



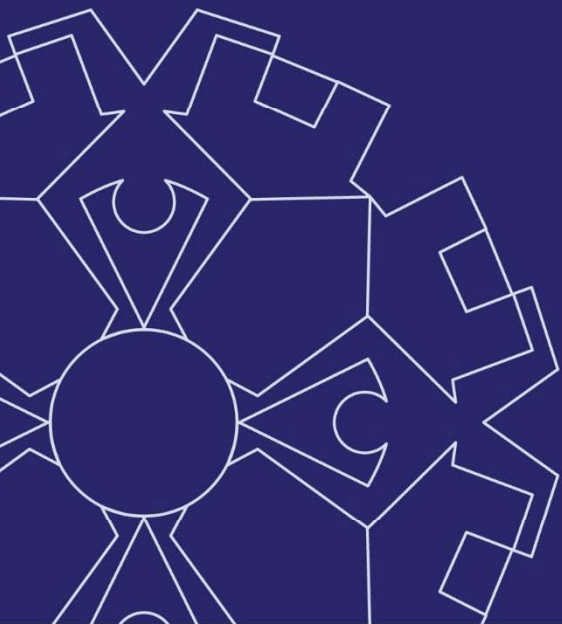
GEOLYSE

**ANNUAL ENVIRONMENTAL MONITORING REPORT
24 SEPTEMBER 2014 TO 23 SEPTEMBER 2015**

LITHGOW SOLID WASTE FACILITY EPL 6004

**PREPARED FOR
LITHGOW CITY COUNCIL**

NOVEMBER 2015



• Civil, Environmental & Structural Engineering • Surveying • Environmental • Planning • Architecture

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Introduction

1.1 BACKGROUND

The Lithgow Solid Waste Facility (Lithgow SWF) operates as a scheduled activity for 'Waste Disposal (application to land)'. The facility accepts all solid wastes consistent with this classification, including putrescible wastes and other wastes approved by the Environment Protection Authority (EPA).

The facility is owned by Lithgow City Council. The management and operation of the depot is undertaken in accordance with Environment Protection Licence (EPL) No. 6004 issued under Section 55 of the Protection of the Environment Operations Act 1997 (the Act). The depot is located approximately 4 kilometres (km) north-west of Lithgow within Lot 1 Deposited Plan (DP) 190934, Lot 1 DP 630638, Lot 1 DP 947828 (portion) and Lot 1 DP 751655 (portion).

1.2 LICENCE REQUIREMENTS

EPL No. 6004 governs the design, construction, operation, monitoring and rehabilitation of the facility in accordance with the Act.

Section 5 of the licence provides instructions on environmental monitoring requirements. Specifically, Condition M2.1 describes the requirements to monitor the concentration of pollutants at specified locations by collection of samples and obtaining results by laboratory analysis. The monitoring locations are specified at Conditions P1.1 and P1.3, and the pollutant sampling method, unit of measure and sample frequency are specified at Conditions M2.2 and M2.3.

Annual reporting requirements are outlined in Condition R1.1:

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

- a) a Statement of Compliance; and*
- b) a Monitoring and Complaints Summary.*

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

The deadline for the Annual Return that is outlined in condition R1.5 states:

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

The reporting period is consistent with the enforcement period of the EPL and is from 24 September 2014 to 23 September 2015. Comparison of monitoring results with previous reporting periods has also been made, where applicable.

Condition R1.8 states:

R1.8 Monitoring Report.

The licensee must supply with the Annual Return a Monitoring Report which provides:

- a) an analysis and interpretation of monitoring results;*
- b) actions proposed / taken to correct identified adverse trends; and*

- c) *The achieved compaction rate (excluding cover material) for the premises and the remaining disposal capacity for the premises.*

This Annual Environmental Management Report (AEMR) is a response to Condition R1.8. The reporting period for this AEMR is from 24 September 2014 to 23 September 2015.

1.3 REPORT STRUCTURE

- **Section 1** presents a brief introduction and background to the report;
- **Section 2** provides an overview of the environmental monitoring program undertaken at the facility during the reporting period;
- **Section 3** presents the data and discussion of data collected during the reporting period;
- **Section 4** presents all monitoring data that falls outside of the scope of environmental monitoring for the annual return year, including records of public complaints and quantities of waste deposited;
- **Section 5** presents a summary of all monitoring undertaken as described in detail in Section 3 and Section 4; and
- **Section 6** presents the conclusions and recommendations resulting from monitoring undertaken during the reporting period.

Environmental Monitoring Program

2.1 OVERVIEW

Environmental monitoring was undertaken at Lithgow SWF for groundwater in October 2014 and April 2015, surface water in January and April 2015, and leachate in April 2015. Groundwater and leachate are required to be monitored biannually and surface water is required to be monthly whenever discharge events occur, however the only discharge events that occurred during the reporting period were in January and April 2015.

Accumulated landfill gas in buildings is also required to be monitored monthly.

This section summarises all environmental monitoring undertaken during the reporting period.

2.2 GROUNDWATER

The groundwater monitoring network is illustrated in **Drawing 01B_EV04**. The network consists of seven (7) piezometers. The piezometers are identified as MB1, MB5, MB6-B, MB9, MB10, (EPL Points 1–5), MB12 and MB14 (EPL Points 7–8).

Groundwater level measurements and quality sampling commenced in January 1999 at all monitoring stations, except at MB11, MB12, MB13 and MB14 which were installed in January 2002. Prior to January 2001, three initial monitoring rounds were conducted at the existing piezometers. Geolyse was commissioned to carry out quarterly monitoring at the site from this date forward. The 4 October 2011 licence variation reduced the required groundwater monitoring frequency from quarterly to biannual.

Monitoring station MB6-B was installed in August 2006 to replace MB6 which was no longer functional. The replacement monitoring station MB6-B was positioned approximately 6 m north-east of MB6. Monitoring station MB6 was then decommissioned and plugged with a bentonite grout to maintain aquifer integrity and to negate the potential for increased contamination pathways. For the purpose of this report, MB6-B is referred to as MB6 when results after August 2006 are discussed.

The MB6 piezometer is located up-gradient of the landfill area and within a surface water diversion drain. Approximately three years ago the landfill area was extended to allow an access road to be constructed, which resulted in fill being moved into close proximity of the piezometer. The area surrounding the fill batter and drain often contains quantities of litter from the landfill operations.

Due to significant fluctuations in a number of parameters at MB6, works to limit surface water ingress as recommended in the 2012 AEMR were undertaken in June 2013. These works included:

- The area around the piezometer was cleared of rubbish; and
- The area around the piezometer tube was excavated for a depth of approximately 0.5 m and extending in a 1 m radius from the tube and then filled with compacted clay material.

In the April 2014 monitoring round, it was noted that MP5 had sustained damaged and required repairs to enable sampling. Samples were subsequently obtained in June 2014 following the necessary repairs.

Groundwater sampling was not undertaken at MB1 during the reporting period as this monitoring point remained dry at the time of each biannual sampling round. The laboratory analyte list and frequency of analysis are provided below.

- Alkalinity (as calcium carbonate)
- Ammonia
- Calcium
- Chemical Oxygen Demand

- Chloride
- Chromium (hexavalent and total)
- Conductivity
- Fluoride
- Iron
- Magnesium
- Manganese
- Nitrate
- Pesticides
- pH
- Phosphorus
- Potassium
- Sodium
- Standing Water Level
- Sulfate
- Total Dissolved Solids
- Total Organic Carbon
- Total Phenolics
- Total Petroleum Hydrocarbons

2.3 SURFACE WATER

The surface water monitoring network consists of a single monitoring point SW1 (EPL Point 6). The location of the surface water monitoring point is illustrated in **Drawing 01B_EV04**, which is required to be sampled biannually during discharge (however only two discharge events occurred during the reporting period). The laboratory analyte list and frequency of analysis are provided below.

- Alkalinity (as calcium carbonate)
- Aluminium
- Ammonia
- Calcium
- Chemical Oxygen Demand
- Chloride
- Chromium (hexavalent and total)
- Conductivity
- Fluoride
- Iron
- Magnesium
- Manganese
- Nitrate
- Pesticides
- pH
- Phosphorus

- Potassium
- Sodium
- Sulfate
- Total Organic Carbon
- Total Phenolics
- Total Suspended Solids
- Total Petroleum Hydrocarbons

2.4 LEACHATE

Leachate quality is monitored on a biannual basis from the leachate monitoring station located to the south-west of the site, at the neighbouring sewage treatment plant. Specifically, leachate is sampled from the drainage into the sump that collects leachate for recirculating to the landfill. This leachate collection point is identified as LW1 (EPL Point 9) and is shown in **Drawing 01B_EV04**. Sampling was undertaken at LW1 during April 2015. LW1 was dry at the time of the October 2014 monitoring round.

The laboratory analyte list and frequency of analysis are provided below.

- Alkalinity (as calcium carbonate)
- Ammonia
- Calcium
- Chloride
- Fluoride
- Iron
- Magnesium
- Manganese
- Nitrate
- pH
- Potassium
- Sodium
- Sulfate
- Total Organic Carbon
- Total Phenolics

2.5 LANDFILL GAS

Landfill gas monitoring involves monitoring of accumulated gas in buildings within 250 m of the landfill area. Surface gas monitoring was conducted on a monthly basis using a GA2000 Landfill Gas Analyser calibrated for methane.

The demountable office and storeroom located at the landfill, as well as the Sewage Treatment Plant office, crib, workshop and control room were monitored for accumulated gas.

2.6 QUALITY CONTROL

The laboratory quality control meets the NEPM 2013 Schedule B(3) and ALS QCS3 requirement.

The ALS Quality Control Reports (**Appendix B**) provide the following:

- Laboratory Duplicate (DUP) Report: Relative Percentage Difference (RPD) and Acceptance Limits;
- Method Blank (MB) and Laboratory Control Spike (LCS) Report: % Recovery and Acceptance Limits; and
- Matrix Spike (MS) Report: % Recovery and Acceptance Limits.

Environmental Monitoring Results

3.1 INTRODUCTION

Monitoring results are presented in this section for all environmental monitoring undertaken during the reporting period. The laboratory data is presented, along with an interpretation of trends, variability and anomalies for groundwater and surface water. Any deficiencies in monitoring, environmental incidents and remedial actions undertaken to correct any problems or deficiencies are also discussed.

Monitoring data is summarised in the following figures and in the tables of **Appendix A**. All laboratory reports and chain-of-custody documentation are included in **Appendix B**.

3.2 GROUNDWATER

Groundwater monitoring consisted of biannual level measurement and quality sampling at monitoring points MB5, MB6B, MB9, MB10, MB12 and MB14. Monitoring was undertaken in October 2014 and April 2015.

No groundwater quality data was obtained from groundwater monitoring points MB1 at the time of the monitoring rounds due to insufficient water volume for sampling.

3.2.1 LEVELS

Groundwater level measurements are presented for all monitoring points in **Appendix A** and are illustrated below in **Figure 1**.

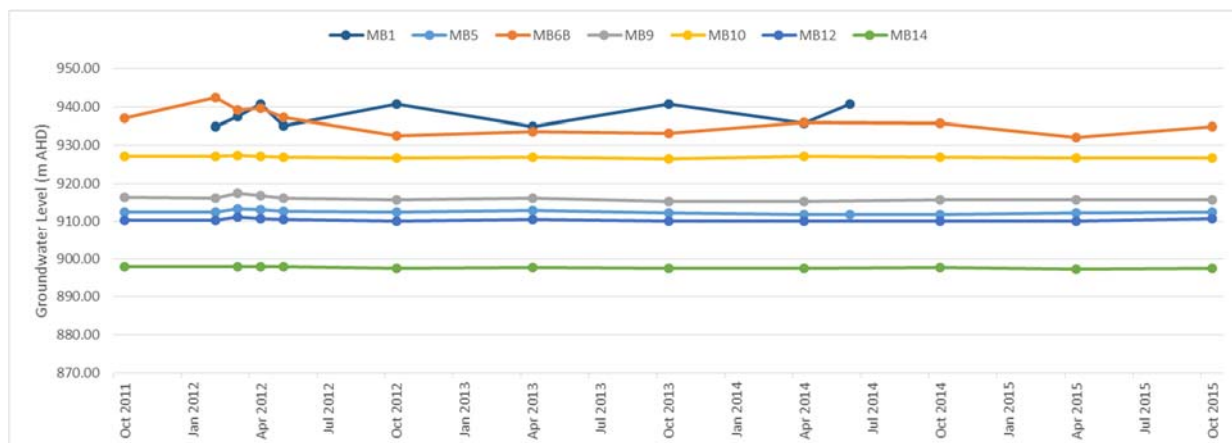


Figure 1: Groundwater levels – Lithgow SWF, October 2011 to October 2015

Groundwater levels were relatively constant in the 12 month period, with the exception of MP6B which decreased by 3.57 m in the 6 month period from October 2014 to April 2015. All standing water levels with the exception of MP6B in April 2015 were consistent with historical ranges.

From the data it can be concluded that the hydraulic gradient falls in a south-south-westerly direction, generally consistent with the fall of the land. The observed groundwater levels indicate that MB6B is up-gradient of the landfill and MB5, MB9, MB12 and MB14 are down-gradient monitoring points (with MB14 the most down-gradient).

3.2.2 PHYSICAL PROPERTIES

In the reporting period, groundwater pH levels were relatively neutral to slightly acid, ranging from 6.37 at MB10 (April 2015) to 7.37 at MB14 (October 2014), with the exception of MB12 which ranged from

4.16 to 4.99, as shown on **Figure 2**. All samples with the exception of MB6 (April 2015 only), MB10 and MB12 were within the recommended range for livestock drinking water (6.5 – 8.5, Markwick 2007) and were consistent with historical ranges.

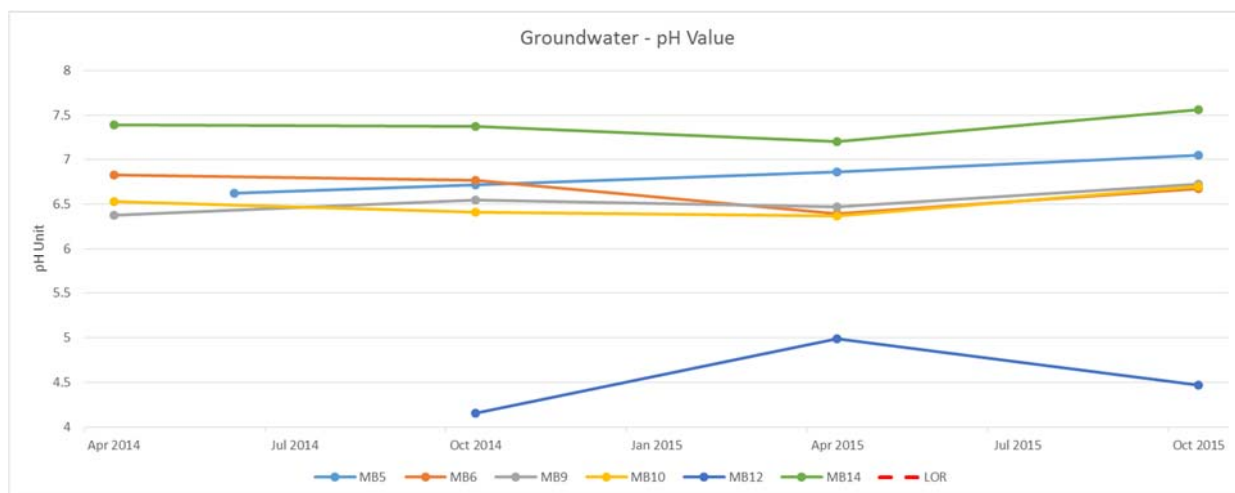


Figure 2: Groundwater pH – Lithgow SWF, April 2014 to October 2015

Groundwater electrical conductivity (EC) results in the reporting period were consistent with historical data and ranged from 137 $\mu\text{S}/\text{cm}$ at MB10 (October 2014) to 4010 $\mu\text{S}/\text{cm}$ at MB6, as shown on **Figure 3**. Corresponding total dissolved solids (TDS) concentrations ranged from 92 mg/L to 2687 mg/L and were below the loss of production threshold value of the most susceptible livestock category, poultry (ANZECC & ARMCANZ, 2000), however some initial reluctance to drink may be evident.

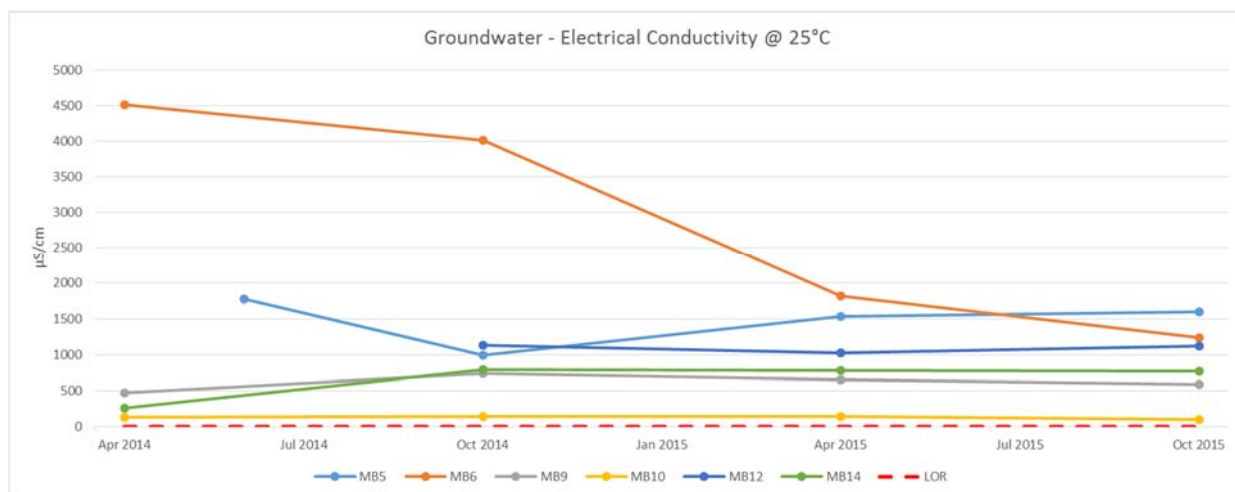


Figure 3: Groundwater EC – Lithgow SWF, April 2014 to October 2015

The lowest total alkalinity recorded in the reporting period was below the laboratory limit of reporting (LOR) of 1 mg/L at MB12 (October 2014) and the highest was 1160 mg/L at MB6 (October 2014). All concentrations remained within the respective established ranges, as shown on **Figure 4**. While there are no livestock drinking water guidelines for this parameter, groundwater samples collected from monitoring points MB5 (April 2015 only), MB6 and MB14 were above the guideline hardness value for potential fouling of waters (<350 mg/L – ANZECC & ARMCANZ, 2000).

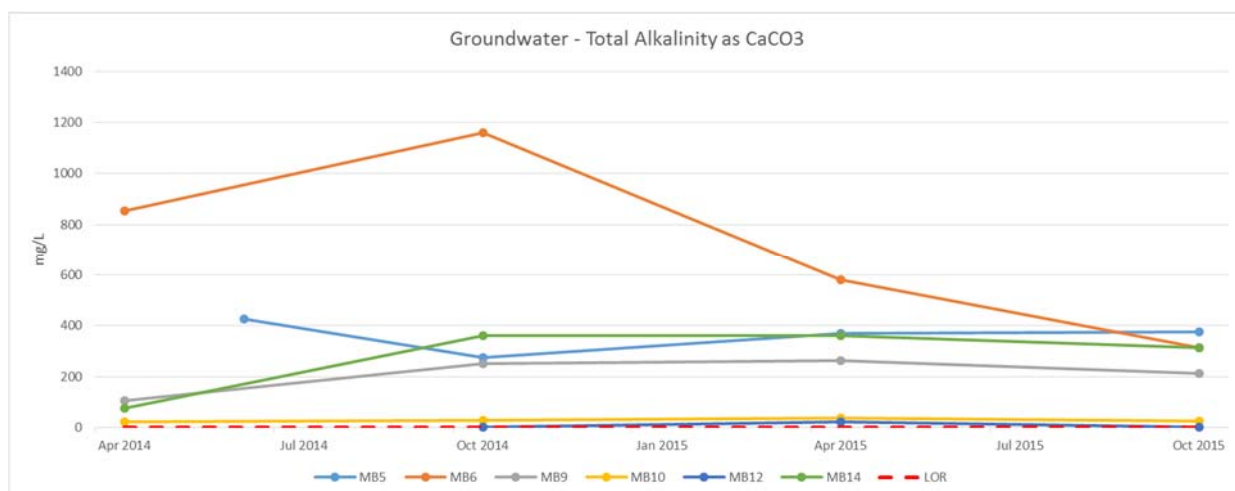


Figure 4: Groundwater Alkalinity – Lithgow SWF, April 2014 to October 2015

Chemical oxygen demand (COD) was introduced under the 4 October 2011 licence variation. COD concentrations ranged from below the LOR of 10 mg/L at MB10 (April 2015 only) and MB14 in October 2014 to 98 mg/L at MB6 (October 2014).

3.2.3 EXCHANGEABLE IONS

Fluoride concentrations in groundwater ranged from below the LOR of 0.1 mg/L at multiple locations to 0.3 mg/L at MB14 (October 2014). As shown on **Figure 5**, all values were consistent with historical results, and below the health limit for human drinking water (1.5 mg/L, NHMRC & NRMCC, 2011) and are considered suitable for livestock drinking water, being below the guideline value of 2 mg/L (ANZECC & ARMCANZ, 2000).

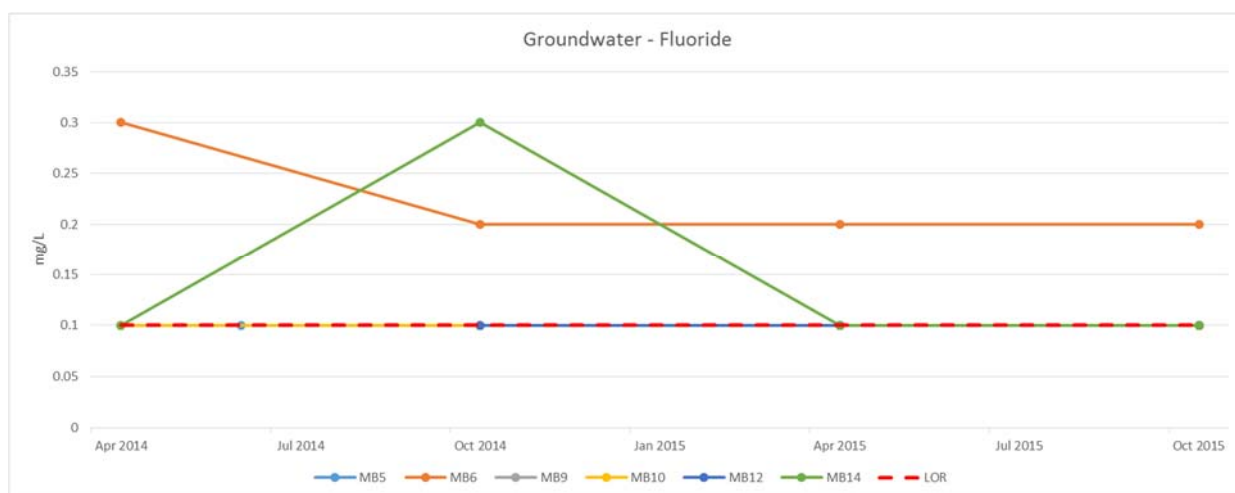


Figure 5: Groundwater Fluoride – Lithgow SWF, April 2014 to October 2015

The highest sulfate concentration recorded in the reporting period was 152 mg/L at MB6 (October 2014), as shown on **Figure 6**. All concentrations were within established ranges and below levels which may cause adverse health effects if consumed by susceptible animals (1000 – 2000 mg/L – ANZECC & ARMCANZ, 2000).

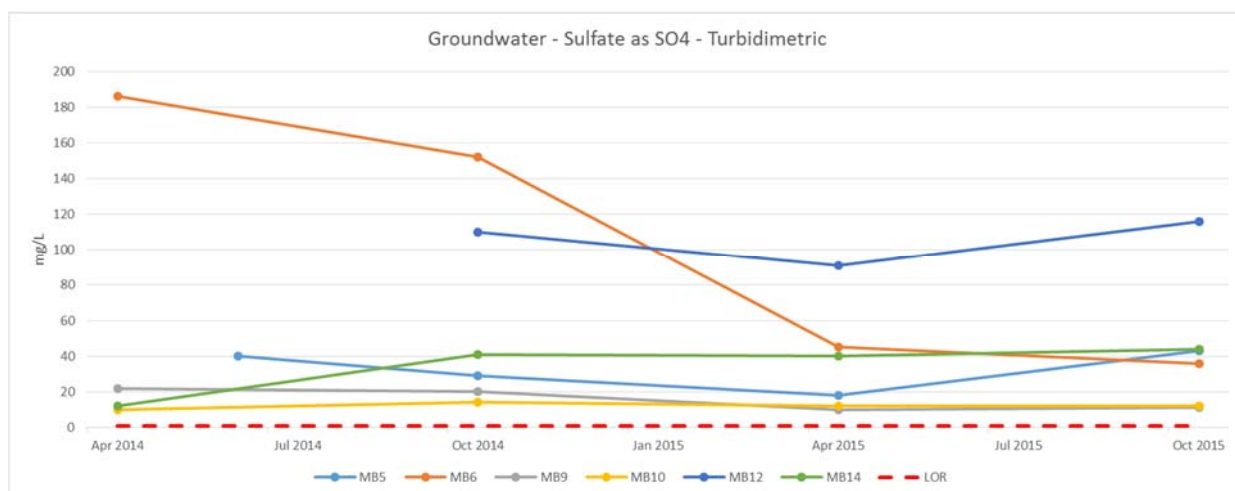


Figure 6: Groundwater Sulfate – Lithgow SWF, April 2014 to October 2015

Concentrations of calcium in groundwater in the reporting period were consistent with established ranges at all monitoring points. The highest concentration of the monitoring round was 196 mg/L at MB6 (October 2014), which was below the 1000 mg/L recommended for livestock drinking water (ANZECC & ARMCANZ, 2000), as shown on **Figure 7**.

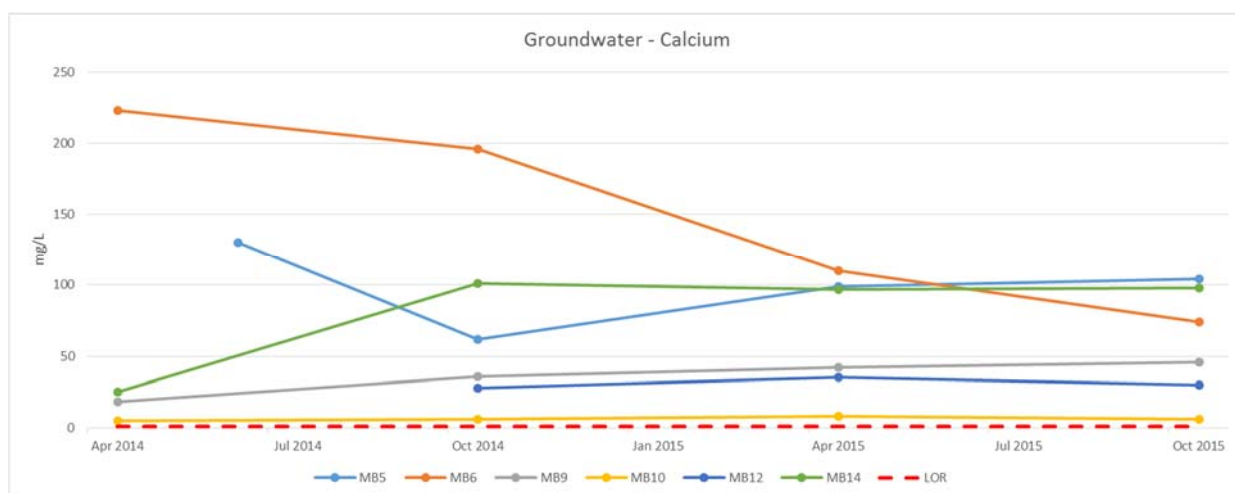


Figure 7: Groundwater Calcium – Lithgow SWF, April 2014 to October 2015

Chloride concentrations in groundwater ranged from 23 mg/L at MB10 (October 2014) to 635 mg/L at MB6 (October 2014). Chloride concentrations were lower than the guideline for irrigation of moderately tolerant crops (< 700 mg/L – ANZECC & ARMCANZ, 2000).

Groundwater samples were analysed in October 2014 and April 2015 for magnesium, sodium, potassium and manganese. Magnesium ranged from 5 mg/L at MB10 (October 2014) to 96 mg/L at MB6 (October 2014), whilst sodium concentrations ranged from a low of 7 mg/L at MB10 (April 2015) to 497 mg/L at MB6 (October 2014). All sodium values with the exception of MB6 in October 2014 were lower than the guideline for irrigation to moderately tolerant crops (<230 mg/L – ANZECC & ARMCANZ, 2000). Potassium was lowest at MB10 (2 mg/L in October 2014 and April 2015) and highest at MB6 (154 mg/L in October 2014).

Concentrations of magnesium, sodium, potassium and chloride in groundwater are respectively shown in **Figures 8 to 11**, and the decreasing concentration of anions at MB6 is apparent.

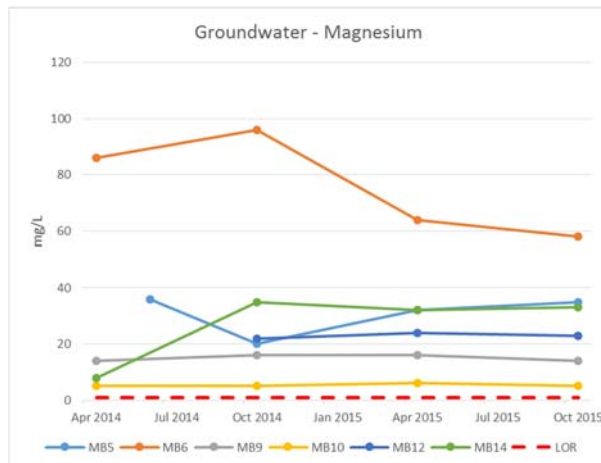


Figure 8: Groundwater Magnesium – Lithgow SWF, April 2014 to October 2015

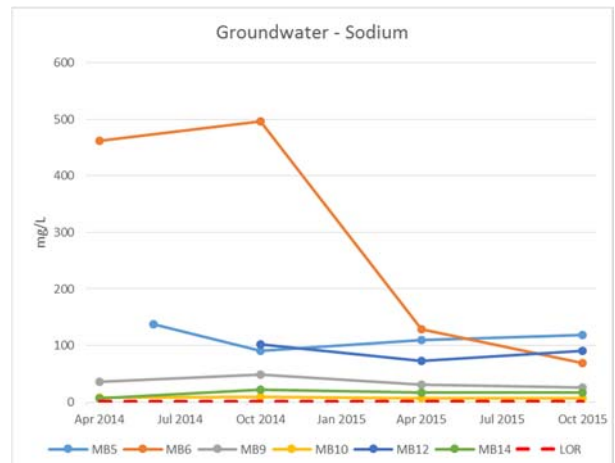


Figure 9: Groundwater Sodium – Lithgow SWF, April 2014 to October 2015

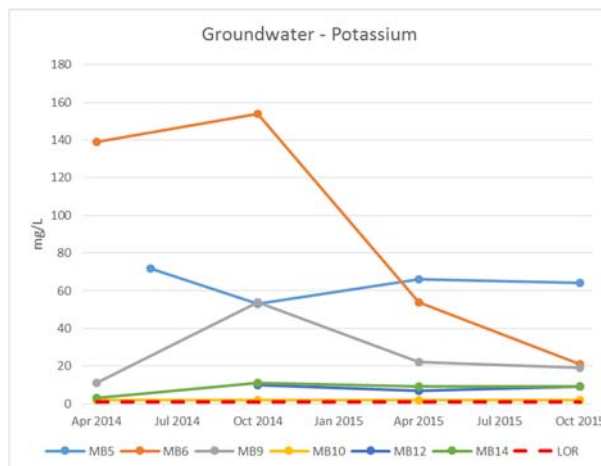


Figure 10: Groundwater Potassium – Lithgow SWF, April 2014 to October 2015

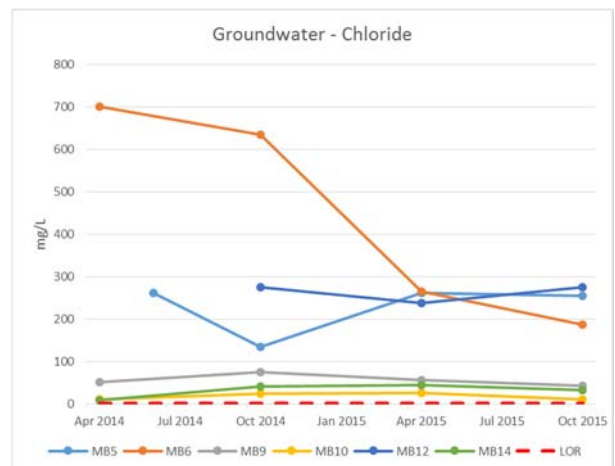


Figure 11: Groundwater Chloride – Lithgow SWF, April 2014 to October 2015

3.2.4 NUTRIENTS

Ammonia concentrations recorded in groundwater in the reporting period ranged from 0.05 mgN/L at MB10 (October 2014), to 8.28 mgN/L at MB9 (October 2014). All values were consistent with historical results, as shown on **Figure 12**, however the conservative human drinking water health guideline of 0.41 mgN/L (NHMRC & NRMCC, 2011) was generally exceeded with the exceptions of MB6 (October 2014 only), MB10 and MB12.

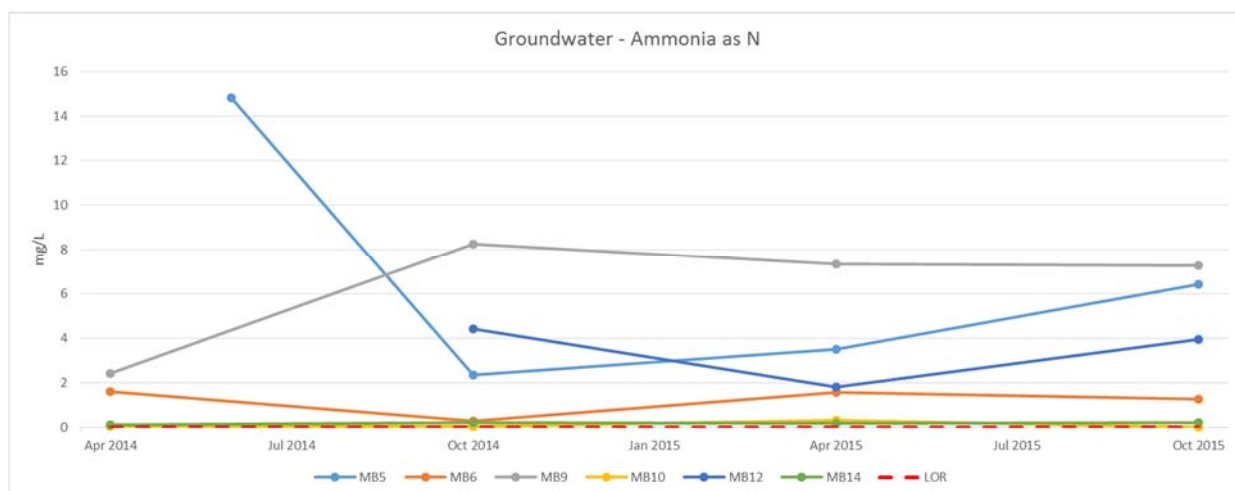


Figure 12: Groundwater Ammonia – Lithgow SWF, April 2014 to October 2015

Nitrate concentrations ranged from below the LOR of 0.01 mgN/L at MB6 and MB12 (April 2015) to 6.09 mgN/L at MB5 (October 2014) as shown on **Figure 13** (note logarithmic scale). All concentrations were significantly lower than the livestock drinking water guideline value of 90.29 mgN/L (ANZECC & ARMCANZ, 2000) and consistent with historical ranges.

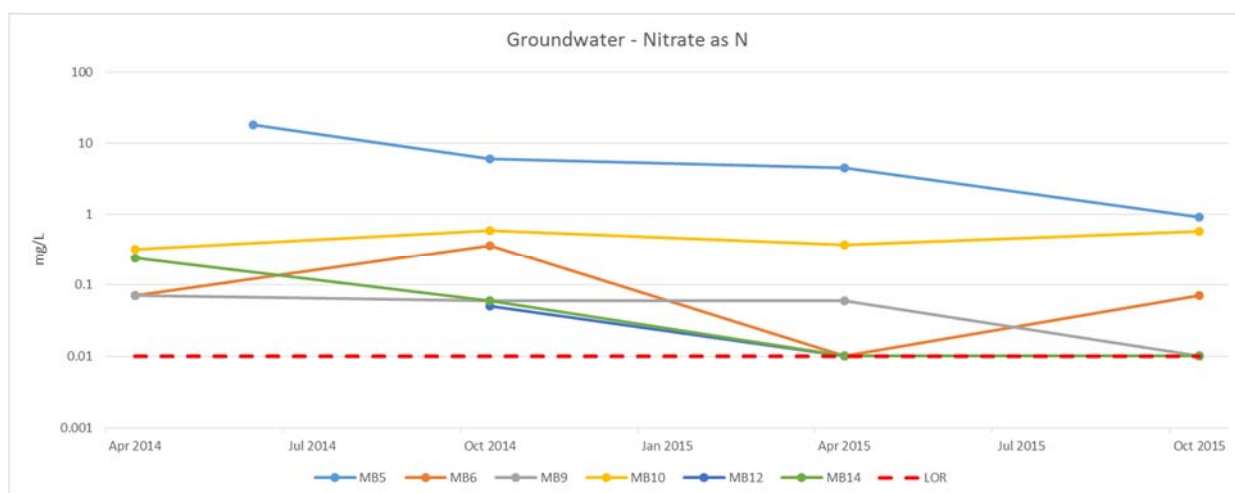


Figure 13: Groundwater Nitrate – Lithgow SWF, April 2014 to October 2015

Total phosphorus in groundwater samples collected during the reporting period was recorded to range from below the laboratory LOR of 0.01 mg/L at MB12 to 0.54 mg/L at MB6 (April 2015). Total phosphorus concentrations are considered suitable for crop irrigation for periods up to 20 years (ANZECC & ARMCANZ, 2000).

3.2.5 METALS

Groundwater iron concentrations in the reporting period ranged from below the LOR of 0.05 mg/L at MB5 (October 2014) to 45.9 mg/L at MB6 (April 2015), as shown on **Figure 14**. While there is no livestock drinking water guideline for this parameter, only groundwater samples collected from MB5, MB10 and MB14 were considered suitable for short-term (i.e. <20 years) crop irrigation (<10 mg/L – ANZECC & ARMCANZ, 2000). Iron concentrations in groundwater, whilst considered to be elevated at MB6, MB9 and MB12, were within the established range.

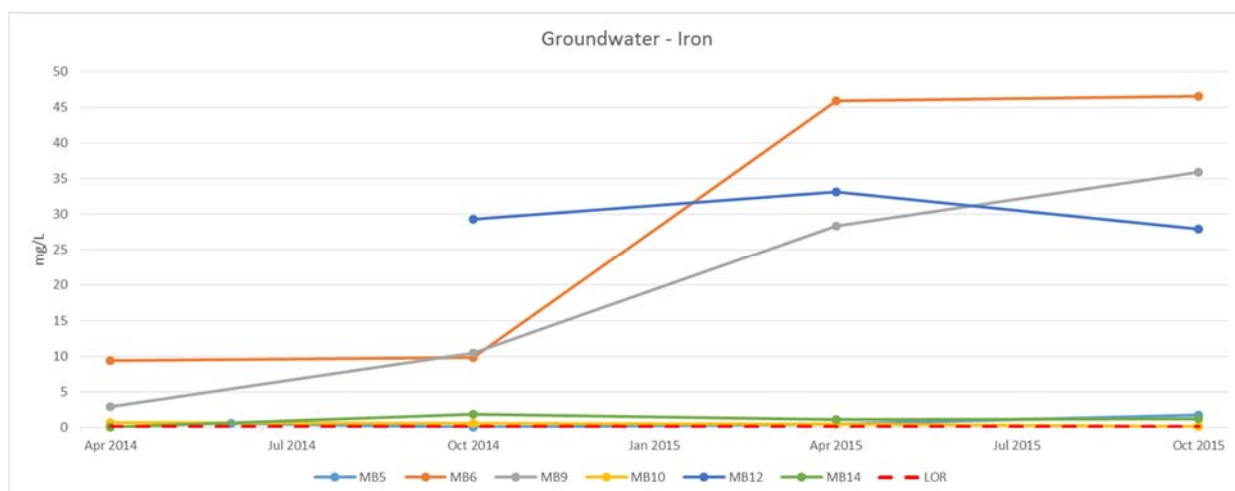


Figure 14: Groundwater Iron – Lithgow SWF, April 2014 to October 2015

Groundwater manganese concentrations ranged from 0.02 mg/L at MB10 (October 2014) to 3.55 mg/L at MB9 (April 2015), as shown on **Figure 15**. All manganese concentrations were considered suitable for short-term (i.e. <20 years) crop irrigation (<10 mg/L – ANZECC & ARMCANZ, 2000).

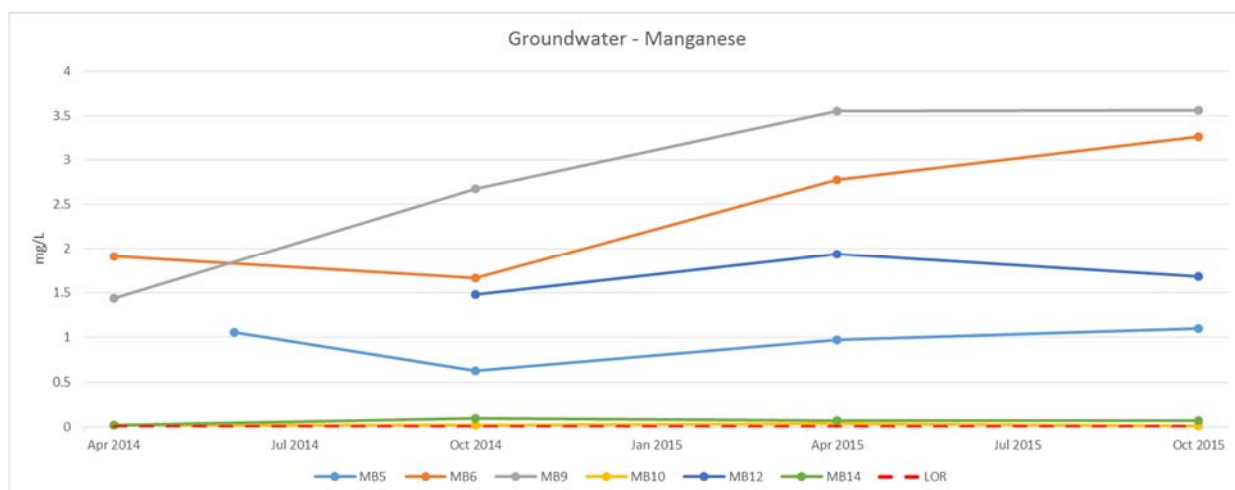


Figure 15: Groundwater Manganese – Lithgow SWF, April 2014 to October 2015

Aluminium concentrations in groundwater ranged from below the LOR of 0.01 mg/L at multiple locations to 6.19 mg/L at MB12 (October 2014). All groundwater aluminium concentrations were below the recommended livestock water quality trigger value (5 mg/L – ANZECC & ARMCANZ, 2000), with the exception of MB12.

Other metals in groundwater, including barium, chromium (total and hexavalent) and cobalt were recorded at concentrations below adopted water quality trigger values.

3.2.6 ORGANICS

Total organic carbon (TOC) concentrations in groundwater ranged from below the LOR of 1 mg/L at MB10 (April 2015) to 32 mg/L at MB6, as shown on **Figure 16** (note logarithmic scale). TOC concentrations at MB6 have historically been considered elevated, however the concentration has been shown to be reducing.

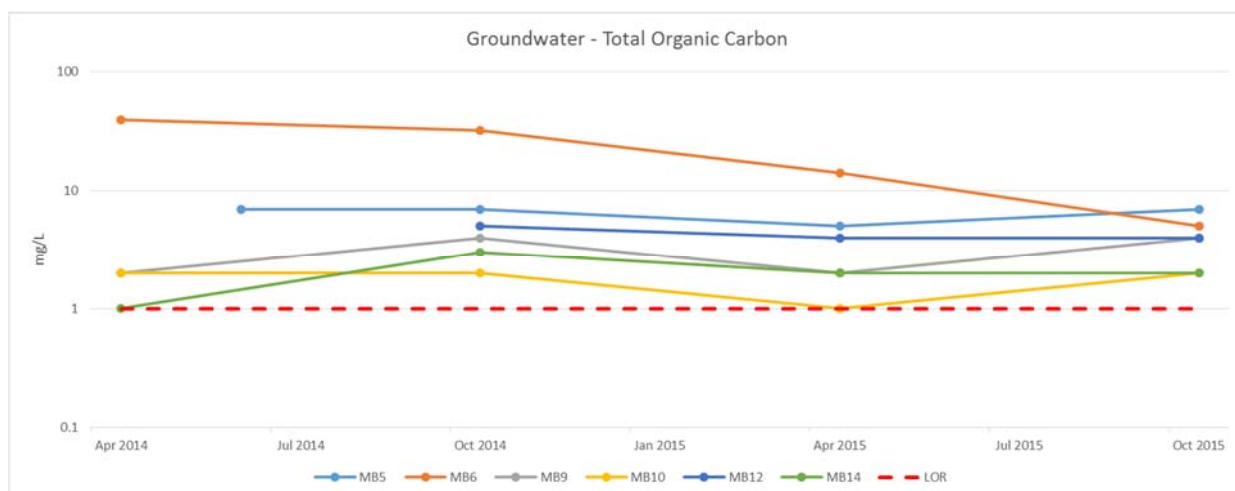


Figure 16: Groundwater TOC – Lithgow SWF, April 2014 to October 2015

Total phenols were below the laboratory LOR of 0.05 mg/L at all groundwater monitoring stations in the reporting period with the exception of MB6, which recorded a concentration of 0.06 mg/L in April 2015.

Organochlorine and organophosphorus pesticides were also below the LOR at all groundwater monitoring stations in the reporting period.

Total petroleum hydrocarbons (TPH) in groundwater ranged from below the LOR at multiple locations to 320 µg/L at MB6 (October 2014), as shown on **Figure 17**.

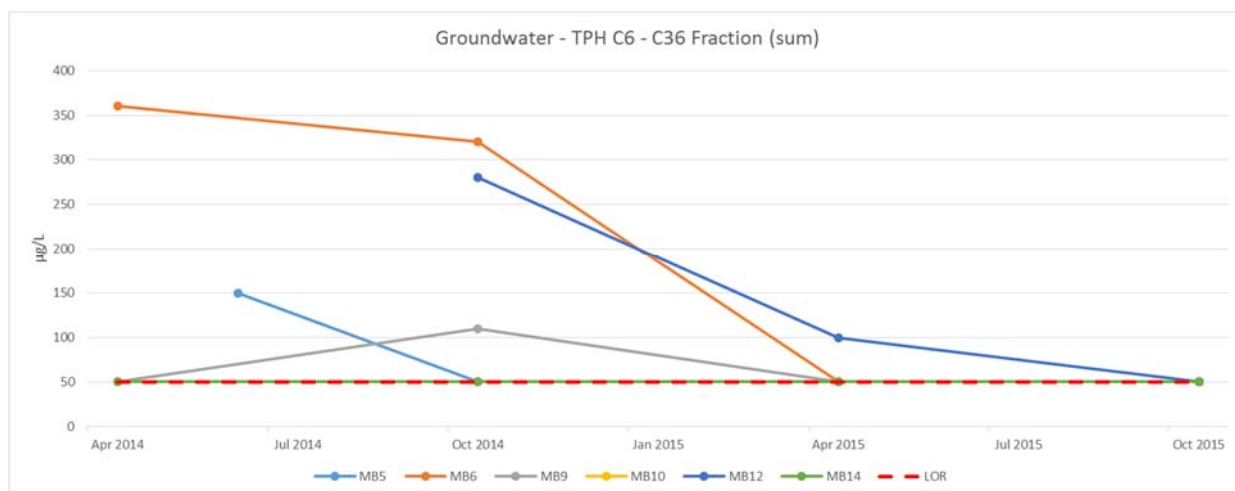


Figure 17: Groundwater TPH – Lithgow SWF, April 2014 to October 2015

3.3 SURFACE WATER

Surface water monitoring consists of a single monitoring point SW1, which is required to be sampled monthly during discharges. The location of the monitoring point is illustrated in **Drawing 01B_EV04**. Discharge samples were obtained in January and April 2015.

3.3.1 PHYSICAL PROPERTIES

pH was recorded at within the EPL 100 percentile range of 6.5 – 8.5 at 6.76 in January and 7.38 in April 2015, as shown on **Figure 18**. The EPL 100 percentile range corresponds to the ideal range for livestock drinking water quality (Markwick, 2007) and for reducing corrosion and encrustation in pipes and fittings (NHMRC & NRMCC, 2011).

The maximum EC of the discharge at SW1 was recorded to be 260 $\mu\text{S}/\text{cm}$ in April 2015, as shown on **Figure 19**. The corresponding TDS concentration (174 mg/L) remains well below the livestock drinking water guidelines (ANZECC & ARMCANZ, 2000).

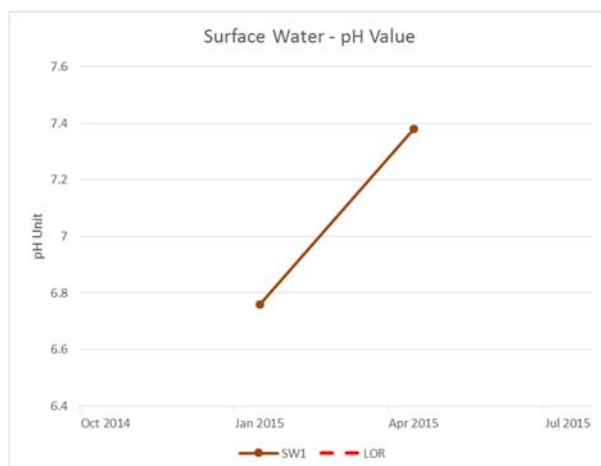


Figure 18: SW1 Discharge pH – Lithgow SWF, January to April 2015

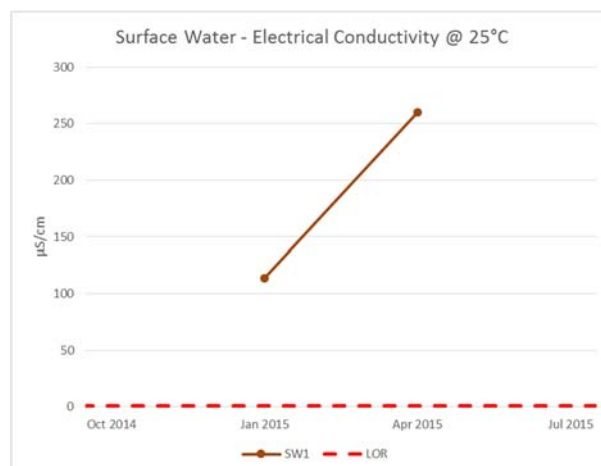


Figure 19: SW1 Discharge EC – Lithgow SWF, January to April 2015

Total suspended solids (TSS) in surface water ranged from 83 mg/L in January 2015 to 366 mg/L in April 2015, which were above the EPL 100 percentile discharge limit of 30 mg/L, as shown on **Figure 20**. It is noted that TSS concentrations were within the historic range for the surface water discharge, having previously been recorded at 367 mg/L in June 2013.

The maximum alkalinity of the discharge at SW1 was recorded to be 59 mgCaCO₃/L in April 2015, as shown on **Figure 21**, and corresponds to an increase in pH (i.e. decreased acidity). Alkalinity was below the irrigation guideline hardness value for potential fouling of waters (350 mg/L, ANZECC & ARMCANZ, 2000).

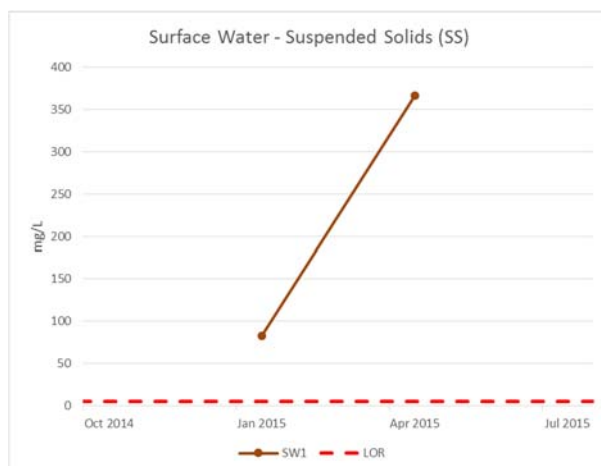


Figure 20: SW1 Discharge TSS – Lithgow SWF, January to April 2015

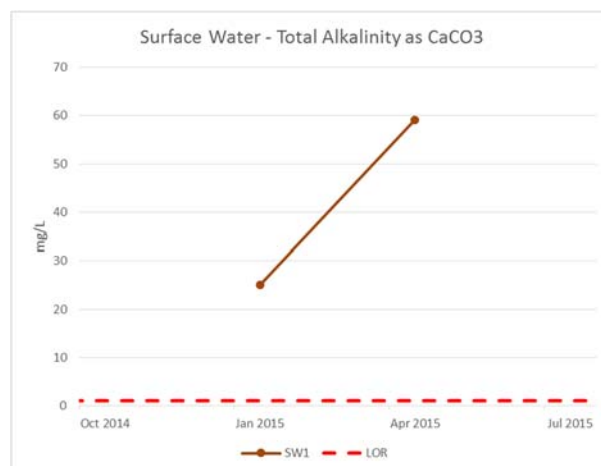


Figure 21: SW1 Discharge Alkalinity – Lithgow SWF, January to April 2015

Chemical oxygen demand of surface water was most elevated in April 2015 at 42 mg/L.

3.3.2 EXCHANGEABLE IONS

The fluoride concentration of surface water was generally low, being recorded at below the LOR of 0.1 mg/L in January 2015 and at 0.2 mg/L in April 2015.

The maximum sulfate (32 mg/L) and chloride (30 mg/L) concentrations in surface water were recorded in April 2015, as shown on **Figures 22** and **23**, and were below relevant guideline values for stock watering and/or crop irrigation (ANZECC & ARMCANZ, 2000).

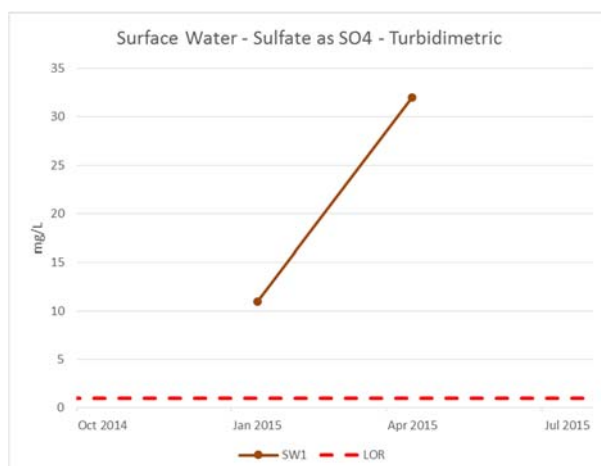


Figure 22: SW1 Discharge Sulfate – Lithgow SWF, January to April 2015

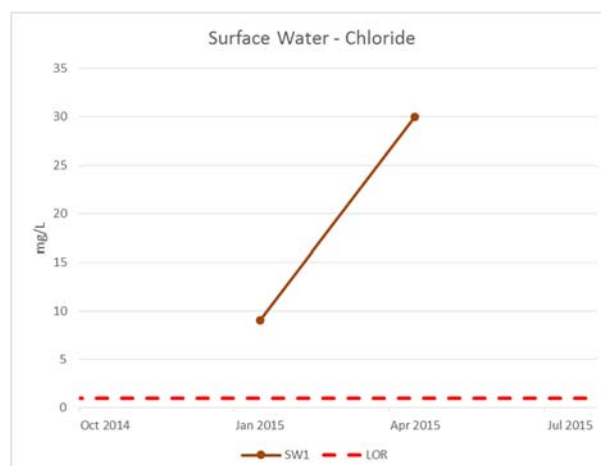


Figure 23: SW1 Discharge Chloride – Lithgow SWF, January to April 2015

The maximum concentrations of calcium (24 mg/L), magnesium (5 mg/L), sodium (16 mg/L) and potassium (8 mg/L) were recorded in surface water in April 2015, as shown on **Figures 25 to 27**. Concentrations were recorded to be below the applicable guideline values for stock watering and/or crop irrigation (ANZECC & ARMCANZ, 2000).

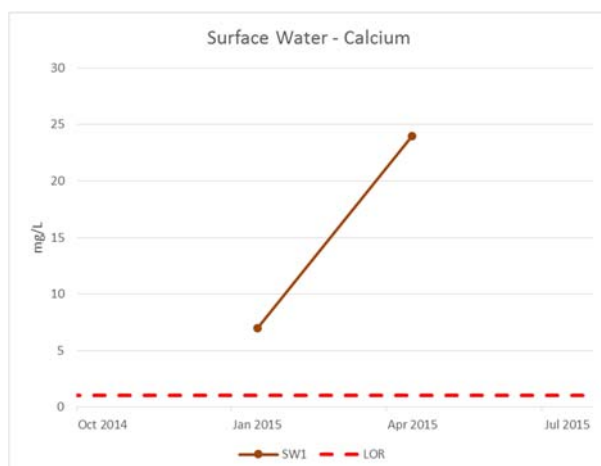


Figure 24: SW1 Discharge Calcium – Lithgow SWF, January to April 2015

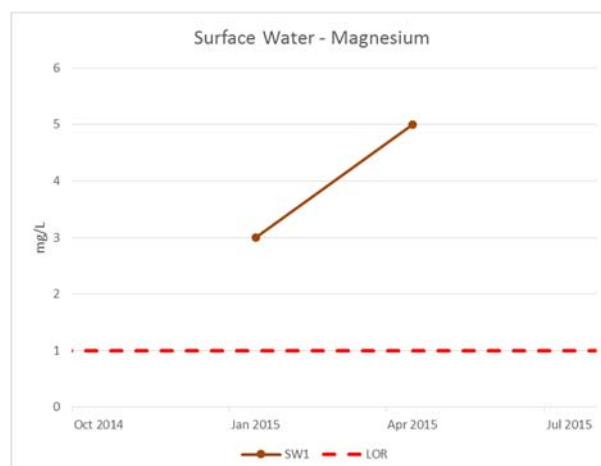


Figure 25: SW1 Discharge Magnesium – Lithgow SWF, January to April 2015

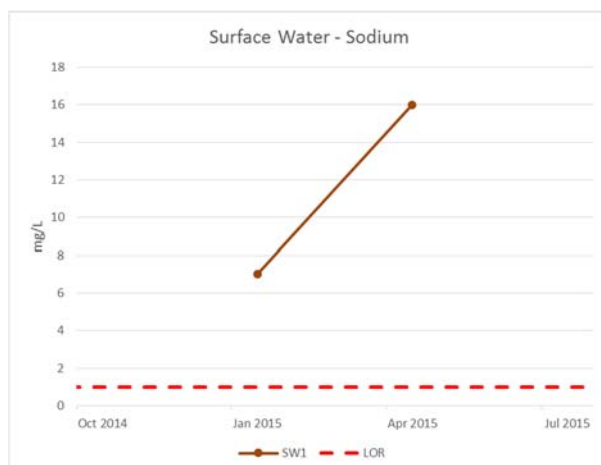


Figure 26: SW1 Discharge Sodium – Lithgow SWF, January to April 2015

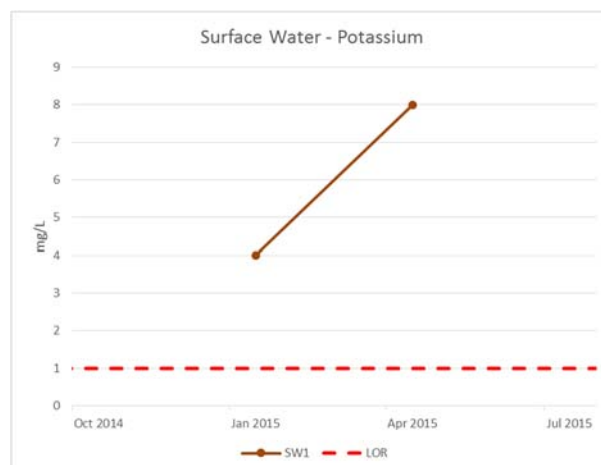


Figure 27: SW1 Discharge Potassium – Lithgow SWF, January to April 2015

3.3.3 NUTRIENTS

The maximum phosphorus concentration in surface water was recorded in April 2015 at a concentration of 0.26 mg/L, below the guideline value for short-term crop irrigation (i.e. <100 years) of 0.8 mg/L (ANZECC & ARMCANZ, 2000), as shown on **Figure 28**.

Ammonia in surface water was highest in April 2015 at 0.52 mgN/L, as shown on **Figure 29**, and above the conservative aesthetic guideline for human drinking water (0.41 mgN/L, NHMRC & NRMCC, 2011).

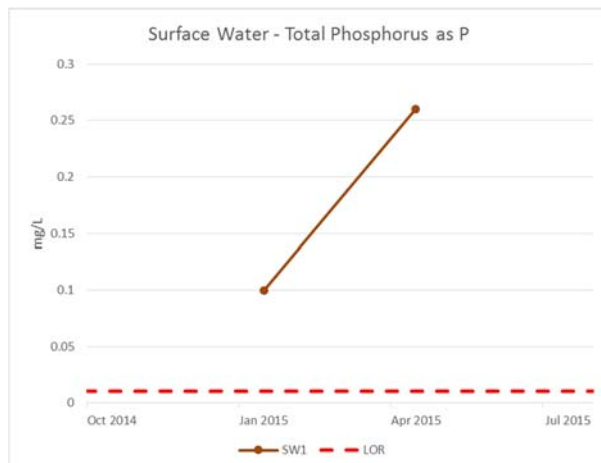


Figure 28: SW1 Discharge Phosphorus – Lithgow SWF, January to April 2015

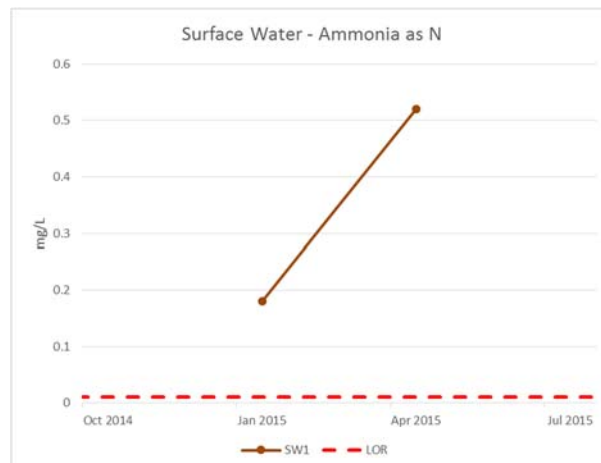


Figure 29: SW1 Discharge Ammonia – Lithgow SWF, January to April 2015

The maximum concentrations of nitrite and nitrate in surface water were recorded in April 2015, at 0.04 mgN/L and 4.14 mgN/L respectively, as shown on **Figures 30** and **31**. Both chemicals were lower than the conservative health guidelines for human drinking water (3 mgN/L and 50 mgN/L respectively, NHMRC & NRMCC, 2011). Nitrite and nitrate were also below the respective livestock drinking water guideline values of 9.12 mgN/L and 90.29 mgN/L (ANZECC & ARMCANZ, 2000).

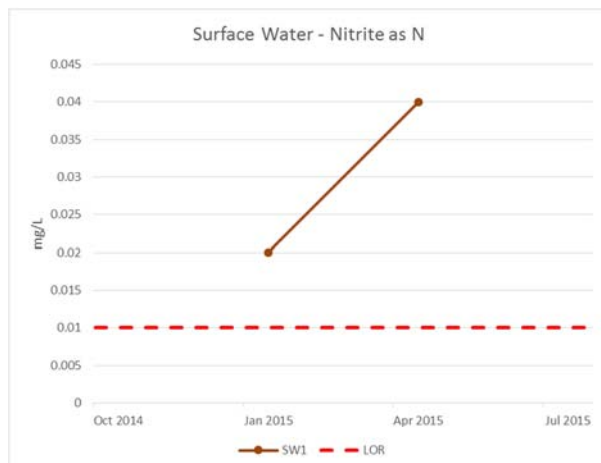


Figure 30: SW1 Discharge Nitrite – Lithgow SWF, January to April 2015

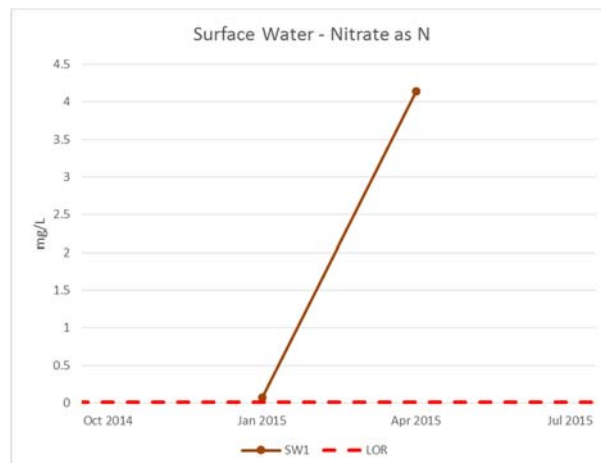


Figure 31: SW1 Discharge Nitrate – Lithgow SWF, January to April 2015

3.3.4 METALS

The maximum concentrations of aluminium (4.08 mg/L), barium (0.069 mg/L), chromium (0.003 mg/L) and iron (3.72 mg/L) in surface water were recorded in April 2015 having increased over the reporting period, as shown on **Figures 32** to **35**. Concentrations of these metals were below the applicable guideline values for stock watering and/or short-term crop irrigation (ANZECC & ARMCANZ, 2000).

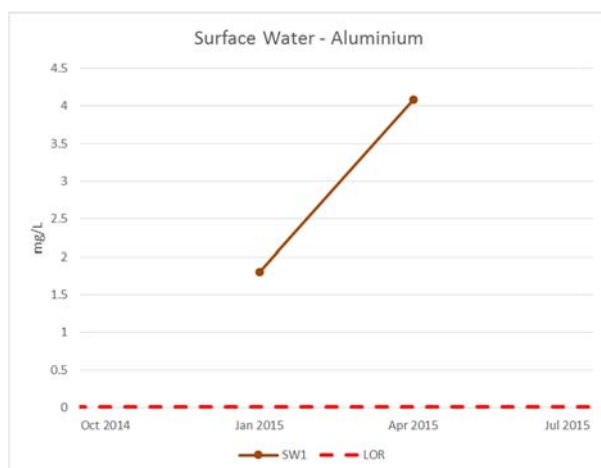


Figure 32: SW1 Discharge Aluminium – Lithgow SWF, January to April 2015

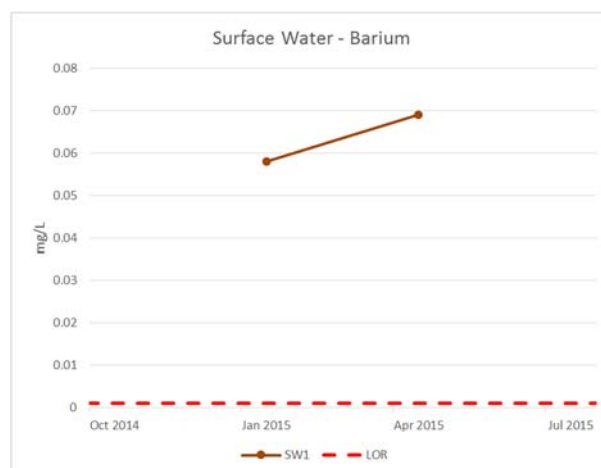


Figure 33: SW1 Discharge Barium – Lithgow SWF, January to April 2015

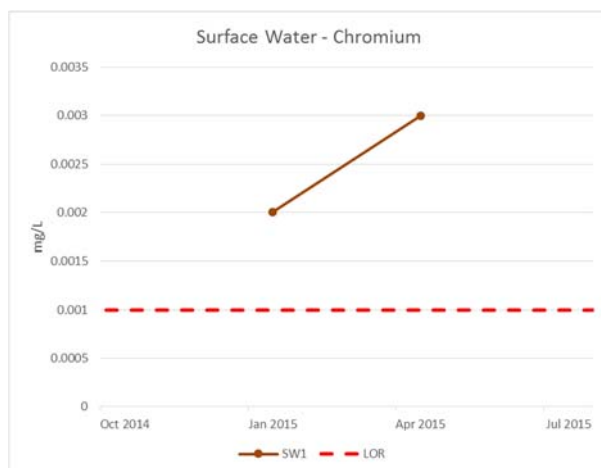


Figure 34: SW1 Discharge Chromium – Lithgow SWF, January to April 2015

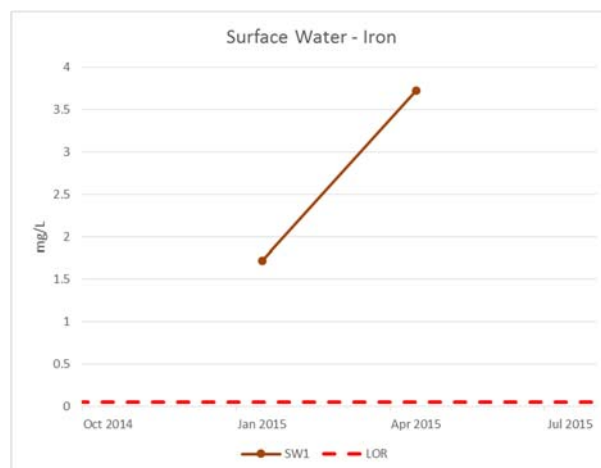


Figure 35: SW1 Discharge Cobalt – Lithgow SWF, January to April 2015

The maximum concentrations of cobalt (0.004 mg/L) and manganese (0.529 mg/L) in surface water were recorded in January 2015 having decreased over the reporting period, as shown on **Figures 36** and **37**. Concentrations of these metals were below the applicable guideline values for stock watering and/or short-term crop irrigation (ANZECC & ARMCANZ, 2000).

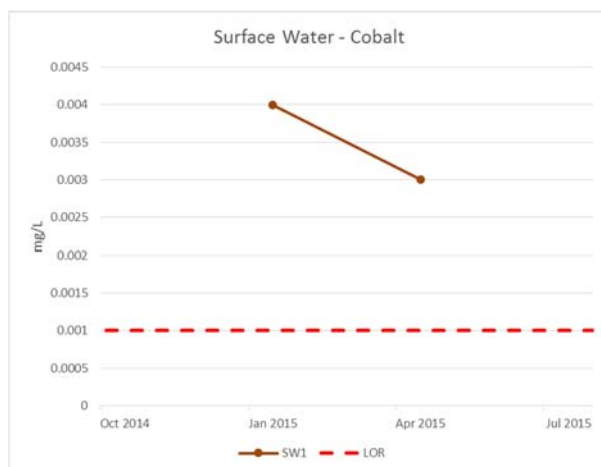


Figure 36: SW1 Discharge Iron – Lithgow SWF, January to April 2015

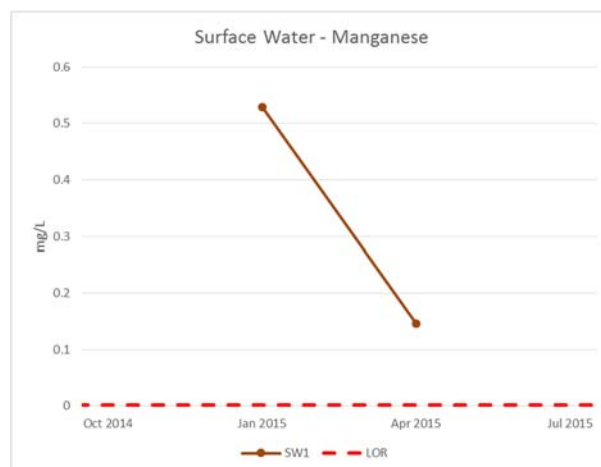


Figure 37: SW1 Discharge Manganese – Lithgow SWF, January to April 2015

3.3.5 ORGANICS

Total organic carbon in surface water was 4 mg/L in January 2015 and 7 mg/L in April 2015.

Phenols (total), organochlorine pesticides, organophosphorus pesticides and total petroleum hydrocarbons were not detected above the laboratory LOR in the discharge samples collected in January and April 2015.

3.4 LEACHATE

Leachate monitoring consists of a single monitoring point LW1, which is required to be sampled biannually when leachate is present. The location of the monitoring point is illustrated in **Drawing 01B_EV04**. No sample could be obtained in the October 2014 monitoring round as the leachate point was dry at the time of monitoring.

3.4.1 PHYSICAL PROPERTIES

The leachate pH level in April 2015 was slightly alkaline at 7.45, as shown on **Figure 2** and within the recommended range for livestock drinking water (6.5 – 8.5, Markwick 2007) and for reducing corrosion and encrustation in pipes and fittings (NHMRC & NRMCC, 2011).

Total suspended solids (TSS) in leachate were recorded at 42 mg/L in April 2015.

The total alkalinity of leachate at LW1 was recorded to be 99 mgCaCO₃/L in April 2015. Alkalinity was below the irrigation guideline hardness value for potential fouling of waters (350 mg/L, ANZECC & ARMICANZ, 2000).

3.4.2 EXCHANGEABLE IONS

The fluoride concentration of leachate was generally low, being recorded at below the LOR of 0.1 mg/L in April 2015.

The sulfate (13 mg/L) and chloride (68 mg/L) concentrations in leachate recorded in April 2015, as shown on **Figure 38**, were below relevant guideline values for stock watering and/or crop irrigation (ANZECC & ARMICANZ, 2000).

Concentrations of calcium (39 mg/L), magnesium (9 mg/L), sodium (27 mg/L) and potassium (17 mg/L) recorded in leachate in April 2015, as shown on **Figure 38**, were recorded to be below the applicable guideline values for stock watering and/or crop irrigation (ANZECC & ARMICANZ, 2000).

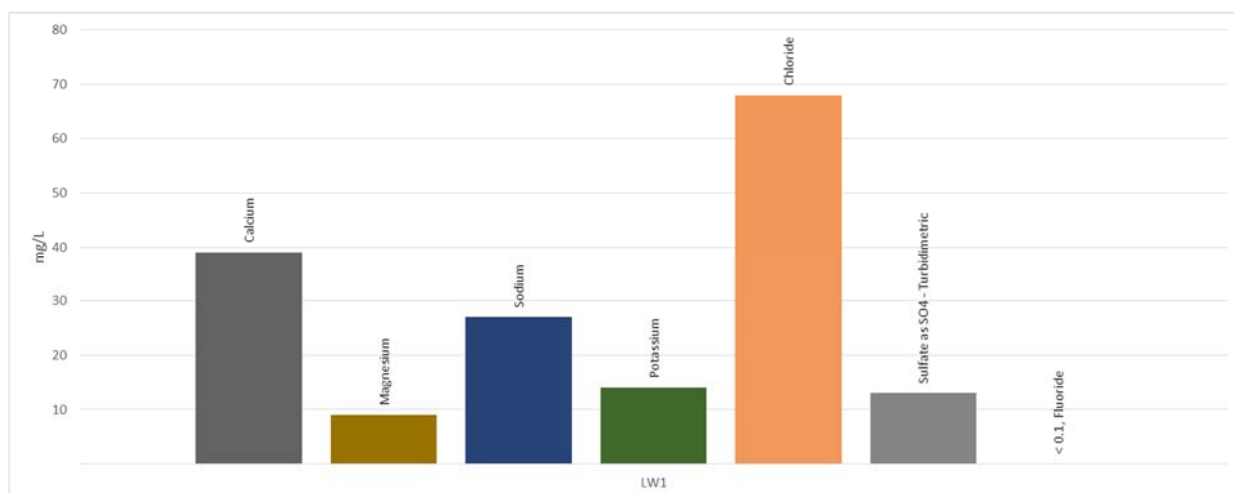


Figure 38: Leachate Exchangeable Ions – Lithgow SWF, April 2015

3.4.3 NUTRIENTS

Ammonia in leachate was 0.30 mgN/L in April 2015, as shown on **Figure 39**, and below the conservative aesthetic guideline for human drinking water (0.41 mgN/L, NHMRC & NRMCC, 2011).

Concentrations of nitrite (0.03 mgN/L) and nitrate (0.81 mgN/L) in leachate were recorded in April 2015, as shown on **Figure 39**. Both chemicals were lower than the conservative health guidelines for human drinking water (3 mgN/L and 50 mgN/L respectively, NHMRC & NRMCC, 2011). Nitrite and nitrate were also below the respective livestock drinking water guideline values of 9.12 mgN/L and 90.29 mgN/L (ANZECC & ARMCANZ, 2000).

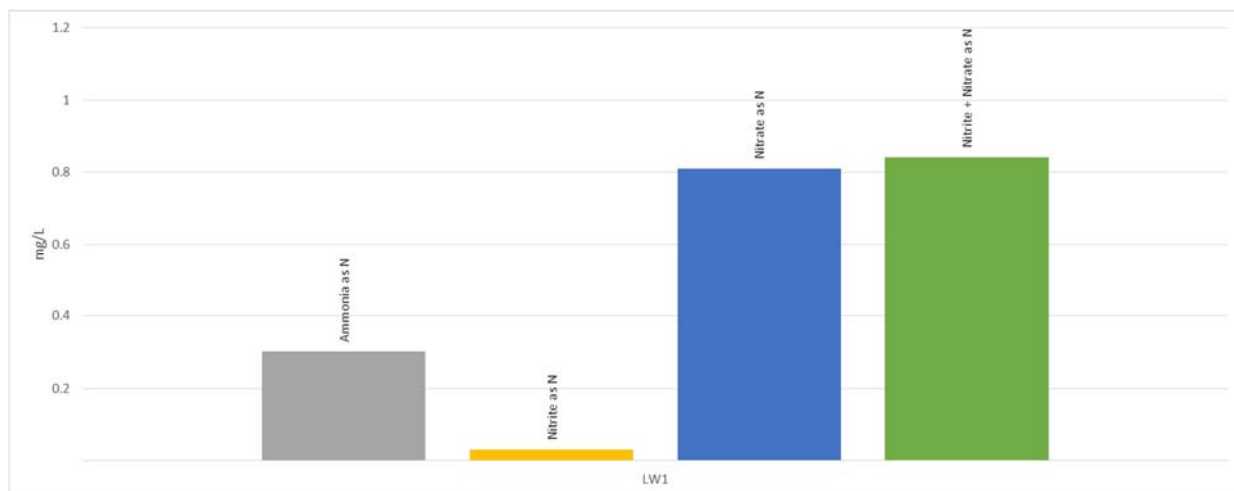


Figure 39: Leachate Nutrients – Lithgow SWF, April 2015

3.4.4 METALS AND ORGANICS

Concentrations of manganese (0.567 mg/L) and iron (2.48 mg/L) in leachate were recorded in April 2015, as shown on **Figure 40**. Concentrations of these metals were below the applicable guideline values for stock watering and/or short-term crop irrigation (ANZECC & ARMCANZ, 2000).

Total organic carbon in leachate was 5 mg/L in April 2015, as shown on **Figure 40**.

Total phenols were not detected above the laboratory LOR in the leachate sample collected in April 2015.

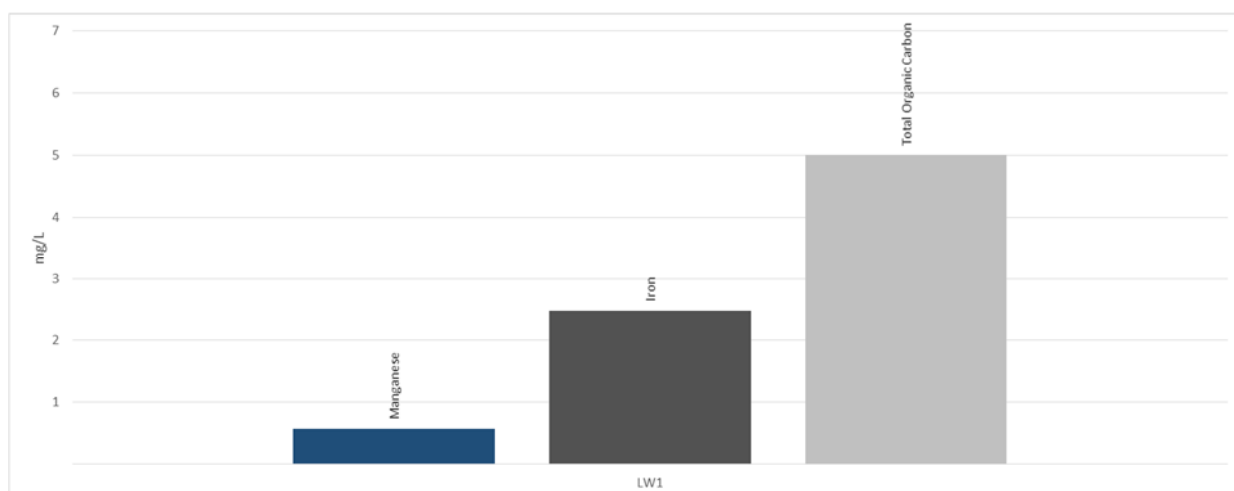


Figure 40: Leachate Metals and Organics – Lithgow SWF, April 2015

3.5 LANDFILL GAS ACCUMULATION

Monitoring of accumulated building gas was conducted monthly throughout the reporting period. Measurements taken within the demountable office and storeroom located at the landfill, as well as the Sewage Treatment Plant office, crib, workshop and control room were all below the allowable threshold of 1.25% (v/v).

3.6 QUALITY CONTROL

3.6.1 OUTLINE

The laboratory quality control meets the NEPM 2013 Schedule B(3) and ALS QCS3 requirement.

The ALS Quality Control Report provides the following:

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity.

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix.

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

3.6.2 RESULTS

For the groundwater, surface water and leachate sampling conducted in October 2014, January 2015 and April 2015, the following QC comments have been reported:

- Groundwater, October 2014: Matrix spike recovery for sulfate not determined as the background level in sample MB12 was greater than or equal to 4 times the spike level
- Groundwater, October 2014: Matrix spike recovery for nitrite + nitrate not determined as the background level in 'anonymous' sample was greater than or equal to 4 times the spike level
- Groundwater, October 2014: Matrix spike recovery for chemical oxygen demand not determined as the background level in 'anonymous' sample was greater than or equal to 4 times the spike level
- Groundwater, October 2014: Matrix spike recovery for ethylbenzene not determined as the background level in 'anonymous' sample was greater than or equal to 4 times the spike level
- Surface Water, January 2015: Matrix spike recovery for sulfate not determined as the background level in 'anonymous' sample was greater than or equal to 4 times the spike level
- Surface Water, January 2015: Matrix spike recovery for chemical oxygen demand not determined as the background level in 'anonymous' sample was greater than or equal to 4 times the spike level

- Groundwater / Surface Water / Leachate, April 2015: Matrix spike recovery for nitrite + nitrate not determined as the background level in 'anonymous' sample was greater than or equal to 4 times the spike level
- Groundwater / Surface Water / Leachate, April 2015: Laboratory duplicate samples for pesticides, and TRH (semi-volatile) undertaken at less than specified frequency
- Groundwater / Surface Water / Leachate, April 2015: Matrix spike samples for pesticides, and TRH (semi-volatile) undertaken at less than specified frequency

Other Monitoring

4.1 WASTE QUANTITIES

Waste quantities recorded by Council and reported to the EPA for the 2014-2015 reporting period totalled 64,732 tonnes.

This included a component of 16,962 tonnes of virgin excavated natural material (VENM) used for capping. Therefore, the total waste amount received for licensing purposes was 47,770 tonnes. Compaction is achieved using a 20 tonne excavator, as required.

The total quantity of waste received into Lithgow SWF for the reporting period was below the limits set under Licence Condition L3.1, which states that the total amount of general solid waste (putrescible and non-putrescible), asbestos, clinical waste and waste tyres disposed of at the premises must not exceed 50,000 tonnes per annum.

4.2 EFFECTIVE COMPACTION

The licence for Lithgow SWF requires a minimum waste compaction of 0.65 t/m³ (EPL Condition O6.15), and is calculated by dividing the tonnage received by the volume utilised. As a volumetric survey of the facility at the end of the reporting period was not completed, the average waste compaction for the landfill in the reporting period was unable to be calculated.

All exposed landfilled waste is generally covered daily to a minimum depth of 150 mm and compacted at the end of each day prior to ceasing operations. Compaction is achieved using a 20 tonne excavator, and is anticipated to be comparable to the EPL requirement of 0.65 t/m³.

4.3 COMPLAINTS

There were two (2) public complaints made regarding the operations covered by the Lithgow SWF EPL during the annual reporting period, relating to nuisance dust. The details of the complaints are provided below.

Dates:

2 October 2014 & 29 December 2014

Complaint description:

Nuisance dust generated

Response to Complaint:

Water cart deployed by LCC on access roads to minimise dust generated by landfill traffic

Summary

5.1 GROUNDWATER LEVELS

Measurement of standing water level is required annually by EPL 6004. Routine measurements were undertaken during the October 2014 and April sampling round.

Groundwater levels were relatively constant in the 12 month period, with the exception of MP6B which decreased in the 6 month period from October 2014 to April 2015. All standing water levels with the exception of MP6B in April 2015 were consistent with historical ranges.

Groundwater is considered to flow in a south-south-westerly direction, generally consistent with the fall of the land.

5.2 GROUNDWATER QUALITY

Biannual groundwater quality sampling was undertaken in October 2014 and April 2015 in accordance with EPL 6004. No samples were able to be obtained from MB1 due to insufficient recharge.

Minimal change in groundwater conditions at the site was evident, however the following items were noted:

- pH at MB12 was notably lower than at other monitoring locations, being markedly more acidic than the range recommended for livestock drinking water.
- Groundwater EC and exchangeable ions were relatively elevated in October 2014 at location MB6, with the exception of fluoride, however concentrations notably reduced in the period to the April 2015 monitoring round.
- Ammonia in groundwater was relatively elevated at location MB9 and nitrate in groundwater was relatively elevated at location MB5 in the reporting period.
- Manganese and iron were considered to be relatively elevated at locations MB6, MB9 and MB12.
- The groundwater TOC concentration was considered to be elevated in October 2014 at location MB6, however the concentration notably reduced in the period to the April 2015 monitoring round.
- Concentrations of TPH were recorded above the laboratory LOR in the October 2014 monitoring round at locations MB6, MB9 and MB12, however these concentrations notably reduced in the period to the April 2015 monitoring round.
- Alkalinity at groundwater points MB5 (April 2015 only), MB6 and MB14 may result in potential fouling of waters.

No adverse trends were evident in other groundwater monitoring points.

5.3 SURFACE WATER QUALITY

Discharge samples from SW1 as required by to be collected by EPL occurred in January and April 2015.

Total suspended solids in samples collected in January 2015 (83 mg/L) and April 2015 (366 mg/L) exceeded the EPL 100 percentile discharge limit (licence condition L2.4) of 30 mg/L.

pH, EC, alkalinity, exchangeable ions, nutrients and metals (with the exceptions of cobalt and manganese) in the surface water discharge notably increased in the period from January 2015 to April 2015.

5.4 LEACHATE QUALITY

Leachate parameter concentrations observed during the reporting period were generally below applicable guideline values for stock watering and/or crop irrigation, and consistent with historical data.

5.5 LANDFILL GAS ACCUMULATION

Monthly measurements taken within associated buildings were all below the allowable threshold of 1.25% (v/v).

5.6 WASTE QUANTITIES AND COMPACTION

A total of 64,732 tonnes of waste (including VENM) was received into the landfill for the 2014-2015 reporting period.

The total waste entombed for licensing purposes was 47,770 tonnes. This is below the maximum annual limit set under Licence Condition L3.1 (50,000 t).

Compaction at Lithgow SWF is achieved using a 20 tonne excavator, and is anticipated to be comparable to the EPL requirement of 0.65 t/m³. The ratio of waste compaction in the previous 2013-2014 reporting period was calculated to be 0.90 t/m³, utilising the same compaction methodology.

Conclusion

6.1 CONCLUSIONS

Environmental monitoring of groundwater and surface water quality in the 2014-2015 reporting period is not considered to be indicative of adverse off-site impacts resulting from the operation of the Lithgow Solid Waste Facility.

6.2 RECOMMENDATIONS

It is recommended that environmental monitoring be continued at the Lithgow SWF in accordance with the monitoring requirements of Environment Protection Licence 6004.

The total waste entombed for licensing purposes in the 2014-2015 reporting period was 47,770 tonnes. This quantity is approaching the maximum annual limit set under Licence Condition L3.1 (50,000 t) and was noted to have increased from the 26,230 tonnes entombed in the 2013-2014 period. Projections of waste quantities for the 2015-2016 period should be conducted with regularity to provide timely forewarning of a possible exceedance of the maximum annual limit.

Treatment of surface water for turbidity prior to discharge should be considered if exceedances of the EPL concentration limit for suspended solids continue to occur.

References

Australian and New Zealand Environment and Conservation Council & Agricultural and Resource Management Council of Australia and New Zealand (ANZECC & ARMCANZ) 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

C.M. Jewell & Associates, November 2001, *Hydrogeological Investigation for Lithgow Solid Waste Facility*, Report No. AJ00-109.20.

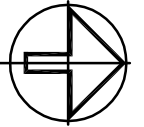
Markwick, G 2007, 'Water requirements for sheep and cattle', Primefact 326, New South Wales Department of Primary Industries, Australia.

National Health and Medical Research Council & the Natural Resource Management Ministerial Council (NHMRC & NRMCC) 2011, National Water Quality Management Strategy: Australian Drinking Water Guidelines, Updated March 2015.

NSW Environment Protection Authority 2013, *Environment Protection Licence No. 6004 - Lithgow Solid Waste Facility Licence*.

NSW Environment Protection Authority, January 1996, Environmental Guidelines: Solid Waste Landfills, NSW EPA, Chatswood.

Drawings



MB14

LITHGOW SEWERAGE
TREATMENT WORKS

LW1

MB5

MB9

ACCESS

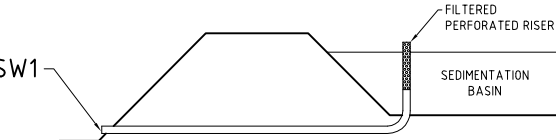
MB12

EXISTING

EXISTING CREEK

SW1

EXISTING
SEDIMENTATION
BASIN



EXISTING WHITE
GOODS AREA

MB1

MB6-B

NOTES:

1. THIS PLAN IS PREPARED FROM A FIELD SURVEY FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS ON THE LAND AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.
2. VISIBLE SERVICES HAVE BEEN LOCATED ONLY. PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITIES SHOULD BE CONTACTED FOR LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.
3. CONTOUR INTERVAL 1m.
4. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.

LEGEND:

- — — — — EXISTING TOP OF BANK
- - - - - EXISTING BOTTOM OF BANK
- - - - - EXISTING TRACK
- e — — — EXISTING ELECTRICITY
- / — — — EXISTING FENCE
- ⊗ EXISTING VEGETATION
- ▬ EXISTING ACCESS ROAD

EPA MONITORING POINTS

EPA ID No.	LOCATION	TYPE
1	MB1	GROUNDWATER
2	MB5	GROUNDWATER
3	MB6-B	GROUNDWATER
4	MB9	GROUNDWATER
5	MB10	GROUNDWATER
6	SW1	AMBIENT WATER
7	MB12	GROUNDWATER
8	MB14	GROUNDWATER
9	LW1	LEACHATE
10		LANDFILL GAS

SCALE 1:1500(A1)
0 10 20 40 60 80 100
0 10 20 40 60 80 100
SCALE 1:3000(A3)



No	DATE	DRAFTING CHECK	PM CHECK	DETAILS
A	27/06/11	LP	AB	WORKING DRAFT
B	28/09/11	LP	AB	EPL VARIATION

PROJECT
LITHGOW SOLID WASTE FACILITY LANDFILL ENVIRONMENTAL MANAGEMENT PLAN
FILE REFERENCE: 0:\Projects\211109\04\1\Cad\Lithgow\211109_04B_EV01-EV09.dwg

APPROVAL AUTHORITY
ENVIRONMENTAL PROTECTION AUTHORITY EPL : 6004

CLIENT
 CITY OF LITHGOW COUNCIL

DRAWING		
ENVIRONMENTAL MONITORING POINTS		
PROJECT NUMBER: 211109	DRAWING NUMBER: 01B_EV04	REV. B
SOURCE: CRAVEN, ELLISTON & HAYES (LITHGOW) PTY. LTD. (DRAWING No. E668-10, DATED 19/04/2010)		

Appendix A

MONITORING DATA

TABLE 1 - GROUNDWATER MONITORING DATA

Ground Water Levels: 21-Oct-14

21-Apr-15

Piezometer Details:

	Ground Elev (mAHD)	Stickup (m)	Elevation Top PVC (mAHD)	Date	Measured (m)	GWL (mAHD)	Well Depth (m)	Well Base (mAHD)	Water Column (m)
MB1	939.790	0.86	940.65	21/10/2014	NMWL	-	6.5	934.15	nil
MB5	914.940	0.8	915.74	21/10/2014	3.81	911.93	9.8	905.94	5.99
MB6	945.820	0.85	946.67	21/10/2014	NMWL	-	-	-	nil
MB6B	946.290	0.75	947.04	21/10/2014	11.41	935.63	19.3	927.74	7.89
MB9	928.260	0.69	928.95	21/10/2014	13.13	915.82	17.1	911.85	3.97
MB10	932.180	0.73	932.91	21/10/2014	6.01	926.90	13.7	919.21	7.69
MB11	915.010	0.67	915.68	21/10/2014	NMWL	-	17.9	897.82	nil
MB12	918.330	0.76	919.09	21/10/2014	8.89	910.20	22.3	896.84	13.36
MB13	914.980	0.7	915.68	21/10/2014	NMWL	-	39.4	876.28	nil
MB14	899.790	0.78	900.57	21/10/2014	2.97	897.60	17.7	882.87	14.73

	Measured (m)	GWL (mAHD)	Well Depth (m)	Well Base (mAHD)	Water Column (m)
21/04/2015	NMWL	-	6.5	934.15	nil
21/04/2015	3.56	912.18	9.8	905.94	6.24
21/04/2015	NMWL	-	-	-	nil
21/04/2015	14.98	932.06	19.3	927.74	4.32
21/04/2015	13.19	915.76	17.1	911.85	3.91
21/04/2015	6.26	926.65	13.7	919.21	7.44
21/04/2015	NMWL	-	17.9	897.82	nil
21/04/2015	9.06	910.03	22.3	896.84	13.19
21/04/2015	NMWL	-	39.4	876.28	nil
21/04/2015	3.27	897.30	17.7	882.87	14.43

Definitions:

Stickup: Height of piezometer pipe above ground surface.

Ground Elev: Actual elevation of ground at the piezometer relative to an arbitrary datum. All ground elevations are measured to the same datum, hence Piezo GWLs are relative to each other.

GWL: Actual elevation of groundwater at the piezometer relative to an arbitrary datum.

Measured: Depth of groundwater measured from the top of the piezometer pipe.

	MB1		MB5		MB6		MB6B		MB9		MB10		MB11		MB12		MB13		MB14	
	GWL		GWL		GWL		GWL		GWL		GWL		GWL		GWL		GWL			
Date	Measured	(mAHD)	Measured	(mAHD)	Measured	(mAHD)	Measured	(mAHD)	Measured	(mAHD)	Measured	(mAHD)	Measured	(mAHD)	Measured	(mAHD)	Measured	(mAHD)	Measured	
25-Oct-11	NMWL		3.20	912.54	NMWL		9.92	937.12	12.62	916.33	5.77	927.14		915.68	8.69	910.40	NMWL		2.80	897.77
8-Feb-12	5.85	934.80	3.26	912.48	NMWL		4.68	942.36	12.71	916.24	5.83	927.08	6.87	908.81	8.77	910.32	6.89	908.79	NMWL	
15-Mar-12	3.11	937.54	2.29	913.45	NMWL		7.82	939.22	11.56	917.39	5.51	927.40	6.08	909.60	7.95	911.14	6.11	909.57	2.64	897.93
24-Apr-12		940.65	2.55	913.19	NMWL		7.47	939.57	12.10	916.85	5.78	927.13	NMWL		8.24	910.85	NMWL		2.67	897.90
31-May-12	5.55	935.10	3.07	912.67	NMWL		9.71	937.33	12.73	916.22	6.04	926.87	NMWL		8.43	910.66	NMWL		2.64	897.93
30-Oct-12		940.65	3.29	912.45	NMWL		14.64	932.40	13.33	915.62	6.19	926.72	6.83	908.85	8.90	910.19	6.87	908.81	3.11	897.46
17-Apr-13	5.81	934.84	2.87	912.87	NMWL		13.55	933.49	12.80	916.15	6.10	926.81	NMWL		8.50	910.59	NMWL		2.91	897.66
23-Oct-13		940.65	3.44	912.30	NMWL		13.97	933.07	13.60	915.35	6.35	926.56	NMWL		9.01	910.08	NMWL		3.09	897.48
2-Apr-14	4.90	935.75	3.98	911.76	NMWL		11.00	936.04	13.66	915.29	5.75	927.16	NMWL		9.04	910.05	NMWL		3.20	897.37
2-Jun-14		940.65	3.96	911.78	NMWL		NMWL		NMWL		NMWL		NMWL		NMWL		NMWL		NMWL	
21-Oct-14	NMWL		3.81	911.93	NMWL		11.41	935.63	13.13	915.82	6.01	926.90	NMWL		8.89	910.20	NMWL		2.97	897.60
21-Apr-15	NMWL		3.56	912.18	NMWL		14.98	932.06	13.19	915.76	6.26	926.65	NMWL		9.06	910.03	NMWL		3.27	897.30
13-Oct-15	NMWL		3.34	912.40	NMWL		12.18	934.86	13.30	915.65	6.30	926.61	NMWL		8.35	910.74	NMWL		3.06	897.51

**TABLE 2 RESULTS OF LABORATORY ANALYSIS
OCTOBER 2014**

[illegible]

TABLE 2 RESULTS OF LABORATORY ANALYSIS
OCTOBER 2014

Sample ID			MB5	MB6	MB9	MB10	MB12	MB14	W9001	W9003
Sample Date			21/10/2014	21/10/2014	21/10/2014	21/10/2014	21/10/2014	21/10/2014	21/10/2014	21/10/2014
Analyte	LOR	Units	PS	PS	PS	PS	PS	PS	RB	FD (MB5)
C6 - C9 Fraction	20	µg/L	< 20	< 20	< 20	< 20	40	< 20	< 20	< 20
C10 - C14 Fraction	50	µg/L	< 50	50	110	< 50	70	< 50	70	< 50
C15 - C28 Fraction	100	µg/L	< 100	270	< 100	< 100	170	< 100	150	< 100
C29 - C36 Fraction	50	µg/L	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
C10 - C36 Fraction (sum)	50	µg/L	< 50	320	110	< 50	240	< 50	220	< 50
C6 - C10 Fraction	20	µg/L	< 20	< 20	< 20	< 20	40	< 20	< 20	< 20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	< 20	< 20	< 20	< 20	40	< 20	< 20	< 20
>C10 - C16 Fraction	100	µg/L	< 100	< 100	< 100	< 100	< 100	< 100	140	< 100
>C10 - C16 Fraction minus Naphthalene	100	µg/L	< 100	< 100	< 100	< 100	< 100	< 100	140	< 100
>C16 - C34 Fraction	100	µg/L	< 100	280	< 100	< 100	160	< 100	< 100	< 100
>C34 - C40 Fraction	100	µg/L	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
>C10 - C40 Fraction (sum)	100	µg/L	< 100	280	< 100	< 100	160	< 100	140	< 100
Benzene	1	µg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	2	µg/L	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Ethylbenzene	2	µg/L	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
meta- & para-Xylene	2	µg/L	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
ortho-Xylene	2	µg/L	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Total Xylenes	2	µg/L	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Sum of BTEX	1	µg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	5	µg/L	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

µS/cm microsiemens per centimetre
mg/L milligrams per litre
µg/L micrograms per litre
LOR limit of reporting
PS primary sample
RB rinsate blank
FD field duplicate

TABLE 3 RESULTS OF LABORATORY ANALYSIS
JANUARY 2015

Sample ID			SW1
Sample Date			21/01/2015
Analyte	LOR	Units	PS
pH Value	0.01	pH Unit	6.76
Electrical Conductivity @ 25°C	1	µS/cm	114
Ammonia as N	0.01	mg/L	0.18
Nitrite as N	0.01	mg/L	0.02
Nitrate as N	0.01	mg/L	0.07
Nitrite + Nitrate as N	0.01	mg/L	0.09
Total Phosphorus as P	0.01	mg/L	0.1
Suspended Solids (SS)	5	mg/L	83
Calcium	1	mg/L	7
Magnesium	1	mg/L	3
Sodium	1	mg/L	7
Potassium	1	mg/L	4
Chloride	1	mg/L	9
Sulfate as SO4 - Turbidimetric	1	mg/L	11
Fluoride	0.1	mg/L	< 0.1
Total Anions	0.01	meq/L	0.98
Total Cations	0.01	meq/L	1
Hydroxide Alkalinity as CaCO3	1	mg/L	< 1
Carbonate Alkalinity as CaCO3	1	mg/L	< 1
Bicarbonate Alkalinity as CaCO3	1	mg/L	25
Total Alkalinity as CaCO3	1	mg/L	25
Aluminium	0.01	mg/L	1.8
Chromium	0.001	mg/L	0.002
Cobalt	0.001	mg/L	0.004
Manganese	0.001	mg/L	0.529
Barium	0.001	mg/L	0.058
Iron	0.05	mg/L	1.72
Hexavalent Chromium	0.01	mg/L	< 0.01
Total Organic Carbon	1	mg/L	4
Chemical Oxygen Demand	10	mg/L	16
Phenols (Total)	0.05	mg/L	< 0.05
alpha-BHC	0.5	µg/L	< 0.5
Hexachlorobenzene (HCB)	0.5	µg/L	< 0.5
beta-BHC	0.5	µg/L	< 0.5
gamma-BHC	0.5	µg/L	< 0.5
delta-BHC	0.5	µg/L	< 0.5
Heptachlor	0.5	µg/L	< 0.5
Aldrin	0.5	µg/L	< 0.5
Heptachlor epoxide	0.5	µg/L	< 0.5
trans-Chlordane	0.5	µg/L	< 0.5
alpha-Endosulfan	0.5	µg/L	< 0.5
cis-Chlordane	0.5	µg/L	< 0.5
Dieldrin	0.5	µg/L	< 0.5
4.4`-DDE	0.5	µg/L	< 0.5
Endrin	0.5	µg/L	< 0.5
beta-Endosulfan	0.5	µg/L	< 0.5
4.4`-DDD	0.5	µg/L	< 0.5
Endrin aldehyde	0.5	µg/L	< 0.5
Endosulfan sulfate	0.5	µg/L	< 0.5
4.4`-DDT	2	µg/L	< 2
Endrin ketone	0.5	µg/L	< 0.5
Methoxychlor	2	µg/L	< 2
Total Chlordane (sum)	0.5	µg/L	< 0.5
Sum of DDD + DDE + DDT	0.5	µg/L	< 0.5
Sum of Aldrin + Dieldrin	0.5	µg/L	< 0.5
Dichlorvos	0.5	µg/L	< 0.5
Demeton-S-methyl	0.5	µg/L	< 0.5
Monocrotophos	2	µg/L	< 2
Dimethoate	0.5	µg/L	< 0.5
Diazinon	0.5	µg/L	< 0.5
Chlorpyrifos-methyl	0.5	µg/L	< 0.5
Parathion-methyl	2	µg/L	< 2
Malathion	0.5	µg/L	< 0.5
Fenthion	0.5	µg/L	< 0.5
Chlorpyrifos	0.5	µg/L	< 0.5
Parathion	2	µg/L	< 2
Pirimphos-ethyl	0.5	µg/L	< 0.5
Chlorfenvinphos	0.5	µg/L	< 0.5
Bromophos-ethyl	0.5	µg/L	< 0.5
Fenamiphos	0.5	µg/L	< 0.5
Prothiofos	0.5	µg/L	< 0.5
Ethion	0.5	µg/L	< 0.5
Carbophenothion	0.5	µg/L	< 0.5
Azinphos Methyl	0.5	µg/L	< 0.5

TABLE 3 RESULTS OF LABORATORY ANALYSIS
JANUARY 2015

Sample ID			SW1
Sample Date			21/01/2015
Analyte	LOR	Units	PS
C6 - C9 Fraction	20	µg/L	< 20
C10 - C14 Fraction	50	µg/L	< 50
C15 - C28 Fraction	100	µg/L	< 100
C29 - C36 Fraction	50	µg/L	< 50
C10 - C36 Fraction (sum)	50	µg/L	< 50
C6 - C10 Fraction	20	µg/L	< 20
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	< 20
>C10 - C16 Fraction	100	µg/L	< 100
>C10 - C16 Fraction minus Naphthalene	100	µg/L	< 100
>C16 - C34 Fraction	100	µg/L	< 100
>C34 - C40 Fraction	100	µg/L	< 100
>C10 - C40 Fraction (sum)	100	µg/L	< 100
Benzene	1	µg/L	< 1
Toluene	2	µg/L	< 2
Ethylbenzene	2	µg/L	< 2
meta- & para-Xylene	2	µg/L	< 2
ortho-Xylene	2	µg/L	< 2
Total Xylenes	2	µg/L	< 2
Sum of BTEX	1	µg/L	< 1
Naphthalene	5	µg/L	< 5

µS/cm microsiemens per centimetre
mg/L milligrams per litre
µg/L micrograms per litre
LOR limit of reporting
PS primary sample
RB rinsate blank
FD field duplicate

TABLE 4 RESULTS OF LABORATORY ANALYSIS
APRIL 2015

Sample ID			LW1	MB5	MB6	MB9	MB10	MB12	MB14	SW1	W9001	W9003
Sample Date			21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015
Analyte	LOR	Units	PS	PS	PS	PS	PS	PS	PS	PS	RB	FD (MB14)
pH Value	0.01	pH Unit	7.45	6.86	6.4	6.47	6.37	4.99	7.2	7.38	6.23	7.29
Electrical Conductivity @ 25°C	1	µS/cm	-	1530	1820	650	142	1020	776	260	11	784
Total Dissolved Solids (Calc.)	1	mg/L	-	994	1180	422	92	663	504	-	7	510
Ammonia as N	0.01	mg/L	0.3	3.5	1.59	7.35	0.31	1.8	0.19	0.52	< 0.01	0.18
Nitrite as N	0.01	mg/L	0.03	0.01	0.02	0.02	< 0.01	0.01	< 0.01	0.04	< 0.01	< 0.01
Nitrate as N	0.01	mg/L	0.81	4.54	< 0.01	0.06	0.37	< 0.01	< 0.01	4.14	< 0.01	< 0.01
Nitrite + Nitrate as N	0.01	mg/L	0.84	4.55	0.02	0.08	0.37	0.01	< 0.01	4.18	< 0.01	< 0.01
Total Phosphorus as P	0.01	mg/L	-	0.08	0.54	0.14	0.14	< 0.01	0.02	0.26	< 0.01	0.01
Suspended Solids (SS)	5	mg/L	42	-	-	-	-	-	-	366	-	-
Reactive Phosphorus as P	0.01	mg/L	-	< 0.01	< 0.05	< 0.01	< 0.01	0.02	< 0.01	-	< 0.01	< 0.01
Calcium	1	mg/L	39	99	110	42	8	35	97	24	< 1	97
Magnesium	1	mg/L	9	32	64	16	6	24	32	5	< 1	33
Sodium	1	mg/L	27	110	129	31	7	72	17	16	2	17
Potassium	1	mg/L	14	66	54	22	2	7	9	8	< 1	9
Chloride	1	mg/L	68	262	265	56	26	238	44	30	2	40
Sulfate as SO4 - Turbidimetric	1	mg/L	13	18	45	10	12	91	40	32	< 1	42
Fluoride	0.1	mg/L	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1	0.1	0.2	< 0.1	0.1
Total Anions	0.01	meq/L	4.17	15.1	20	7.04	1.74	9.07	9.27	2.69	0.1	9.36
Total Cations	0.01	meq/L	4.22	14	20.3	7.37	1.25	8.94	8.44	2.51	0.09	8.52
Ionic Balance	0.01	%	0.65	3.72	0.78	2.26	-	0.72	4.63	-	-	4.62
Total Hardness as CaCO3	1	mg/L	-	379	538	171	45	186	374	-	< 1	378
Hydroxide Alkalinity as CaCO3	1	mg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbonate Alkalinity as CaCO3	1	mg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bicarbonate Alkalinity as CaCO3	1	mg/L	99	369	580	263	38	23	360	59	2	368
Total Alkalinity as CaCO3	1	mg/L	99	369	580	263	38	23	360	59	2	368
Aluminium	0.01	mg/L	-	< 0.01	0.01	0.04	0.01	0.72	< 0.01	4.08	< 0.01	< 0.01
Chromium	0.001	mg/L	-	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.001	< 0.001
Cobalt	0.001	mg/L	-	0.005	0.002	0.022	< 0.001	0.031	< 0.001	0.003	< 0.001	< 0.001
Manganese	0.001	mg/L	0.567	0.975	2.78	3.55	0.036	1.94	0.068	0.146	< 0.001	0.068
Barium	0.001	mg/L	-	0.416	0.308	0.224	0.037	0.08	0.08	0.069	< 0.001	0.079
Iron	0.05	mg/L	2.48	0.47	45.9	28.4	0.45	33.1	1.12	3.72	< 0.05	0.99
Hexavalent Chromium	0.01	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Organic Carbon	1	mg/L	5	5	14	2	1	4	2	7	2	2
Chemical Oxygen Demand	10	mg/L	-	14	75	26	< 10	15	< 10	42	< 10	< 10
Phenols (Total)	0.05	mg/L	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
alpha-BHC	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Hexachlorobenzene (HCB)	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
beta-BHC	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
gamma-BHC	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
delta-BHC	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Heptachlor	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aldrin	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Heptachlor epoxide	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
alpha-Endosulfan	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-Chlordane	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dieldrin	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4,4'-DDE	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Endrin	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
beta-Endosulfan	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4,4'-DDD	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Endrin aldehyde	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Endosulfan sulfate	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4,4'-DDT	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Endrin ketone	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methoxychlor	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Total Chlordane (sum)	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sum of DDD + DDE + DDT	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sum of Aldrin + Dieldrin	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorvos	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Demeton-S-methyl	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Monocrotophos	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethoate	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Diazinon	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorpyrifos-methyl	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Parathion-methyl	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Malathion	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fenthion	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorpyrifos	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Parathion	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Pirimphos-ethyl	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorfenvinphos	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromophos-ethyl	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fenamiphos	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Prothiofos	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethion	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbophenothion	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Azinphos Methyl	0.5	µg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

TABLE 4 RESULTS OF LABORATORY ANALYSIS
APRIL 2015

Sample ID			LW1	MB5	MB6	MB9	MB10	MB12	MB14	SW1	W9001	W9003
Sample Date			21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015	21/04/2015
Analyte	LOR	Units	PS	PS	PS	PS	PS	PS	PS	PS	RB	FD (MB14)
C6 - C9 Fraction	20	µg/L	-	< 20	< 20	< 20	< 20	100	< 20	< 20	< 20	< 20
C10 - C14 Fraction	50	µg/L	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
C15 - C28 Fraction	100	µg/L	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
C29 - C36 Fraction	50	µg/L	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
C6 - C10 Fraction minus BTEX (F1)	20	µg/L	-	< 20	< 20	< 20	< 20	100	< 20	< 20	< 20	< 20
>C10 - C16 Fraction	100	µg/L	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
>C10 - C16 Fraction minus Naphthalene	100	µg/L	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
>C16 - C34 Fraction	100	µg/L	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
>C34 - C40 Fraction	100	µg/L	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
>C10 - C40 Fraction (sum)	100	µg/L	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Benzene	1	µg/L	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Ethylbenzene	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
meta- & para-Xylene	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
ortho-Xylene	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Total Xylenes	2	µg/L	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Sum of BTEX	1	µg/L	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	5	µg/L	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

µS/cm

microsiemens per centimetre

mg/L

milligrams per litre

µg/L

micrograms per litre

LOR

limit of reporting

PS

primary sample

RB

rinsate blank

FD

field duplicate

Appendix B

LABORATORY ANALYSIS REPORTS

CERTIFICATE OF ANALYSIS

Work Order	: ES1423199	Page	: 1 of 12
Client	: LITHGOW CITY COUNCIL	Laboratory	: Environmental Division Sydney
Contact	: MS KERRY FRAGAR	Contact	: Client Services
Address	: PO Box 19 LITHGOW NSW 2790	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: kfragar@geolyse.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 6362 1055	Telephone	: +61-2-8784 8555
Facsimile	: +61 6361 8178	Facsimile	: +61-2-8784 8500
Project	: 200280 LITHGOW LANDFILL	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 070865-ENVR	Date Samples Received	: 23-OCT-2014
C-O-C number	: ----	Issue Date	: 30-OCT-2014
Sampler	: DL	No. of samples received	: 8
Site	: LITHGOW LANDFILL	No. of samples analysed	: 8
Quote number	: SY/476/14		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.**
- **EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.**
- **EP80: Positive results have been confirmed by re-analysis.**

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	MB5	MB6	MB9	MB10	MB12
Client sampling date / time					21-OCT-2014 03:30	21-OCT-2014 02:30	21-OCT-2014 11:30	21-OCT-2014 01:30	21-OCT-2014 10:30
Compound	CAS Number	LOR	Unit	ES1423199-001	ES1423199-002	ES1423199-003	ES1423199-004	ES1423199-005	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	6.72	6.77	6.55	6.41	4.16	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	995	4010	736	137	1130	
EA016: Non Marine - Estimated TDS Salinity									
Total Dissolved Solids (Calc.)	----	1	mg/L	647	2610	478	89	734	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	237	885	156	36	160	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	273	1160	251	28	<1	
Total Alkalinity as CaCO3	----	1	mg/L	273	1160	251	28	<1	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	29	152	20	14	110	
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L	134	635	75	23	275	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	62	196	36	6	28	
Magnesium	7439-95-4	1	mg/L	20	96	16	5	22	
Sodium	7440-23-5	1	mg/L	91	497	49	9	102	
Potassium	7440-09-7	1	mg/L	53	154	54	2	10	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	0.02	0.04	0.06	6.19	
Barium	7440-39-3	0.001	mg/L	0.225	0.367	0.228	0.032	0.070	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	<0.001	<0.001	0.001	
Cobalt	7440-48-4	0.001	mg/L	0.003	0.012	0.014	<0.001	0.047	
Manganese	7439-96-5	0.001	mg/L	0.622	1.67	2.68	0.020	1.48	
Iron	7439-89-6	0.05	mg/L	<0.05	9.77	10.4	0.60	29.3	
EG050F: Dissolved Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.2	<0.1	<0.1	0.1	
EK055G: Ammonia as N by Discrete Analyser									



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				MB5	MB6	MB9	MB10	MB12
				21-OCT-2014 03:30	21-OCT-2014 02:30	21-OCT-2014 11:30	21-OCT-2014 01:30	21-OCT-2014 10:30
Compound	CAS Number	LOR	Unit	ES1423199-001	ES1423199-002	ES1423199-003	ES1423199-004	ES1423199-005
EK055G: Ammonia as N by Discrete Analyser - Continued								
Ammonia as N	7664-41-7	0.01	mg/L	2.34	0.27	8.28	0.05	4.42
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	0.11	0.05	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	6.09	0.36	0.06	0.60	0.05
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	6.20	0.41	0.06	0.60	0.05
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.15	0.05	0.07	0.06	<0.01
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	9.84	44.2	7.55	1.50	10.0
Total Cations	----	0.01	meq/L	10.0	43.2	----	1.15	----
Total Cations	----	0.01	meq/L	----	----	7.22	----	10.1
Ionic Balance	----	0.01	%	1.09	1.16	----	----	----
Ionic Balance	----	0.01	%	----	----	2.27	----	0.38
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	7	32	4	2	5
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	13	98	12	11	24
EP035G: Total Phenol by Discrete Analyser								
Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				MB5	MB6	MB9	MB10	MB12
				21-OCT-2014 03:30	21-OCT-2014 02:30	21-OCT-2014 11:30	21-OCT-2014 01:30	21-OCT-2014 10:30
Compound	CAS Number	LOR	Unit	ES1423199-001	ES1423199-002	ES1423199-003	ES1423199-004	ES1423199-005
EP068A: Organochlorine Pesticides (OC) - Continued								
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4,4'-DDT	50-29-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Methoxychlor	72-43-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of DDD + DDE + DDT	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				MB5	MB6	MB9	MB10	MB12
				21-OCT-2014 03:30	21-OCT-2014 02:30	21-OCT-2014 11:30	21-OCT-2014 01:30	21-OCT-2014 10:30
Compound	CAS Number	LOR	Unit	ES1423199-001	ES1423199-002	ES1423199-003	ES1423199-004	ES1423199-005
EP068B: Organophosphorus Pesticides (OP) - Continued								
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	40
C10 - C14 Fraction	----	50	µg/L	<50	50	110	<50	70
C15 - C28 Fraction	----	100	µg/L	<100	270	<100	<100	170
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	320	110	<50	240
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	40
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	40
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	280	<100	<100	160
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	280	<100	<100	160
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	77.5	83.8	82.7	73.1	78.3
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	73.9	74.2	91.5	85.9	72.8
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	99.2	94.2	96.7	99.6	98.2
Toluene-D8	2037-26-5	0.1	%	99.6	109	101	100	98.6
4-Bromofluorobenzene	460-00-4	0.1	%	93.6	95.3	94.7	95.7	93.1

Sub-Matrix: **GROUNDWATER** (Matrix: **WATER**)

Client sample ID

Client sampling date / time

Sub-Matrix: GROUNDWATER (Matrix: WATER)		Client sample ID		MB5	MB6	MB9	MB10	MB12
Client sampling date / time				21-OCT-2014 03:30	21-OCT-2014 02:30	21-OCT-2014 11:30	21-OCT-2014 01:30	21-OCT-2014 10:30
Compound	CAS Number	LOR	Unit	ES1423199-001	ES1423199-002	ES1423199-003	ES1423199-004	ES1423199-005
EP080S: TPH(V)/BTEX Surrogates - Continued								

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID		MB14		W9001		W9003		----		----	
				Client sampling date / time		21-OCT-2014 04:20		21-OCT-2014 03:30		21-OCT-2014 03:30		----		----	
Compound		CAS Number	LOR	Unit	ES1423199-006		ES1423199-007		ES1423199-008		----		----		
EA005P: pH by PC Titrator															
pH Value		----	0.01	pH Unit	7.37		6.36		6.77		----		----		
EA010P: Conductivity by PC Titrator															
Electrical Conductivity @ 25°C		----	1	µS/cm	790		11		994		----		----		
EA016: Non Marine - Estimated TDS Salinity															
Total Dissolved Solids (Calc.)		----	1	mg/L	514		7		646		----		----		
EA065: Total Hardness as CaCO3															
Total Hardness as CaCO3		----	1	mg/L	396		<1		241		----		----		
ED037P: Alkalinity by PC Titrator															
Hydroxide Alkalinity as CaCO3		DMO-210-001	1	mg/L	<1		<1		<1		----		----		
Carbonate Alkalinity as CaCO3		3812-32-6	1	mg/L	<1		<1		<1		----		----		
Bicarbonate Alkalinity as CaCO3		71-52-3	1	mg/L	360		3		272		----		----		
Total Alkalinity as CaCO3		----	1	mg/L	360		3		272		----		----		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA															
Sulfate as SO4 - Turbidimetric		14808-79-8	1	mg/L	41		<1		28		----		----		
ED045G: Chloride Discrete analyser															
Chloride		16887-00-6	1	mg/L	40		2		133		----		----		
ED093F: Dissolved Major Cations															
Calcium		7440-70-2	1	mg/L	101		<1		62		----		----		
Magnesium		7439-95-4	1	mg/L	35		<1		21		----		----		
Sodium		7440-23-5	1	mg/L	22		2		86		----		----		
Potassium		7440-09-7	1	mg/L	11		<1		46		----		----		
EG020F: Dissolved Metals by ICP-MS															
Aluminium		7429-90-5	0.01	mg/L	<0.01		0.02		0.05		----		----		
Barium		7440-39-3	0.001	mg/L	0.078		<0.001		0.234		----		----		
Chromium		7440-47-3	0.001	mg/L	<0.001		<0.001		<0.001		----		----		
Cobalt		7440-48-4	0.001	mg/L	<0.001		<0.001		0.003		----		----		
Manganese		7439-96-5	0.001	mg/L	0.095		<0.001		0.629		----		----		
Iron		7439-89-6	0.05	mg/L	1.80		<0.05		0.06		----		----		
EG050F: Dissolved Hexavalent Chromium															
Hexavalent Chromium		18540-29-9	0.01	mg/L	<0.01		<0.01		<0.01		----		----		
EK040P: Fluoride by PC Titrator															
Fluoride		16984-48-8	0.1	mg/L	0.3		<0.1		<0.1		----		----		
EK055G: Ammonia as N by Discrete Analyser															



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				MB14	W9001	W9003	----	----
				21-OCT-2014 04:20	21-OCT-2014 03:30	21-OCT-2014 03:30	----	----
Compound	CAS Number	LOR	Unit	ES1423199-006	ES1423199-007	ES1423199-008	----	----
EK055G: Ammonia as N by Discrete Analyser - Continued								
Ammonia as N	7664-41-7	0.01	mg/L	0.21	<0.01	2.13	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	<0.01	<0.01	0.11	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.06	0.02	6.40	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.02	6.51	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.03	<0.01	0.15	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	9.17	0.12	9.77	----	----
Total Cations	----	0.01	meq/L	9.16	0.09	9.74	----	----
Ionic Balance	----	0.01	%	0.07	----	0.14	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	3	<1	7	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	<10	<10	10	----	----
EP035G: Total Phenol by Discrete Analyser								
Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	<0.05	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	----	----
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	----	----
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				MB14	W9001	W9003	----	----
				21-OCT-2014 04:20	21-OCT-2014 03:30	21-OCT-2014 03:30	----	----
Compound	CAS Number	LOR	Unit	ES1423199-006	ES1423199-007	ES1423199-008	----	----
EP068A: Organochlorine Pesticides (OC) - Continued								
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
4,4'-DDT	50-29-3	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Methoxychlor	72-43-5	2.0	µg/L	<2.0	<2.0	<2.0	----	----
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
^ Sum of DDD + DDE + DDT	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				MB14	W9001	W9003	----	----
				21-OCT-2014 04:20	21-OCT-2014 03:30	21-OCT-2014 03:30	----	----
Compound	CAS Number	LOR	Unit	ES1423199-006	ES1423199-007	ES1423199-008	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	<50	70	<50	----	----
C15 - C28 Fraction	----	100	µg/L	<100	150	<100	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	220	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	140	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	140	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	140	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	72.0	72.6	79.1	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	76.2	76.4	88.0	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	94.8	97.3	103	----	----
Toluene-D8	2037-26-5	0.1	%	99.7	94.0	96.3	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	96.4	90.1	93.9	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	30	120
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	26.8	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

CERTIFICATE OF ANALYSIS

Work Order	: ES1501526	Page	: 1 of 7
Client	: LITHGOW CITY COUNCIL	Laboratory	: Environmental Division Sydney
Contact	: MS KERRY FRAGAR	Contact	: Client Services
Address	: PO Box 19 LITHGOW NSW 2790	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: kfragar@geolyse.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 6362 1055	Telephone	: +61-2-8784 8555
Facsimile	: +61 6361 8178	Facsimile	: +61-2-8784 8500
Project	: 200280 LITHGOW LANDFILL	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 075306-ENV	Date Samples Received	: 23-JAN-2015
C-O-C number	: ----	Issue Date	: 02-FEB-2015
Sampler	: DL	No. of samples received	: 1
Site	: ----	No. of samples analysed	: 1
Quote number	: SY/476/14		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW1	----	----	----	----
Client sampling date / time				21-JAN-2015 03:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1501526-001	----	----	----	----	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	6.76	----	----	----	----	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	114	----	----	----	----	
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L	83	----	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	25	----	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	25	----	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	11	----	----	----	----	
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L	9	----	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	7	----	----	----	----	
Magnesium	7439-95-4	1	mg/L	3	----	----	----	----	
Sodium	7440-23-5	1	mg/L	7	----	----	----	----	
Potassium	7440-09-7	1	mg/L	4	----	----	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	1.80	----	----	----	----	
Barium	7440-39-3	0.001	mg/L	0.058	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	0.002	----	----	----	----	
Cobalt	7440-48-4	0.001	mg/L	0.004	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.529	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	1.72	----	----	----	----	
EG050F: Dissolved Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.18	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									



Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

				SW1	----	----	----	----
Client sampling date / time				21-JAN-2015 03:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501526-001	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser - Continued								
Nitrite as N	----	0.01	mg/L	0.02	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.07	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.09	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.10	----	----	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	0.98	----	----	----	----
Total Cations	----	0.01	meq/L	1.00	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	4	----	----	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	16	----	----	----	----
EP035G: Total Phenol by Discrete Analyser								
Phenols (Total)	----	0.05	mg/L	<0.05	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L	<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L	<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L	<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L	<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L	<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L	<0.5	----	----	----	----
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L	<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	----	----	----	----
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	----	----	----	----



Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

Client sampling date / time

				SW1	----	----	----	----
				21-JAN-2015 03:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501526-001	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued								
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	----	----	----	----
4,4'-DDT	50-29-3	2.0	µg/L	<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L	<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	----	0.5	µg/L	<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----



Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

				SW1	----	----	----	----
Client sampling date / time				21-JAN-2015 03:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1501526-001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	93.4	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	71.1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	90.0	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	109	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	118	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	30	120
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	26.8	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: ES1520253	Page	: 1 of 12
Amendment	: 1		
Client	: LITHGOW CITY COUNCIL	Laboratory	: Environmental Division Sydney
Contact	: MR BRENDON STUART	Contact	:
Address	: PO Box 19 LITHGOW NSW 2790	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: bstuart@geolyse.com	E-mail	:
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 200280, Lithgow Landfill	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 070865-ENVR	Date Samples Received	: 22-Apr-2015 17:45
C-O-C number	: ----	Date Analysis Commenced	: 22-Apr-2015
Sampler	: DEAN LAVERS	Issue Date	: 30-Apr-2015 16:23
Site	: ----		
Quote number	: ----	No. of samples received	: 10
		No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Edwandy Fadjjar	Organic Coordinator	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- EK071G: LOR raised for Reactive Phosphorus analysis on sample ID: MB 10, due to matrix interferences.
- It has been noted that Reactive P is greater than Total P for sample 5, however this difference is within the limits of experimental variation.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB5	MB6	MB9	MB10	MB12
Client sampling date / time					21-Apr-2015 02:30	21-Apr-2015 01:00	21-Apr-2015 07:00	21-Apr-2015 08:00	21-Apr-2015 09:30
Compound	CAS Number	LOR	Unit		ES1520253-001	ES1520253-002	ES1520253-003	ES1520253-004	ES1520253-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		6.86	6.40	6.47	6.37	4.99
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		1530	1820	650	142	1020
EA016: Calculated TDS (from Electrical Conductivity)									
^ Total Dissolved Solids (Calc.)	----	1	mg/L		994	1180	422	92	663
EA025: Suspended Solids									
^ Suspended Solids (SS)	----	5	mg/L		----	----	----	----	----
EA065: Total Hardness as CaCO3									
^ Total Hardness as CaCO3	----	1	mg/L		379	538	171	45	186
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		369	580	263	38	23
Total Alkalinity as CaCO3	----	1	mg/L		369	580	263	38	23
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		18	45	10	12	91
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		262	265	56	26	238
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		99	110	42	8	35
Magnesium	7439-95-4	1	mg/L		32	64	16	6	24
Sodium	7440-23-5	1	mg/L		110	129	31	7	72
Potassium	7440-09-7	1	mg/L		66	54	22	2	7
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	0.01	0.04	0.01	0.72
Barium	7440-39-3	0.001	mg/L		0.416	0.308	0.224	0.037	0.080
Chromium	7440-47-3	0.001	mg/L		<0.001	0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		0.005	0.002	0.022	<0.001	0.031
Manganese	7439-96-5	0.001	mg/L		0.975	2.78	3.55	0.036	1.94
Iron	7439-89-6	0.05	mg/L		0.47	45.9	28.4	0.45	33.1
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	----	----	----
Barium	7440-39-3	0.001	mg/L		----	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB5	MB6	MB9	MB10	MB12
Client sampling date / time					21-Apr-2015 02:30	21-Apr-2015 01:00	21-Apr-2015 07:00	21-Apr-2015 08:00	21-Apr-2015 09:30
Compound	CAS Number	LOR	Unit		ES1520253-001	ES1520253-002	ES1520253-003	ES1520253-004	ES1520253-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L		----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		----	----	----	----	----
Iron	7439-89-6	0.05	mg/L		----	----	----	----	----
EG050F: Dissolved Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.2	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		3.50	1.59	7.35	0.31	1.80
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		0.01	0.02	0.02	<0.01	0.01
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		4.54	<0.01	0.06	0.37	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		4.55	0.02	0.08	0.37	0.01
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.08	0.54	0.14	0.14	<0.01
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.05	<0.01	<0.01	0.02
EN055: Ionic Balance									
^ Total Anions	----	0.01	meq/L		15.1	20.0	7.04	1.74	9.07
Total Cations	----	0.01	meq/L		----	20.3	7.37	----	8.94
^ Total Cations	----	0.01	meq/L		14.0	----	----	1.25	----
Ionic Balance	----	0.01	%		----	0.78	2.26	----	0.72
^ Ionic Balance	----	0.01	%		3.72	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		5	14	2	1	4
EP026SP: Chemical Oxygen Demand (Spectrophotometric)									
Chemical Oxygen Demand	----	10	mg/L		14	75	26	<10	15
EP035G: Total Phenol by Discrete Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	0.06	<0.05	<0.05	<0.05
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				MB5	MB6	MB9	MB10	MB12
Client sampling date / time				21-Apr-2015 02:30	21-Apr-2015 01:00	21-Apr-2015 07:00	21-Apr-2015 08:00	21-Apr-2015 09:30
Compound	CAS Number	LOR	Unit	ES1520253-001	ES1520253-002	ES1520253-003	ES1520253-004	ES1520253-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4,4'-DDT	50-29-3	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Methoxychlor	72-43-5	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of DDD + DDE + DDT	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Monocrotophos	6923-22-4	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Parathion	56-38-2	2	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB5	MB6	MB9	MB10	MB12
Client sampling date / time				21-Apr-2015 02:30	21-Apr-2015 01:00	21-Apr-2015 07:00	21-Apr-2015 08:00	21-Apr-2015 09:30	
Compound	CAS Number	LOR	Unit	ES1520253-001	ES1520253-002	ES1520253-003	ES1520253-004	ES1520253-005	
				Result	Result	Result	Result	Result	
EP068B: Organophosphorus Pesticides (OP) - Continued									
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	100	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	100	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	100	
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%	89.9	95.6	103	76.6	78.4	
EP068T: Organophosphorus Pesticide Surrogate									



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MB5	MB6	MB9	MB10	MB12
Client sampling date / time				21-Apr-2015 02:30	21-Apr-2015 01:00	21-Apr-2015 07:00	21-Apr-2015 08:00	21-Apr-2015 09:30
Compound	CAS Number	LOR	Unit	ES1520253-001	ES1520253-002	ES1520253-003	ES1520253-004	ES1520253-005
				Result	Result	Result	Result	Result
EP068T: Organophosphorus Pesticide Surrogate - Continued								
DEF	78-48-8	0.5	%	90.2	98.1	102	75.8	87.4
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	115	98.2	102	96.0	105
Toluene-D8	2037-26-5	2	%	116	119	112	84.5	119
4-Bromofluorobenzene	460-00-4	2	%	116	107	121	97.9	109



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB14	W9001	W9003	SW1	L2
Client sampling date / time					21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 11:00	21-Apr-2015 03:30
Compound	CAS Number	LOR	Unit		ES1520253-006	ES1520253-007	ES1520253-008	ES1520253-009	ES1520253-010
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.20	6.23	7.29	7.38	7.45
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		776	11	784	260	----
EA016: Calculated TDS (from Electrical Conductivity)									
^ Total Dissolved Solids (Calc.)	----	1	mg/L		504	7	510	----	----
EA025: Suspended Solids									
^ Suspended Solids (SS)	----	5	mg/L		----	----	----	366	42
EA065: Total Hardness as CaCO3									
^ Total Hardness as CaCO3	----	1	mg/L		374	<1	378	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		360	2	368	59	99
Total Alkalinity as CaCO3	----	1	mg/L		360	2	368	59	99
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		40	<1	42	32	13
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		44	2	40	30	68
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		97	<1	97	24	39
Magnesium	7439-95-4	1	mg/L		32	<1	33	5	9
Sodium	7440-23-5	1	mg/L		17	2	17	16	27
Potassium	7440-09-7	1	mg/L		9	<1	9	8	14
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Barium	7440-39-3	0.001	mg/L		0.080	<0.001	0.079	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Manganese	7439-96-5	0.001	mg/L		0.068	<0.001	0.068	----	----
Iron	7439-89-6	0.05	mg/L		1.12	<0.05	0.99	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	----	4.08	----
Barium	7440-39-3	0.001	mg/L		----	----	----	0.069	----
Chromium	7440-47-3	0.001	mg/L		----	----	----	0.003	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB14	W9001	W9003	SW1	L2
Client sampling date / time					21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 11:00	21-Apr-2015 03:30
Compound	CAS Number	LOR	Unit		ES1520253-006	ES1520253-007	ES1520253-008	ES1520253-009	ES1520253-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L		----	----	----	0.003	----
Manganese	7439-96-5	0.001	mg/L		----	----	----	0.146	0.567
Iron	7439-89-6	0.05	mg/L		----	----	----	3.72	2.48
EG050F: Dissolved Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.1	<0.1	0.1	0.2	<0.1
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.19	<0.01	0.18	0.52	0.30
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L		<0.01	<0.01	<0.01	0.04	0.03
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	<0.01	4.14	0.81
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	<0.01	4.18	0.84
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.02	<0.01	0.01	0.26	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EN055: Ionic Balance									
^ Total Anions	----	0.01	meq/L		9.27	0.10	9.36	2.69	4.17
Total Cations	----	0.01	meq/L		----	----	----	----	----
^ Total Cations	----	0.01	meq/L		8.44	0.09	8.52	2.51	4.22
Ionic Balance	----	0.01	%		----	----	----	----	----
^ Ionic Balance	----	0.01	%		4.63	----	4.62	----	0.65
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		2	2	2	7	5
EP026SP: Chemical Oxygen Demand (Spectrophotometric)									
Chemical Oxygen Demand	----	10	mg/L		<10	<10	<10	42	----
EP035G: Total Phenol by Discrete Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				MB14	W9001	W9003	SW1	L2
Client sampling date / time				21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 11:00	21-Apr-2015 03:30
Compound	CAS Number	LOR	Unit	ES1520253-006	ES1520253-007	ES1520253-008	ES1520253-009	ES1520253-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
4,4'-DDT	50-29-3	2	µg/L	<2.0	<2.0	<2.0	<2.0	----
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Methoxychlor	72-43-5	2	µg/L	<2.0	<2.0	<2.0	<2.0	----
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
^ Sum of DDD + DDE + DDT	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Monocrotophos	6923-22-4	2	µg/L	<2.0	<2.0	<2.0	<2.0	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	<2.0	<2.0	----
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Parathion	56-38-2	2	µg/L	<2.0	<2.0	<2.0	<2.0	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB14	W9001	W9003	SW1	L2
Client sampling date / time				21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 11:00	21-Apr-2015 03:30	
Compound	CAS Number	LOR	Unit	ES1520253-006	ES1520253-007	ES1520253-008	ES1520253-009	ES1520253-010	
				Result	Result	Result	Result	Result	
EP068B: Organophosphorus Pesticides (OP) - Continued									
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----	
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----	
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----	
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----	
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----	
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----	
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%	91.5	96.0	75.6	92.4	----	
EP068T: Organophosphorus Pesticide Surrogate									



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MB14	W9001	W9003	SW1	L2
Client sampling date / time				21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 04:30	21-Apr-2015 11:00	21-Apr-2015 03:30
Compound	CAS Number	LOR	Unit	ES1520253-006	ES1520253-007	ES1520253-008	ES1520253-009	ES1520253-010
				Result	Result	Result	Result	Result
EP068T: Organophosphorus Pesticide Surrogate - Continued								
DEF	78-48-8	0.5	%	96.5	100	73.8	103	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	109	100	102	109	----
Toluene-D8	2037-26-5	2	%	120	94.8	97.6	105	----
4-Bromofluorobenzene	460-00-4	2	%	114	110	112	118	----