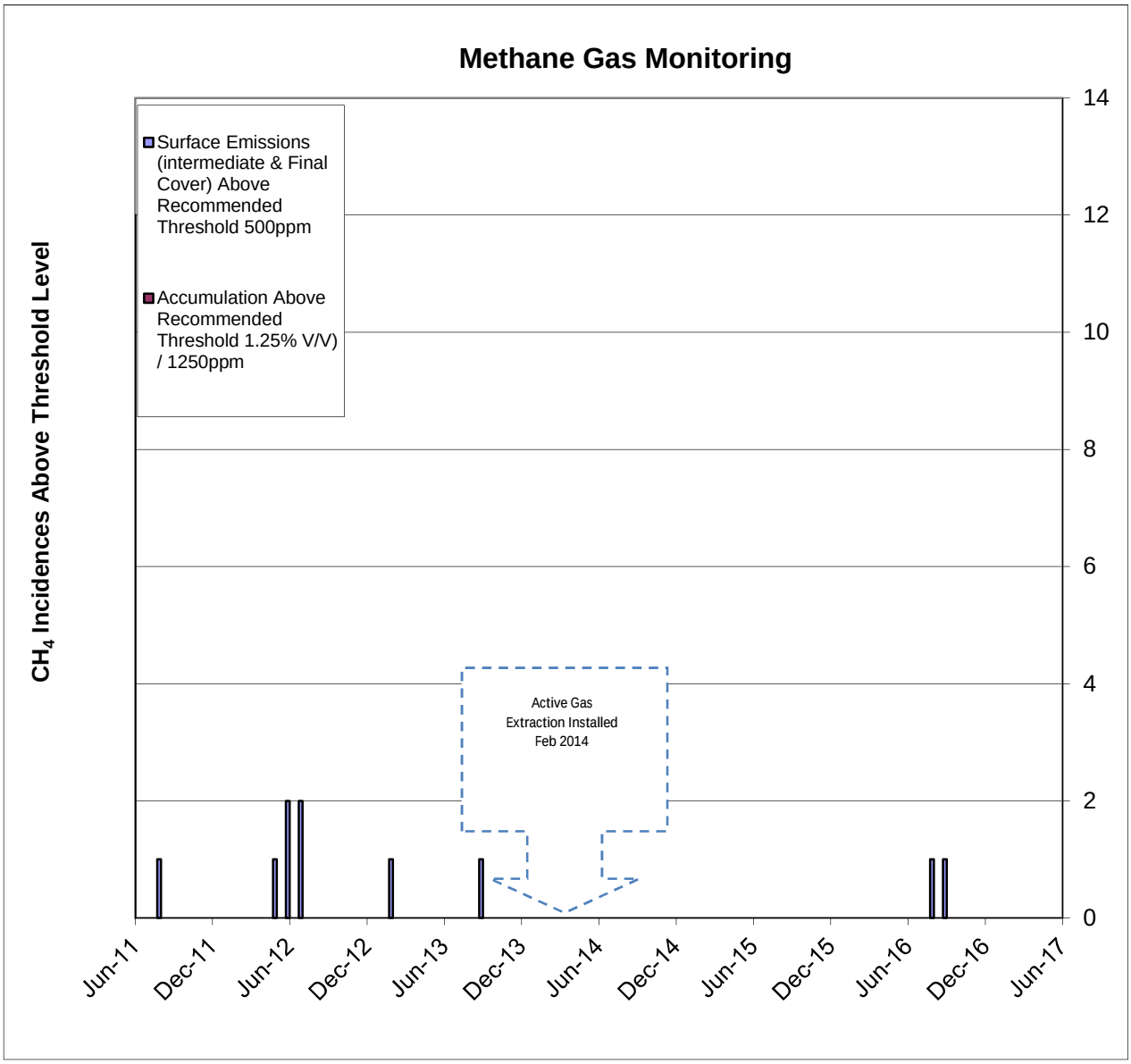
Table 3.3.1 Methane monitoring results for the reporting period

Date	Results Above Recommended Threshold 500ppm	Accumulation Above Recommended Threshold 1250ppm
Jun-16	0	0
Jul-16	0	0
Aug-16	1	0
Sep-16	1	0
Oct-16	0	0
Nov-16	0	0
Dec-16	0	0
Jan-17	0	0
Feb-17	0	0
Mar-17	0	0
Apr-17	0	0
May-17	0	0

The presented data describes 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



The surface emissions sampled in August 2016 (located at the edge of the liner) and September 2017 (located at the southern edge of the cell) were recorded above acceptable limits, however upon further investigation it is noted the surrounding grid pattern (25 meter spacing's) did not register elevated levels. Both areas were monitored and further samples taken have been low and in line with historical trends.

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 in February 2014. Phase 1 (covering the older western gully) of the landfill gas management is in place and connected to a flaring unit. Phase 2 (capturing gas from legacy waste in under the new cell liner in 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.

3.4 ENVIRONMENTAL COMPLAINTS

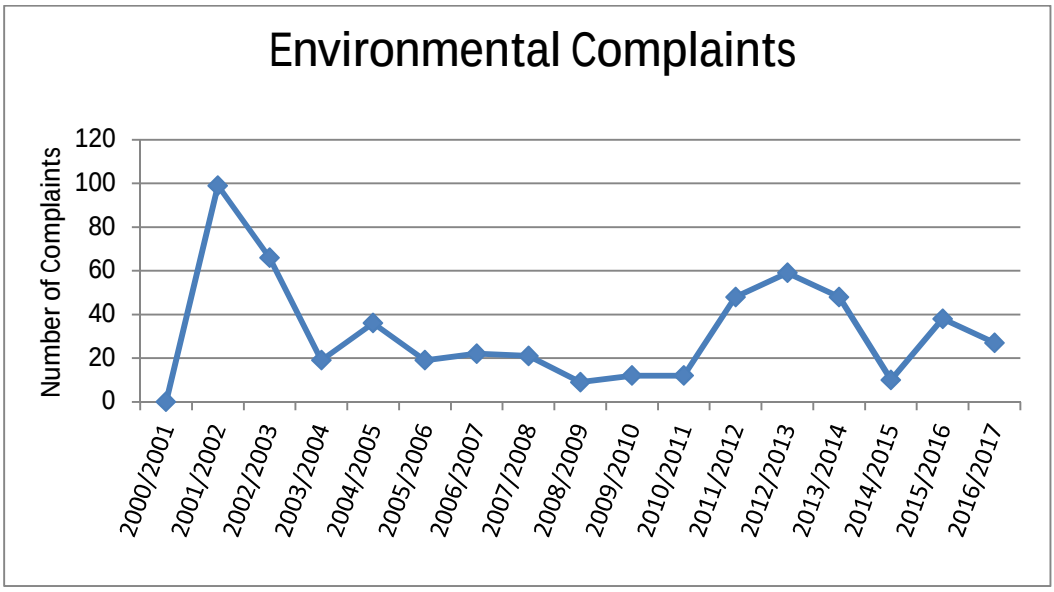
3.4.1 Tabulated Results

Table 3.4.1.1 Environmental complaints

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
2015/2016	38
2016/2017	27

3.4.2 Data Presentation

Figure 3.4.2.1 Environmental related complaints presentation



3.4.3 Environmental Complaints Results Interpretation

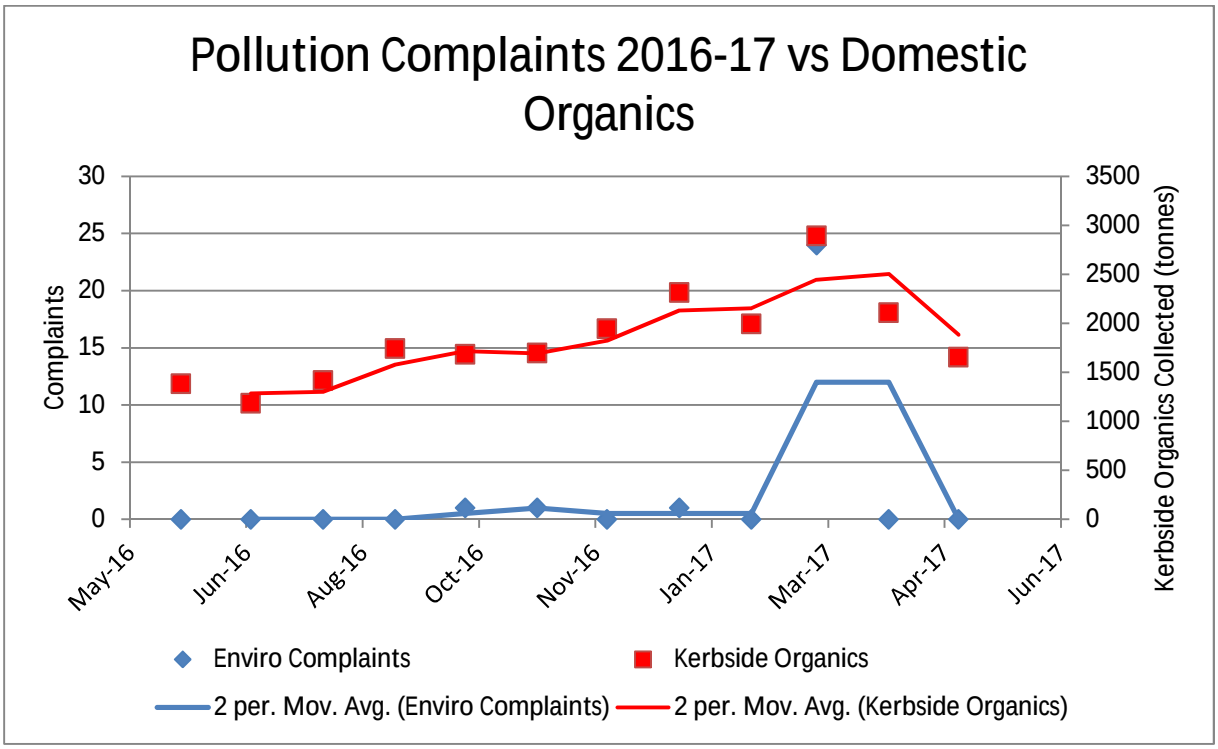
The overlying trend for environmental complaints had been downward after closure of the solid waste energy recovery facility in 2004. However, the reporting periods 2011/12 to 2013/14 have given rise to a spike of approximately 150 complaints, invariably regarding perceived odour from the WWARRP. It 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.

From 01 July 2014, kerbside green waste not stored at the WWARRP, instead it is unloaded at a nearby site on Reddalls Road. Organics received at the WWARRP are removed from site and processed at the above mentioned nearby facility.

All air pollution complaints received were investigated. Evidence was gathered and data from the on-site weather station was invaluable comparing the source of the odour and prevailing wind direction relative to the Wollongong Waste and Resource Recovery site (Whytes Gully)

The bulk of the complaints (almost 85%) conveyed in the reporting period have been received in March 2017. The majority of the pollution complaints received coincided with the timing of the proposed expansion of the nearby organics processing facility and the associated notification and advertising to key stakeholders and neighbours.

Figure 3.4.3.1 Pollution (odour) complaints compared to garden organics collection volumes



As demonstrated by the blue line in the Figure 3.4.3.1, the majority of complaints have been received during late summer and into the autumn season. This mirrors the red line which displays trend average volume of green waste collected from kerbside collections (Wollongong only). Statistically, the data set for odour related complaints has a strong correlation value (r^2) of greater than +0.5 to the data set for the volume of domestic garden organics. This gives efficacy to the theory that garden organics are most often the source of odours detected by nearby residents.

From 01 July 2014, kerbside green waste not stored at the WWARRP, instead it is unloaded at a nearby site on Reddalls Road, which also accepts other Council area's green waste and food waste. Regardless of this, Wollongong City Council fully investigates all odour complaints received upon receipt of the complaint.

3.5 TRADE WASTEWATER RESULTS

As required in Clause M6.2 of the Sites EPL, the Trade Wastewater Results are tabulated below:

Table 3.5.1 Trade Wastewater Results Jun-Aug 2016

Analyte	Units	2-Jun	15 Jun	21 Jun	13 July	5 Aug	25 Aug
pH Start	Units	9.7	7.1	7.5	7.8	7.7	7.5
TDS	mg/L	6020	2370	2420	2680	3040	3350
TSS	mg/L	41	59	24	42	106	109
Ammonia (N)	mg/L	22.5	18.7	28	93.9	<0.1	<0.1
pH Finish	Units	9.1	7.4	7.5	8.4	7	7
BOD	mg/L	35	62	38	99	15	35
Temp	^{o}C	17	20	16	18	17	16

Table 3.5.2 Trade Wastewater Results Sep-Nov 2016

Analyte	Units	21-Sep	20-Oct	4-Nov	28-Nov
pH Start	Units	6.9	7.2	7.1	7.3
TDS	mg/L	3580	5630	4540	4880
TSS	mg/L	62	46	32	29
Ammonia (N)	mg/L	1	2	0.8	0.8
pH Finish	Units	6.8	7.1	7.1	8.4
BOD	mg/L	15	15	11	13
Temp	^{o}C	22	19	23	28

Table 3.5.3 Trade Wastewater Results Dec 16 –Feb 17

Analyte	Units	20-Dec	12-Jan	30-Jan	23-Feb
pH Start	Units	7.5	7.1	7.8	7.3
TDS	mg/L	5650	147	5630	4670
TSS	mg/L	50	30	70	29
Ammonia (N)	mg/L	203	<0.1	3.6	<0.1
pH Finish	Units	7.7	7.3	8.9	8
BOD	mg/L	38	10	6	6
Temp	^{o}C	22	34	30	21

Table 3.5.4 Trade Wastewater Results Mar – May 2017

Analyte	Units	16-Mar	6-Apr	28-Apr	16-May
pH Start	Units	7.4	6.8	8.6	7.6
TDS	mg/L	3290	2610	3510	3440
TSS	mg/L	22	24	8	31
Ammonia (N)	mg/L	<0.1	0.8	54.3	9.7
pH Finish	Units	7.4	6.7	7.6	7.8
BOD	mg/L	6	20	73	48
Temp	^{o}C	25	21	19	14

4 SITE SUMMATION

4.1 DEFICIENCY IDENTIFICATION & REMEDIATION

4.1.1 Surface Water Overflow Result of 78 mg/L in June 2016 and 88 mg/L in July 2016

Surface water that exited the site in June 2016 and July 2016 contained suspended solids at levels above the 50mg/L concentration limit prescribed in the sites Environment Protection Licence. Downstream samples taken at the same time indicate suspended solids <50mg/L concentration limit and it was affirmed that there was no material harm caused by the non-compliance (as defined by Section 147 of the POEO Act 1997).

To help reduce the likelihood of future non compliances, a Wet Weather and Stormwater Management work instruction was created in July 2016 and implemented to ensure that the sediment pond capacity is maintained between rainfall events. The Wet Weather and Stormwater Management work instruction is attached to this report in Annexure C.

Since the implementation of the new work instruction, no further sediment rich discharges have occurred.

Note: The stormwater ponds are regularly inspected and sampled to monitor compliance with EPL 5862. When Turbidity and pH levels are compliant a controlled release is approved. Re sampling is conducted at least once every 24 hours while controlled release is in progress. Inspection and sample data is recorded. The controlled release allows the sediment pond capacity to be maintained and increase storage capacity of stormwater on site during rain events. If an uncontrolled overflow event occurs, it is to be sampled and documented.

4.1.2 Ground water monitoring

Results presenting in monitoring wells 11 and 16 warrant continued scrutiny. An increase to current test schedule from annual to quarterly sampling will commence in August 2017 for Aluminium, Barium, Cadmium, Chromium (total,) Cobalt, Copper, Lead, Manganese and Zinc.

4.2 CONCLUSION

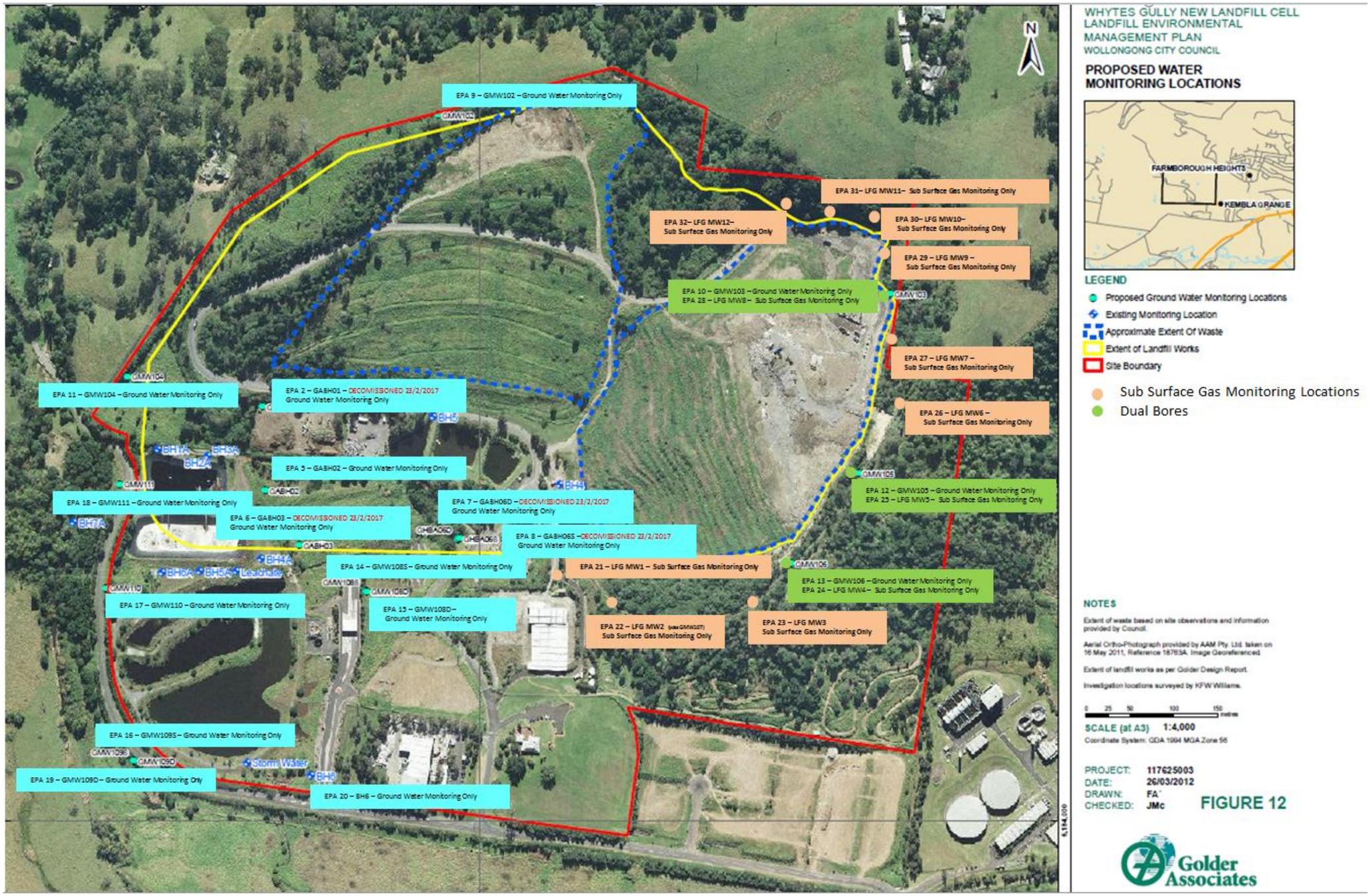
The site is performing well within the individual criteria and limits assigned to it in regard to environmental performance. The low number of deficiencies shows that Council has maintained satisfactory environmental performance. Actions are in place to monitor and improve the sites performance in regard to the identified deficiency in Section 4.1 which will ensure Council's goal of continuous environmental improvement at Whytes Gully is achieved.

Further, the modernised test regimes already implemented, along with the best practice multi redundancy lined new cell development will provide a far more sustainable environmental outcome for the surrounding environment and our community. Observations made in this year's annual return indicate that the new landfill cell development is functioning well and as designed.

Environmental Monitoring Locations

Wollongong Waste & Resource Recovery Park– 5862

Environmental Monitoring Points - Groundwater & Landfill Gas



ANNEXURE B

Example Environmental Incident Report

ENVIRONMENTAL INCIDENT REPORT - (1)

wollongong
city of innovation

Complete this form for all environmental incidents that occur at or on Wollongong City Council worksites.
MATERIAL HARM INCIDENTS MUST BE REPORTED TO 5 ESSENTIAL AGENCIES IMMEDIATELY

(i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or
(ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and
(iii) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment

The purpose of this form (1) is to alert Waste Service to potential environmental incidents. It does not represent Wollongong City Council's final position for any incident reported on this form.

Remember!	Complete all fields prior to submitting form Be succinct, stick to the facts and **do not** make assumptions Only record information you know to be correct

Incident Details

DATE:	17-3-17	TIME:	7.30am - ☒ 2pm	Duration:	PATHWAY: 547198, 547201, 547203, 547208 Wind Correlation Z17/68765

Description (provide a brief description of what happened during the incident (**MATERIAL HARM INCIDENT - 5 ESSENTIAL AGENCIES MUST BE NOTIFIED IMMEDIATELY)**	4 callers reported strong waste smell on and off all day (7.30am – 2pm). The caller (Ref 547198) is concerned for plans to extend the waste facility because of ongoing odour problems. Referred by EPA to Whytes Gully Waste Disposal Facility 133 Reddalls Road, KEMBLA GRANGE NSW 2526
EXACT location of the incident (include chainage, landmarks, features, nearest cross street) – provide a sketch if appropriate	No name(s) submitted by EPA Address -4 complaints received from Highview Drive, Farmborough Heights on 17 March 2017
Quantity or volume of material discharged or affected by incident (provide estimate if quantity is unknown)	Unknown
Estimated distance to nearest waterway. This can include stormwater drains and dry watercourses. (where relevant)	N/A
Type of activity that caused incident (what works were in progress at the time of the incident?)	Normal Operations
How was the incident identified? (eg employee, Contractor, community, complaint)	Community Complaint to EPA
Name and contact details of complainant (where relevant)	EPA James Wraith Operations Officer, Waste Compliance
Address of complainant	Farmborough Heights – Highview Drive
If Odour, describe complainants description of odour, What does it smell like? Intensity: 0 No odour 1 Very faint odour 2 Faint odour 3 Distinct odour 4 Strong odour 5 Very Strong odour	Odour Intensity: ☐1 ☐2 ☐3 ☒4 ☐5
Describe weather conditions at the time Temperature(very warm, warm, mild, cold) Wind Strength (none, light, steady, strong, gusting) Wind Direction (eg from NE)	Temperature 19.0 to 19.8 Wind speed 9.7 to 16.1Km/h from predominantly from the North 1ml up to 3.30 pm
Describe weather conditions during recent weeks Temperature(very warm, warm, mild, cold) Wind Strength (none, light, steady, strong, gusting) Wind Direction (eg from NE)	Average Temperature -18.2 low 26.8high Average Wind speed -6.1 Km/h Average wind direction –Predominantly from the North Total rainfall (1- 17 March 2017) – 210mm

Any other details of the incident (including any information which did not fit in spaces above, as well as any special circumstances of the day or the location)

Nil additional detail

What immediate actions/control measures were taken to rectify or contain the incident?

Review of tip face operations, additional slag utilised onsite during wet weather running surface during wet weather periods additional VENM cover utilised to enable effective stormwater drainage from current landfill operations.

- Nil waste odour detected offsite.
- Review of weather station data (see attached Wind Correlation Data) indication odour not generated by WWARRP.
- Additional information supplied to the EPA in a separate letter regarding neighbouring facilities notifying residents of their plans to expand their facilities and residents also protesting a subdivision of lots in Farmborough Heights.

What corrective action has been taken to prevent similar incidents recurring?

Continue to keep landfill operations as dry as possible in wet weather conditions. Continue to cover waste in accordance with EPL. Reinforce tip face start-up procedure with operatives ensuring deodoriser trailer is activated. Ongoing assessment periodically throughout the day to detecting odour onsite.

Incident Category

Potential Category 1 Incident (may involve one or more of the following (tick incident type)	
☒ Material, odour or noise that travels beyond site boundary causing or potentially causing adverse impact to the environment or community	☐ Unauthorised harm or damage to threatened species, endangered populations, endangered ecological communities or critical habitat.
☐ Discharge of waters from site not in accordance with any applicable REF determination/approval/environment protection licence condition	☐ Unauthorised harm or damage to threatened aquatic species and protected marine vegetation or unauthorised dredging of reclamation works within a watercourse.
☐ A fire that travels beyond site boundary	☐ Unauthorised damage or destruction to any State or locally significant relic or Heritage item
☐ Unauthorised harm or desecration to Aboriginal objects and Aboriginal places	☐ Material harm to the environment or persons as per Part 5.7 of POEO Act (including harm on site)
☐ Failure to comply with a REF determination/approval/environment protection licence condition.	☐ Works undertaken without required approval or environmental assessment.

Potential Category 2 Incident (may involve one or more of the following (tick incident type)	
☐ Failure to implement component of Environment Management Plan that does not result in a Category 1 incident	☐ Spills that do not leave the site boundary and are cleaned up without material environmental harm or residual environmental impact.
☐ A fire contained on site without causing impact to the environment	

Sign-Off (person making report)

Print Name: Della Kutzner	Sign:
Position: WHS, Environment and Quality Officer	Date: 21 March 2017

Notification to the 5 Essential Agencies (where material harm identified notify immediately)

To be completed by the relevant Manager or delegated authority
Were relevant authorities notified under part 5.7 of POEO Act?

Authority	**Number**			**Date and Time Notified**
Fire and Rescue	000	☐ Yes	☐ No	
Wollongong City Council	4227 7111	☐ Yes	☐ No	
EPA NSW	131 555	☒ Yes	☐ No	Lodge with EPA 17/3/17, sent to WCC 20/3/2017 Response back 26/3/2017
The Ministry of Health	4222 5000	☐ Yes	☐ No	
SafeWork NSW	13 10 50	☐ Yes	☐ No	
Fire and Rescue	1300 729 579	☐ Yes	☐ No	
Department of Planning	4224 9450	☐ Yes	☐ No	

Surrounding Land Holders (if necessary)	Refer to Pollution Incident Response Management Plan (PIRMP) for contacts	☐ Yes	☐ No	

Who notified the EPA? Name: Resident

Notification Method ☒ Phone ☐ on site	Date	17/3/17	Time	7.30am – 2.00pm ☐ am ☐ pm
Has there been a EPA Environmental Line Complaint? ☒ Yes ☐ No				EPA Complaint No: **103380-2017**
Authorities notified and why: (eg Essential Agencies and Neighbouring properties - NA				

Sign off (Manager/delegated authority officer)

Print Name: Sandra Belanszky	Sign:
Position: Waste operations Manager	Date: 26 March 2017

Please submit all completed forms to relevant Area Manager

Z15/38744

ANNEXURE C

Contingency Sediment Pond Work Instruction

Issue: 1 Rev: 0 Date: 08/07/16	**Wollongong City Council – City Works and Services, Waste Services** *Wet Weather Monitoring and Stormwater Management* Wollongong Waste & Resource Recovery Park (Whytes Gully)

Wet Weather & Stormwater Management Work Instruction

1.0 PURPOSE AND SCOPE

The purpose of this work instruction is to describe the way in which wet weather monitoring and storm water management is carried out on Council's Waste Sites:

- The Wollongong Waste and Resource Recovery Park (Whytes Gully)

2.0 DEFINITIONS/REFERENCES

The following references may be consulted if required;

- Whytes Gully Licence Number 5862 under Section 55 of the Protection of the Environment Operations Act 1997 (see http://www.epa.nsw.gov.au/prpoeoapp/ and enter licence number 5862 for the latest version)
- Whytes Gully Consent to discharge trade waste - Agreement No 11205 (TRIM Ref Z16/149009)
- Whytes Gully LEMP September 2014 Report No: 117625003_061_R_Rev2 (TRIM Ref Z12/221925)

3.0 INSTRUCTION DETAILS

3.1 GENERAL DESCRIPTION OF STORMWATER MANAGEMENT

3.1.1 Storm runoff water is collected into three dams (see Figure 2 below). Water in the dams should be kept below 50% capacity to enable sufficient storage capacity to handle runoff from most rainfall events and thus minimise the potential for uncontrolled discharges.

Warning: To avoid environmental harm no release is to occur to the external stormwater system until Council's Environment Officer (or nominated representative) has tested the water and confirmed that it is suitable for release. A record of the test must to be retained on file.

3.1.2 After cessation of inflow from a rainfall event, stored water in all three dams is allowed to settle. Dams may require expedited treatment through the use of gypsum dosing to bring the turbidity down to levels suitable for release to the external storm water system. The water may also need to be treated with acid or caustic to ensure pH is within range.

3.1.3 When testing shows that the water quality of a dam meets Environment Protection Licence conditions for release, it may be released to the creek at a rate not exceeding 1,000 m^3 /day (or 1 ML /day) until the water level is returned below 50% capacity.

3.1.4 Water remaining in the dams after cessation of the rainfall event may be managed/utilised as follows:

- dust suppression
- used for on-site irrigation

3.1.5 When an overflow event occurs during rainfall, sampling must be carried out by a Council's Waste Operations Manager (or nominated representative) at discharge points numbered 1, 4 and 6 on Figure 2 at a frequency of no less than one sample per day.

Note: Point numbers 1, 4 and 6 on Figure 2 represent the Environment Protection Licence Identification Numbers displayed in Table 1:

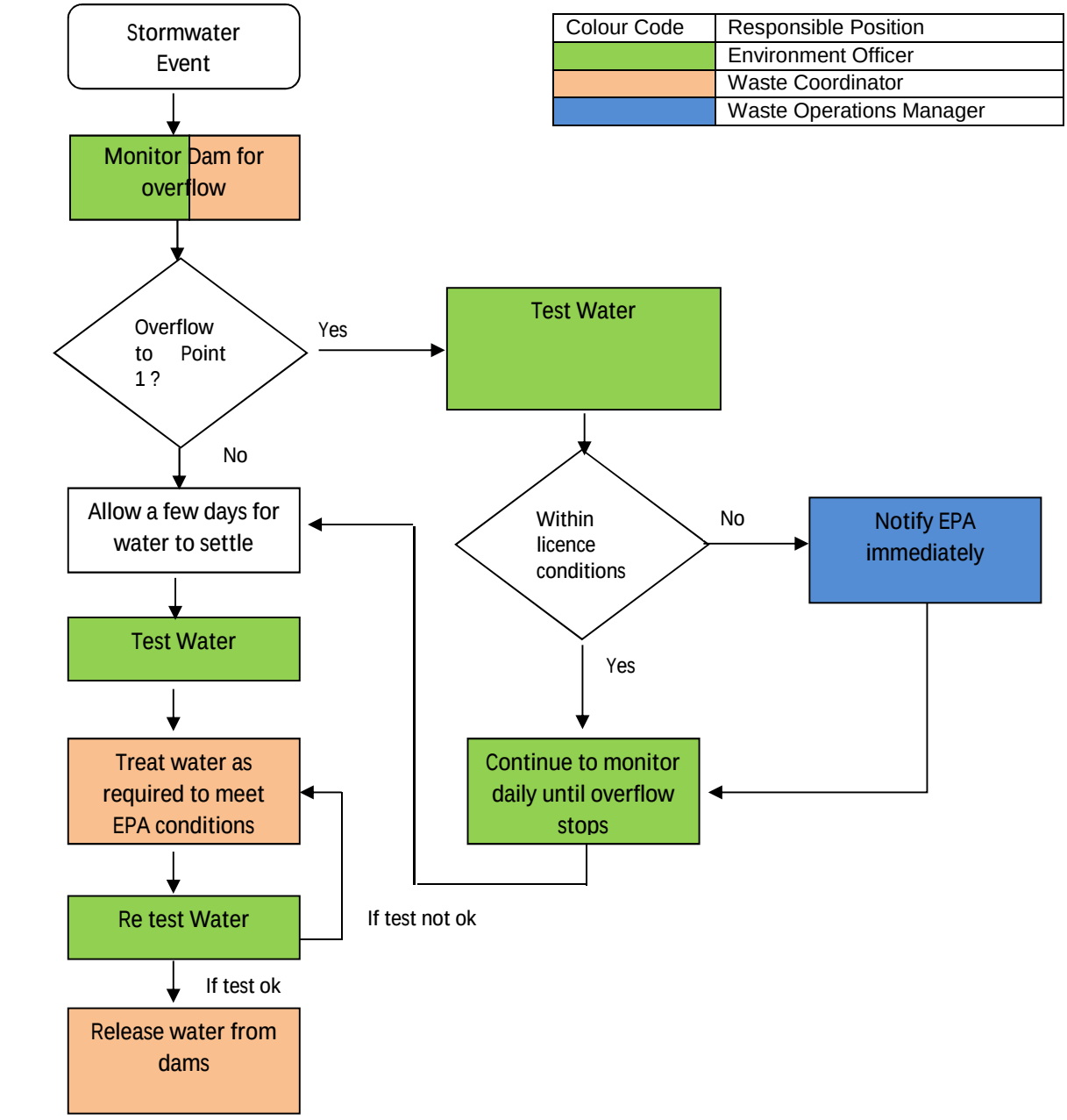
Table 1 Key Environment Protection Licence Identification Numbers

Figure 2 No.	EPL No.	Comment
1	1	Source
4	33	Downstream
6	34	Upstream

3.1.6 The samples are tested for compliance against the parameters specified in the Environment Protection Licence 5862. Where there is an exceedance of licence conditions, Council's Waste Operations Manager (or delegated representative) is to notify the EPA immediately.

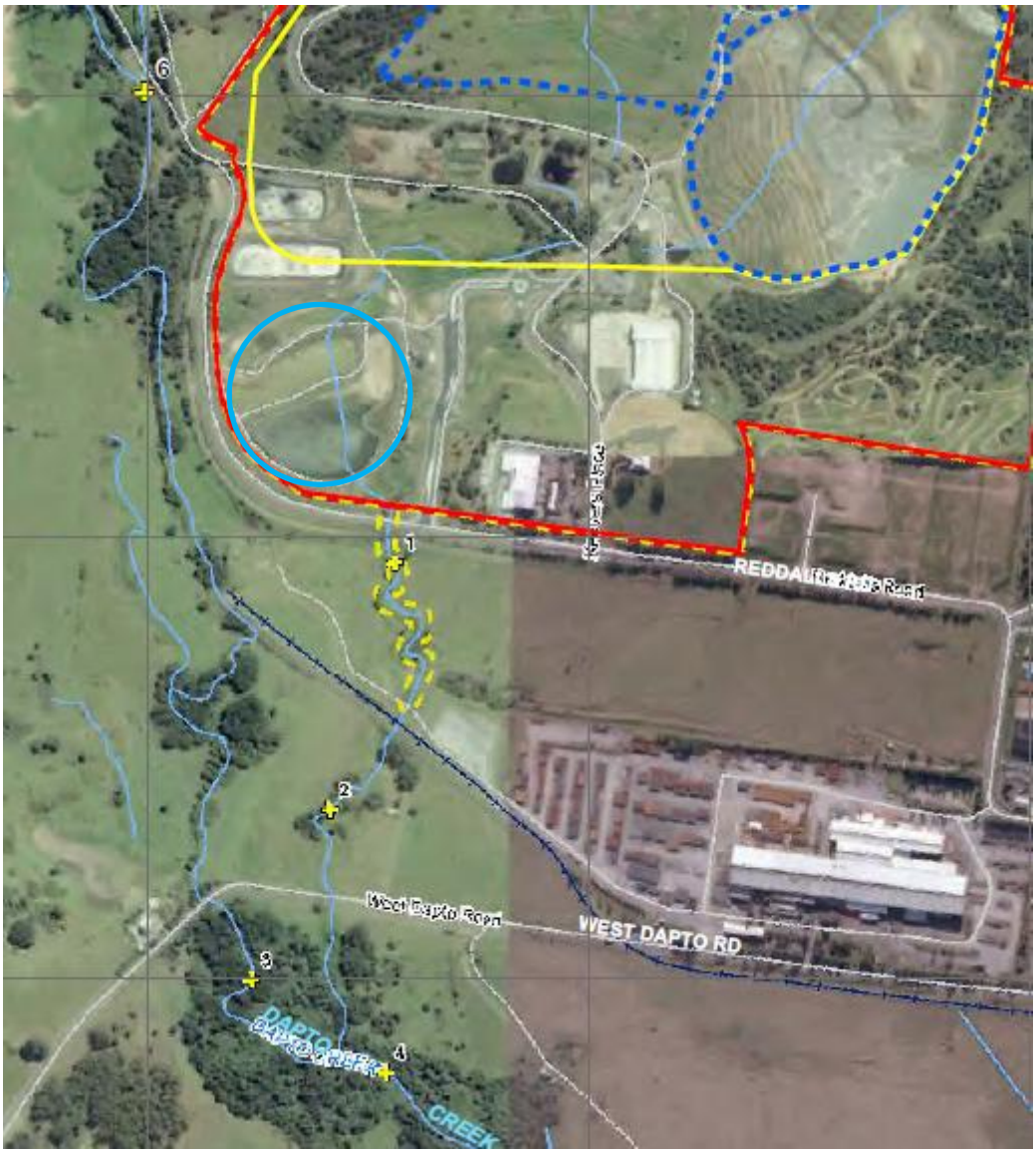
3.1.7 Where the samples are collected by the site Environmental Officer (or nominated Council representative) the Laboratory Submission Cover Sheet in Appendix 4.1 should be filled in and retained on file.

Figure 1 Stormwater Management Process



Note: Treatment will be by gypsum dosing to reduce suspended solids

Figure 2: Location monitoring points



3.2 RESPONSIBILITIES

3.2.1 For each rainfall event the Environmental Officer and Site Coordinator (or delegate) shall monitor the dam levels to establish if there is an overflow condition. Where an overflow condition occurs, the Environmental Officer (or delegate) notifies contracted sampler or the environmental representative who will in turn arrange for samples from monitoring points 1, 4 and 6.

3.2.2 Controlled release of water to creek is carried out by Council under the direction of the Operations Manager. The Operations Manager is responsible to ensure that appropriate testing is conducted and that the water quality falls within EPA guidelines before a controlled release occurs.

3.2.3 Council will be required to chemically dose dams using gypsum (dosage varies with sediment load, but dose average is 32kg/100m^3). The Site Coordinator will arrange for a suitably trained person to carry out this work.

3.2.4 Council is responsible for the supply of all chemicals required to treat storm water. The Waste Coordinator (or delegate) is required to monitor the stock of chemicals on site and record their use and replace stocks. The Environment Officer will ensure that all chemicals are listed on the hazardous chemicals register, MSDS are available on site for all chemicals, and that staff using the chemicals have been appropriately trained in their safe handling prior to use.

3.2.5 All major site drainage works such as stormwater ponds, dams, bund, drains, sediment retention traps, screens and erosion controls will be constructed by in accordance with relevant requirements (Refer appendices for construction methods). The Waste Coordinator is responsible for the operation and maintenance of the storm water management infrastructure which includes:

- Maintaining in a litter free condition
- Desilt & repair on an as required basis
- Maintain in a peak functional condition in accordance with design capacity
- Ensure that drainage occurs in a manner which prevents ponding and minimises erosion/scouring

3.2.6 All temporary drains will generally be earthen drains constructed at grades not steeper than 1%, to minimise scouring. Where steeper grades are required, the drains must be provided with appropriate scour protection, for example hay bales or rubble. All earthen drains will be grassed to minimise erosion.

Warning: A life buoy and throw rope is required when working in or around the dams in case someone slips or falls into the dam.

4.0 APPENDICES

4.1 Laboratory Submission Sheet

4.2 Construction of Drains on Outside of Batter

4.3 Construction of Drainage Channels

4.4 Typical Erosion Control Structure

4.5 Stormwater Treatment Plant

Wollongong City Council
City Works and Services Division – Waste Services
Laboratory Submission Sheet

Location/Site	Wollongong Waste and Resource Recovery Park (Whytes Gully)
Laboratory	ALS – Contract T
Purchase Order	
Sample Number	
Period Sampled	
Date Dispatched	

Dust Analysis Suite (Select One)

Selection	Test Type	Analytes/Results Required
☐	Monthly Dust	Total Insoluble Solids
☐	Other	Specify

Water Analysis Suite (Select One) (Note: All results in milligrams per litre unless specified)

Selection	Test Type	Analytes/Results Required
☐	Sediment Basin Discharge	pH, Total Suspended Solids.
☐	Surface Water Annual	Alkalinity (as Calcium Carbonate), Ammonia, Calcium, Chloride, Conductivity (µS/cm), Dissolved Oxygen, Filterable Iron, Fluoride, Magnesium, Nitrate, pH, Potassium, Sodium, Sulfate, Temperature (^{o}C), Total Organic Carbon , Total Phenolics and Total Suspended Solids.
☐	Quarterly Ground Water	Alkalinity (as Calcium Carbonate), Calcium, Chloride, Conductivity (µS/cm), Magnesium, Nitrogen (Ammonia), pH, Potassium, Sodium, Standing Water Level (m), Sulfate, Total Dissolved Solids and Total Organic Carbon
☐	Annual Ground Water	Aluminium, Arsenic, Barium, Benzene, Bicarbonate, Cadmium, Chromium (Hexavalent), Chromium (Total), Cobalt, Copper, Ethyl Benzene, Fluoride, Lead, Manganese, Mercury, Nitrate, Nitrite, Organochlorine Pesticides, Organophosphate pesticides, Polycyclic Aromatic Hydrocarbons, Toluene, Total Petroleum Hydrocarbons, Total Phenolics, Xylene and Zinc.
☐	Trade Waste (22 Days)	Ammonia, Biochemical Oxygen Demand, Suspended Solids, Temperature (^{o}C), Total Dissolved Solids, pH.
☐	Other	Specify

Special Instructions: Certified report required. All work to be undertaken to a current accredited testing method.

Contact	Signed	Name

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ANNUAL RETURN

LICENCE NO	**5862**
LICENCE HOLDER	WOLLONGONG CITY COUNCIL
REPORTING PERIOD	29-May-2016 to 28-May-2017

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 H)

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 28-Jul-2017

Your Annual Return must be completed, including certification in Section H, 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*.

Annual Return

WOLLONGONG CITY COUNCIL

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

CHECKLIST		
☑	Section A:	All licence details are correct
☐	Section B1:	You have entered the correct number in the complaints table
☐	Section B2 – B3:	If there are tables, you have provided the required details
☐	Section C:	You have answered question 1, and 2 if applicable
☐	Section D:	If applicable, you have completed all load calculation worksheets
☐	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
☐	Section F:	You have answered question 1, 2 and 3 if applicable
☐	Section G:	You have answered question 1 and question 2, 3 and 4 or question 5 through to 11 if applicable
☐	Section H:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
☐	Make a copy of the completed Annual Return and keep it with your licence records	

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

Annual Return

WOLLONGONG CITY COUNCIL

NSW EPA

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		capacity

A6 Assessable Pollutants (Not Applicable)

B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

Number of complaints recorded by the licensee during the reporting period. **If no complaints were received enter nil in the attached box, otherwise complete the table below.**	27

Pollution Complaint Category	Number of Complaints
Air	27
Water	NIL
Noise	NIL
Waste	NIL
Other	NIL

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 26 March 2012 (Whytes 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	6	103	180.50	278

Ammonia	milligrams per litre	1	6	0.05	0.51	1.3
Calcium	milligrams per litre	1	6	20	29.83	38
Chloride	milligrams per litre	1	6	33	78.83	175
Conductivity	microsiemens per centimetre	1	6	367	650.50	1160
Dissolved Oxygen	milligrams per litre	1	6	5.79	7.76	9.59
Filterable iron	milligrams per litre	1	6	0.05	0.13	0.25
Fluoride	milligrams per litre	1	6	0.2	0.32	0.5
Magnesium	milligrams per litre	1	6	10	16.83	27
Nitrate	milligrams per litre	1	6	0.2	0.71	1.36
pH	pH	1	6	7.3	7.7	8.1
Potassium	milligrams per litre	1	6	7	11.83	18
Sodium	milligrams per litre	1	6	34	76	150
Sulfate	milligrams per litre	1	6	20	31.17	42
Temperature	degrees Celsius	1	6	13.7	17.28	22.1
Total organic carbon	milligrams per litre	1	6	2	13	18
Total Phenolics	milligrams per litre	1	6	0.05	0.05	0.05

Total suspended solids	milligrams per litre	1	6	7	41.17	88

Monitoring Point 2 DECOMMISSIONED 23 FEBRUARY 2017

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					
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 petroleum hydrocarbons	milligrams per litre					
Total Phenolics	milligrams per litre					
Xylene	milligrams per litre					
Zinc	milligrams per kilogram					

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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	0.0012	0.001638	0.283

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

Methane	percent by volume	12	12	0.00014	0.000239	0.00044

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). E297754.9 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	1060	1127	1200
Aluminium	milligrams per litre	1	1	3.37	3.37	3.37
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.016	0.016	0.016
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	300	321	360
Chloride	milligrams per litre	4	4	1130	1170	1220
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	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	5200	5557.50	5710

Copper	milligrams per litre	1	1	0.01	0.01	0.01
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	0.003	0.003	0.003
Magnesium	milligrams per litre	4	4	170	185.25	192
Manganese	~~micrograms~~ per litre	1	1	0.096	0.096	0.096
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	7.15	7.8
Polycyclic aromatic hydrocarbons	~~milligrams~~ per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	2	2.5	3
Sodium	milligrams per litre	4	4	558	607	639

Standing Water Level	metres	4	4	4.99	6.59	10.9
Sulfate	milligrams per litre	4	4	150	156.50	168
Toluene	~~milligrams~~ per litre	1	1	< 2	< 2	< 2
Total dissolved solids	milligrams per litre	4	4	3330	3487.50	3840
Total organic carbon	milligrams per litre	4	4	6	29.50	98
Total petroleum hydrocarbons	~~milligrams~~ per litre	1	1	< 50	< 50	< 50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	~~milligrams~~ per litre	1	1	< 2	< 2	< 2
Zinc	milligrams per kilogram	1	1			

Monitoring Point 6 - DECOMMISSIONED 23 FEBRUARY 2017

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). E297793.8 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	3	772	671	809
Aluminium	milligrams per litre	1	1	0.13	0.13	0.13
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	3	351	358	369
Chloride	milligrams per litre	4	3	1300	1240	1390
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	0.002	0.002	0.002
Conductivity	microsiemens per centimetre	1	1	5940	5940	5940
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	3	206	211.33	214
Manganese	micrograms per litre	1	1	0.335	0.335	0.335
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	3	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	3	6.9	7.17	7.5
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	3	2	2	2
Sodium	milligrams per litre	4	3	491	512	530
Standing Water Level	metres	4	3	0.5	0.7	0.92
Sulfate	milligrams per litre	4	3	123	166.67	193
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	3	3500	394	4790
Total organic carbon	milligrams per litre	4	3	5	7	10
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.030	< 0.06	0.036

Monitoring Point 7 DECOMMISSIONED 23 FEBRUARY 2017

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	2	362	384	420
Aluminium	milligrams per litre	1	1	1.44	1.44	1.44
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.073	0.073	0.073
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	3	81	91.33	97
Chloride	milligrams per litre	4	3	604	616.33	640
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	3	2660	2880	3000

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	3	55	62	73
Manganese	micrograms per litre	1	1	0.011	0.011	0.011
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	3	0.01	0.02	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	3	6.7	7.03	7.6
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	< 1	< 1	< 1
Potassium	milligrams per litre	4	3	1	1	1
Sodium	milligrams per litre	4	3	399	421.67	465

Standing Water Level	metres	4	3	1.73	2.17	2.5
Sulfate	milligrams per litre	4	3	113	135.33	174
Toluene	milligrams per litre	1	1	< 2	< 2	< 2
Total dissolved solids	milligrams per litre	4	3	1530	1576.67	1629
Total organic carbon	milligrams per litre	4	3	1	1.67	2
Total petroleum hydrocarbons	milligrams per litre	1	1	< 50	< 50	< 50
Total Phenolics	milligrams per litre	1	1	< 0.05	< 0.05	< 0.05
Xylene	milligrams per litre	1	1	2	2	2
Zinc	milligrams per kilogram	1	1	0.01	0.01	0.01

Monitoring Point 8 - DECOMMISSIONED 23 FEBRUARY 2017

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	3	336	426.33	495
Aluminium	milligrams per litre	1	1	2.73	2.73	2.73
Arsenic	milligrams per litre	1	1	< 0.001	< 0.001	< 0.001
Barium	milligrams per litre	1	1	0.099	0.099	0.099

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	3	77	87	98
Chloride	milligrams per litre	4	3	606	624	645
Chromium (hexavalent)	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Chromium (total)	milligrams per litre	1	1	0.002	0.002	0.002
Cobalt	milligrams per litre	1	1	0.005	0.005	0.005
Conductivity	microsiemens per centimetre	4	3	2800	2960	3200
Copper	milligrams per litre	1	1	0.011	0.011	0.011
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	0.003	0.003	0.003
Magnesium	milligrams per litre	4	3	59	68.33	74
Manganese	micrograms per litre	1	1	0.241	0.241	0.241
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	3	0.01	0.02	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	3	6.7	7.1	7.6
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	3	1	1	1
Sodium	milligrams per litre	4	3	417	444.67	464
Standing Water Level	metres	4	3	1.97	2.31	2.72
Sulfate	milligrams per litre	4	3	189	196	206
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	3	1650	1770	1920
Total organic carbon	milligrams per litre	4	3	2	3	4
Total petroleum hydrocarbons	milligrams per litre	1	1	<2	<2	<2
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.019	0.019	0.019

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	107	200.67	248
Aluminium	milligrams per litre	1	1			
Arsenic	milligrams per litre	1	1			
Barium	milligrams per litre	1	1	DRY		
Benzene	milligrams per litre	1	1			
Cadmium	milligrams per litre	1	1			
Calcium	milligrams per litre	4	4	22	49	65
Chloride	milligrams per litre	4	4	14	18.67	22
Chromium (hexavalent)	milligrams per litre	1	1			
Chromium (total)	milligrams per litre	1	1			
Cobalt	milligrams per litre	1	1	DRY		
Conductivity	microsiemens per centimetre	4	4	262	455.33	559

Copper	milligrams per litre	1	1			
Ethyl benzene	micrograms per litre	1	1			
Fluoride	milligrams per litre	1	1	DRY		
Lead	milligrams per litre	1	1			
Magnesium	milligrams per litre	4	4	6	12.67	17
Manganese	micrograms per litre	1	1			
Mercury	milligrams per litre	1	1			
Nitrate	milligrams per litre	1	1	DRY		
Nitrite	milligrams per litre	1	1			
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.03	0.05
Organochlorine pesticides	milligrams per litre	1	1			
Organophosphate pesticides	milligrams per litre	1	1	DRY		
pH	pH	4	4	7	7.03	7.1
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	DRY		
Potassium	milligrams per litre	4	4	1	1	1
Sodium	milligrams per litre	4	4	20	25	29

Standing Water Level	metres	4	4	2.50	7.06	11.68
Sulfate	milligrams per litre	4	4	9	10.67	13
Toluene	milligrams per litre	1	1	DRY		
Total dissolved solids	milligrams per litre	4	4	215	449.33	628
Total organic carbon	milligrams per litre	4	4	2	3.33	5
Total petroleum hydrocarbons	milligrams per litre	1	1			
Total Phenolics	milligrams per litre	1	1		DRY	
Xylene	milligrams per litre	1	1			
Zinc	milligrams per kilogram	1	1			

Monitoring Point 10

Groundwater quality monitoring, Monitoring point labelled GMW103 on Figure 15 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	444	483.50	525
Aluminium	milligrams per litre	1	1	6.34	6.34	6.34
Arsenic	milligrams per litre	1	1	0.001	0.001	0.001
Barium	milligrams per litre	1	1	0.052	0.052	0.052

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	162	181	224
Chloride	milligrams per litre	4	4	237	371	525
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.007	0.007	0.007
Cobalt	milligrams per litre	1	1	0.009	0.009	0.009
Conductivity	microsiemens per centimetre	4	4	1650	2035	2700
Copper	milligrams per litre	1	1	0.028	0.028	0.028
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	0.014	0.014	0.014
Magnesium	milligrams per litre	4	4	50	62.25	75
Manganese	micrograms per litre	1	1	0.517	0.517	0.517
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	0.05
Organochlorine pesticides	milligrams per litre	1	1	<0.5	<0.05	<0.05
Organophosphate pesticides	milligrams per litre	1	1	<0.5	<0.5	<0.5
pH	pH	4	4	6.7	7.1	7.5
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	156	167.50	184
Standing Water Level	metres	4	4	7.1	7.5	7.9
Sulfate	milligrams per litre	4	4	114	126.75	149
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	998	1367	2140
Total organic carbon	milligrams per litre	4	4	1	1.75	3
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.045	0.045	0.045

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	1	323.75	523
Aluminium	milligrams per litre	1	1	6.73	6.73	6.73
Arsenic	milligrams per litre	1	1	0.018	0.018	0.018
Barium	milligrams per litre	1	1	0.624	0.624	0.624
Benzene	milligrams per litre	1	1	<1	<1	<1
Cadmium	milligrams per litre	1	1	0.002	0.002	0.002
Calcium	milligrams per litre	4	4	39	47.25	55
Chloride	milligrams per litre	4	4	50	118.75	250
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.305	0.305	0.305
Cobalt	milligrams per litre	1	1	0.448	0.448	0.448
Conductivity	microsiemens per centimetre	4	4	553	1001.50	1303

Copper	milligrams per litre	1	1	0.962	0.962	0.962
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	0.23	0.23	0.23
Magnesium	milligrams per litre	4	4	18	29.75	39
Manganese	micrograms per litre	1	1	21.2	21.2	21.2
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	0.02	0.02	0.02
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.11	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	6.2	7.08	7.5
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	74	123	176

Standing Water Level	metres	4	4	7.04	7.47	7.8
Sulfate	milligrams per litre	4	4	39	102	250
Toluene	milligrams per litre	4	4	422	916.75	1180
Total dissolved solids	milligrams per litre	1	1	1180	1180	1180
Total organic carbon	milligrams per litre	4	4	2	2.5	3
Total petroleum hydrocarbons	milligrams per litre	1	1	< 50	< 50	< 50
Total Phenolics	milligrams per litre	1	1	< 0.05	< 0.05	< 0.05
Xylene	milligrams per litre	1	1	< 2	< 2	< 2
Zinc	milligrams per kilogram	1	1	1.7	1.7	1.7

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	32	38.67	45
Aluminium	milligrams per litre	1	1	11.5	11.5	11.5
Arsenic	milligrams per litre	1	1	0.006	0.006	0.006
Barium	milligrams per litre	1	1	0.501	0.501	0.501

Benzene	milligrams per litre	1	1	< 1	< 1	< 1
Cadmium	milligrams per litre	1	1	0.0004	0.0004	0.0004
Calcium	milligrams per litre	4	4	5	6.67	8
Chloride	milligrams per litre	4	4	24	34	41
Chromium (hexavalent)	milligrams per litre	1	1	< 0.01	< 0.01	< 0.01
Chromium (total)	milligrams per litre	1	1	0.068	0.068	0.068
Cobalt	milligrams per litre	1	1	0.048	0.048	0.048
Conductivity	microsiemens per centimetre	4	4	212	257.33	289
Copper	milligrams per litre	1	1	0.179	0.179	0.179
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	0.073	0.073	0.073
Magnesium	milligrams per litre	4	4	2	2.67	3
Manganese	micrograms per litre	1	1	2.42	2.42	2.42
Mercury	milligrams per litre	1	1	0.0004	0.0004	0.0004
Nitrate	milligrams per litre	1	1	0.85	0.85	0.85

Nitrite	milligrams per litre	1	1	0.03	0.03	0.03
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.05	0.12
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	5.7	6.2	7
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	31	33.33	36
Standing Water Level	metres	4	4	10.65	10.78	10.9
Sulfate	milligrams per litre	4	4	12	13.33	14
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	173	338.67	543
Total organic carbon	milligrams per litre	4	4	1	2.33	4
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0·31	0·31	0·31

Monitoring Point 13

Groundwater quality monitoring, Monitoring point labelled GMW106 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	4	4	594	594	594
Aluminium	milligrams per litre	1	1			
Arsenic	milligrams per litre	1	1			
Barium	milligrams per litre	1	1			
Benzene	milligrams per litre	1	1			
Cadmium	milligrams per litre	1	1			
Calcium	milligrams per litre	4	4	64	64	64
Chloride	milligrams per litre	4	4	408	408	408
Chromium (hexavalent)	milligrams per litre	1	1			
Chromium (total)	milligrams per litre	1	1			
Cobalt	milligrams per litre	1	1			
Conductivity	microsiemens per centimetre	4	4	3550	3550	3550

Copper	milligrams per litre	1	1			
Ethyl benzene	micrograms per litre	1	1			
Fluoride	milligrams per litre	1	1 DR4			
Lead	milligrams per litre	1	1			
Magnesium	milligrams per litre	4	4	65	65	65
Manganese	micrograms per litre	1	1			
Mercury	milligrams per litre	1	1			
Nitrate	milligrams per litre	1	1 DR4			
Nitrite	milligrams per litre	1	1			
Nitrogen (ammonia)	milligrams per litre	4	4	0.04	0.04	0.04
Organochlorine pesticides	milligrams per litre	1	1			
Organophosphate pesticides	milligrams per litre	1	1 DR4			
pH	pH	4	4	8.2	8.2	8.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	DR4		
Potassium	milligrams per litre	4	4	2	3	3
Sodium	milligrams per litre	4	4	635	635	635

Standing Water Level	metres	4	4	5·3	5·3	5·3
Sulfate	milligrams per litre	4	4	596	596	596
Toluene	milligrams per litre	1	1	ORM		
Total dissolved solids	milligrams per litre	4	4	2100	2100	2100
Total organic carbon	milligrams per litre	4	4	4	4	4
Total petroleum hydrocarbons	milligrams per litre	1	1			
Total Phenolics	milligrams per litre	1	1			
Xylene	milligrams per litre	1	1		DET	
Zinc	milligrams per kilogram	1	1			

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	288	430	576
Aluminium	milligrams per litre	1	1	21·4	21·4	21·4
Arsenic	milligrams per litre	1	1	0·001	0·001	0·001
Barium	milligrams per litre	1	1	0·22	0·22	0·22

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	46	95.75	147
Chloride	milligrams per litre	4	4	32	406.50	680
Chromium (hexavalent)	milligrams per litre	1	1	<0.01	<0.01	<0.01
Chromium (total)	milligrams per litre	1	1	0.017	0.017	0.017
Cobalt	milligrams per litre	1	1	0.009	0.009	0.009
Conductivity	microsiemens per centimetre	4	4	620	2167.50	3020
Copper	milligrams per litre	1	1	0.041	0.041	0.041
Ethyl benzene	micrograms per litre	1	1	<2	<2	<2
Fluoride	milligrams per litre	1	1	0.6	0.6	0.6
Lead	milligrams per litre	1	1	0.013	0.013	0.013
Magnesium	milligrams per litre	4	4	17	60.50	125
Manganese	micrograms per litre	1	1	0.315	0.315	0.315
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	0.02	0.05	0.1
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	6.98	7.5
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	2.5	5
Sodium	milligrams per litre	4	4	68	266.75	441
Standing Water Level	metres	4	4	1.88	2.44	2.79
Sulfate	milligrams per litre	4	4	19	109.50	204
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	269	1347.25	2540
Total organic carbon	milligrams per litre	4	4	3	5.75	10
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.053	0.053	0.053

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). E297871.4 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	466	504.50	567
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	0.013	0.013	0.013
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	111	121.50	126
Chloride	milligrams per litre	4	4	621	650.25	675
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	3060	3152.50	3330

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	0.6	0.6	0.6
Lead	milligrams per litre	1	1	< 0.001	< 0.001	< 0.001
Magnesium	milligrams per litre	4	4	81	83.25	84
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	0.02	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	7.13	7.9
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	< 1	< 1	< 1
Potassium	milligrams per litre	4	4	1	1.25	2
Sodium	milligrams per litre	4	4	397	417	432

Standing Water Level	metres	4	4	2·03	2·23	2·5
Sulfate	milligrams per litre	4	4	159	173·75	189
Toluene	milligrams per litre	1	1	< 2	< 2	< 2
Total dissolved solids	milligrams per litre	4	4	1680	1835	2020
Total organic carbon	milligrams per litre	4	4	2	5 25	14
Total petroleum hydrocarbons	milligrams per litre	1	1	< 50	< 50	< 50
Total Phenolics	milligrams per litre	1	1	< 0·05	< 0·5	< 0·05
Xylene	milligrams per litre	1	1	< 2	< 2	< 2
Zinc	milligrams per kilogram	1	1	0·005	0·005	0·005

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	227	287	358
Aluminium	milligrams per litre	1	1	106	106	106
Arsenic	milligrams per litre	1	1	0·013	0·013	0·013
Barium	milligrams per litre	1	1	1·65	1·65	1·65

Benzene	milligrams per litre	1	1	< 1	< 1	< 1
Cadmium	milligrams per litre	1	1	0.0033	0.0033	0.0033
Calcium	milligrams per litre	4	4	84	90.75	95
Chloride	milligrams per litre	4	4	247	327.50	376
Chromium (hexavalent)	milligrams per litre	1	1	< 0.01	< 0.01	< 0.01
Chromium (total)	milligrams per litre	1	1	0.17	0.17	0.17
Cobalt	milligrams per litre	1	1	0.195	0.195	0.195
Conductivity	microsiemens per centimetre	4	4	1540	1620	1780
Copper	milligrams per litre	1	1	0.474	0.474	0.474
Ethyl benzene	micrograms per litre	1	1	< 2	< 2	< 2
Fluoride	milligrams per litre	1	1	< 1	< 1	< 1
Lead	milligrams per litre	1	1	0.19	0.19	0.19
Magnesium	milligrams per litre	4	4	38	46.75	51
Manganese	micrograms per litre	1	1	7.32	7.32	7.32
Mercury	milligrams per litre	1	1	0.0004	0.0004	0.0004
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	0.30	0.62	1.16
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	5.9	6.2	6.4
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	154	165	173
Standing Water Level	metres	4	4	3.03	3.49	4.01
Sulfate	milligrams per litre	4	4	45	88.25	105
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	810	882	1010
Total organic carbon	milligrams per litre	4	4	5	9.75	14
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	1·03	1·03	1·03

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 N6184266

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	602	630	677
Aluminium	milligrams per litre	1	1	17	17	17
Arsenic	milligrams per litre	1	1	0·001	0·001	0·001
Barium	milligrams per litre	1	1	0·051	0·051	0·051
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	194	206·75	228
Chloride	milligrams per litre	4	4	870	891	917
Chromium (hexavalent)	milligrams per litre	1	1	<0·01	<0·01	<0·01
Chromium (total)	milligrams per litre	1	1	0·012	0·012	0·012
Cobalt	milligrams per litre	1	1	0·01	0·01	0·01
Conductivity	microsiemens per centimetre	4	4	3970	4287·50	4440

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	0.4	0.4	0.4
Lead	milligrams per litre	1	1	0.008	0.008	0.008
Magnesium	milligrams per litre	4	4	128	145.5	154
Manganese	micrograms per litre	1	1	0.434	0.434	0.434
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.35	0.35	0.35
Nitrite	milligrams per litre	1	1	<0.01	<0.01	<0.01
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	0.01	0.01
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	7.05	7.7
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1.25	2
Sodium	milligrams per litre	4	4	434	460	486

Standing Water Level	metres	4	4	3.97	4.16	4.4
Sulfate	milligrams per litre	4	4	262	272	288
Toluene	milligrams per litre	1	1	< 2	< 2	< 2
Total dissolved solids	milligrams per litre	4	4	2510	2705	3080
Total organic carbon	milligrams per litre	4	4	2	3.25	4
Total petroleum hydrocarbons	milligrams per litre	1	1	< 50	< 50	< 50
Total Phenolics	milligrams per litre	1	1	< 0.05	< 0.05	< 0.05
Xylene	milligrams per litre	1	1	< 2	< 2	< 2
Zinc	milligrams per kilogram	1	1	0.051	0.051	0.051

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	494	540.50	571
Aluminium	milligrams per litre	1	1	96.2	96.2	96.2
Arsenic	milligrams per litre	1	1	0.018	0.018	0.018
Barium	milligrams per litre	1	1	0.198	0.198	0.198

Benzene	milligrams per litre	1	1	< 1	< 1	< 1
Cadmium	milligrams per litre	1	1	0.0006	0.0006	0.0006
Calcium	milligrams per litre	4	4	116	122.75	130
Chloride	milligrams per litre	4	4	639	661.25	670
Chromium (hexavalent)	milligrams per litre	1	1	< 0.01	< 0.01	< 0.01
Chromium (total)	milligrams per litre	1	1	0.045	0.045	0.045
Cobalt	milligrams per litre	1	1	0.075	0.075	0.075
Conductivity	microsiemens per centimetre	4	4	2320	3045	3470
Copper	milligrams per litre	1	1	0.209	0.209	0.209
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			
Magnesium	milligrams per litre	4	4	86	92.50	100
Manganese	micrograms per litre	1	1	0.082	0.082	0.082
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	0.07	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	6.9	7.13	7.5
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	389	411.50	421
Standing Water Level	metres	4	4	6.27	6.47	6.7
Sulfate	milligrams per litre	4	4	152	171.25	210
Toluene	milligrams per litre	1	1	<2	<2	<2
Total dissolved solids	milligrams per litre	4	4	1690	1852.50	2230
Total organic carbon	milligrams per litre	4	4	1	7.75	25
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0.376	0.376	0.376

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). E297604.9 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	218	237.75	256
Aluminium	milligrams per litre	1	1	0.24	0.24	0.24
Arsenic	milligrams per litre	1	1	<0.001	<0.001	<0.001
Barium	milligrams per litre	1	1	0.145	0.145	0.145
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	90	91.25	92
Chloride	milligrams per litre	4	4	417	430.50	438
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	1690	1747.50	1810

Copper	milligrams per litre	1	1	0.009	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	40	45	47
Manganese	micrograms per litre	1	1	0.352	0.352	0.352
Mercury	milligrams per litre	1	1	<0.0001	<0.0001	<0.0001
Nitrate	milligrams per litre	1	1	0.12	0.13	0.13
Nitrite	milligrams per litre	1	1	0.13	0.13	0.13
Nitrogen (ammonia)	milligrams per litre	4	4	0.01	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	6.9	7.05	7.2
Polycyclic aromatic hydrocarbons	milligrams per litre	1	1	<1	<1	<1
Potassium	milligrams per litre	4	4	1	1.25	2
Sodium	milligrams per litre	4	4	164	182.75	190

Standing Water Level	metres	4	4	2.9	3.13	3.46
Sulfate	milligrams per litre	4	4	22	23.50	24
Toluene	milligrams per litre	1	1	< 2	< 2	< 2
Total dissolved solids	milligrams per litre	4	4	758	1031.50	1340
Total organic carbon	milligrams per litre	4	4	1	2.5	6
Total petroleum hydrocarbons	milligrams per litre	1	1	< 50	< 50	< 50
Total Phenolics	milligrams per litre	1	1	< 0.05	< 0.05	< 0.05
Xylene	milligrams per litre	1	1	< 2	< 2	< 2
Zinc	milligrams per kilogram	1	1	0.019	0.019	0.019

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	604	728.50	814
Aluminium	milligrams per litre	1	1	1.44	1.44	1.44
Arsenic	milligrams per litre	1	1	0.002	0.002	0.002
Barium	milligrams per litre	1	1	0.073	0.073	0.073

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	91	115.75	128
Chloride	milligrams per litre	4	4	902	1065.50	1170
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	0.019	0.019	0.019
Conductivity	microsiemens per centimetre	4	4	3930	4797.50	5350
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	0.9	0.9	0.9
Lead	milligrams per litre	1	1	0.01	0.01	0.01
Magnesium	milligrams per litre	4	4	100	116.75	127
Manganese	micrograms per litre	1	1	2.84	2.84	2.84
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	0.08	0.12	0.26
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	6.5	6.83	7.5
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	687	769.75	819
Standing Water Level	metres	4	4	1.39	1.51	1.65
Sulfate	milligrams per litre	4	4	47	175	244
Toluene	milligrams per litre	1	1	2	2	2
Total dissolved solids	milligrams per litre	4	4	2130	3477.50	5460
Total organic carbon	milligrams per litre	4	4	9	10	11
Total petroleum hydrocarbons	milligrams per litre	1	1	<50	<50	<50
Total Phenolics	milligrams per litre	1	1	<0.05	<0.05	<0.05
Xylene	milligrams per litre	1	1	<2	<2	<2

Zinc	milligrams per kilogram	1	1	0·01	0·01	0·01

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	12	0·0001	0·00045	0·002

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	12	0·0001	0·00038	0·001

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	12	0·0001	0·00023	0·0007

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

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	0.0002	0.00033	0.0006

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	12	0.0002	0.000825	0.0018

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	12	0.0002	0.000792	0.0024

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	12	0.0006	0.00193	0.0054

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	12	0.0005	0.001675	0.0046

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	12	0.0005	0.001333	0.0027

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	12	0.0002	0.00145	0.0066

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

Methane	percent by volume	12	12	0.0003	0.000617	0.0013

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). E298351 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	12	0.0004	0.002642	0.014

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	6	67	82-83	96
Ammonia	milligrams per litre	1	6	0.02	0.04	0.07
Calcium	milligrams per litre	1	6	16	20-83	30
Chloride	milligrams per litre	1	6	29	34-50	42
Conductivity	microsiemens per centimetre	1	6	265	335-50	405
Dissolved Oxygen	milligrams per litre	1	6	5.29	8.39	9.96
Filterable iron	milligrams per litre	1	6	0.12	0.19	0.3

Fluoride	milligrams per litre	1	6	0.1	0.12	0.2
Magnesium	milligrams per litre	1	6	7	9.33	13
Nitrate	milligrams per litre	1	6	0.02	0.34	0.7
pH	pH	1	6	6.4	7.22	7.7
Potassium	milligrams per litre	1	6	3	3.83	6
Sodium	milligrams per litre	1	6	21	28.67	37
Sulfate	milligrams per litre	1	6	16	25.33	47
Temperature	degrees Celsius	1	6	14	16.40	20.9
Total organic carbon	milligrams per litre	1	6	4	6.33	8
Total Phenolics	milligrams per litre	1	6	0.05	0.05	0.05
Total suspended solids	milligrams per litre	1	6	5	25.83	53

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	6	59	108.83	214
Ammonia	milligrams per litre	1	6	0.01	0.02	0.04

Calcium	milligrams per litre	1	6	18	27-33	52
Chloride	milligrams per litre	1	6	26	34	51
Conductivity	microsiemens per centimetre	1	6	249	368-73	633
Dissolved Oxygen	milligrams per litre	1	6	7.71	8.81	10.2
Filterable iron	milligrams per litre	1	6	0.07	0.16	0.26
Fluoride	milligrams per litre	1	6	0.1	0.13	0.2
Magnesium	milligrams per litre	1	6	8	12-33	24
Nitrate	milligrams per litre	1	6	0.05	0.33	0.47
pH	pH	1	6	7	7.52	7.9
Potassium	milligrams per litre	1	6	2	2.83	4
Sodium	milligrams per litre	1	6	20	26.17	39
Sulfate	milligrams per litre	1	6	16	22.67	38
Temperature	degrees Celsius	1	6	13.5	16.85	21
Total organic carbon	milligrams per litre	1	6	3	5.17	7
Total Phenolics	milligrams per litre	1	6	0.05	0.05	0.05
Total suspended solids	milligrams per litre	1	6	6	15	24

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 registrati on 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

2

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

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)

C2 Details of Non Compliance with Licence 5862

a)	**Licence Condition number not complied with?**
	Licence condition L2.1 was not complied with, which states: "For each monitoring /discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table" The results are discharge point 2 indicated that a Suspended Solids (SS) reading greater than the licence concentration of 50mg/L.
b)	**Summary of particulars of the non-compliance?**
	Following a rainfall event, a sample of water exiting the Whytes Gully detention pond indicated that the amount of total suspended solids was 78mg/L, this is 28mg/l more than the concentration limit provided in the sites Environmental Protection Licence (EPL).
c)	**Date(s) when the non-compliance occurred?**
	7th June 2016
d)	**If relevant, precise location where the non-compliance occurred?**
	Stormwater Monitoring and discharge point 1. (E297,777, N6,183,972)
e)	**If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?**
	N/A
f)	**Cause of the non-compliance?**
	The discharge of turbid water was caused by a heavy rainfall event in which the site was inundated with water, causing a discharge of stormwater from the sites detention pond system. The large volume of rainfall and overall turbid water witnessed throughout the entire catchment at this time indicated that the non-compliance did not have the potential to cause material harm to the environment as defined by Section 147 of the POEO Act (1997).
g)	**Action taken or that will be taken to mitigate any adverse effects of the non-compliance?**
	The water that exited the site contained suspended solids at levels above 50mg/L concentration limit prescribed in the sites EPL. Given that the entire catchment was visibly turbid and heavily laden with sediment at the time. The downstream sample taken at the same time indicated that the suspended solids were lower than the 50mg/L concentration limit, this illustrates that the discharge did not cause any material harm to the local environment.
h)	**Action taken or that will be taken to prevent a recurrence of the non-compliance?**
	A wet weather and stormwater management work instruction had been created and implemented to ensure that the sediment pond capacity is maintained between rainfall events. This work instruction was reviewed following the two breaches (June and July) and amendments made such as the purchase of a handheld turbidity monitor and pH sampling equipment. This will enable site staff to monitor and evaluate the water quality on a daily basis.

C2 Details of Non Compliance with Licence 5862

a)	**Licence Condition number not complied with?**
	Licence condition L2.1 was not complied with, which states: "For each monitoring /discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table" The results are discharge point 2 indicated that a Suspended Solids (SS) reading greater than the licence concentration of 50mg/L.
b)	**Summary of particulars of the non-compliance?**
	Following a rainfall event, a sample of water exiting the Whytes Gully detention pond indicated that the amount of total suspended solids was 88mg/L, this is 38mg/L more than the concentration limit provided in the sites Environmental Protection Licence (EPL).
c)	**Date(s) when the non-compliance occurred?**
	8th July 2016
d)	**If relevant, precise location where the non-compliance occurred?**
	Stormwater Monitoring and discharge point 1. (E297,777, N6,183,972)
e)	**If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?**
	N/A
f)	**Cause of the non-compliance?**
	The discharge of turbid water was caused by a heavy rainfall event in which the site was inundated with water, causing a discharge of stormwater from the sites detention pond system. The large volume of rainfall and overall turbid water witnessed throughout the entire catchment at this time indicated that the non-compliance did not have the potential to cause material harm to the environment as defined by Section 147 of the POEO Act (1997).
g)	**Action taken or that will be taken to mitigate any adverse effects of the non-compliance?**
	The water that exited the site contained suspended solids at levels above 50mg/L concentration limit prescribed in the sites EPL. Given that the entire catchment was visibly turbid and heavily laden with sediment at the time. The downstream sample taken at the same time indicated that the suspended solids were lower than the 50mg/L concentration limit, this illustrates that the discharge did not cause any material harm to the local environment.
h)	**Action taken or that will be taken to prevent a recurrence of the non-compliance?**
	A wet weather and stormwater management work instruction had been created and implemented to ensure that the sediment pond capacity is maintained between rainfall events. This work instruction was reviewed following the two breaches (June and July) and amendments made such as the purchase of a handheld turbidity monitor and pH sampling equipment. This will enable site staff to monitor and evaluate the water quality on a daily basis.

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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/wastemanagementplan.aspx

4 Has the PIRMP been tested in the last 12 months?

(✓ 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 25/01/2017

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 25/01/2017

6 How many times has the PIRMP been activated in this reporting period? 1

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

The PIRMP was activated on 29/11/2016

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

http://www.epa.nsw.gov.au/legislation/20120227epgreppirmp.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/environment/pages/water-quality-monitoring-data.aspx

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

G Statement of Compliance - Environmental Management Systems and Practices

1 Do you have an environmental management system (EMS) certified to ISO 14001 or any other demonstrated equivalent system[1]? (see note below on demonstrated equivalent)

(✓ a box) ☐ Yes ☑ No

If your answer to question 1 is 'No', please proceed to question 5. If your answer to question 1 is 'Yes', please proceed to question 2.

2 When was the last check of the EMS[2] completed (see note below on check of EMS)? __ / __ / ____

3 Were there any non-conformances related to environmental issues identified in the last check of the EMS?

(✓ a box) ☐ Yes ☐ No

4 If there were non-conformances identified, were these non-conformances rectified?

(✓ a box) ☐ Yes ☐ No

If you answered 'No' to question 1, please answer questions 5 - 11. If you answered 'Yes' to question 1 please proceed to section H. Questions 5-11 relate to any documented environmental practices, procedures and systems in place. Refer to http://www.epa.nsw.gov.au/licensing/EMCP.htm for guidance on how to complete questions 5 to 11. If unsure of the answer, tick No.

5 Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?

(✓ a box) ☑ Yes ☐ No

6 Have you established and implemented an operational maintenance program, including preventative maintenance?

(✓ a box) ☑ Yes ☐ No

7 Do you keep records of regular inspections and maintenance of plant and equipment?

(✓ a box) ☑ Yes ☐ No

8 Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?

(✓ a box) ☑ Yes ☐ No

9 Are the audits of documented environmental practices, procedures and systems undertaken by a third party?

(✓ a box) ☐ Yes ☑ No

10 Have you established and implemented an environmental improvement or management plan?

(✓ a box) ☑ Yes ☐ No

11 Do you train staff in environmental issues that may arise from your activities and operations and keep records of this

(✓ a box) ☑ Yes ☐ No

[1] Demonstrated equivalent refers to an environmental management system that the EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 system. For further information go to:
http://www.epa.nsw.gov.au/resources/licensing/150402-environmental-management-systems-guidelines.pdf

[2] Undertaking a 'check of an EMS' refers to the ISO 14001 requirements that an organisation demonstrates conformity to the requirements of its EMS and to the standard, these checks require third-party certification that requirements have been met.

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H 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 by one of the following:
an individual	☐ the individual licence holder, or ☐ a person acting on behalf of the individual licence holder in accordance with a power of attorney for the individual. A copy of the power of attorney must be submitted with the Annual Return.
a company	☐ by two directors, or ☐ by a director and a company secretary, or ☐ if a proprietary company that has a sole director who is also the sole company secretary - by that director, or ☐ by a person delegated to sign a copy of the Annual Return on the company's behalf in accordance with the Corporations Act 2001. Delegation of authority must be submitted with the Annual Return, or. ☐ by affixing the common seal, in accordance with the Corporations Act 2001
a public authority other than a Council	☐ by the Chief Executive Officer of the public authority, or ☐ by a person delegated to sign on the public authority's behalf in accordance with its legislation
a local Council	☑ by the General Manager in accordance with s377 of the Local Government Act 1993 , or ☐ by affixing the seal of the Council in a manner authorised under the Local Government Act 1993.

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, F and G 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-2016 to 28-May-2017 or ___/___/___ to ___/___/___

SIGNATURE: _____ SIGNATURE: _____

NAME (printed): DAVID FARMER NAME: (printed) _____

POSITION: GENERAL MANAGER POSITION: _____

DATE: 25 / 07 / 2017 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