ARCADIS Design & Consultancy for natural and built assets

ENVIROGUARD ERSKINE PARK DECEMBER 2017 QUARTERLY GROUNDWATER MONITORING EVENT

85-87 Quarry Road, Erskine Park, NSW

18 JANUARY 2018

Incorporating

Environmental Strategies

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ENVIROGUARD ERSKINE PARK 17272

DECEMBER 2017 QUARTERLY GROUNDWATER MONITORING EVENT

85-87 Quarry Road, Erskine Park, NSW

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This report has been prepared for Enviroguard Erskine Park in accordance with the terms and conditions of appointment for 17272 dated 15 September 2017. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289), incorporating Environmental Strategies Pty Ltd (ABN 91 104 512 816) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party

REVISIONS

Revision	Date	Description	Prepared by	Approved by
01	18.1.18	Draft report	GB	LM

CONTENTS

APPENDICES

1 INTRODUCTION

Arcadis Australia Pacific Pty Ltd (Arcadis) was engaged by Enviroguard Pty Ltd to undertake the December 2017 quarterly groundwater sampling from 13 monitoring wells (i.e. BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23 and BH24) at the Enviroguard Erskine Park Landfill site located at 85-87 Quarry Road, Erskine Park, NSW. This quarterly groundwater monitoring was undertaken in compliance with the premises Environmental Protection License (EPL) 4865. Details of scope of works, results obtained from analysis of groundwater samples, discussion of results and laboratory control measures are included in this report.

The location of the site is indicated on **Figure 1** in **Appendix A**. A detailed site layout plan is presented as **Figure 2** (**Appendix B**).

1.1 Scope of Work

To meet the project objectives Arcadis has completed the following scope of works:

- Gauging, purging and sampling of thirteen existing monitoring wells (i.e. BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23 and BH24) in compliance with the premises Environmental Protection License (EPL) 4865;
- Measurement of field parameters (pH, conductivity, redox potential, dissolved oxygen and temperature) in each of the thirteen monitoring wells;
- Sampling and analysis of groundwater extracted from each of the thirteen monitoring wells for a prescribed list of analytes (TDS, TOC, ammonia, cations, anions and alkalinity);
- Collection of Quality Assurance and Quality Control (QA/QC), including one duplicate, one triplicate and one rinsate sample, samples for above analytes; and
- Preparation of a quarterly groundwater monitoring report detailing the monitoring results and identifying any changes in water quality.

2 LIMITATIONS

The findings of this report are based on the scope of work outlined in **Section 1.1**. Arcadis performed its services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties, expressed or implied are made.

Subject to the scope of work, Arcadis' assessment was limited strictly to identifying the environmental conditions associated with the subject property and does not include evaluation of any other issues. The absence of any identified hazardous or toxic materials should not be interpreted as a guarantee that such materials do not exist on the subject property.

Additionally, unless otherwise stated Arcadis did not conduct soil, air, wastewater or other matrix analyses including asbestos or perform contaminated sampling of any kind. Nor did Arcadis investigate any waste material from the property that may have been disposed of at the site, or undertake an assessment or review of related site waste management practices.

The results of this assessment are based upon (if undertaken as part of the scope work) collection and analysis of groundwater samples in accordance with the requirements of EPL 4865. All conclusions and recommendations regarding the property are the professional opinions of the Arcadis personnel involved with the project, subject to the qualifications made above.

All conclusions and recommendations regarding the property are the professional opinions of the Arcadis personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements or sources outside of Arcadis, or developments resulting from situations outside the scope of this project.

Arcadis is not engaged in environmental assessment and reporting for the purpose of advertising sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity purposes. The client acknowledges that this report is for the exclusive use of the client.

3 SITE CHARACTERISTICS

3.1 Site Setting & History

The subject site is the Enviroguard Erskine Park Landfill, located at 50 Quarry Road, Erskine Park within the Penrith Local Government Area (LGA), approximately 40 km west of the Sydney Central Business District (CBD). Legally, prior to 2006, the site was known as Lots 91, 92 and 93 within DP 838541 with areas totalling 17.227 ha, 3.804 ha and 147.56 ha respectively. Lot 91 was owned by Enviroguard whilst Lot 92 was leased by CSR and encompassed site offices, a workshop and weighbridge. Lot 93, previously open grazing land, was owned by CSR prior to commercial industrial development (CES 2009).

Following subdivision during March 2006, DP 838541 became DP 1094504 and Lot 91 was increased in area and renamed Lot 4. Lot 92 was renamed Lot 6 and Lot 93 was additionally subdivided. As a result, the site is now legally known as Lot 4, part Lot 5 and Lot 6 within DP 1094505.

Historical information (CES 2009), indicates that the site operated as a former CSR quarry that mined breccia from the Erskine Park diatrime. Landfill activities are contained within the void created during the former mining activities. Currently operating under Environmental Protection Licence number 4865, the site is licensed to accept General Solid Waste (non-putrescible).

3.2 Surrounding Land Uses

The site is located in a mainly industrial and commercial area, surrounded by the following land uses:

- **North:** the area to the north is currently being developed with commercial/ industrial properties to the north east.
- **South:** Commercial/industrial properties such as Devondale Murray Goulburn and undeveloped land beyond.
- **West:** Enviroguard Erskine Park administration and weighbridge with properties associated with construction, logistics and transport beyond.
- **East:** Commercial/industrial properties such as Darley Aluminium, Bluescope Western Sydney Service Centre.

4 SAMPLING, ANALYSIS PLAN AND INVESTIGATION METHODOLOGY

This section outlines the methodology adopted by Arcadis during this GME. This section also provides details on the sampling, analysis, description of field equipment used, decontamination procedures, field and laboratory quality assurance and control, laboratory analytical methods and sample preservation.

4.1 Data Quality Objectives

The DQO process is a systematic planning tool based on the scientific method for establishing criteria for data quality and for developing data collection designs. The DQO defines the experimental process required to test a hypothesis. The DQO process has been developed to ensure that efforts relating to data collection are cost effective, by eliminating unnecessary, duplicative or overly precise data whilst at the same time, ensuring the data collected is of sufficient quality and quantity to support defensible decision making.

It is recognised that the most efficient way to accomplish these goals is to establish criteria for defensible decision making before data collection begins and develop a data collection design based on these criteria.

The DQO process consists of seven steps, which are designed to clarify the study objectives, define the appropriate type of data and specify tolerable levels of potential decision errors. The seven-step DQO process adopted for this GME can be summarised as:

- Step 1: State the Problem – concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem;
- Step 2: Identify the Decision – identify what questions the study will attempt to resolve, and what actions may result;
- Step 3: Identify the Inputs to the Decision – identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement;
- Step 4: Define the Study Boundaries – specify the time periods and spatial area to which decisions will apply. Determine when and where data should be collected;
- Step 5: Develop a Decision Rule – define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions;
- Step 6: Specify Tolerable Limits on Decision Errors – define the decision maker's tolerable decision error rates1 based on a consideration of the consequences of making an incorrect decision; and
- Step 7: Optimise the Design –evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

The DQOs for this GME are provided in **Table 4.1** and were derived in general accordance with *AS 4482.1-2005.*

Table 4.1 Project DQOs.

Step	Detail
State the Problem	To assess whether impact from landfilling at the site is present in groundwater and to make recommendation for further investigation/remediation/management if required.
Identify the Decision	If elevated concentrations of COPCs were identified at the site: ▪ What is the extent of the impact? ▪ Does any COPCs at the subject site occur at concentrations that pose or may pose an unacceptable liability or risk to the environment and/or human health to persons who will utilize the site or off site users? ▪ If so what is the order of priority to minimise the risk and what additional measures are required to mitigate or manage the risk?
Identify the Inputs to the Decision	Key data required to resolve the project problem included concentrations of COPCs in the groundwater collected in the study area. The COPCs selected were based on the sites EPL (EPL 4865).
Define the Study Boundaries	This report was restricted to the physical site boundaries as shown in **Figure 2,** Error! Reference source not found. **A**. The temporal boundaries of the study were limited to the date that the investigation was completed listed in **Section 2**.
Develop a Decision Rule	If the concentrations of COPCs in the groundwater are reported to be below the relevant adopted guidelines, then the groundwater will be deemed suitable and no management/remediation options will be proposed for the continued land use at the site. If, however, the concentration of one or more COPCs is greater than the adopted guidelines, further investigation/remediation/management will be recommended, where required to make the site suitable for the current use.
Specify Tolerable Limits on Decision Errors	The acceptable limits for water are as follows: ▪ % RPD for laboratory duplicates for analysis is less than 60%; and ▪ Recovery of matrix spikes and surrogate spikes is as per the laboratory's Quality Assurance targets accepted under their NATA accreditation. ▪ Precision is measured using the standard deviation 'SD' or Relative Percent Difference '%RPD'. Replicate data for field duplicates of organics is expected to be as follows: ▪ RPD criteria of 50% or less, for concentrations > or = 10 times PQL; ▪ RPD criteria of 75% or less, for concentrations between 5 and 10 times the PQL; and ▪ RPD criteria of 100% or less, for concentrations < 5 times PQL. ▪ Replicate data for field duplicates for inorganics, including metals is expected to be as follows: ▪ RPD criteria of 30% or less, for concentrations > or = 10 times PQL; ▪ RPD criteria of 75% or less, for concentrations between 5 and 10 times the PQL; and ▪ RPD criteria of 100% or less, for concentrations < 5 times PQL.

Step	Detail
	Where acceptable limits for field duplicates were not met, a discussion on low or high biased errors will be provided.
Optimise the Design	Groundwater samples were collected at locations where historical monitoring wells were sampled.

5 GROUNDWATER SAMPLING METHODOLOGY

Groundwater gauging and sampling were conducted by Arcadis Environmental Scientists Jack O'Shaughnessy and Caitlain Regena on the 20th December 2017.

Prior to sampling, each groundwater well was gauged with an interface probe to measure groundwater levels. All monitoring wells were then purged using a QED micropurge and dedicated Well Wizard bladder pump. The pump in groundwater monitoring well BH15B and BH22 was found to be faulty and therefore in this instance the wells were purged using a disposable bailer.

Water quality parameters recorded included pH, redox potential (ORP), electrical conductivity (EC), dissolved oxygen (DO) and temperature (°C) for all groundwater wells. All groundwater wells were purged until groundwater parameters stabilised to within 10% of the previous reading for two consecutive readings and a stabilised standing water level.

Groundwater samples were placed directly into appropriately preserved laboratory supplied sampling containers.

Dedicated tubing was used at each monitoring well and the interface probe and pump were thoroughly decontaminated between gauging events with a phosphate free detergent, rinsed with potable water and a then thoroughly rinse in a bucket of deionised water. Field records of purging and sampling event are provided in **Appendix B**.

6 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

6.1 Field QA/QA

6.1.1 Decontamination Procedures Carried out Between Sampling Events

Several items were re-used during the groundwater monitoring event at the site. These included oil-water interface probe, QED sampling pump and field water quality meter.

Prior to being used at the site and between sampling locations, these items were sprayed or placed in a bucket containing a mix of phosphate free detergent scrubbed with a brush, rinsed in a bucket containing tap water and then thoroughly rinsed in a bucket of deionised water.

Arcadis considers this to be a suitable method of decontamination during the GME works.

6.1.2 Chain of Custody Details

Samples were transferred to the laboratory under chain-of-custody (CoC) procedures. The details included on the chain-of-custody forms included the following:

- Job name and number
- List of samples
- Analysis required
- Date sampled
- Date results are required
- Release signature and date
- Acceptance signature and date

CoC's are provided in **Appendix C** along with the laboratory reports.

6.1.3 Rinsate Sample Results

A rinsate sample was not collected as dedicated pumps and tubing were used in each groundwater monitoring well.

6.1.4 Sample Splitting Techniques

Groundwater samples were prepared in the field by collecting split or separate samples from the tubing at the same depth and by filling the required number of sample bottles concurrently with the primary samples to ensure that the same representative water was being collected in each sample container.

A primary and duplicate field sample set were also analysed by the primary laboratory (ALS) as part of the QA/QC for this assessment. The triplicate field sample was analysed by the secondary laboratory (Envirolab).

6.1.5 Statement of Replicate Frequency

Arcadis collects field duplicates for intra-laboratory QA/QC at a rate of at least 1:20 samples. For this project, the following QA/QC samples were collected:

- DUP was respectively the groundwater intra-laboratory duplicate for BH19; and
- TRIP was respectively the groundwater inter-laboratory duplicate for BH19. It is noted that due to laboratory error the triplicate sample was not sent to the

secondary laboratory and in this instance was analysed at the primary laboratory as well.

Based on the above collected field replicates were at a rate of 1:13 meeting the adopted replicate frequency criteria of 1:20.

The agreement between analyte concentrations in the original and replicate samples is determined by calculating the Relative Percentage Differences (RPDs). Groundwater RPDs for the triplicate sample in comparison to the primary showed no exceedances. Groundwater RPDs for the duplicate and triplicate sample in comparison to the primary showed no exceedances above the acceptable ranges.

Arcadis considers the data is of acceptable quality for this assessment.

6.1.6 Field Instrument Calibration

Field instruments were calibrated prior to use onsite refer **Appendix B**.

6.2 Laboratory QA/QC

6.2.1 Holding Times

All holding times were reported as being within the specified ranges with the exception of total dissolved solids (TDS). TDS is not a major COPC and Arcadis consider this minor exceedance of holding times to not affect the findings of this investigation.

6.2.2 Laboratory Accreditation for Analytical Methods Used

The primary laboratory used for this project was ALS Environmental (ALS). ALS is accredited by NATA to ISO 17025, ALS's accreditation number is 825.

6.2.3 Percent Recoveries of Spikes and Surrogates

Laboratory QA/QC is provided in the laboratory reports in **Appendix C**. All laboratory spikes and surrogate results were within acceptable ranges within the exception of matrix spike recoveries for:

- Chloride in lab sample ID (ES1732666-003);
- Total Organic Carbon in lab sample ID (ES1732665-012).

Matrix spike recoveries for chloride and Total Organic Carbon were not determined due to laboratory background levels greater than or equal to four times the spike level.

6.2.4 Standard Solution Results

All ALS laboratory control sample (LCS) were within acceptable ranges.

6.2.5 Laboratory Duplicate Results

All laboratory duplicates were within acceptable ranges.

6.2.6 Laboratory Blank Results

All laboratory blank results were within acceptable ranges.

6.3 QA/QC Data Evaluation

6.3.1 Evaluation of the QA/QC Information Compared to the DQOs

- Documentation completeness:
  - Groundwater logs and chain-of-custody forms were completed and appropriate.
- Data completeness:
  - All samples were received by the laboratory and analytical results reported including laboratory QA/QC.
- Data comparability:
  - Arcadis standard operating procedures, Australian Standards and industry practice were followed during sampling;
  - Consistent field conditions and similarly trained staff were used during sampling;
  - Standard analytical methods were used by the laboratories for all analyses; and
  - The limits of reporting are appropriate and generally consistent from each laboratory.
- Data representativeness:
  - After review Arcadis considers the analytical data shows that suitable decontamination methods were used during the field works; and
  - The frequency of laboratory blanks, spikes and standard solutions were acceptable and the results/frequencies were within specified ranges.
- Precision:
  - QA/QC samples for groundwater were collected at a rate of 1:13, which is within guidance provided in AS4482.1-2005.
  - Laboratory duplicates were collected at acceptable frequencies. The laboratory duplicate RPDs were within acceptable ranges.

In conclusion, whilst some minor QA/QC discrepancies were noted, Arcadis does not consider that these have affected the overall conclusions of this assessment.

7 ASSESSMENT CRITERIA

7.1 Rationale for Selection of Assessment Criteria

The selected assessment criteria for groundwater was based on *Sub Section U1.1* in *Section 8* of EPL 4865 which specifies that:

'*The licensee must prepare and submit a report to the EPA within two months of any groundwater monitoring at the premises that detects ammonia at a concentration above 15 mg/L in any groundwater monitoring bore on this licence. The report must propose actions which the licensee will implement (including timeframes) to prevent contaminated groundwater migrating from the premises.*'

8 OBSERVATIONS AND ANALYTICAL RESULTS

The following section presents an overview of the field observations for groundwater encountered during the December 2017 GME. A total of thirteen wells were gauged and sampled and field data sheets completed on the day of sampling are provided in **Appendix B**.

8.1 Groundwater Gauging

The measured depth to water at each well is provided in the field data sheets provided in **Appendix B**. Previous investigations (Woodward Clyde 1997) indicated the groundwater flowed in a westerly direction.

Groundwater gauging results are summarised below:

- No hydrocarbon odours were observed in any of the wells gauged, however a Sulphur odour was noted during the purging of monitoring wells BH16B and BH20;
- Groundwater was encountered at the site at depths between 9.049 and +30.0 metres below top of casing (mbTOC);
- Groundwater depth could not be measured at groundwater monitoring well BH24 due to pump interference;
- Groundwater depth could not be measured at groundwater monitoring well BH22 as the depth to water exceeded the length of the interface probe;
- Groundwater encountered was slightly cloudy to clear in colour becoming clearer during purging; and
- Groundwater was generally found to be higher across the site compared to the previous September 2017 GME with the exception of groundwater monitoring wells BH21, BH22, BH23 and BH24 situated to the south of the landfill and BH17E located to the south west.

8.2 Groundwater Quality Results

Groundwater was purged until physicochemical parameters (i.e. pH, EC, DO, Temperature and ORP) values had stabilised and a static standing water level was achieved. A summary of the physicochemical parameters for the site are summarised in

Table 8.1 below and are provided in the field data sheets in **Appendix B**. Historical groundwater parameters are provided in **Table 4** in **Appendix D**. The DO probe was found to be faulty and the WQM was also faulty at two locations, likely to be attributed to the extreme weather conditions during the monitoring event.

Table 8.1 Groundwater Physicochemical Parameters

Monitoring Well ID	Date	Temp (°C)	pH (pH units)	Dissolved Oxygen (ppm)	Redox / ORP (mV)	Conductivity (µS/cm)
BH15A	20/12/17	27.4	6.5	-	-120.3	11,140
BH15B	20/12/17	-	-	-	-	-
BH16A	20/12/17	24.4	6.5	-	-116.2	12,859
BH16B	20/12/17	21.7	6.23	-	-156.3	19,071
BH17D	20/12/17	23.9	6.70	-	-212.1	7,384
BH17E	20/12/17	22.4	6.92	-	-165.0	1,993
BH18	20/12/17	22.5	6.81	-	-147.3	6,660
BH19	20/12/17	23.8	7.20	-	-192.4	3,984
BH20	20/12/17	22.5	6.90	-	-157.3	7,355
BH21	20/12/17	26.6	6.62	-	-67.0	18,238
BH22	20/12/17	-	-	-	-	-
BH23	20/12/17	27.3	6.37	-	-65.3	18,991
BH24	20/12/17	32.5	6.55	-	-100.0	2,941

The field parameters groundwater sampling event are summarised below:

- pH values of groundwater generally remained neutral between 6.23 (BH16B) and 7.20 (BH19). The pH readings are generally consistent with the data reported from the June 2017 GME;
- Groundwater electrical conductivity (EC) ranged between 1.993 mS/cm (BH17E) to 19.071 mS/cm (BH16B). The electrical conductivity values were generally significantly lower than previously reported data from the September 2017 GME;
- Redox potential measurements of groundwater indicated reducing environmental conditions ranging between -212.1 mV (BH17D) and -65.3 mV (BH23). Readings were generally lower than the September 2017 GME;
- Groundwater temperature ranged between 22.4°C (BH17E) and 32.5°C (BH24). These were generally higher than the previous 2017 GME.

8.3 Analytical Results

The results of analytical testing in this current GME is presented below. Tabulated analytical results are provided within **Appendix D**.

8.3.1 Ammonia

Concentrations of ammonia were reported below the selected assessment criteria for groundwater (15mg/L) specified in *Sub Section U1.1* in *Section 8* of EPL 4865. Ammonia concentrations ranged between 0.38 mg/L (BH24) and 9.26 mg/L (BH16B) and have remained below the EPL trigger level (15mg/L) since December 2014. Ammonia concentrations have remained relatively stable since the previous GME in September 2017.

8.3.2 TDS

TDS concentrations ranged between 1,270 mg/L (BH17E) and 16,200 mg/L (BH23). With the exception of a significant increase in BH15B, TDS concentrations have remained relatively stable since the September 2017 GME.

8.3.3 TOC

TOC concentrations ranged between 1 mg/L (BH16A) and 14 mg/L (BH22). TOC concentrations have remained relatively stable since the September 2017 GME.

8.3.4 Cations & Anions

Concentrations above laboratory LORs for cations and anions are as follows:

- Calcium in all thirteen wells with concentrations ranging from 44 mg/L (BH19) to 727 mg/L (BH16B);
- Magnesium in all thirteen wells with concentrations ranging from 38 mg/L (BH19) to 1,030 mg/L (BH23);
- Sodium in all thirteen wells with concentrations ranging from 268 mg/L (BH16B) to 3,270 mg/L (BH16B);
- Potassium in all thirteen wells with concentrations ranging from 4 mg/L (BH24) to 121 mg/L (BH16B);
- Chloride in all thirteen wells with concentrations ranging from 154mg/L (BH17E) to 6,900 mg/L (BH16B);
- Sulphate in thirteen wells BH15B, BH17D, BH17E, BH19, BH23 and BH24 with concentrations ranging from 2 mg/L (BH19) to 68 mg/L (BH24);
- Alkalinity in all thirteen wells with concentrations ranging from 546mg/L (BH16A) to 966 mg/L (BH18).

9 CONCLUSIONS

Enviroguard Erskine Park (the client) engaged Arcadis Australia Pacific Pty Ltd (Arcadis) to undertake the December 2017 quarterly groundwater sampling from 13 monitoring wells (i.e. BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23 and BH24) at the Enviroguard Erskine Park Landfill site located at 85-87 Quarry Road, Erskine Park, NSW.

This quarterly groundwater monitoring was undertaken in compliance with the premises Environmental Protection License (EPL) 4865.

Based on the scope of work conducted for the site, the following conclusions & recommendations are provided:

Groundwater monitoring was undertaken at the site to monitor groundwater quality beneath the site and comment on any changes noted in regard to groundwater impact identified during previous quarterly and annually groundwater assessments.

Results from the current groundwater monitoring event has indicated that no phase separated hydrocarbons (PSH) was detected in the fourteen groundwater monitoring wells sampled. Additionally, concentrations of ammonia were reported below the selected assessment criteria for groundwater (15mg/L) specified in *Sub Section U1.1* in *Section 8* of EPL 4865. Ammonia concentrations have remained below the EPL trigger level since December 2014.

10 REFERENCES

Consulting Earth Scientists Pty Ltd (2009) QA/ QC Plan: Environmental Monitoring Programme Erskine Park Landfill (CES 2009b).

Woodward Clyde (1997) Report on the Upgrade of the Groundwater Monitoring Network at the Erskine Park Landfill

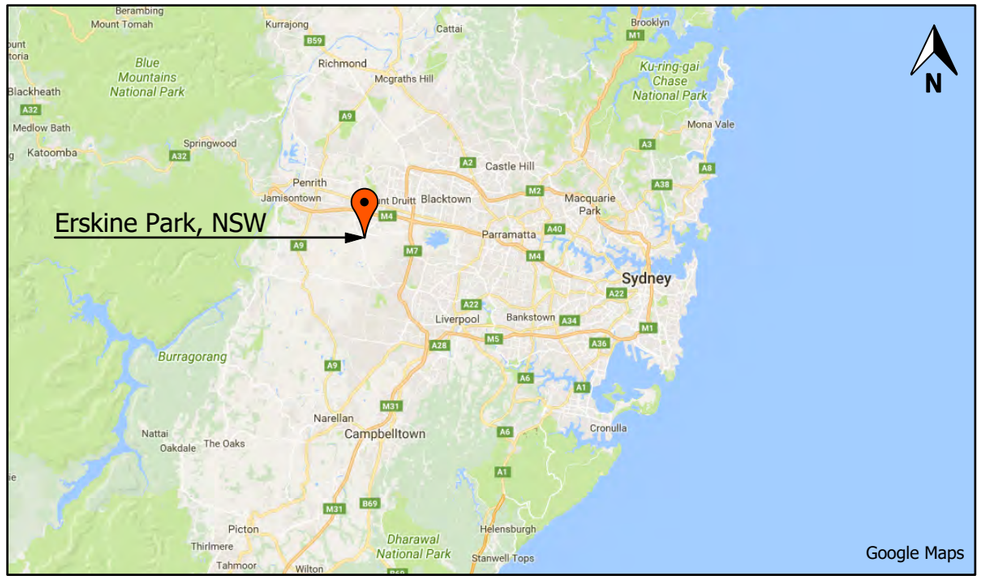
NSW EPA Environment Protection Licence 4865

APPENDIX A FIGURES

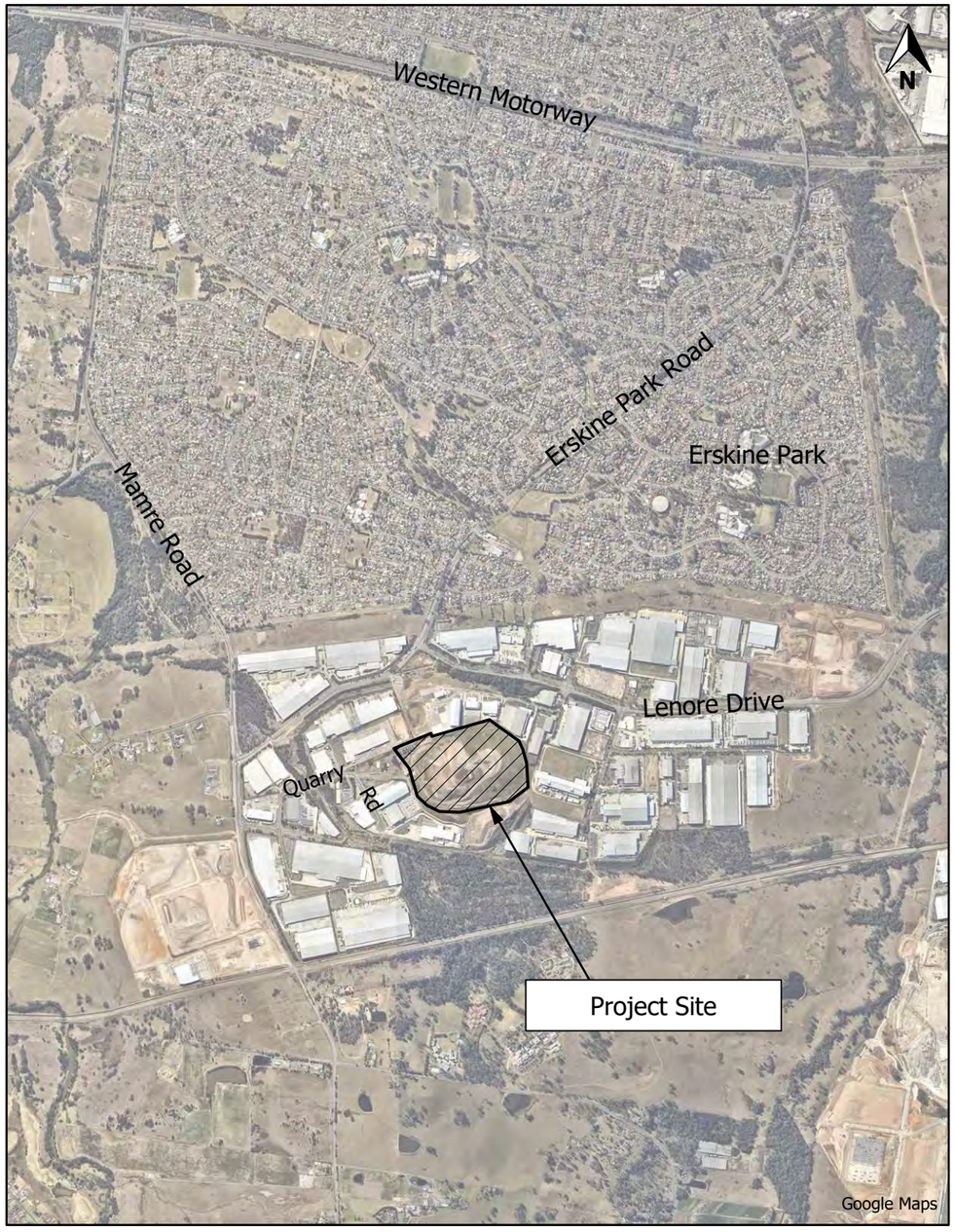
COUNTRY

Australia

REGION



SITE LOCATION



Note: Not to Scale.

Key

Site Boundary (approximate)

Site Location 85-87 Quarry Road, Erskine Park NSW		Figure 1 Site Location
Project No. 17272	Source Cleanaway Sept 2016	ARCADIS Design & Consultancy for natural and built assets

Key

- Property Boundary (approximate)
- Waste Boundary (approximate)
- BH## Groundwater Monitoring Well Location

Site Location 85-87 Quarry Road, Erskine Park NSW		Figure 2 Groundwater Monitoring Well Locations
Project No. 17272	Source Cleanaway Sept 2016	ARCADIS Design & Consultancy for natural and built assets

(392x277mm) 17272 Erskine Park F02 GW Well Locations.vwx - Wednesday, October 11, 2017 7:33:16 AM - drawn by laurie white at www.reumad.com.au

APPENDIX B FIELD DATA SHEETS

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information

Date:	Time: arrive depart
Project Name:	Project Number:
Site Location:	Operator:
Well ID: BH154 -	Weather:

Equipment

Water quality equipment description:

Interface probe number:

Purging equipment: (please cirlce) Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth _____ m (-) Water level 11.443 m (=) Water Column _____ m

Depth to Product _____ (m)

Water Column _____ m (x) Conversion Factor 1.96 (=) Litres per 1 Well Volume _____ L

Water Quality Parameters

Beginning purge time: 1:05

Ending purge time: ~~1:10~~

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1.00	1:07	7.00	27.0	10529	—	-111.1	Clear, no odour.
2.00	1:09	6.80	28.0	11164	—	-122.4	
3.00	1:11	6.70	28.8	11465	—	-124	
4.00	1:13	6.65	27.4	11140		-120.3	
Stabilisation Criteria	+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%		Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

*pH, temp, cond readings not necessary if well is purged dry

Did field parameters stabilise? Y N NA

Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information	
Date:	Time: arrive 13:20 depart
Project Name:	Project Number:
Site Location:	Operator:
Well ID: BH15B.	Weather:

Equipment						
Water quality equipment description:						
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) 12.611 m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) 1.96 (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1.00	13:28						Grab sample collected.
Stabilisation Criteria		+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

*pH, temp, cond readings not necessary if well is purged dry

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information	
Date:	Time: arrive depart
Project Name:	Project Number:
Site Location:	Operator:
Well ID: 16B	Weather:

Equipment						
Water quality equipment description:						
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	**Plastic**	**Teflon**			
	Pump type:	**Peristaltic**	**Submersible**	**Micro-purge**	**Amazon**	**Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) 17.724 m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) _____ (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1	10:10	6.46	22	19071	3.61	-119.6	clear, no odour, no sheen
2	10:15	6.32	21.7	18989	2.07	-145.7	" "
3	10:20	6.26	21.7	19047	-	-158.1	" "
4	10:25	6.23	21.7	19071	-	-156.3	
Stabilisation Criteria		**+/- 0.05**	**+/- 10%**	**+/- 3%**	**+/- 10%**	**+/- 10%**	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N		
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N		
Was documentation of equipment conducted?	Y	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	NA	
Was sample for metals field filtered prior to preservations?	Y	N	NA	
Duplicate sample collected?	Y	N		Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information	
Date:	Time: arrive depart
Project Name:	Project Number:
Site Location:	Operator:
Well ID: 17A	Weather:

Equipment						
Water quality equipment description:						
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) 7.21 m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) _____ (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1	10:20	6.56	26.8	11661	0.33	-105.3	clear, no odour, no sheen
2	10:22	6.56	24.9	12982		-112.7	
3	10:24	6.61	24.5	12891		-115.3	
4	10:26	6.65	24.4	12859		-116.2	
Stabilisation Criteria		+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%	Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

*pH, temp, cond readings not necessary if well is purged dry

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information

Date: 20/12/17	Time: arrive 12:10 depart
Project Name: Ehmoguard Quarterly Monitoring	Project Number: 17272
Site Location: 85-87 Quarry Rd, Erskine Park	Operator: JO/CR
Well ID: BH17[redacted]D	Weather: Sunny

Equipment

Water quality equipment description: YSI Pro Plus

Interface probe number:

Purging equipment: (please cirlce)
~~Bailer type~~: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) _____ m (=) _____ m _____ (m)
19.154

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) 1.96 (=) _____ L

Water Quality Parameters

Beginning purge time: 12:13 Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1	12:15	7.16	35.6	6700	2.79	-14	clear no odour
2	12:20	7.30	30.9	5699	3.54	17.6	
3	12:22	7.29	24.0	4143	—	-211.8	
4	12:24	7.21	24.1	3958	—	-210.8	Sulfur odour
5	12:26	7.08	23.5	4069	—	-212.3	Frothing/foaming
6	12:28	6.99	24.2	6296	—	-213.5	
7	1230	6.87	24.1	7215	—	-207.8	
8	12:32	6.70	23.9	7384	—	-212.1	
Stabilisation Criteria		+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%	Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

*pH, temp, cond readings not necessary if well is purged dry

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information	
Date:	Time: arrive depart
Project Name:	Project Number:
Site Location:	Operator:
Well ID: BH17 E	Weather:

Equipment						
Water quality equipment description:						
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	**Plastic**	**Teflon**			
	Pump type:	**Peristaltic**	**Submersible**	**Micro-purge**	**Amazon**	**Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) _____ m (=) _____ m _____ (m)

9.04

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) _____ (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1	12:45	7.32	22.1	1962		-176	clear, no odour, no sheen
2	12:47	7.06	22.4	1990		-172	
3	12:49	6.94	22.4	2005		-165	
4	12:51	6.92	22.4	1997		-165	
Stabilisation Criteria		**+/- 0.05**	**+/- 10%**	**+/- 3%**	**+/- 10%**	**+/- 10%**	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information

Date: 20/12/17.	Time: arrive 0910. depart
Project Name:	Project Number: 17272
Site Location: 85-87 Quarry Road, Erskine Park	Operator: JO/CR
Well ID: BH 18.	Weather: Sunny/humid

Equipment

Water quality equipment description:

Interface probe number:

Purging equipment: (please circle) Bailer type: **Plastic** **Teflon**

Pump type: **Peristaltic** **Submersible** **Micro-purge** **Amazon** **Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column _____ m (-) 13.948 m (=) _____ m

Depth to Product _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume _____ m (x) 1.96. (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1	9:15	7.53	23.9	6268	6.77	-18.8	clear, no odour
2	9:17	7.35	23.3	6757	5.75	-14.8	
3	9:19	7.01	22.7	5950		-162.1	
4	9:21	6.94	22.5	6007		-160.7	
5	9:23	6.86	22.4	6024		-159.6	
6	9:25	6.81	22.5	5660		-147.3	
Stabilisation Criteria		**+/- 0.05**	**+/- 10%**	**+/- 3%**	**+/- 10%**	**+/- 10%**	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	(N)	NA	
Was sample for metals field filtered prior to preservations?	Y	(N)	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID —

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information			
Date:	20/12/17.	Time: arrive	0928 depart
Project Name:	Envirogard Quarterly Monitoring	Project Number:	17272
Site Location:	85-87 Erskine Park Road.	Operator:	JO/CR
Well ID:	BH 19.	Weather:	Humid / Cloudy

Equipment

Water quality equipment description:	YSI Pro Plus					
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) 13.930 m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) 1.96 (=) _____ L

Water Quality Parameters

Beginning purge time: 0933 Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
	0933						
1.00	~~0930~~	8.10	26.3	3183	7.06	-95.4	Clear, no odour
2.00	0935	8.04	25.2	2953	4.75	-119.5	
3.00	0937	7.87	24.2	2661	0.40	-171.8	
4.00	0939	7.72	24.2	2491		-190.7	
5.00	0941	7.53	23.8	2538		-199.1	
6.00	0943	7.33	23.7	3248		-193.8	
7	9:45	7.22	23.8	3962		-193.8	
8	9:47	7.20	23.8	3984		-192.4	
Stabilisation Criteria		+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%	Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

*pH, temp, cond readings not necessary if well is purged dry

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	(N)	NA	
Was sample for metals field filtered prior to preservations?	Y	(N)	NA	
Duplicate sample collected?	(Y)	N		Duplicate sample ID DUP/TRIP

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information

Date: 20/12/17.	Time: arrive 0845 depart
Project Name: Environguard Quarterly Monitoring	Project Number: 17272
Site Location: 85-87 Quarry Road, Erskine Park	Operator: JO/CR.
Well ID: BH20.	Weather: cloudy + humid.

Equipment

Water quality equipment description: YSI Pro Plus.

Interface probe number:

Purging equipment (please cirlce):
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) 12.71 m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) 1.96 (=) _____ L

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Water Quality Parameters

Beginning purge time: 0850 Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1.00	0853	7.54	24.3	7762	3.12	-66.0	Clear, slight sulfur odour
2.00	0855	7.33	22.5	7444	2.89	-137.6	
2.50	0857	7.18	22.5	7425	1.50	-147.6	
3.00	0859	7.04	22.4	7393		-153.8	
3.50	0901	6.98	22.4	7376		-156.7	
4.00	0903	6.90	22.5	7355		-157.3.	
Stabilisation Criteria		+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%	Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	Y	(N)	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID ———

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information

Date: 20/12/17	Time: arrive 10:50. depart
Project Name: Environguard Quarterly Gauging	Project Number: 17272
Site Location: 85-87 Quarry Rd Erskine Park	Operator: SO/CR
Well ID: BH21	Weather: Sunny

Equipment

Water quality equipment description: YSI Pro PMO

Interface probe number:

Purging equipment: (please cirlce)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) _____ m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) 1.96 (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1.00	10:52	7.19	33.1	14127	4.21	31.2	
2.00	10:55	7.00	26.4	15773	2.58	-48.9	
3.00	10:59	6.68	29.4	15196	1.18	-63.6	
4.00	11:02	6.62	26.6	18238	0.32	-67.0	
Stabilisation Criteria		+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%	Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information	
Date: 20/12/17.	Time: arrive 10:40 depart
Project Name: Quarterly Environmental Monitoring	Project Number: 17272
Site Location: 85-87 Quarry Rd, Erskine Park.	Operator: JO/CR
Well ID: BH22.	Weather: Sunny

Equipment

Water quality equipment description: XSI Pro Plus

Interface probe number:

Purging equipment: (please cirlce)
Bailer type: **Plastic** **Teflon**
Pump type: **Peristaltic** **Submersible** **Micro-purge** **Amazon** **Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) _____ m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) 1.96 (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
Stabilisation Criteria		+/- 0.05	+/- 10%	+/- 3%	+/- 10%	+/- 10%	Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N		
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N		
Was documentation of equipment conducted?	Y	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	NA	
Was sample for metals field filtered prior to preservations?	Y	N	NA	
Duplicate sample collected?	Y	N		Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information

Date:	20/12/17.	Time: arrive	11:24 depart
Project Name:	Enviro ground water quarterly monitoring	Project Number:	17227
Site Location:	85-87 Quarry Rd, Erskine Park	Operator:	JO/CR
Well ID:	BH23	Weather:	Sunny

Equipment

Water quality equipment description:

Interface probe number:

Purging equipment: (please cirlce)
Bailer type: **Plastic** **Teflon**
Pump type: **Peristaltic** **Submersible** **Micro-purge** **Amazon** **Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
____ m (-) 19.23 m (=) ____ m ____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
____ m (x) 1.96 (=) ____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1.00	11:25	7.10	24.2	15785	0.86	-49.1	clear, no odour.
2.00	11:27	6.92	24.7	19097	0.57	-50.4	
3.00	11:29	6.67	25.6	18490	—	-49.2	
4.00	11:31	6.49	26.2	18068	—	-60.5	
5.00	11:33	6.42	26.7	18957	—	-62.5	
6.00	11:35	6.37	27.3	18991	—	-65.3	
Stabilisation Criteria		**+/- 0.05**	**+/- 10%**	**+/- 3%**	**+/- 10%**	**+/- 10%**	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	Y	(N)	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information	
Date: 20/12/17.	Time: arrive depart
Project Name:	Project Number:
Site Location:	Operator:
Well ID: BH24	Weather:

Equipment						
Water quality equipment description:						
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	**Plastic**	**Teflon**			
	Pump type:	**Peristaltic**	**Submersible**	**Micro-purge**	**Amazon**	**Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
_____ m (-) _____ m (=) _____ m

Depth to Product
_____ (m) ~ cord not recorded

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) _____ (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
1	12:00	6.74	33.1	3574		-92.7	clear, no odour, low flow
2	12:02	6.72	32.5	3470		-97.5	
3	12:04	6.66	32.5	2970		-99.1	
4	12:06	6.58	32.5	2959		-100.6	
5	12:08	6.55	32.5	2941		-100	
Stabilisation Criteria		**+/- 0.05**	**+/- 10%**	**+/- 3%**	**+/- 10%**	**+/- 10%**	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? Y N NA

Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information	
Date:	Time: arrive depart
Project Name:	Project Number:
Site Location:	Operator:
Well ID: SD003 and SD003	Weather:

Equipment						
Water quality equipment description:						
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	**Plastic**	**Teflon**			
	Pump type:	**Peristaltic**	**Submersible**	**Micro-purge**	**Amazon**	**Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column Depth to Product
_____ m (-) _____ m (=) _____ m _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) _____ (=) _____ L

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
SD003 ~	14:17	9.09	33.0	1339	1.24	19.2	Silty, no odour
SD002	14:28	8.36	35.2	2146	—	35.1	Silty, no odour.
Stabilisation Criteria		**+/- 0.05**	**+/- 10%**	**+/- 3%**	**+/- 10%**	**+/- 10%**	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

ARCADIS Design & Consultancy for natural and built assets — Groundwater Monitoring Field Sheet

Job Information			
Date:	20/12/17.	Time: arrive	depart
Project Name:	Environmental quarterly Monitoring	Project Number:	17272
Site Location:	85-85 Quay Rd, Erskineville	Operator:	KJ / CR
Well ID:	Leachate	Weather:	Sunny

Equipment						
Water quality equipment description:						
Interface probe number:						
Purging equipment: (please cirlce)	Bailer type:	**Plastic**	**Teflon**			
	Pump type:	**Peristaltic**	**Submersible**	**Micro-purge**	**Amazon**	**Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column _____ m (-) _____ m (=) _____ m

Depth to Product _____ (m)

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume _____ m (x) _____ (=) _____ L

Water Quality Parameters

Beginning purge time: —

Ending purge time: —

Litres	Time	pH	Temp C	Cond µS/cm	DO ppm	Redox mV	Comments
—	1:05	6.85	25.0	10847	—	-63.0	
Stabilisation Criteria		**+/- 0.05**	**+/- 10%**	**+/- 3%**	**+/- 10%**	**+/- 10%**	**Example Comments:** clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour

Total Well Volume
Actual amount of water prior to sampling

**pH, temp, cond readings not necessary if well is purged dry*

Did field parameters stabilise? Y | N | NA

Was the well dry purged? Y | N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID

APPENDIX C LABORATORY REPORTS AND CHAIN OF CUSTODY DOCUMENTATION

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1732666**

Client	: **ARCADIS AUSTRALIA PACIFIC PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR GREG BARTLETT	Contact	: Larissa Burns
Address	: LEVEL 5, 141 MILLER STREET NORTH SYDNEY NSW, AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: Greg.Bartlett@arcadis.com	E-mail	: Larissa.burns@alsglobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: December Quartely Monitoring	Page	: 1 of 2
Order number	: ----	Quote number	: ES2017HYDCON0003 (SY/492/17 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: JACK O SHAUGHNESSY		

Dates

Date Samples Received	: 21-Dec-2017 17:10	Issue Date	: 22-Dec-2017
Client Requested Due Date	: 09-Jan-2018	Scheduled Reporting Date	: **09-Jan-2018**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 9'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 15 / 15

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA015H Total Dissolved Solids - High Level	WATER - EP005 Total Organic Carbon (TOC)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
ES1732666-001	20-Dec-2017 00:00	BH15A	✓	✓	✓
ES1732666-002	20-Dec-2017 00:00	BH15B	✓	✓	✓
ES1732666-003	20-Dec-2017 00:00	BH16A	✓	✓	✓
ES1732666-004	20-Dec-2017 00:00	BH16B	✓	✓	✓
ES1732666-005	20-Dec-2017 00:00	BH17D	✓	✓	✓
ES1732666-006	20-Dec-2017 00:00	BH17E	✓	✓	✓
ES1732666-007	20-Dec-2017 00:00	BH18	✓	✓	✓
ES1732666-008	20-Dec-2017 00:00	BH19	✓	✓	✓
ES1732666-009	20-Dec-2017 00:00	BH20	✓	✓	✓
ES1732666-010	20-Dec-2017 00:00	BH21	✓	✓	✓
ES1732666-011	20-Dec-2017 00:00	BH22	✓	✓	✓
ES1732666-012	20-Dec-2017 00:00	BH23	✓	✓	✓
ES1732666-013	20-Dec-2017 00:00	BH24	✓	✓	✓
ES1732666-014	20-Dec-2017 00:00	DUP	✓	✓	✓
ES1732666-015	20-Dec-2017 00:00	TRIP	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

GREG BARTLETT

- *AU Certificate of Analysis - NATA (COA)	Email	Greg.Bartlett@arcadis.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Greg.Bartlett@arcadis.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Greg.Bartlett@arcadis.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Greg.Bartlett@arcadis.com
- A4 - AU Tax Invoice (INV)	Email	Greg.Bartlett@arcadis.com
- Chain of Custody (CoC) (COC)	Email	Greg.Bartlett@arcadis.com
- EDI Format - ENMRG (ENMRG)	Email	Greg.Bartlett@arcadis.com
- EDI Format - ESDAT (ESDAT)	Email	Greg.Bartlett@arcadis.com

IN OF USTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-16 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

a Pacific Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☑ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
mber Quartely Monitoring	**ALS QUOTE NO.:** SY-492-17	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
MBER:		
ECT MANAGER: Greg Bartlett	CONTACT PH: 0477 882 907	
SAMPLER: Jack O'Shaughnessy	SAMPLER MOBILE: 0403 481 503	
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed):		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: 9.0 °C

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
~~Ryan Wells~~ Jack O'Shaughnessy	ANDREW		
DATE/TIME: 21/12/2017	DATE/TIME: 21/12/17 5:10pm	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required)..								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	Ammonia	TDS	TOC	NT1-Cations	NT-2 Anions				
13	BH24	20/12/17	water	1x 60 ml purple, 1 x 40ml purple vial, 1 x 500ml green	x	x	x	x	x				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
14	DUP	20/12/17	water		X	x	x	x	x				
15	TRIP	20/12/17	water		X	x	x	x	x				
				TOTAL									

Environmental Division Sydney
Work Order Reference
ES1732666

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

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☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Arcadis Australia Pacific Pty Ltd	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☑ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE: Sydney	
PROJECT: December Quartely Monitoring	ALS QUOTE NO.: SY-492-17
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
PROJECT MANAGER: Greg Bartlett	CONTACT PH: 0477 882 907
SAMPLER: Jack O'Shaughnessy	SAMPLER MOBILE: 0403 481 503
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT
Email Reports to (will default to PM if no other addresses are listed):	
Email Invoice to (will default to PM if no other addresses are listed):	
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: 9.0 °C

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
~~Ryan Wells~~ Jack O'Shaughnessy	ANDREW		
DATE/TIME: 20/12/2017	DATE/TIME: 21/12/17 5:10pm	DATE/TIME:	DATE/TIME:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	Ammonia	TDS	TOC	NT1-Cations	NT-2 Anions					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH24	20/12/17	water	1x 60 ml purple, 1 x 40ml purple vial, 1 x 500ml green	x	x	x	x	x					
2	DUP	20/12/17	water		x	x	x	x	x					
3	TRIP	20/12/17	water		x	x	x	x	x					
				TOTAL										

Environmental Division Sydney
Work Order Reference
ES1732666

Telephone : + 61-2-8784 8555

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CHAIN OF CUSTODY

ALS Laboratory: please tick →

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MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
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NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Arcadis Australia Pacific Pty Ltd	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: December Quartely Monitoring	ALS QUOTE NO.: SY-492-17	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: 9.0 °C
PROJECT MANAGER: Greg Bartlett CONTACT PH: 0477 882 907		Other comments:
SAMPLER: Jack O'Shaughnessy SAMPLER MOBILE: 0403 481 503	RELINQUISHED BY: ~~Ryan Wells~~ JACK O'SHAUGHNESSY	RECEIVED BY: ANDREW
COC emailed to ALS? (YES / NO) EDD FORMAT (or default): ESDAT	DATE/TIME: 21/12/2017	DATE/TIME: 21/12/17 5:10pm
Email Reports to (will default to PM if no other addresses are listed):	RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).						Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	Ammonia	TDS	TOC	NT1-Cations	NT-2 Anions		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH15A	20/12/17	Water	1x 60 ml purple, 1 x 40ml purple vial, 1 x 500ml green	x	x	x	x	x		
2	BH16B 1BB	20/12/18	Water		x	x	x	x	x		
3	BH16A	20/12/19	Water		x	x	x	x	x		
4	BH16B	20/12/20	Water		x	x	x	x	x		
5	BH17D	20/12/21	Water		x	x	x	x	x		
6	BH17E	20/12/22	Water		x	x	x	x	x		
7	BH18	20/12/23	Water		x	x	x	x	x		
8	BH19	20/12/24	Water		x	x	x	x	x		
9	BH20	20/12/25	Water		x	x	x	x	x		
10	BH21	20/12/26	Water		x	x	x	x	x		
11	BH22	20/12/27	Water		x	x	x	x	x		
12	BH23	20/12/28	Water		x	x	x	x	x		
				TOTAL							

Environmental Division Sydney
Work Order Reference
ES1732666
Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1732666**	Page	: 1 of 5
Client	: **ARCADIS AUSTRALIA PACIFIC PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR GREG BARTLETT	Contact	: Larissa Burns
Address	: LEVEL 5, 141 MILLER STREET NORTH SYDNEY NSW, AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: December Quartely Monitoring	Date Samples Received	: 21-Dec-2017 17:10
Order number	: ----	Date Analysis Commenced	: 22-Dec-2017
C-O-C number	: ----	Issue Date	: 09-Jan-2018 13:07
Sampler	: JACK O SHAUGHNESSY		
Site	: ----		
Quote number	: SY/492/17 V2		
No. of samples received	: 15		
No. of samples analysed	: 15		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH15A	BH15B	BH16A	BH16B	BH17D
				Client sampling date / time	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1732666-001	ES1732666-002	ES1732666-003	ES1732666-004	ES1732666-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		6530	9840	7800	16000	4540
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		830	692	546	638	736
Total Alkalinity as CaCO3	----	1	mg/L		830	692	546	638	736
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	1	<1	<1	20
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		3150	4500	4010	6900	1750
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		318	472	171	727	136
Magnesium	7439-95-4	1	mg/L		62	130	87	273	95
Sodium	7440-23-5	1	mg/L		1800	2280	2350	3270	1400
Potassium	7440-09-7	1	mg/L		38	62	46	121	45
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		6.77	5.33	6.60	9.26	7.14
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		105	141	124	207	64.5
Total Cations	----	0.01	meq/L		100	135	119	204	76.6
Ionic Balance	----	0.01	%		2.53	2.09	2.03	0.80	8.62
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		3	9	1	5	9

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	BH17E	BH18	BH19	BH20	BH21
			Client sampling date / time	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00
Compound	CAS Number	LOR	Unit	ES1732666-006	ES1732666-007	ES1732666-008	ES1732666-009	ES1732666-010
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1270	6770	3010	4200	12800
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	827	966	608	946	786
Total Alkalinity as CaCO3	----	1	mg/L	827	966	608	946	786
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	16	<1	2	<1	<1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	154	3340	1180	1610	5580
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	49	156	44	72	486
Magnesium	7439-95-4	1	mg/L	69	176	38	148	300
Sodium	7440-23-5	1	mg/L	317	1940	1100	1310	2610
Potassium	7440-09-7	1	mg/L	10	44	20	26	68
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	1.52	5.39	3.12	3.09	7.46
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	21.2	114	45.5	64.3	173
Total Cations	----	0.01	meq/L	22.2	108	53.7	73.4	164
Ionic Balance	----	0.01	%	2.23	2.59	8.28	6.61	2.64
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	2	2	3	2	6

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH22	BH23	BH24	DUP	TRIP
				Client sampling date / time	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1732666-011	ES1732666-012	ES1732666-013	ES1732666-014	ES1732666-015
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		6970	16200	1400	3000	2980
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		780	678	830	546	613
Total Alkalinity as CaCO3	----	1	mg/L		780	678	830	546	613
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	16	68	2	2
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		3600	6420	272	1200	1180
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		161	512	97	44	44
Magnesium	7439-95-4	1	mg/L		72	1030	97	38	38
Sodium	7440-23-5	1	mg/L		2210	2080	268	1050	1040
Potassium	7440-09-7	1	mg/L		38	44	4	19	18
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		5.49	3.67	0.38	3.02	3.30
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		117	195	25.7	44.8	45.6
Total Cations	----	0.01	meq/L		111	202	24.6	51.5	51.0
Ionic Balance	----	0.01	%		2.66	1.75	2.17	6.94	5.64
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		14	2	12	3	4

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1732666**	Page	: 1 of 5
Client	: **ARCADIS AUSTRALIA PACIFIC PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR GREG BARTLETT	Contact	: Larissa Burns
Address	: LEVEL 5, 141 MILLER STREET NORTH SYDNEY NSW, AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: December Quartely Monitoring	Date Samples Received	: 21-Dec-2017
Order number	: ----	Date Analysis Commenced	: 22-Dec-2017
C-O-C number	: ----	Issue Date	: 09-Jan-2018
Sampler	: JACK O SHAUGHNESSY		
Site	: ----		
Quote number	: SY/492/17 V2		
No. of samples received	: 15		
No. of samples analysed	: 15		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

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. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 1339858)									
ES1732666-001	BH15A	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	6530	6620	1.32	0% - 20%
ES1732666-011	BH22	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	6970	6900	0.980	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1338330)									
ES1732653-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	446	425	4.65	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	446	425	4.65	0% - 20%
ES1732561-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	9	162	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	86	80	6.89	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	86	90	4.20	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1338333)									
ES1732666-009	BH20	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	946	959	1.33	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	946	959	1.33	0% - 20%
EW1705322-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1339766)									
EP1714510-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6	6	0.00	No Limit
ES1732603-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2230	2240	0.541	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1339769)									

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1339769) - continued									
ES1732666-003	BH16A	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ES1732666-012	BH23	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	16	16	0.00	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 1339767)									
EP1714510-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	49	49	0.00	0% - 20%
ES1732603-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	12900	13000	0.150	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 1339768)									
ES1732666-003	BH16A	ED045G: Chloride	16887-00-6	1	mg/L	4010	3960	1.07	0% - 20%
ES1732666-012	BH23	ED045G: Chloride	16887-00-6	1	mg/L	6420	6480	0.845	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1338649)									
ES1732650-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
ES1732666-010	BH21	ED093F: Calcium	7440-70-2	1	mg/L	486	489	0.450	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	300	301	0.548	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2610	2640	1.26	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	68	69	1.61	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1349096)									
ES1731647-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	2.08	1.91	8.43	0% - 20%
ES1732666-004	BH16B	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	9.26	9.34	0.858	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1349097)									
ES1732666-015	TRIP	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	3.30	3.19	3.34	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 1338274)									
ES1732647-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	219	226	3.33	0% - 20%
ES1732666-009	BH20	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.00	No Limit

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 Spike (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. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 1339858)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	99.8	87	109
				<10	293 mg/L	110	66	126
ED037P: Alkalinity by PC Titrator (QCLot: 1338330)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	97.9	81	111
				----	50 mg/L	107	70	130
ED037P: Alkalinity by PC Titrator (QCLot: 1338333)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	87.9	81	111
				----	50 mg/L	104	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1339766)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1339769)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	82	122
ED045G: Chloride by Discrete Analyser (QCLot: 1339767)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	112	81	127
				<1	1000 mg/L	93.6	81	127
ED045G: Chloride by Discrete Analyser (QCLot: 1339768)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	112	81	127
				<1	1000 mg/L	93.9	81	127
ED093F: Dissolved Major Cations (QCLot: 1338649)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.1	80	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	100	90	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	87.8	82	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	88.1	85	113
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1349096)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	103	90	114
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1349097)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	90	114
EP005: Total Organic Carbon (TOC) (QCLot: 1338274)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	98.6	72	120

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.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1339766)							
EP1714510-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	100	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1339769)							
ES1732666-003	BH16A	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 1339767)							
EP1714510-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	114	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 1339768)							
ES1732666-003	BH16A	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1349096)							
ES1731647-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	71.1	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1349097)							
ES1732666-015	TRIP	EK055G: Ammonia as N	7664-41-7	1 mg/L	70.8	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1338274)							
ES1732665-012	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	# Not Determined	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1732666**	Page	: 1 of 6
Client	: **ARCADIS AUSTRALIA PACIFIC PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR GREG BARTLETT	Telephone	: +61-2-8784 8555
Project	: December Quartely Monitoring	Date Samples Received	: 21-Dec-2017
Site	: ----	Issue Date	: 09-Jan-2018
Sampler	: JACK O SHAUGHNESSY	No. of samples received	: 15
Order number	: ----	No. of samples analysed	: 15

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	ES1732666--003	BH16A	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP005: Total Organic Carbon (TOC)	ES1732665--012	Anonymous	**Total Organic Carbon**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
BH15A,	BH15B,	**20-Dec-2017**	**----**	----	----	**23-Dec-2017**	27-Dec-2017	✓
BH16A,	BH16B,							
BH17D,	BH17E,							
BH18,	BH19,							
BH20,	BH21,							
BH22,	BH23,							
BH24,	DUP,							
TRIP								
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
BH15A,	BH15B,	**20-Dec-2017**	**----**	----	----	**22-Dec-2017**	03-Jan-2018	✓
BH16A,	BH16B,							
BH17D,	BH17E,							
BH18,	BH19,							
BH20,	BH21,							
BH22,	BH23,							
BH24,	DUP,							
TRIP								

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23, BH24, DUP, TRIP	**20-Dec-2017**	**----**	----	----	**23-Dec-2017**	17-Jan-2018	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23, BH24, DUP, TRIP	**20-Dec-2017**	**----**	----	----	**23-Dec-2017**	17-Jan-2018	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23, BH24, DUP, TRIP	**20-Dec-2017**	**----**	----	----	**22-Dec-2017**	27-Dec-2017	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23, BH24, DUP, TRIP	**20-Dec-2017**	**----**	----	----	**02-Jan-2018**	17-Jan-2018	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
BH15A, BH15B, BH16A, BH16B, BH17D, BH17E, BH18, BH19, BH20, BH21, BH22, BH23, BH24, DUP, TRIP	**20-Dec-2017**	**----**	----	----	**22-Dec-2017**	17-Jan-2018	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	3	23	**13.04**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)

APPENDIX D RESULTS SUMMARY TABLES

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 1 - Gauging Data

Monitor Well ID:	Date Sampled	Depth to Water (m)	Depth to PSH (m) LNAPL	Thickness of PSH (m) LNAPL	Depth to PSH (m) DNAPL	Depth to Base of Well (m)
BH15A	28/09/2017	11.443	-	-	-	-
BH15B	28/09/2017	12.611	-	-	-	-
BH16A	28/09/2017	17.129	-	-	-	-
BH16B	28/09/2017	17.724	-	-	-	-
BH17D	28/09/2017	19.154	-	-	-	-
BH17E	28/09/2017	9.049	-	-	-	-
BH18	28/09/2017		-	-	-	-
BH19	28/09/2017	13.930	-	-	-	-
BH20	28/09/2017	12.710	-	-	-	-
BH21	28/09/2017		-	-	-	-
BH22	28/09/2017	30+	-	-	-	-
BH23	28/09/2017	19.231	-	-	-	-
BH24	28/09/2017	^	-	-	-	-

Notes:
^ -Unable to gauge due to pump interference.

Monitor Well ID:	Date Sampled	Depth to Water (m)	Depth to PSH (m) LNAPL	Thickness of PSH (m) LNAPL	Depth to PSH (m) DNAPL	Depth to Base of Well (m)
BH15A	31/03/2009	11.75	-	-	-	-
	29/06/2009	11.59	-	-	-	-
	23/09/2009	11.58	-	-	-	-
	23/12/2009	NA	NA	NA	NA	NA
	5/03/2010	11.733	-	-	-	-
	29/06/2010	11.702	-	-	-	-
	14/12/2010	11.672	-	-	-	-
	29/03/2011	11.751	-	-	-	-
	22/03/2012	11.523	-	-	-	-
	28/03/2013	11.538	-	-	-	-
	20/03/2014	11.618	-	-	-	-
	11/03/2015	11.608	-	-	-	-
	23/03/2016	5.509	-	-	-	-
	28/03/2017	11.400	-	-	-	-
	27/06/2017	11.378	-	-	-	-
	28/09/2017	11.324	-	-	-	-
	20/12/2017	11.443	-	-	-	-
BH15B	31/03/2009	12.91	-	-	-	-
	29/06/2009	12.91	-	-	-	-
	23/09/2009	11.7	-	-	-	-
	23/12/2009	NA	NA	NA	NA	NA
	6/03/2010	12.948	-	-	-	-
	29/06/2010	12.975	-	-	-	-
	14/12/2010	12.754	-	-	-	-
	29/03/2011	12.905	-	-	-	-
	22/03/2012	12.662	-	-	-	-
	28/03/2013	12.713	-	-	-	-
	20/03/2014	12.730	-	-	-	-
	11/03/2015	12.790	-	-	-	-
	23/03/2016	12.745	-	-	-	-
	28/03/2017	12.589	-	-	-	-
	28/06/2017	12.613	-	-	-	-
	28/09/2017	12.484	-	-	-	-
	20/12/2017	12.611	-	-	-	-
BH16A	31/03/2009	18.23	-	-	-	-
	29/06/2009	18.06	-	-	-	-
	23/09/2009	17.99	-	-	-	-
	23/12/2009	NA	NA	NA	NA	NA
	6/03/2010	17.997	-	-	-	-
	29/06/2010	18.976	-	-	-	-
	14/12/2010	17.763	-	-	-	-
	29/03/2011	17.808	-	-	-	-
	22/03/2012	17.571	-	-	-	-
	28/03/2013	17.500	-	-	-	-
	20/03/2014	17.571	-	-	-	-
	11/03/2015	17.483	-	-	-	-
	23/03/2016	17.425	-	-	-	-
	27/03/2017	17.395	-	-	-	-
	29/06/2017	17.417	-	-	-	-
	29/06/2017	17.417	-	-	-	-
	20/12/2017	17.129	-	-	-	-
BH16B	31/03/2009	18.4	-	-	-	-
	29/06/2009	18.24	-	-	-	-
	23/09/2009	18.16	-	-	-	-
	23/12/2009	NA	NA	NA	NA	NA
	6/03/2010	18.205	-	-	-	-
	29/06/2010	18.225	-	-	-	-
	14/12/2010	18.077	-	-	-	-
	29/03/2011	18.064	-	-	-	-
	22/03/2012	17.812	-	-	-	-
	28/03/2013	17.774	-	-	-	-
	20/03/2014	17.907	-	-	-	-
	11/03/2015	17.841	-	-	-	-
	23/03/2016	17.773	-	-	-	-
	27/03/2017	17.746	-	-	-	-
	29/06/2017	17.787	-	-	-	-
	28/09/2017	17.750	-	-	-	-
	20/12/2017	17.724	-	-	-	-

Monitor Well ID:	Date Sampled	Depth to Water (m)	Depth to PSH (m) LNAPL	Thickness of PSH (m) LNAPL	Depth to PSH (m) DNAPL	Depth to Base of Well (m)
BH17D	31/03/2009	nt	nt	nt	nt	nt
	29/06/2009	nt	nt	nt	nt	nt
	23/09/2009	nt	nt	nt	nt	nt
	23/12/2009	nt	nt	nt	nt	nt
	6/03/2010	19.211	-	-	-	-
	29/06/2010	19.317	-	-	-	-
	14/12/2010	19.309	-	-	-	-
	29/03/2011	19.340	-	-	-	-
	22/03/2012	19.174	-	-	-	-
	28/03/2013	18.975	-	-	-	-
	20/03/2014	19.158	-	-	-	-
	11/03/2015	19.163	-	-	-	-
	23/03/2016	19.235	-	-	-	-
	27/03/2017	19.281	-	-	-	-
	29/06/2017	19.251				
	28/09/2017	19.200				
	20/12/2017	19.154	-	-	-	-
BH17E	31/03/2009	nt	nt	nt	nt	nt
	29/06/2009	nt	nt	nt	nt	nt
	23/09/2009	nt	nt	nt	nt	nt
	23/12/2009	nt	nt	nt	nt	nt
	6/03/2010	6.192	-	-	-	-
	29/06/2010	5.854	-	-	-	-
	14/12/2010	5.120	-	-	-	-
	29/03/2011	5.712	-	-	-	-
	22/03/2012	4.453	-	-	-	-
	28/03/2013	5.905	-	-	-	-
	20/03/2014	6.094	-	-	-	-
	11/03/2015	6.250	-	-	-	-
	23/03/2016	6.959	-	-	-	-
	27/03/2017	7.235	-	-	-	-
	29/06/2017	8.495	-	-	-	-
	28/09/2017	9.090	-	-	-	-
	20/12/2017	9.049	-	-	-	-
BH18	31/03/2009	24.61	-	-	-	-
	29/06/2009	24.53	-	-	-	-
	23/09/2009	24.39	-	-	-	-
	23/12/2009	NA	NA	NA	NA	NA
	5/03/2010	24.309	-	-	-	-
	29/06/2010	24.862	-	-	-	-
	14/12/2010	24.448	-	-	-	-
	29/03/2011	24.488	-	-	-	-
	22/03/2012	24.662	-	-	-	-
	28/03/2013	24.568	-	-	-	-
	20/03/2014	24.557	-	-	-	-
	11/03/2015	24.592	-	-	-	-
	23/03/2016	24.599	-	-	-	-
	27/03/2017	24.619	-	-	-	-
	29/06/2017	26.656	-	-	-	-
	28/09/2017	24.550	-	-	-	-
	20/12/2017		-	-	-	-
BH19	31/03/2009	14.17	-	-	-	-
	29/06/2009	14.03	-	-	-	-
	23/09/2009	13.93	-	-	-	-
	23/12/2009	NA	NA	NA	NA	NA
	5/03/2010	13.556	-	-	-	-
	29/06/2010	13.598	-	-	-	-
	14/12/2010	13.483	-	-	-	-
	29/03/2011	13.531	-	-	-	-
	22/03/2012	13.681	-	-	-	-
	28/03/2013	13.308	-	-	-	-
	20/03/2014	13.268	-	-	-	-
	11/03/2015	13.089	-	-	-	-
	23/03/2016	13.268	-	-	-	-
	28/03/2017	10.347	-	-	-	-
	29/06/2017	14.367	-	-	-	-
	28/09/2017	14.040	-	-	-	-
	20/12/2017	13.930	-	-	-	-

ARCADIS

Monitor Well ID:	Date Sampled	Depth to Water (m)	Depth to PSH (m) LNAPL	Thickness of PSH (m) LNAPL	Depth to PSH (m) DNAPL	Depth to Base of Well (m)
BH20	31/03/2009	nt	nt	nt	nt	nt
	29/06/2009	nt	nt	nt	nt	nt
	23/09/2009	nt	nt	nt	nt	nt
	23/12/2009	nt	nt	nt	nt	nt
	5/03/2010	9.206	-	-	-	-
	29/06/2010	9.373	-	-	-	-
	14/12/2010	9.295	-	-	-	-
	29/03/2011	9.615	-	-	-	-
	22/03/2012	8.656	-	-	-	-
	28/03/2013	9.185	-	-	-	-
	20/03/2014	9.306	-	-	-	-
	11/03/2015	9.564	-	-	-	-
	23/03/2016	9.195	-	-	-	-
	28/03/2017	9.609	-	-	-	-
	29/06/2017	9.541	-	-	-	-
	28/09/2017	9.660	-	-	-	-
	20/12/2017	12.710	-	-	-	-
BH21	31/03/2009	25.88	-	-	-	-
	29/06/2009	27.77	-	-	-	-
	23/09/2009	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA
	5/03/2010	27.24	-	-	-	-
	29/06/2010	26.043	-	-	-	-
	15/12/2010	27.954	-	-	-	-
	29/03/2011	26.992	-	-	-	-
	22/03/2012	26.388	-	-	-	-
	28/03/2013	27.388	-	-	-	-
	20/03/2014	30+	-	-	-	-
	11/03/2015	17.512	-	-	-	-
	23/03/2016	19.405	-	-	-	-
	27/03/2017	16.922	-	-	-	-
	29/06/2017	17.068	-	-	-	-
	28/09/2017	21.170	-	-	-	-
	20/12/2017		-	-	-	-
BH22	31/03/2009	35.7	-	-	-	-
	29/06/2009	34.99	-	-	-	-
	23/09/2009	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA
	5/03/2010	35.162	-	-	-	-
	29/06/2010	30+	-	-	-	-
	15/12/2010	30+	-	-	-	-
	29/03/2011	30+	-	-	-	-
	22/03/2012	30 +	-	-	-	-
	28/03/2013	30+	-	-	-	-
	20/03/2014	30+	-	-	-	-
	11/03/2015	30+	-	-	-	-
	23/03/2016	30+	-	-	-	-
	27/03/2017	33.441	-	-	-	-
	29/06/2017	30.000	-	-	-	-
	28/09/2017	30+	-	-	-	-
	20/12/2017	30+	-	-	-	-
BH23	31/03/2009	20.71	-	-	-	-
	29/06/2009	20.12	-	-	-	-
	23/09/2009	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA
	5/03/2010	19.771	-	-	-	-
	29/06/2010	19.464	-	-	-	-
	15/12/2010	18.940	-	-	-	-
	29/03/2011	18.866	-	-	-	-
	22/03/2012	18.255	-	-	-	-
	28/03/2013	18.353	-	-	-	-
	20/03/2014	19.124	-	-	-	-
	11/03/2015	18.439	-	-	-	-
	23/03/2016	19.065	-	-	-	-
	29/06/2017	19.152	-	-	-	-
	27/03/2017	19.284	-	-	-	-
	28/09/2017	^	-	-	-	-
	20/12/2017	19.231				

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 2 - Historical Annual Gauging Data

Monitor Well ID:	Date Sampled	Depth to Water (m)	Depth to PSH (m) LNAPL	Thickness of PSH (m) LNAPL	Depth to PSH (m) DNAPL	Depth to Base of Well (m)
BH24	31/03/2009	24.53	-	-	-	-
	29/06/2009	23.69	-	-	-	-
	23/09/2009	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA
	6/03/2010	23.404	-	-	-	-
	29/06/2010	23.195	-	-	-	-
	14/12/2010	22.783	-	-	-	-
	29/03/2011	23.128	-	-	-	-
	22/03/2012	22.190	-	-	-	-
	28/03/2013	23.307	-	-	-	-
	20/03/2014	23.733	-	-	-	-
	11/03/2015	23.857	-	-	-	-
	23/03/2016	24.417	-	-	-	-
	27/03/2017	25.095	-	-	-	-
	29/06/2017	25.773	-	-	-	-
	28/09/2017	^	-	-	-	-
	20/12/2017	^	-	-	-	-

Notes:

^ -Unable to gauge due to pump interference.

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 3 - Groundwater Field Parameters

Monitor Well ID:		*Physical Parameters*						*Subjective Physical Description*		
	Date	**Temp** (°C)	**DO** mg/L [2]	**pH**	**ORP** (mV)	**Conductivity** (ms/cm)	**TDS** [1]	**Odour**	**Sheen**	**Colour and Other Notes:**
BH15A	20/12/2017	27.40	-	7.00	-111.1	10.53	6.84	no	no	Bailer
BH15B [3]	20/12/2017	-	-	-	-	-	-	no	no	micro purge sample
BH16A	20/12/2017	24.40	-	6.65	-116.2	12.86	8.36	no	no	micro purge sample
BH16B	20/12/2017	21.70	-	6.23	-156.3	19.07	12.40	yes	no	micro purge sample, sulphur odour
BH17D	20/12/2017	23.90	-	6.70	-212.1	6.38	4.15	no	no	micro purge sample
BH17E	20/12/2017	22.40	-	6.92	-165	1.99	1.29	no	no	micro purge sample
BH18	20/12/2017	22.50	-	6.81	-147.3	6.66	4.33	no	no	micro purge sample
BH19	20/12/2017	23.80	-	7.20	-192.4	3.98	2.59	no	no	micro purge sample
BH20	20/12/2017	22.50	-	6.90	-157.3	7.36	4.78	yes	no	micro purge sample, sulphur odour
BH21	20/12/2017	26.60	-	6.62	-67	18.24	11.86	no	no	micro purge sample
BH22 [3]	20/12/2017	-	-	-	-	-	-	no	no	Bailer
BH23	20/12/2017	27.30	-	6.37	-65.3	18.99	12.34	yes	no	micro purge sample, sulphur odour
BH24	20/12/2017	32.50	-	6.55	-100	2.941	1.91	no	no	micro purge sample

1. Approximate value determined using the following equation: TDS (mg/L) = EC x 0.65
2 DO probe faulty
3 WQM Fault

Monitor Well ID:		*Physical Parameters*					
	Date	Temp (°C)	DO (mg/L)	pH	ORP (mV)	Conductivity (ms/cm)	TDS (g/L)
BH15A	31/03/2009	21.90	1.00	7.20	-63	7.91	6
	29/06/2009	20.60	3.50	7.40	-130	8.49	6.1
	23/09/2009	18.70	1.30	6.90	-111	10.51	6.1
	23/12/2009	NA	NA	NA	NA	NA	NA
	5/03/2010	20.21	1.19	7.10	111	11.18	7.2
	26/06/2010	19.13	0.48	7.11	122	11.21	7.2
	17/09/2010	19.17	1.92	7.42	119	11.17	7.2
	14/12/2010	19.66	0.84	6.42	142	11.28	7.2
	29/03/2011	19.39	0.60	6.62	95	11.31	7.2
	22/03/2012	19.51	2.05	6.89	127	10.94	7
	28/03/2013	19.72	0.26	6.65	139	11.02	7.1
	20/03/2014	19.80	0.33	6.86	-92	91.98	59.78
	11/03/2015	20.00	0.04	6.71	23	9.32	6.06
	23/03/2016	26.00	4.44	7.27	33	9.73	6.10
	28/03/2017	27.50	0.18	6.77	-116	5890	-
	27/06/2017	19.40	0.08	6.72	-110	9.48	6.16
	28/09/2017	20.10	0.35	6.38	-116.3	16.2	10.53
	20/12/2017	27.40	-	7.00	-111.1	10.53	6.84
BH15B	31/03/2009	21.80	0.23	6.61	-80	11.65	11
	29/06/2009	20.20	2.17	6.66	-80	13.2	10
	23/09/2009	19.30	1.00	6.43	-81	16.3	10
	23/12/2009	NA	NA	NA	NA	NA	NA
	6/03/2010	21.50	1.56	6.81	136	17.2	11
	26/06/2010	17.69	1.37	7.00	169	14.9	9.5
	18/09/2010	19.23	4.83	7.45	123	13.03	8.3
	14/12/2010	19.67	0.82	6.31	150	14.9	9.5
	29/03/2011	19.55	2.77	6.58	139	14.81	9.5
	22/03/2012	19.58	0.34	6.48	140	16.5	10.6
	28/03/2013	19.77	0.18	6.55	119	16.4	10.5
	20/03/2014	19.80	0.19	6.74	-105	13.39	8.71
	11/03/2015	19.70	0.02	6.58	20	15.27	9.27
	23/03/2016	20.90	0.57	6.45	-16	10.32	6.48
	28/03/2017	19.60	0.73	6.76	-872	12340	-
	28/06/2017	17.30	1.05	6.46	-51	9.26	6.02
	28/09/2017	20.40	0.39	6.25	-28.6	25.6	16.64
	20/12/2017	-	-	-	-	-	-
BH16A	31/03/2009	21.50	0.23	7.46	-72	9.62	7.7
	29/06/2009	20.00	2.92	7.45	-123	10.25	7.4
	23/09/2009	19.50	0.68	7.32	-139	12.59	7.4
	23/12/2009	NA	NA	NA	NA	NA	NA
	6/03/2010	20.31	0.61	7.54	77	13.3	8.5
	26/06/2010	18.98	0.42	6.89	204	10.68	6.8
	18/09/2010	19.32	1.22	7.63	103	10.02	6.4
	14/12/2010	20.24	0.24	6.43	127	12.27	7.8
	29/03/2011	20.99	1.43	8.23	86	11.77	7.5
	22/03/2012	19.74	0.65	6.97	92	13.07	7.9
	28/03/2013	20.36	0.12	7.02	63	13.13	8.4
	20/03/2014	20.40	0.16	7.14	-118	10.25	6.65
	11/03/2015	21.00	1.35	7.00	-31	11.14	7.24
	23/03/2016	21.40	2.38	6.52	0	12.4	7.83
	27/03/2017	22.30	0.31	7.17	-203	7300	-
	29/06/2017	19.30	0.26	7.02	-125	10.46	6.80

Monitor Well ID:		*Physical Parameters*					
	Date	**Temp** (°C)	**DO** (mg/L)	**pH**	**ORP** (mV)	**Conductivity** (ms/cm)	**TDS** (g/L)
	28/09/2017	20.60	0.15	6.64	-79.2	19.488	12.67
	20/12/2017	24.40	-	6.65	-116.2	12.86	8.36

Monitor Well ID:		*Physical Parameters*					
	Date	Temp (°C)	DO (mg/L)	pH	ORP (mV)	Conductivity (ms/cm)	TDS (g/L)
BH16B	31/03/2009	21.50	0.72	6.85	-69	16.1	16
	29/06/2009	19.10	4.97	7.18	-118	16.1	14
	23/09/2009	19.00	0.85	6.73	-86	20.9	14
	23/12/2009	NA	NA	NA	NA	NA	NA
	6/03/2010	20.69	0.48	7.19	92	20.3	130
	26/06/2010	17.72	0.44	7.18	125	15.1	9.7
	18/09/2010	24.31	6.25	7.51	136	6.05	3.8
	14/12/2010	29.89	1.49	6.64	105	13.03	8.4
	29/03/2011	27.00	0.60	6.98	78	11.09	7.2
	22/03/2012	19.77	1.30	6.61	150	6.3	4.2
	28/03/2013	20.34	0.16	6.60	91	13.34	8.4
	20/03/2014	20.50	0.14	7.00	-129	14.98	9.74
	11/03/2015	21.60	0.96	6.89	-25	17.62	11.62
	23/03/2016	21.20	2.64	6.53	0	19.57	12.65
	27/03/2017	22.30	0.81	6.93	-222	17360	-
	29/06/2017	19.00	0.08	6.81	-138	15.96	10.37
	28/09/2017	20.60	0.15	6.32	-72.4	32.9	21.39
	20/12/2017	21.70	-	6.23	-156.3	19.07	12.40
BH17D	31/03/2009	NA	NA	NA	NA	NA	NA
	29/06/2009	NA	NA	NA	NA	NA	NA
	23/09/2009	NA	NA	NA	NA	NA	NA
	23/12/2009	NA	NA	NA	NA	NA	NA
	6/03/2010	22.78	1.01	8.20	114	8.84	5.7
	26/06/2010	18.62	2.47	12.58	-34	6.89	4.4
	19/09/2010	20.14	1.97	12.71	62	5.97	3.8
	14/12/2010	21.93	0.60	11.66	-47	7.03	4.5
	29/03/2011	20.42	0.28	11.90	-160	6.93	4.4
	22/03/2012	20.48	0.22	8.58	-84	7.05	4.5
	28/03/2013	21.95	0.16	7.88	-43	2.21	1.4
	20/03/2014	21.10	1.01	7.75	-175	18.58	12.07
	11/03/2015	21.20	0.96	7.42	-121	6.84	4.45
	23/03/2016	26.40	0.25	7.39	-126	5.9	3.61
	27/03/2017	23.20	0.48	7.17	-279	7000	-
	29/06/2017	20.10	0.09	7.10	-243	6.27	4.08
	28/09/2017	20.60	0.23	6.53	-159	13.085	8.51
	20/12/2017	23.90	-	6.70	-212.1	6.38	4.15
BH17E	31/03/2009	NA	NA	NA	NA	NA	NA
	29/06/2009	NA	NA	NA	NA	NA	NA
	23/09/2009	NA	NA	NA	NA	NA	NA
	23/12/2009	NA	NA	NA	NA	NA	NA
	6/03/2010	22.72	0.18	7.15	37	1.89	1.2
	26/06/2010	20.64	0.23	7.41	44	2.13	1.4
	17/09/2010	20.93	0.43	7.63	69	1.85	1.2
	14/12/2010	21.89	0.57	6.66	120	2.18	1.4
	29/03/2011	20.80	0.70	6.90	76	2.23	1.4
	22/03/2012	20.70	0.06	6.95	42	2.12	1.4
	28/03/2013	21.43	0.12	6.91	64	2.06	1.3
	20/03/2014	20.90	0.10	7.00	-102	17.86	11.60
	11/03/2015	21.00	0.00	6.99	-99	1.81	1.18
	23/03/2016	27.20	3.69	7.68	34	1.884	1.095
	27/03/2017	22.80	0.82	6.98	-264	1862	-
	29/06/2017	20.30	0.14	7.10	-202	1.84	1.196

Monitor Well ID:		*Physical Parameters*					
	Date	**Temp** (°C)	**DO** (mg/L)	**pH**	**ORP** (mV)	**Conductivity** (ms/cm)	**TDS** (g/L)
	28/09/2017	20.90	0.28	6.53	-127	3.069	1.995
	20/12/2017	22.40	-	6.92	-165	1.99	1.294

Monitor Well ID:		*Physical Parameters*					
	Date	Temp (°C)	DO (mg/L)	pH	ORP (mV)	Conductivity (ms/cm)	TDS (g/L)
BH18	31/03/2009	21.80	0.62	6.83	59	7.59	5.5
	29/06/2009	19.20	4.00	6.99	42	8.01	5.8
	23/09/2009	19.80	0.89	6.78	-49	9.69	5.5
	23/12/2009	NA	NA	NA	NA	NA	NA
	5/03/2010	20.89	1.08	6.93	169	10.71	6.7
	26/06/2010	10.29	2.04	7.09	188	10.63	6.8
	18/09/2010	19.99	2.70	7.43	131	9.17	5.9
	14/12/2010	20.23	1.01	6.43	159	10.71	6.8
	29/03/2011	24.31	1.91	6.87	122	10.59	6.8
	22/03/2012	20.43	2.69	6.89	224	10.49	6.7
	28/03/2013	22.90	0.51	6.64	166	10.49	6.7
	20/03/2014	22.60	0.56	6.83	-59	87.61	56.97
	11/03/2015	21.40	0.19	6.71	-9	8.89	5.77
	23/03/2016	21.70	2.73	6.64	6	9.53	5.95
	27/03/2017	23.10	1.36	6.93	-220	8920	-
	29/06/2017	20.20	0.21	6.78	-193	8.98	5.84
	28/09/2017	21.20	2.08	6.38	-15.2	16.382	10.65
	20/12/2017	22.50	-	6.81	-147.3	6.66	4.33
BH19	31/03/2009	21.90	0.66	6.90	12	9.38	7.1
	29/06/2009	20.30	3.88	7.02	-72	9.79	7.1
	23/09/2009	19.50	5.00	6.94	-49	12.1	7.4
	23/12/2009	NA	NA	NA	NA	NA	NA
	5/03/2010	20.23	0.08	6.93	250	12.41	7.9
	26/06/2010	18.72	0.33	7.18	174	11.02	7.1
	17/09/2010	21.46	1.88	7.98	94	1.78	1.1
	14/12/2010	21.68	0.18	6.94	67	2.14	1.4
	29/03/2011	21.97	0.19	9.91	-9	3.1	2
	22/03/2012	19.84	1.06	6.62	144	11.59	7.4
	28/03/2013	20.42	0.14	6.81	129	0.993	0.6
	20/03/2014	20.50	0.61	7.08	-87	5.31	3.44
	11/03/2015	21.00	0.12	7.16	-64	0.51	0.32
	23/03/2016	22.90	0.71	7.14	-26	0.686	0.38
	28/03/2017	23.00	1.53	7.24	-188	2890	-
	29/06/2017	20.00	0.13	7.31	-213	0.906	0.59
	28/09/2017	21.00	0.10	6.90	-114.4	6.144	3.99
	20/12/2017	23.80	-	7.20	-192.4	3.98	2.59
BH20	31/03/2009	nt	nt	nt	nt	nt	nt
	29/06/2009	nt	nt	nt	nt	nt	nt
	23/09/2009	nt	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA	NA
	5/03/2010	20.01	1.06	7.19	103	8.13	5.2
	26/06/2010	18.82	0.95	7.39	153	7.92	5.1
	17/09/2010	18.97	1.35	7.61	98	6.77	4.3
	14/12/2010	20.23	0.63	6.55	133	7.92	5.1
	29/03/2011	20.30	0.92	6.74	134	7.86	5
	22/03/2012	19.08	0.23	6.74	140	7.55	4.8
	28/03/2013	21.64	1.19	6.78	107	7.52	4.8
	20/03/2014	20.80	0.28	7.09	-87	65.34	42.46
	11/03/2015	21.70	0.96	7.00	-12	6.98	4.54
	23/03/2016	22.90	0.72	6.84	-23	4.53	2.72
	28/03/2017	25.10	2.52	7.24	-199	6570	-
	29/06/2017	20.90	0.18	6.72	-96	6.47	4.21

Monitor Well ID:		*Physical Parameters*					
	Date	**Temp** (°C)	**DO** (mg/L)	**pH**	**ORP** (mV)	**Conductivity** (ms/cm)	**TDS** (g/L)
	28/09/2017	21.50	0.42	6.81	-114.4	11.695	7.60
	20/12/2017	22.50	-	6.90	-157.3	7.36	4.78

Monitor Well ID:		*Physical Parameters*					
	Date	Temp (°C)	DO (mg/L)	pH	ORP (mV)	Conductivity (ms/cm)	TDS (g/L)
BH21	31/03/2009	22.10	0.07	7.08	12	6.81	6.3
	29/06/2009	19.70	7.62	7.80	-12	8.65	6.2
	23/09/2009	19.90	1.15	6.91	-74	10.11	6.6
	23/12/2009	NA	NA	NA	NA	NA	NA
	5/03/2010	21.32	2.97	7.29	164	11.43	7.1
	26/06/2010	16.08	2.50	7.33	141	10.92	7
	15/12/2010	20.74	1.25	6.69	135	11.32	7.2
	29/03/2011	20.50	2.44	8.19	110	11.37	7.3
	22/03/2012	20.26	1.43	6.93	15.81	9.9	6.3
	28/03/2013	21.41	0.84	6.89	116	12.9	8.3
	20/03/2014	20.50	2.22	7.00	-63	11.08	7.20
	11/03/2015	21.50	3.16	7.03	21	11.95	7.70
	23/03/2016	21.10	1.40	7.01	-70	14.95	9.58
	27/03/2017	13.20	0.64	6.78	-233	14230	-
	29/06/2017	20.00	0.12	6.73	-164	13.26	8.62
	28/09/2017	20.60	2.06	7.16	-140.2	26.601	17.29
	20/12/2017	26.60	-	6.62	-67	18.24	11.86
BH22	31/03/2009	23.10	0.33	6.96	32	5.29	4.6
	29/06/2009	19.90	4.01	6.93	40	6.53	4.8
	23/09/2009	21.50	2.00	6.68	-4	7.95	4.8
	23/12/2009	NA	NA	NA	NA	NA	NA
	5/03/2010	22.86	0.60	7.05	267	8.17	5.2
	26/06/2010	19.02	2.13	7.28	115	8.23	5.3
	18/09/2010	21.50	1.84	7.58	6.7	7.17	4.6
	15/12/2010	20.55	0.47	6.64	25	9.11	5.8
	29/03/2011	20.24	2.17	8.61	11	9.54	6.1
	22/03/2012	19.19	0.63	6.78	160	10.35	6.6
	28/03/2013	21.66	0.70	6.83	130	10.93	7
	20/03/2014	20.20	2.93	7.26	-82	93.86	61.00
	11/03/2015	21.60	3.21	6.94	6	9.65	6.27
	23/03/2016	21.20	1.06	6.88	-196	11.2	7.06
	27/03/2017	14.10	0.07	6.90	-180	10450	-
	29/06/2017	19.70	0.96	6.85	-120	9.77	6.35
	28/09/2017	23.90	0.41	6.22	-122	3.922	2.55
	20/12/2017	-	-	-	-	-	-
BH23	31/03/2009	22.00	<0.01	6.50	-54	14.28	17
	29/06/2009	20.60	3.22	6.69	-54	15.94	17
	23/09/2009	20.00	0.88	6.58	-34	19.72	16
	23/12/2009	NA	NA	NA	NA	NA	NA
	5/03/2010	20.67	1.72	6.71	177	21.2	13.6
	26/06/2010	20.16	0.49	6.87	166	21.2	13.6
	17/09/2010	20.21	0.84	7.04	177	19.1	12.2
	15/12/2010	20.89	0.30	5.91	174	21.6	13.8
	29/03/2011	21.57	0.72	7.57	188	21.6	13.9
	22/03/2012	20.50	1.12	6.20	217	21.1	13.5
	28/03/2013	21.71	0.21	6.38	143	20.9	13.4
	20/03/2014	21.50	0.31	6.60	-34	19.92	12.96
	11/03/2015	21.50	1.05	6.45	68	18.03	11.72
	23/03/2016	22.30	2.82	6.36	-2	19.35	12.52
	27/03/2017	13.60	1.10	6.54	-265	16050	-
	29/06/2017	20.00	0.16	6.55	-172	13.97	9.08
	28/09/2017	21.40	0.24	6.17	-118.4	31.158	20.25

Monitor Well ID:		*Physical Parameters*					
	Date	**Temp** (°C)	**DO** (mg/L)	**pH**	**ORP** (mV)	**Conductivity** (ms/cm)	**TDS** (g/L)
	20/12/2017	27.30	-	6.37	-65.3	18.99	12.34

Monitor Well ID:		*Physical Parameters*					
	Date	**Temp** (°C)	**DO** (mg/L)	**pH**	**ORP** (mV)	**Conductivity** (ms/cm)	**TDS** (g/L)
BH24	31/03/2009	22.00	0.02	6.99	-9	1.28	1.1
	29/06/2009	21.10	4.99	7.12	-34	1.94	1.1
	23/09/2009	20.10	0.54	6.90	-52	1.69	1.1
	23/12/2009	NA	NA	NA	NA	NA	NA
	6/03/2010	25.17	2.63	6.94	156	1.81	1.1
	26/06/2010	21.73	0.43	7.27	141	1.77	1.1
	17/09/2010	23.33	1.29	7.49	160	1.55	1
	14/12/2010	27.00	0.51	6.37	149	2.05	1.3
	29/03/2011	25.54	0.37	7.23	138	2.21	1.4
	22/03/2012	22.33	1.08	6.45	186	2.79	1.8
	28/03/2013	28.29	0.17	6.48	150	3.04	2
	20/03/2014	28.30	0.19	6.54	-42	28.11	18.23
	11/03/2015	27.80	0.03	6.45	5	3.15	2.04
	23/03/2016	28.10	1.70	6.52	-6	2.27	1.32
	27/03/2017	27.40	0.30	6.79	-256	2340	-
	29/06/2017	25.20	0.15	6.76	-144	2.02	1.31
	28/09/2017	24.90	0.71	6.13	-137.3	3.828	2.49
	20/12/2017	32.50	-	6.55	-100	2.941	1.91

Notes:

1. Approximate value determined using the following equation: TDS (mg/L) = EC x 0.65
NA = Not available at time of testing

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 5 - Groundwater Summary Results

ARCADIS

All units in mg/l unless otherwise stated

Sample ID	Sampling				Cations				Anions		Alkalinity by PC Titrator			
	Date	TDS	TOC	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)	Hydroxide (as $CaCO_3$)	Carbonate (as $CaCO_3$)	Bicarbonate (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1	1	1	1
Investigation Criteria		-	-	**15**	-	-	-	-	-	-	-	-	-	-
BH15A	20/12/2017	6530	3	6.77	318	62	1800	38	3150	<1	830	<1	<1	830
BH15B	20/12/2017	9840	9	5.33	472	130	2280	62	4500	1	692	<1	<1	692
BH16A	20/12/2017	7800	1	6.6	171	87	2350	46	4010	<1	546	<1	<1	546
BH16B	20/12/2017	16000	5	9.26	727	273	3270	121	6900	<1	638	<1	<1	638
BH17D	20/12/2017	4540	9	7.14	136	95	1400	45	1750	20	736	<1	<1	736
BH17E	20/12/2017	1270	2	1.52	49	69	317	10	154	16	827	<1	<1	827
BH18	20/12/2017	6770	2	5.39	156	176	1940	44	3340	<1	966	<1	<1	966
BH19	20/12/2017	3010	3	3.12	44	38	1100	20	1180	2	608	<1	<1	608
BH20	20/12/2017	4200	2	3.09	72	148	1310	26	1610	<1	946	<1	<1	946
BH21	20/12/2017	12800	6	7.46	486	300	2610	68	5580	<1	786	<1	<1	786
BH22	20/12/2017	6970	14	5.49	161	72	2210	38	3600	<1	780	<1	<1	780
BH23	20/12/2017	16200	2	3.67	512	1030	2080	44	6420	16	678	<1	<1	678
BH24	20/12/2017	1400	12	0.38	97	97	268	4	272	68	830	<1	<1	830
BH19	20/12/2017	3010	3	3.12	44	38	1100	20	1180	2	608	<1	<1	608
DUP	20/12/2017	3000	3	3.02	44	38	1050	19	1200	2	546	<1	<1	546
RPD %		0%	0%	3%	0%	0%	5%	5%	2%	0%	11%	NA	NA	11%
BH19	20/12/2017	3010	3	3.12	44	38	1100	20	1180	2	608	<1	<1	608
TRIP	20/12/2017	2980	4	3.30	44	38	1040	18	1180	2	613	<1	<1	613
RPDs %		1%	29%	6%	0%	0%	6%	11%	0%	22%	1%	NA	NA	1%

Notes:

bold	Exceeds RPD target of 50%
bold	*Concentration exceeds concentration limits for groundwater as per EPL 4865*

NA - Not Applicable
Primary Lab: ALS
Secondary Lab: Envirolab
RPDs were not calculated for analytes which had reported results below detection limits
LOR - Limit of Reporting

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 6 - Historical Groundwater Summary Results

ARCADIS

All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
BH15A	31/03/2009	6000	<1	6	150	86	2000	46	3100	<1	1200
	29/06/2009	6100	<1	4.8	120	77	2500	55	3200	<1	1200
	23/09/2009	6100	5	6.1	130	77	2000	46	3100	<1	1200
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/03/2010	5620	131	5.62	131	73	2090	45	4120	0.61	1130
	26/06/2010	5880	1	4.54	162	72	1940	48	2370	1.49	1190
	17/09/2010	5950	<1	6.67	140	72	1910	44	2990	<1	991
	14/12/2010	5780	<1	6.64	144	71	1900	40	2930	1	1140
	29/03/2011	11400	10	5.32	138	74	2130	48	3170	<1	1050
	20/06/2011	6860	<1	4.56	132	73	2250	44	3540	<1	1040
	16/09/2011	6110	<1	4.78	96	71	2140	43	3360	14	951
	20/12/2011	6200	11	5.33	130	158	2600	50	3540	8	1080
	15/06/2012	5940	<1	6.57	139	75	2120	47	3190	<1	1100
	21/09/2012	6140	<1	6.04	193	78	2090	46	3300	<1	1130
	13/12/2012	5140	1	6.74	204	75	2030	48	3130	<1	1010
	28/03/2013	6060	2	5.65	189	72	1990	58	3040	<1	1050
	27/06/2013	6160	27	5.83	227	68	1940	39	2960	<1	951
	12/09/2013	6230	<1	5.78	229	66	1890	43	3080	<1	984
	19/12/2013	6520	3	5.16	322	66	1910	47	2880	<1	907
	20/03/2014	6180	<1	5.66	316	64	1930	41	2880	<1	798
	11/06/2014	6250	<1	5.48	331	65	1830	48	3030	<1	1020
	19/09/2014	6070	<1	5.67	326	66	1890	44	3430	<1	839
	19/12/2014	6570	<1	5.38	449	65	1920	37	3340	<1	813
	11/03/2015	5290	12	5.6	405	65	1810	35	2750	2	996
	3/06/2015	6080	<1	4.71	471	72	1850	36	3380	<1	776
	18/09/2015	6380	16	3.22	847	51	1530	30	3330	<1	446
	9/12/2015	7080	<LOR	4.9	468	70	1880	36	3390	<1	798
	23/03/2016	6360	2	3.69	252	61	1680	34	3440	<1	437
	28/06/2016	5810	4	5.89	214	60	1920	35	3240	<1	804
	19/09/2016	3110	<1	5.8	226	66	1910	35	3020	<1	3020
	13/12/2016	6880	1	5.43	531	72	1780	40	3520	<1	738
	28/03/2017	6270	1	6.04	261	68	1860	39	3020	<1	1100
	27/06/2017	6460	1	7	434	68	1960	37	3330	<1	804
	28/09/2017	6420	1	7.07	275	64	1880	136	2990	<1	1090
	20/12/2017	6530	3	6.77	318	62	1800	38	3150	<1	830
BH15B	31/03/2009	11000	<1	8	430	210	3000	83	5600	<1	1100
	29/06/2009	10000	2	6.6	420	190	3400	98	5700	<1	1000
	23/09/2009	10000	<1	7.9	420	190	3000	82	5400	<1	1100
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/03/2010	7090	395	7.09	395	188	2880	89	6990	0.9	1020
	26/06/2010	8440	3	4.52	316	147	2480	68	4620	0.62	996
	17/09/2010	8070	3	6.47	372	139	2290	67	4350	<1	792
	14/12/2010	8250	6	7.05	372	143	2370	60	4480	<1	895
	29/03/2011	8300	3	5.85	366	147	2550	77	4600	<1	860
	20/06/2011	10700	<1	6.91	313	140	2810	70	5040	<1	973
	16/09/2011	9320	<1	7.14	301	150	2910	69	5440	<1	851
	20/12/2011	9820	8	7.8	330	207	3110	69	5400	<1	938
	15/06/2012	9370	<LOR	7.12	380	177	2850	82	5450	<1	1000
	21/09/2012	9290	13	7.49	412	181	2790	76	5180	6	1080
	13/12/2012	9280	<1	8	353	168	2730	73	4870	<1	983
	28/03/2013	9880	<1	5.29	303	161	2800	102	4890	<1	1030
	27/06/2013	9870	15	7.13	339	154	2670	66	4670	<1	962
	12/09/2013	9880	<LOR	7.39	318	155	2780	83	4780	<1	1040
	19/12/2013	10200	2	6.91	324	162	3180	91	4890	<1	1040
	20/03/2014	10200	<1	7.47	370	187	3600	95	4580	<1	845
	11/06/2014	9950	<1	7.44	382	164	3000	85	4890	<1	1120
	19/09/2014	9930	<1	7.69	334	166	3170	79	5710	<1	905
	19/12/2014	9690	<1	7.69	398	168	3070	70	5660	10	895
	11/03/2015	7170	4	7.79	417	171	2940	67	4580	1	1040
	3/06/2015	9140	<1	7.58	416	188	3140	77	5580	<1	919
	18/09/2015	10300	1	7.21	412	159	3220	73	5120	<1	949
	9/12/2015	11000	<1	7.76	423	188	3240	75	5670	<1	962
	23/03/2016	11100	<1	7.61	390	182	2720	74	5700	3	1010
	28/06/2016	10000	2	7.4	429	162	3150	70	5240	<1	1140
	19/09/2016	10600	<1	7.41	404	169	2880	64	4980	<1	1090
	13/12/2016	10400	2	7.35	450	169	3030	72	5740	<1	922
	28/03/2017	7520	3	6.01	374	127	2340	60	4390	<1	997
	28/06/2017	9220	1	7.06	415	185	3260	75	5590	<1	839
	28/09/2017	11300	3	7.97	362	173	3020	69	5100	<10	1080

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 6 - Historical Groundwater Summary Results

All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
	20/12/2017	9840	9	5.33	472	130	2280	62	4500	1	692

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All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
BH16A	31/03/2009	7700	<1	7	200	98	2600	48	5000	<1	520
	29/06/2009	7400	<1	5.6	180	87	2700	58	4300	<1	530
	23/09/2009	7400	<1	6.6	180	87	2300	48	3800	<1	520
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/03/2010	6020	201	6.02	201	94	2420	89	4800	1.06	519
	26/06/2010	5620	5	2	133	57	1720	73	3180	<1	373
	17/09/2010	6030	2	5.22	154	65	2000	71	3620	<1	346
	14/12/2010	6420	2	7.41	147	67	2180	53	3800	<1	364
	29/03/2011	6940	9	5.26	154	74	2390	63	3990	<1	399
	21/06/2011	5490	2	3.76	167	61	2150	73	3740	3	398
	16/09/2011	7260	<1	5.76	182	88	2560	46	4540	4	452
	20/12/2011	7400	<1	6.61	175	129	2760	51	4440	<1	416
	15/06/2012	6940	<1	6.93	173	84	2380	56	4210	<1	510
	21/09/2012	7460	<1	6.3	208	97	2460	50	4320	<1	580
	13/12/2012	7860	1	7.54	190	95	2430	53	4090	<1	546
	28/03/2013	7050	5	5.55	89	85	2340	71	3830	<1	542
	27/06/2013	7580	3	6.67	179	87	2320	43	3860	<1	537
	12/09/2013	7560	1	6.8	168	88	2420	50	4000	<1	570
	19/12/2013	7750	<1	6.52	170	90	2530	56	4100	<1	572
	20/03/2014	6290	4	7.31	165	66	2080	50	3040	<1	444
	11/06/2014	7530	<1	6.69	198	87	2480	54	3960	<1	634
	19/09/2014	7450	<1	7.33	175	90	2610	54	4450	<1	544
	19/12/2014	7410	<1	6.73	223	89	2400	43	4260	<1	552
	11/03/2015	5980	13	7.1	246	91	2370	40	4020	<1	633
	3/06/2015	7180	<1	6.32	219	102	2530	44	4190	<1	569
	18/09/2015	6380	12	6.49	218	80	2440	44	3870	<1	578
	9/12/2015	7600	10	6.90	229	92	2410	41	4330	<1	596
	23/03/2016	7650	<1	6.95	244	93	2410	40	4240	<1	635
	28/06/2016	7250	2	6.72	219	80	2440	38	4060	2	715
	19/09/2016	7580	<1	6.77	228	80	2260	37	3930	<1	690
	13/12/2016	6110	4	5.54	196	80	1990	62	3490	<1	500
	28/03/2017	7650	1	6.93	212	83	2230	40	4000	<1	628
	29/06/2017	7170	1	6.38	197	81	2200	40	4230	<1	512
	28/09/2017	7280	1	7.1	172	88	2380	40	3900	<10	693
	20/12/2017	7800	1	6.6	171	87	2350	46	4010	<1	546
BH16B	31/03/2009	16000	1	10	760	320	3900	110	7600	<1	680
	29/06/2009	41000	2	7.6	680	240	3800	110	7500	<1	560
	23/09/2009	41000	<1	9.6	710	270	3300	98	7500	<1	750
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/03/2010	8740	708	8.74	708	278	3240	102	7340	1.88	642
	26/06/2010	8360	5	3.95	480	179	2210	68	4570	0.88	541
	17/09/2010	6500	5	5.12	395	137	1630	56	3740	<1	401
	14/12/2010	7560	7	5.99	405	145	1950	54	4140	<1	472
	29/03/2011	5000	<1	2.66	275	92	1270	41	2470	<1	381
	21/06/2011	8030	4	4.69	466	152	2280	64	4820	<1	456
	16/09/2011	6650	4	4.17	378	134	1850	56	4110	1	363
	20/12/2011	4380	8	2.48	230	101	1160	33	2030	<1	399
	15/06/2012	3570	6	1.86	228	68	930	31	1730	<1	387
	21/09/2012	5720	6	3.83	343	108	1370	46	3040	<1	457
	13/12/2012	6470	4	6.04	420	152	1950	64	3870	<1	470
	28/03/2013	7750	<1	6.31	359	165	2150	89	4180	<1	492
	27/06/2013	9020	5	6	449	163	2160	62	4360	<1	474
	12/09/2013	10300	3	6.7	466	180	2550	109	4830	<1	532
	19/12/2013	12500	5	7.19	470	196	3120	118	5580	<1	516
	20/03/2014	13300	3	8.62	567	241	3740	124	5320	<1	478
	11/06/2014	12500	<1	8.49	611	224	3340	116	6140	<1	666
	19/09/2014	12500	2	9.36	592	240	3540	111	7340	<1	605
	19/12/2014	14100	<1	8.84	673	234	3440	95	7100	<1	616
	11/03/2015	13100	12	9.04	673	236	3260	91	6590	<1	700
	3/06/2015	11800	1	8.06	729	297	3700	102	6840	<1	621
	18/09/2015	12100	2	8.41	676	229	3550	91	6330	<1	647
	9/12/2015	14600	2	4.75	678	261	3520	92	7180	<1	661
	23/03/2016	14600	4	8.81	759	274	3550	90	7320	<1	700
	28/06/2016	12800	2	10.2	785	244	3710	88	6760	<1	814
	19/09/2016	13000	2	9.21	733	261	3370	86	6680	<1	787
	13/12/2016	11500	2	8.2	722	234	3240	84	6610	<1	610
	28/03/2017	14200	1	9.3	776	229	3290	88	7000	<1	718
	29/06/2017	13900	<1	8.69	766	276	3140	79	7570	<1	595
	28/09/2017	15800	1	9.99	626	256	3410	84	6880	<10	740

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 6 - Historical Groundwater Summary Results

ARCADIS

All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
	20/12/2017	16000	5	9.26	727	273	3270	121	6900	<1	638

All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
BH17D	31/03/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	29/06/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	23/09/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/03/2010	4200	60	4.2	89	98	1500	55	3000	1.07	432
	26/06/2010	2640	68	7.12	60	<1	871	224	1090	152	1030
	17/09/2010	1650	61	12.9	1	<1	850	183	1160	162	440
	14/12/2010	2510	61	**15.2**	34	<1	920	186	1060	151	519
	29/03/2011	3150	58	12.1	10	28	1120	116	1360	62	550
	20/06/2011	4430	76	10.5	17	76	1230	82	1590	26	714
	16/09/2011	3510	59	8.05	21	49	1300	85	1700	43	557
	21/12/2011	3560	60	9.16	19	54	1320	78	1730	35	642
	15/06/2012	3800	38	9.04	84	60	1340	78	1830	22	720
	21/09/2012	4440	31	7.64	113	67	1320	69	1880	<1	823
	13/12/2012	2420	52	**20.6**	<1	1	920	121	997	87	464
	28/03/2013	1230	8	5.1	8	124	283	36	311	161	644
	27/06/2013	952	11	4.03	26	145	215	20	210	153	626
	12/09/2013	1130	4	4.49	26	151	228	22	213	146	681
	19/12/2013	1120	7	4.58	23	146	182	18	224	154	686
	20/03/2014	1050	4	5.46	20	149	202	22	228	146	572
	11/06/2014	1130	4	6.98	19	146	274	31	305	138	698
	19/09/2014	1520	18	12.6	5	70	526	67	805	88	510
	19/12/2014	1980	38	**16.3**	4	43	761	89	942	101	493
	11/03/2015	3430	36	5.66	144	77	1390	47	2060	2	891
	3/06/2015	3930	16	5.90	138	106	1350	45	1810	23	771
	18/09/2015	3830	14	5.64	161	96	1420	46	1990	18	788
	9/12/2015	4420	17	6.20	160	107	1460	47	2240	23	838
	23/03/2016	3630	11	8.10	51	127	655	32	1660	27	772
	28/06/2016	2210	8	10.7	47	108	671	27	853	96	795
	19/09/2016	3940	8	7.17	165	98	1290	46	1870	19	934
	13/12/2016	4990	9	5.71	182	100	1590	51	2510	<1	809
	28/03/2017	4550	14	6.81	167	100	1350	46	1860	15	824
	29/06/2017	4160	12	6.81	141	92	1190	40	2260	17	705
	28/09/2017	5130	11	6.41	122	95	1480	46	2290	2	938
	20/12/2017	4540	9	7.14	136	95	1400	45	1750	20	736
BH17E	31/03/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	29/06/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	23/09/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/03/2010	860	60	0.86	60	63	415	15	111	1	1020
	26/06/2010	1090	5	0.73	60	77	340	14	127	18.5	806
	17/09/2010	1180	3	1.44	67	92	308	12	145	36	898
	14/12/2010	1220	3	1.79	61	79	338	12	157	45	942
	29/03/2011	1280	58	1.05	61	79	337	14	146	43	880
	20/06/2011	1450	2	1	62	76	319	11	144	43	879
	16/09/2011	1400	1	1.65	58	80	346	12	154	114	872
	21/12/2011	1220	7	1.21	22	85	319	12	148	54	902
	15/06/2012	1120	<1	1.49	69	94	285	11	133	43	878
	21/09/2012	1230	1	1.63	57	71	330	12	147	20	961
	13/12/2012	1240	1	1.72	58	79	328	14	135	34	897
	28/03/2013	1060	1	1.4	51	87	253	13	134	34	888
	27/06/2013	1130	9	1.22	62	88	272	10	131	39	836
	12/09/2013	1120	1	1.35	60	90	296	12	130	38	864
	19/12/2013	1090	3	1.75	64	93	229	10	138	45	885
	20/03/2014	1090	2	1.13	65	90	261	10	136	46	733
	11/06/2014	1170	<1	1.18	70	86	241	11	139	45	942
	19/09/2014	1030	2	1.29	62	89	256	11	162	45	794
	19/12/2014	1000	<LOR	1.01	88	103	257	10	159	64	782
	11/03/2015	995	17	1.17	96	104	242	9	166	54	904
	3/06/2015	1050	<1	1.25	91	104	290	10	170	49	800
	18/09/2015	1140	3	1.20	86	91	264	9	171	45	813
	9/12/2015	1160	2	1.06	80	110	274	10	180	64	825
	23/03/2016	1180	2	1.07	96	108	255	9	184	33	901
	28/06/2016	1080	2	1.21	87	88	301	10	178	50	982
	19/09/2016	1270	2	1.38	87	86	283	10	174	41	967
	13/12/2016	1290	3	1.35	76	85	309	13	189	38	813
	28/03/2017	1130	2	1.16	82	98	264	9	152	33	862
	29/06/2017	1160	2	1.24	67	78	271	11	168	22	802
	28/09/2017	1160	2	1.49	64	86	275	10	145	18	980

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Table 6 - Historical Groundwater Summary Results

All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
	20/12/2017	1270	2	1.52	49	69	317	10	154	16	827

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		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
BH18	31/03/2009	5500	1	5	160	150	1800	46	3100	<1	920
	29/06/2009	5800	3	4.1	140	140	2100	53	2700	<1	960
	23/09/2009	5500	1	5	150	140	1800	49	2700	<1	970
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/03/2010	4670	157	4.67	157	146	1810	43	3040	1.15	936
	26/06/2010	5490	3	4.53	152	141	1890	48	2640	<1	967
	17/09/2010	5570	3	5.49	146	137	1700	45	3060	<1	847
	14/12/2010	5460	34	5.51	145	132	1790	41	2990	<1	939
	29/03/2011	5670	1	4.59	140	134	1900	49	3040	<1	891
	21/06/2011	5300	4	3.9	145	130	1730	42	3060	<1	864
	16/09/2011	5820	<1	4.31	125	132	1870	43	3300	6	800
	20/12/2011	5860	5	5.25	48	143	1990	46	3200	4	865
	15/06/2012	5690	2	5.23	148	135	1980	49	3170	<1	906
	21/09/2012	5770	<1	5.08	169	144	1820	44	3190	<1	953
	13/12/2012	5940	<1	4.36	151	141	1850	49	3010	<1	894
	28/03/2013	5330	2	5.28	132	132	1820	58	2970	<1	898
	27/06/2013	5900	12	5.29	150	127	1820	40	2980	<1	872
	12/09/2013	5790	<1	5.39	147	130	1970	50	3000	<1	898
	19/12/2013	5900	3	5.1	144	130	1910	51	3060	<1	935
	20/03/2014	5750	2	5.56	148	124	1870	46	2710	<1	762
	11/06/2014	5370	<1	5.3	160	122	1790	50	2880	1	1010
	19/09/2014	5390	2	5.5	135	121	1810	44	3180	<1	862
	19/12/2014	4590	<1	5.51	169	122	1850	41	3010	<1	891
	11/03/2015	4420	15	5.26	177	117	1810	38	2860	<1	1010
	3/06/2015	5280	1	5.26	167	134	1910	42	3010	<1	891
	18/09/2015	5490	2	4.94	172	121	2030	43	2740	3	900
	9/12/2015	5350	2	5.06	164	123	1940	40	3010	<1	946
	23/03/2016	5700	2	5.23	168	118	1770	37	3020	<1	963
	28/06/2016	5440	2	5.13	155	100	1860	36	2850	1	1100
	19/09/2016	5580	2	5.33	169	110	1780	37	2650	<1	1050
	13/12/2016	5140	5	5.24	165	128	1900	47	3150	<1	912
	28/03/2017	5790	5.4	164	124	1780	38	2920	1010	<1	1010
	29/06/2017	5660	2	5.22	176	181	1790	39	3490	<1	896
	28/09/2017	6370	1	5.61	144	146	1800	54	3040	<1	1050
	20/12/2017	6770	2	5.39	156	176	1940	44	3340	<1	966
BH19	31/03/2009	7100	1	7	200	150	2400	46	4100	<1	830
	29/06/2009	7100	2	5.7	180	140	2600	53	3900	<1	820
	23/09/2009	7400	1	6.9	190	140	2200	44	3800	<1	830
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/03/2010	6360	180	6.36	180	142	2060	41	3740	3.94	802
	26/06/2010	6160	3	4.43	187	181	2300	48	3460	7.62	736
	17/09/2010	1120	8	0.04	33	72	321	45	218	66	625
	14/12/2010	1090	9	0.11	30	68	384	5	262	69	644
	29/03/2011	1590	8	0.25	35	66	506	7	528	77	585
	21/06/2011	3320	8	2.55	79	88	1110	19	1510	47	614
	16/09/2011	6160	3	5.04	136	126	2000	37	3630	8	675
	20/12/2011	6800	4	5.44	56	144	2140	43	3780	5	656
	15/06/2012	6200	2	3.91	150	136	2100	43	3580	<1	790
	21/09/2012	6230	3	4.69	165	138	1960	39	3490	<1	837
	13/12/2012	1180	7	0.7	25	36	409	8	491	54	299
	28/03/2013	518	4	0.31	13	26	154	3	97	66	259
	27/06/2013	547	4	0.11	19	35	170	3	123	68	270
	12/09/2013	3150	5	2.74	67	77	1120	23	1430	28	609
	19/12/2013	416	9	0.06	10	19	105	1	62	45	208
	20/03/2014	333	6	0.3	7	13	97	<1	52	41	158
	11/06/2014	365	3	0.2	16	23	116	2	43	42	297
	19/09/2014	390	4	0.06	11	22	123	2	99	42	197
	19/12/2014	397	2	0.02	33	38	97	2	57	41	282
	11/03/2015	283	1	0.11	21	18	77	1	50	27	203
	3/06/2015	354	3	0.07	37	28	95	1	58	30	282
	18/09/2015	378	4	0.03	17	19	114	2	72	28	208
	9/12/2015	366	4	0.02	17	22	111	1	54	34	232
	23/03/2016	506	1	0.07	38	33	133	2	59	30	347
	28/06/2016	404	5	0.17	15	16	111	1	74	44	218
	19/09/2016	531	4	0.06	25	31	139	2	77	41	344
	13/12/2016	623	5	0.38	23	33	229	5	178	40	331
	28/03/2017	1690	6	2.16	32	23	645	13	720	9	548
	29/06/2017	512	5	0.21	16	18	154	3	90	30	284
	28/09/2017	2200	2	2.61	37	25	743	14	876	<1	623

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		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
	20/12/2017	3010	3	3.12	44	38	1100	20	1180	2	608

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		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
BH20	31/03/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	29/06/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	23/09/2009	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/03/2010	3920	89	3.92	89	142	1390	28	2380	1.55	918
	26/06/2010	3880	5	1.54	87	173	1440	32	1960	3.08	1060
	17/09/2010	4130	4	3.42	82	160	1250	28	21500	<1	901
	14/12/2010	3990	5	3.84	75	146	1360	27	1990	<1	931
	29/03/2011	4230	3	1.7	76	149	1330	29	1880	<1	903
	20/06/2011	5020	4	2.16	76	140	1260	25	1960	<1	900
	16/09/2011	4160	2	2.9	74	148	1370	26	1950	<1	908
	20/12/2011	4080	6	3.01	32	146	1320	28	1890	<1	977
	15/06/2012	3760	2	3.61	74	145	1350	29	1850	<1	954
	21/09/2012	4040	2	3.07	79	148	1260	28	1680	<1	1010
	13/12/2012	5000	2	3.5	72	148	1280	30	1660	<1	957
	28/03/2013	3930	3	3.28	41	147	1270	36	1810	<1	959
	27/06/2013	3870	12	3.15	74	142	1230	26	1640	<1	893
	12/09/2013	4100	2	3.27	77	150	1420	31	1860	<1	974
	19/12/2013	4170	6	3.09	75	148	1250	31	1870	<1	990
	20/03/2014	4110	2	3.21	81	156	1330	30	1590	<1	810
	11/06/2014	3810	<1	3.22	870	151	1250	31	1720	2	1040
	19/09/2014	3910	2	3.24	76	155	1200	29	2120	<1	848
	19/12/2014	4070	<1	3.09	115	161	1360	26	1930	<1	891
	11/03/2015	3430	8	3.16	359	176	2220	48	1960	<1	1020
	3/06/2015	3890	1	3.26	110	171	1290	26	1870	<1	887
	18/09/2015	3860	2	3.11	122	141	1300	24	1790	<1	924
	9/12/2015	3970	2	3.07	79	176	1350	26	1960	<1	943
	23/03/2016	3670	12	3.01	135	164	1290	25	1910	<1	964
	28/06/2016	4010	2	3.21	116	146	1350	24	1630	<1	1100
	19/09/2016	4200	2	3.3	140	160	1270	25	1690	<1	1030
	13/12/2016	4000	2	3.29	125	153	1320	30	1810	<1	894
	28/03/2017	4120	7	3.67	114	142	1240	25	1620	<1	1010
	29/06/2017	3740	2	3.02	106	173	1130	22	1970	<1	913
	28/09/2017	3770	2	3.37	107	151	1260	24	1840	2	1060
	20/12/2017	4200	2	3.09	72	148	1310	26	1610	<1	946
BH21	31/03/2009	6300	19	5	230	150	1800	48	3300	<1	680
	29/06/2009	6200	23	3.6	200	150	2000	55	3200	<1	680
	23/09/2009	6600	26	5	230	130	1800	52	3600	<1	750
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/03/2010	5520	238	5.52	238	127	1930	51	4700	0.92	733
	26/06/2010	5630	23	3.16	232	166	1890	48	3090	21.2	717
	17/09/2010	5990	23	4.74	213	172	1670	46	3290	40	645
	14/12/2010	6120	22	4.87	197	168	1860	45	3330	41	695
	29/03/2011	6810	20	3.17	213	181	1890	50	345	39	664
	20/06/2011	7770	20	4.51	214	177	1820	45	3490	36	672
	16/09/2011	6840	18	4.56	218	158	1980	48	3910	16	604
	20/12/2011	7340	19	5.5	115	180	2180	52	4000	4	607
	15/06/2012	6000	18	3.79	239	178	2100	53	3880	<1	713
	21/09/2012	7300	18	5.03	264	178	2020	50	3960	<1	770
	13/12/2012	7260	22	5.51	234	190	2090	57	3780	<1	669
	28/03/2013	7630	16	6.11	254	153	2140	72	3890	<1	732
	27/06/2013	8020	24	5.8	286	148	2060	48	3770	<1	693
	12/09/2013	8120	15	6.15	282	158	2360	68	4000	<1	735
	19/12/2013	8870	25	5.64	286	163	2390	70	4170	<1	712
	20/03/2014	8380	18	6.11	319	166	2380	54	3750	<1	634
	11/06/2014	7990	15	5.78	340	167	2370	64	3930	<1	802
	19/09/2014	7940	17	6.22	286	171	2430	57	4580	<1	664
	19/12/2014	8630	15	6.07	348	175	2380	53	4580	<1	700
	11/03/2015	7330	20	5.71	203	82	2080	30	4220	<1	801
	3/06/2015	8210	15	5.95	365	200	2410	53	4450	<1	693
	18/09/2015	6390	14	6.17	368	181	2440	52	4460	<1	728
	9/12/2015	9340	13	6.64	400	232	2690	56	5170	<1	742
	23/03/2016	9470	15	7.16	454	231	2560	55	5290	<1	758
	28/06/2016	9520	10	6.96	452	202	2650	53	5070	<1	881
	19/09/2016	10700	7	7.57	508	226	2630	58	4720	<1	865
	13/12/2016	11500	6	7.24	547	290	2840	61	5820	<1	733
	28/03/2017	4120	7	7.66	513	265	2690	58	5510	<1	758
	29/06/2017	11000	6	7.26	502	301	2620	54	5990	<1	739
	28/09/2017	13000	6	8.03	443	288	2770	59	5480	2	844

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		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
	20/12/2017	12800	6	7.46	486	300	2610	68	5580	<1	786

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		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
BH22	31/03/2009	4600	80	3	97	36	1700	27	2200	150	1100
	29/06/2009	4800	94	2.5	89	35	2000	33	2200	120	1100
	23/09/2009	4800	89	4.1	93	35	1600	25	1900	120	1100
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/03/2010	3370	98	3.37	98	51	1600	25	2160	228	1020
	26/06/2010	4460	80	1	114	74	1620	28	1850	201	738
	17/09/2010	4860	70	4.25	106	74	1500	26	2100	224	886
	14/12/2010	4770	51	4.88	110	64	1810	28	2370	118	961
	29/03/2011	5310	32	3.53	109	59	1870	32	2610	51	867
	21/06/2011	4830	29	3.54	114	61	1800	28	2770	32	842
	16/09/2011	5500	20	4.2	116	61	1960	29	3020	26	776
	20/12/2011	5230	19	4.18	38	60	2050	31	3060	<1	725
	15/06/2012	5380	20	5.42	125	62	2020	34	3170	<1	768
	21/09/2012	5740	21	5.16	143	69	1950	31	3230	<1	814
	13/12/2012	5840	18	5.45	131	68	2000	36	3010	<1	777
	28/03/2013	5170	18	2.48	112	70	1940	42	2980	<1	808
	27/06/2013	5920	31	4.9	133	72	1920	31	2980	<1	767
	12/09/2013	5950	17	5.09	141	79	2320	44	3150	<1	832
	19/12/2013	6180	25	5.04	136	77	2120	40	3240	<1	831
	20/03/2014	5020	22	5.22	149	77	2130	34	2970	<1	672
	11/06/2014	5980	15	5.3	167	77	2080	40	3140	1	864
	19/09/2014	6160	13	5.42	144	74	2090	36	3600	<1	711
	19/12/2014	6080	10	5.41	179	74	2180	32	3540	<1	709
	11/03/2015	5730	26	5.21	643	1140	1960	36	3360	<1	823
	3/06/2015	6120	30	5.04	183	88	2300	32	3590	<1	715
	18/09/2015	5410	15	5.2	203	78	2450	34	3300	<1	729
	9/12/2015	4770	10	5.23	192	81	2280	32	3700	<1	730
	23/03/2016	5820	2	5.77	212	84	2210	32	3860	14	763
	28/06/2016	6490	2	5.37	184	66	2320	30	3570	<1	867
	19/09/2016	6690	8	5.53	206	71	2100	30	3440	2	724
	13/12/2016	6690	2	5.81	208	75	2340	42	3930	<1	920
	28/03/2017	6840	11	5.77	198	79	2180	32	3580	<1	821
	29/06/2017	6460	67	5.41	185	65	2050	32	3830	<1	778
	28/09/2017	6820	12	5.97	192	76	2260	32	3480	<10	917
	20/12/2017	6970	14	5.49	161	72	2210	38	3600	<1	780
BH23	31/03/2009	17000	2	3	560	1300	2000	43	7400	20	660
	29/06/2009	17000	3	2.4	580	1300	2200	48	7200	19	720
	23/09/2009	16000	1	2.7	510	1200	1800	43	7200	25	720
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/03/2010	1730	556	1.73	556	1260	1840	40	11400	49.5	697
	26/06/2010	10600	3	1.81	584	1330	1940	44	7380	28.2	717
	17/09/2010	11400	<1	2.79	540	1200	1760	42	7430	35	664
	14/12/2010	13500	2	3.24	501	1140	1910	40	7420	40	689
	29/03/2011	14000	<1	2.22	542	1160	1970	45	7380	39	651
	21/06/2011	12500	<1	2.57	546	1160	1920	39	7480	33	645
	16/09/2011	13500	<1	2.91	553	1260	1990	40	7770	35	642
	20/12/2011	14500	2	2.88	402	1300	1900	41	7570	36	509
	15/06/2012	11380	<1	3.29	552	1160	2100	47	7570	31	688
	21/09/2012	14100	<1	3	556	1120	1810	42	7250	35	693
	13/12/2012	14600	32	2.86	519	1190	1900	45	6700	38	667
	28/03/2013	12800	2	3.22	400	1120	2120	61	6670	26	666
	27/06/2013	14900	8	2.85	500	1080	1890	38	6360	29	622
	12/09/2013	15900	<1	2.94	514	1230	2210	58	6760	30	694
	19/12/2013	15100	2	2.32	495	1200	2100	51	6980	30	687
	20/03/2014	15700	2	1.9	503	1360	2280	54	5790	27	560
	11/06/2014	12300	<1	2.84	550	1180	2100	49	6580	22	729
	19/09/2014	12900	1	2.87	500	1130	2180	47	7780	22	607
	19/12/2014	14800	<LOR	2.92	674	1330	2050	40	7370	28	629
	11/03/2015	14000	8	2.67	220	181	268	5	6690	24	726
	3/06/2015	11800	<1	2.94	599	1290	2050	39	7180	18	645
	18/09/2015	12000	2	2.93	594	1100	2160	40	6780	24	658
	9/12/2015	11800	2	2.47	595	1240	2080	38	7400	28	670
	23/03/2016	10300	<1	3.57	652	1210	2020	36	7330	14	691
	28/06/2016	13700	4	2.94	615	1130	2050	37	6650	20	776
	19/09/2016	14400	1	2.17	625	1120	1870	34	6540	21	724
	13/12/2016	15100	2	3.78	677	1110	2220	47	7440	14	609
	28/03/2017	13400	3	3.14	600	977	1930	38	6560	16	713
	29/06/2017	12800	3	3.22	573	1090	1670	35	7080	5	627
	28/09/2017	14100	1	3.4	504	1090	2040	37	6570	15	729

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 6 - Historical Groundwater Summary Results

All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
	20/12/2017	16200	2	3.67	512	1030	2080	44	6420	16	678

Project ID - 17272
Enviroguard Erskine Park - September 2017 Quarterly Groundwater Monitoring Event
Table 6 - Historical Groundwater Summary Results

ARCADIS

All units in mg/l unless otherwise stated

Sample ID	Sampling Date	Inorganics			Cations				Anions		
		Total Dissolved Solids (TDS)	Total Organic Carbon (TOC)	Ammonia	Calcium	Magnesuim	Sodium	Potassium	Chloride	Sulphate	Alkalinity (as $CaCO_3$)
LOR		10	1	0.01	1	1	1	1	1	1	1
Investigation Criteria				**15**							
BH24	31/03/2009	1100	1	1	90	86	210	6	100	160	670
	29/06/2009	1100	3	0.4	81	79	320	8.5	160	130	720
	23/09/2009	1100	1	0.4	81	79	210	3.9	120	120	720
	23/12/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/03/2010	1000	86	<0.01	86	82	223	4	103	115	703
	26/06/2010	916	2	0.34	82	79	213	4	92.7	100	738
	17/09/2010	1220	1	0.43	81	83	224	4	104	82	744
	14/12/2010	1120	5	0.44	96	91	236	4	198	84	792
	29/03/2011	1320	6	0.24	121	105	209	4	222	66	760
	21/06/2011	1040	9	0.45	121	109	215	4	272	48	793
	16/09/2011	1340	10	0.2	138	130	203	4	304	43	777
	20/12/2011	1520	21	0.2	28	147	241	4	324	41	821
	15/06/2012	1760	32	0.09	176	155	256	5	436	26	1020
	21/09/2012	1700	27	0.09	176	143	243	4	419	32	1050
	13/12/2012	1720	29	0.16	171	150	252	5	399	25	986
	28/03/2013	1660	27	0.41	160	150	240	5	405	20	1040
	27/06/2013	1590	41	0.47	170	149	262	4	393	20	980
	12/09/2013	1720	27	0.58	164	152	290	5	433	18	1050
	19/12/2013	1730	37	0.71	179	158	243	5	488	20	1030
	20/03/2014	1740	14	0.62	190	164	261	4	452	18	842
	11/06/2014	1680	37	0.74	210	155	245	5	500	20	1100
	19/09/2014	1640	62	0.82	193	172	256	5	613	17	913
	19/12/2014	1700	30	0.84	228	178	285	5	605	18	930
	11/03/2015	1740	21	0.84	138	77	1330	45	565	18	1080
	3/06/2015	1880	29	0.90	214	199	284	5	612	19	948
	18/09/2015	2170	30	0.69	232	189	302	5	556	17	945
	9/12/2015	2170	28	0.54	220	201	278	4	624	22	969
	23/03/2016	2130	23	0.61	225	192	271	5	606	20	1030
	28/06/2016	2000	23	0.41	215	177	336	5	621	27	1140
	19/09/2016	1740	19	0.61	176	144	288	4	464	26	1080
	13/12/2016	1860	10	0.61	153	145	300	6	494	34	895
	28/03/2017	1360	16	0.6	136	117	275	4	325	61	924
	29/06/2017	1260	12	0.56	106	92	231	4	282	41	758
	28/09/2017	1380	13	0.57	110	105	260	4	264	46	899
	20/12/2017	1400	12	0.38	97	97	268	4	272	68	830

Notes:

nt - not tested
NA - not available at time of reporting