

Baseline Environmental Monitoring, Program 1: Groundwater Sampling – Exploration Permit # 51985 at Puhipuhi, Northland

Evolution Mining NZ Pty Limited

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✦ Prepared for

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Table of Contents

SECTION	PAGE
1.0 Introduction	1
2.0 Scope and Objectives	1
3.0 Methodology	1
3.1 Water Quality Sampling	2
3.2 Analytical Testing Suite and Sample Analysis	2
3.3 Sample Sites	3
4.0 Data Quality Evaluation (QA/QC)	3
4.1 Duplicate Analysis	4
4.2 Sample Preservation and Quality Analysis	4
4.3 Field Blanks	6
4.4 QA/QC Summary	6
5.0 Results	6
6.0 Conclusions	8
7.0 References	9

Appendices

Appendix A: Tabulated Field Results

Appendix B: Data Quality Evaluation (QA/QC)

Appendix C: Calibration Records

Appendix D: Laboratory Reports

1.0 Introduction

Pattle Delamore Partners Ltd ('PDP') has been engaged by Evolution Mining NZ Pty Ltd (ENZ) to undertake baseline monitoring of groundwater quality prior to any potential exploration drilling or exploration drilling-related environmental disturbance at Puhipuhi, Northland (Program 1). Program 1 comprised the sampling of privately owned and operated wells (or groundwater bores) and springs within the vicinity of ENZ's tenement (Exploration Permit #51985). Consultation with individual landowners was undertaken by ENZ to identify landowners who wished for their well(s) and/or spring(s) to be sampled.

This report presents the factual results of the groundwater quality samples collected from 12 sites in early March 2016.

2.0 Scope and Objectives

The purpose of Program 1 was to:

- ✧ characterise the existing (baseline conditions) groundwater quality at Puhipuhi, as far as practicable from existing privately owned sample sites, prior to any potential exploration-related environmental disturbance; and
- ✧ to provide data for input into the hydrological and hydrogeological models to be developed in Program 3.

Samples were obtained from five established water wells, six springs and one historic drillhole from which artesian groundwater is issuing. Samples were sent to IANZ/NATA accredited laboratories for various relevant analyses (see Section 3.0).

3.0 Methodology

Initial identification of potential bore and spring locations was undertaken by ENZ in association with a local Ngati Hau representative. Landowners were approached to see if they had a bore or spring which they would permit to being sampled as part of ENZ's baseline study. Where landowners gave permission, an initial site inspection/reconnaissance was completed by ENZ/Ngati Hau representative, to gain basic access and logistical information on the sample site before the sampling was conducted. The final program included groundwater samples from 12 sites, including 5 established water wells, 6 springs and one historic exploration drillhole, from which artesian groundwater is issuing.

For water wells, samples were collected using the existing pump infrastructure installed in the bore. The wells were purged before sample collection to remove potentially stagnant 'bore water'. Samples were then collected directly into the

sample bottles, either from the rising main, or from a valve attached to the rising main.

For springs, samples were collected directly into the sample bottles from pools as close to the head/expression area of the spring as possible to minimise potential atmospheric and land surface influences. Some of the springs have been dammed for water supply purposes. For this situation, samples were collected directly from the water held within the dam. In one case, samples were collected from the overflow point of the dam where water was continuously flowing.

The remainder of spring samples were collected from natural seepages on the land surface. These samples were collected from the closest 'stream' or pool to the head of the spring; that was large enough to accept the sample containers.

For the historic exploration bore hole, a sample was collected with a disposable bailer from near top of the casing (just below ground surface). Water was then transferred from the bailer into the sample bottle. As the bore was flowing (artesian), no purging of 'bore water' was required i.e. the bore was self-purging.

3.1 Water Quality Sampling

All samples were collected following industry best practice and relevant standards (namely AS/NZS 5667.1:1998). Laboratory prepared sample bottles, supplied by Eurofins MGT Laboratory and Whangarei District Council Laboratory were used to store the collected samples. Both laboratories hold industry standard accreditation for the contracted testing (NATA and IANZ).

During bore sampling, field parameters were analysed periodically; prior to, during and after the purging of well water to determine when a representative sample could be taken - as indicated by stabilised field parameters (primarily pH and electrical conductivity). Water quality sampling was undertaken once field parameters had stabilised.

Once collected, samples were kept cool prior to and during transport to the analysing laboratories.

Duplicate samples were collected at three sampling locations, and field blanks were collected at four spring sampling locations for QA/QC.

3.2 Analytical Testing Suite and Sample Analysis

At all sample locations the following physical and chemical assessments were undertaken:

Field Parameters

- ✧ Well/bore/spring details, water use (e.g. irrigation, potable, stock), photographs, GPS location
- ✧ Estimation of flow/flow rate information

- ✧ pH, electrical conductivity (EC), temperature, turbidity, ferrous iron, visual and olfactory assessments.

Gauging of standing water level was attempted at each site, but due to enclosed wellhead construction at the majority of sites, access down the well was not often possible.

Laboratory Parameters

- ✧ pH, EC
- ✧ Major dissolved ions: magnesium, potassium, sodium, calcium, chloride, sulphate, alkalinity
- ✧ Dissolved Nutrients: nitrate, nitrite, ammoniacal-nitrogen
- ✧ Dissolved & Total metals: arsenic, boron, cadmium, chromium, cobalt, copper, iron, mercury, lead, manganese, nickel, thallium and zinc
- ✧ Escherichia coli (E.Coli)
- ✧ Faecal coliforms

Samples were analysed as follows:

- ✧ Samples for nitrate, nitrite, ammoniacal nitrogen, E.coli and Faecal coliforms were analysed by the Whangarei District Council laboratory, Whangarei, New Zealand.
- ✧ Samples for dissolved and total metals (including mercury), major ions, alkalinity and hardness were analysed by Eurofins MGT Ltd., Melbourne, Australia.

All samples were sent under standard chain of custody procedures.

3.3 Sample Sites

Physical details of sample site type are presented in Table A.1, Appendix A.

4.0 Data Quality Evaluation (QA/QC)

Quality Assurance (QA) and Quality Control (QC) procedures and analysis are essential to a robust environmental monitoring campaign. Sound QA procedures for groundwater sampling result in comparable, representative samples and data. QC analysis of results provides confidence that the interpretations and recommendations made on the data are as accurate as reasonably possible. QA/QC testing also aides in providing some qualification of the inherent uncertainty and limits of accuracy within the results.

4.1 Duplicate Analysis

Duplicate samples were collected at three sampling locations and sent to the analysing laboratories (as blinds) for testing. Standard Relative Percentage Difference (RPD) statistical analysis was conducted on the results, whereby an RPD of $\pm 30\%$ is deemed acceptable (industry accepted guideline – MfE, 2011). Tabulated RPD results for individual analytes are presented in Table B.1, Appendix B.

In general the, RPDs calculated for the duplicate samples were well within the acceptable 30% range. Exceptions to this were:

- ✧ Duplicate MWA (GW03) - RPD error of 40% for nitrite, 67 % for total cobalt, 33% for total iron and 158% for total coliforms.
- ✧ Duplicate MWC (GW04) - RPD error of 48% for total iron and 44% for dissolved iron.
- ✧ Duplicate MWE (GW09) - RPD error of 105% for sulphate, 170% for E.coli, 85% for total coliforms and 168% for faecal coliforms.
- ✧ Microbiological samples – the largest RPD errors were seen in the microbiological samples, however this is not unusual due to the method of analysis; which requires culturing.

Discrepancies for cobalt and nitrite in duplicate MWA were associated with near 'Limit of Reporting' accuracy, and were deemed insignificant.

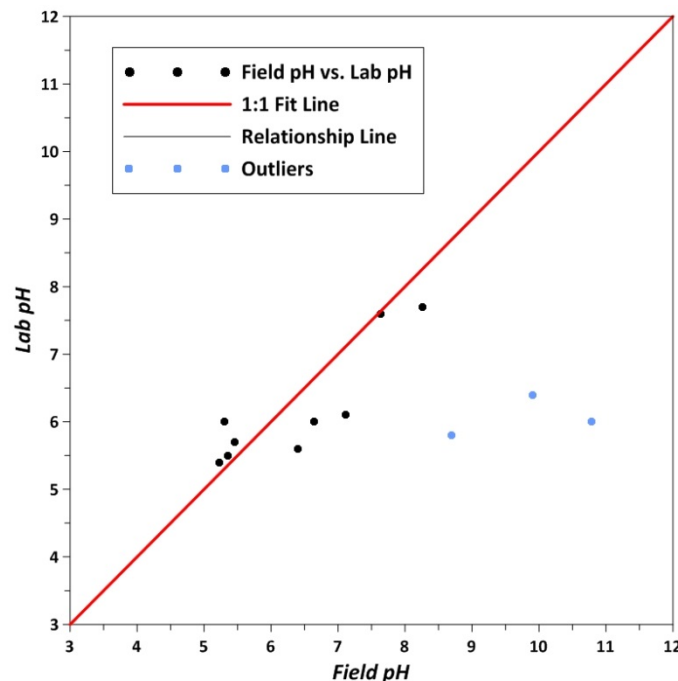
Discrepancies for total and dissolved iron may be associated with unavoidable changes in iron speciation within the sample bottle, during the period between sample collection and sample analysis. However, as field measurements of ferrous iron (Fe II) were collected, these can be used to aid iron analysis.

4.2 Sample Preservation and Quality Analysis

4.2.1 Laboratory pH vs Field pH Assessment

A comparison between field pH and laboratory pH can provide an indication of sample integrity between time of sampling and time of laboratory analysis.

Graph 1 presents a linear plot of field pH vs. laboratory pH.



Graph 1: Field pH vs. Laboratory pH

In general, the relationship between field pH and laboratory pH was satisfactory – indicating sample chemistry is not likely to have changed significantly during transit time. Three outlying samples (marked in blue) have significantly different laboratory pH vs. field pH results (GW04, GW08 and GW10). The reason for these discrepancies is the result of fouling on the pH probe (described further in Section 4.2.2) which impacted the field measurements.

Changes in pH between field and laboratory are not uncommon, and is typically attributed to samples equilibrating with atmospheric carbon dioxide (CO₂) within the sample bottle i.e. CO₂ degassing for acidic samples and CO₂ in-gassing for basic samples; which cause a respective rise or fall in pH. Field and laboratory pH relationship for this sampling event appears aligned with the above mentioned process, with laboratory pH generally higher than field pH for acidic samples and the opposite for basic samples. For the finalised results, field pH is recommended to be used for all sites except the three samples affected by fouling of the field pH probe –the lab pH should be used for these.

4.2.2 Field Water Quality Meter

A YSI ProDSS field water quality meter was used for the project. The meter was hired from ENVCO Global, and came with current calibration certificate (Appendix C). Additional calibration checks for performed each morning on pH and EC. On Friday 4 March, pH calibration was noted to have drifted significantly, with the meter significantly reading higher than the standards.

After consultation with ENVCO the probe was cleaned with alcohol and recalibrated. Consequently, field pH results for the previous day (Thursday, 3 March, and the outliers discuss in Section 4.2.1) are treated with low confidence.

4.2.3 Sample Holding Times

There were no holding time breaches for laboratory received samples, excluding unavoidable exceedance for pH and alkalinity; due to the 6 hour holding time.

4.3 Field Blanks

Sample results for the four field blanks are presented in Table B.1, and Appendix B. For all samples the results are satisfactory, with values below the laboratory levels of detection. This is with the exception of minor concentrations of total and dissolved zinc, which has been found in all four samples at levels ranging from 0.005 mg/L to 0.009 mg/L. The exact source of the zinc anomaly is unknown; however, it is mostly likely caused by the nitric acid preservative leaching zinc from the sample bottle. This is an issue that has been found in previous investigations where trace level analysis has been undertaken.

Due to the relatively low concentrations, this finding is not considered to affect the overall validity of sample results; and all primary samples were returned below the maximum allowable value for total zinc (1.5 mg/L) (NZDWG, MoH, 2008).

4.4 QA/QC Summary

The QA/QC assessment indicates that the sampling results are satisfactory and fit-for-purpose with regards to sample and analysis integrity.

5.0 Results

Tabulated water quality sample results are presented in Table 1, and the raw laboratory reports are provided in Appendix D. Sample results have been compared to the *Drinking-water Standards for New Zealand 2005 (Revised 2008)* (MoH, 2008), and *ANZECC (2000) 80% and 95% Freshwater Ecosystem Protection Guidelines*, and *ANZECC (2000) Livestock Drinking Water Quality Guidelines*.

Results from GW04 contained clear evidence of land surface impacts, and the sample was subsequently deemed invalid. GW04 will require resampling via a different method to provide a true groundwater sample. GW04 results have been excluded from this report in the interim, and results will be provided in an addendum should resampling occur.

A summary and brief discussion of the results is presented below.

Heavy Metals

Water Wells:

All sample results for heavy metals are below the Maximum Allowable Values (MAVs) provided in the NZ drinking water standards. ANZECC (2000) 80% freshwater ecosystem protection guidelines (typically used for groundwater assessments), and ANZECC Livestock drinking water quality were also compared. All samples were below the relevant guideline levels, except:

- ✧ Dissolved copper for GW02 was 0.003 mg/L, guideline = 0.0025 mg/l (80% ANZECC).
- ✧ Dissolved zinc for GW03 was 0.045 mg/L, guideline = 0.031 mg/l (80% ANZECC).

Note – Detectable concentration of dissolved zinc were identified in all water well samples. Whilst the source cannot be confirmed, PDP suspects that this is likely due to the presence of galvanised steel within the well construction (likely the casings).

Springs:

All sample results for heavy metals are below the Maximum Allowable Values (MAVs) provided in the NZ drinking water standards. As groundwater springs are essentially a discharge to surface water, the ANZECC (2000) 95% freshwater ecosystem protection guidelines are typically applied. All samples were below the guideline values for heavy metals, except:

- ✧ Dissolved zinc for GW09 (0.009 mg/L) and GW12 (0.012 mg/L), guideline = 0.008 mg/L.

These are overall low concentrations, and although source cannot be confirmed, PDP suspects that these may be from zinc leaching within the laboratory supplied sample bottles – as discussed in Section 4.3.

Micro-organisms

Water Wells:

All samples collected from bore water had concentrations of E. coli below the NZ drinking water standard MAV of less than 1 per 100 mL of sample.

Springs:

All spring samples had E. coli concentrations above the NZ drinking water standard MAV. This is not unexpected as the springs are located within or very near to farmland where stock are present and due to the inherent potential for surface impacts to be included in spring sampling. Some of these springs are known to be used for domestic purposes, including potable water; however all

samples were taken directly from the spring source i.e. not downstream of any treatment/filtration devices which may exist.

Nitrogen Species

Water Wells:

All nitrogen species analysed were returned below both NZ drinking water and ANZECC 80% freshwater ecosystem protection and livestock drinking guidelines.

Springs:

All nitrogen species analysed were returned below the NZ drinking water guidelines and ANZECC 95% freshwater ecosystem protection and livestock drinking guidelines, except:

- ∴ Nitrate for GW07 (1.47 mg/L) and GW08 (0.73 mg/L), guideline = 0.7 mg/L (ANZECC 95%).

6.0 Conclusions

Baseline monitoring of groundwater quality, comprising the sampling of privately owned and operated water wells and springs within the vicinity of Evolution Mining's tenement (Exploration Permit #51985) has been undertaken. A number of landowners agreed to sampling of groundwater from their well and/or spring. This provided the landowners an opportunity to obtain water quality information from an accredited laboratory.

In total, 12 groundwater quality samples were collected in early March 2016. Five samples were collected from established water wells and six samples were collected from springs. Artesian water from an unsealed historic exploration borehole was also sampled. Samples were sent for laboratory analysis and the results have been compared to the New Zealand drinking-water and ANZECC water quality guidelines standards (where relevant).

Results from GW04 contained clear evidence of land surface impacts, and the sample was subsequently deemed invalid. GW04 will require resampling via a different method to provide a true groundwater sample. GW04 results have been excluded from this report in the interim, and results will be provided in an addendum should resampling occur.

Water Quality:

All water well samples met the New Zealand drinking-water standards and ANZECC Livestock drinking water quality guidelines. When compared to ANZECC 80% freshwater ecosystem protection guidelines, water well samples GW02 (dissolved copper) and GW03 (dissolved zinc) returned slightly elevated values.

All spring samples met the New Zealand drinking-water standards, except for E.coli, which was above the MAV for each sample. Some of these springs are

known to be used for domestic purposes, including potable water; however all samples were taken directly from the spring source i.e. not downstream of any treatment/filtration devices which may exist. Some spring samples returned slightly elevated values when compared to ANZECC 95% freshwater ecosystem protection guidelines and ANZECC Livestock drinking water guidelines.

7.0 References

- ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australia and New Zealand Environment and Conservation Council.
- Australia/New Zealand Standard. (1998). *AS/NZS 5667.1:1998 Water quality sampling - Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*. Wellington: Standards New Zealand.
- MfE. (2011). *Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2011)*. Wellington: Ministry for Environment.
- NZDG. (2008). *Drinking-water Standard for New Zealand 2005 (Revised 2008)*. Wellington: Ministry for Environment.

Table 1: Laboraotry Results - Wells ¹

Sample ID	GW01	GW02	GW03	GW05	GW06	New Zealand Drinking Water Standards ²	ANZECC Water Quality Guidelines 80% Protection ^{3, 4}	ANZECC Water Quality Guidelines - Livestock Drinking Water Quality ^{3, 5}
Eurofins Laboratory ID	M16-Ma09389	M16-Ma09390	M16-Ma09391	M16-Ma09393	M16-Ma09394		Freshwater	
WDC Laboratory ID	16030090	16030089	16030026	16030093	16030167			
Sampling Date	2/03/2016	2/03/2016	1/03/2016	2/03/2016	4/03/2016			
Conductivity (at 25°C) (µS/cm)	240	120	65	110	430	-	-	-
pH (pH Units)	7.6	5.4	5.7	5.6	7.7	-	-	-
Chloride	13	21	15	18	13	250 ^{6a, b}	-	-
Sulphate (as S)	< 5	< 5	< 5	< 5	< 5	250 ^{6a}	-	1000
Alkali Metals								
Calcium	17	2.2	< 0.5	1.9	51	-	-	1000
Magnesium	11	3	1.3	2.9	14	-	-	ID
Potassium	2.4	< 0.5	< 0.5	< 0.5	1	-	-	-
Sodium	20	15	9	13	23	200 ^{6a}	-	-
Alkalinity and Hardness								
Total Alkalinity (as CaCO ₃)	110	< 20	< 20	< 20	210	-	-	-
Hardness mg equivalent CaCO ₃ /L	85	18	6.1	17	180	200 ⁷	-	-
Heavy Metals								
Total Arsenic	< 0.001	< 0.001	< 0.001	< 0.001	0.002	0.01	-	0.5 up to 5 ⁸
Dissolved Arsenic	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.14 ^{9, 10}	-
Total Boron	< 0.05	< 0.05	< 0.05	< 0.05	0.16	1.4	-	5
Dissolved Boron	< 0.05	< 0.05	< 0.05	< 0.05	0.1	-	1.3 ¹⁰	-
Total Cadmium	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.004	-	0.01
Dissolved Cadmium	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	0.0008 ¹⁰	-
Total Chromium	< 0.001	< 0.001	< 0.001	< 0.001	0.004	0.05 ¹¹	-	1
Dissolved Chromium	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.04 ^{12, 13}	-
Total Cobalt	< 0.001	< 0.001	0.002	< 0.001	0.005	-	-	1
Dissolved Cobalt	< 0.001	< 0.001	0.001	< 0.001	0.001	-	ID	-
Total Copper	0.001	0.004	0.002	< 0.001	0.006	2	-	0.4 (sheep); 1 (cattle)
Dissolved Copper	< 0.001	0.003	< 0.001	< 0.001	< 0.001	-	0.0025 ¹⁰	-
Total Iron	3.6	< 0.05	2.5	< 0.05	1.0	0.2 ^{6c}	-	NST
Dissolved Iron	0.75	< 0.05	1.9	< 0.05	< 0.05	-	ID	-
Total Lead	0.002	< 0.001	< 0.001	< 0.001	0.001	0.01	-	0.1
Dissolved Lead	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.0094 ¹⁰	-
Total Manganese	0.072	0.027	0.13	0.025	0.19	0.4	-	NST
Dissolved Manganese	0.069	0.025	0.12	0.022	0.16	-	3.6 ¹⁰	-
Total Mercury	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.007 ¹⁴	-	0.002
Dissolved Mercury	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	-	0.0054 ^{15, 14}	-
Total Nickel	< 0.001	< 0.001	0.001	< 0.001	0.01	0.08	-	1
Dissolved Nickel	< 0.001	< 0.001	< 0.001	< 0.001	0.002	-	0.017 ¹⁰	-
Total Thallium	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	-	-
Dissolved Thallium	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	ID	-
Total Zinc	0.097	0.012	0.055	0.019	0.024	1.5 ^{6a}	-	20
Dissolved Zinc	0.009	0.011	0.045	0.018	0.013	-	0.031 ¹⁰	-
Micro-organisms								
Coliform Escherichia 97w (MPN/100 mL)	< 1	< 1	< 1	< 1	< 10	< 1	-	-
Coliform Total (97w) (MPN/100 mL)	< 1	5	6	112	4,611	-	-	-
Faecal Coliform (Presumptive) (cfu/100 mL)	< 1	< 1	< 10	< 1	1	-	-	100
Nitrogen Species								
Ammoniacal Nitrogen	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	1.5 ¹⁶	2.3 ¹²	-
Nitrate	< 0.002	5.7	0.185	4.9	0.016	50 ¹⁷	17 ¹²	400
Nitrite	< 0.002	< 0.002	0.003	< 0.002	0.033	0.2 ¹⁸ , 3 ¹⁷	-	30

Notes:

- All results in mg/L unless otherwise stated.
- Maxiumum Acceptable Values (MAV) from Tables 2.1 and 2.2, Guideline Values for aesthetic determinands from Table 2.5 of the *Drinking-water Standards for New Zealand 2005 (Revised 2008)* (Ministry of Health, 2008).
- Criteria from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council (ANZECC, 2000).
- ANZECC (2000) trigger values for protection of 80% of aquatic species. Applicable guideline values for groundwater.
- ANZECC (2000) trigger values (low risk) for livestock drinking water.
- Guideline value only, for the following aesthetic qualities: a - taste, b - corrosion, c - staining of laundry and snitary ware, d -odour.
- Aesthetic guideline value, high hardness causes scale deposition, scum formation. Low hardness (<100) may be more corrosive.
- May be tolerated if not provided as a food additive and natural levels in the diet are low.
- Trigger value is for AsV.
- Trigger value may not protect key test species from chronic toxicity.
- MAV is for total chromium. Limited information on health effects.
- Trigger value may not protect key test species from acute toxicity.
- Trigger vale is for CrVI.
- MAV is for inorganic mercury.
- Trigger value is for inorganic mercury.
- Aesthetic guideline value, odour threshold in alkaline conditions.
- The short-term exposure MAVs for nitrate and nitrite have been established to protect against methaemoglobinaemia in bottle-fed infants.
- Long-term exposure MAV.

ID	Insufficient data to derive a reliable trigger value (ANZECC, 2000).
NST	Not sufficiently toxic.
3.6	Sample result exceeds the Guideline Value for aesthetic determinands from the NZ Drinking-water Standards for New Zealand.
153	Sample result exceeds the Maximum Acceptable Value from the NZ Drinking-water Standards for New Zealand.
0.01	Value equals or exceeds ANZECC (2000) Trigger Values for Protection of Freshwater Species (80%).
105	Value equals or exceeds ANZECC (2000) Trigger Values (low risk) for livestock drinking water quality.

Table 2: Laboraotry Results - Springs ¹

Sample ID	GW07	GW08	GW09	GW10	GW11	GW12	New Zealand Drinking Water Standards ²	ANZECC Water Quality Guidelines 95% Protection ^{3, 4}	ANZECC Water Quality Guidelines - Livestock Drinking Water Quality ^{3, 5}
Eurofins Laboratory ID	M16-Ma09395	M16-Ma09396	M16-Ma09397	M16-Ma09398	M16-Ma09399	M16-Ma09400		Freshwater	
WDC Laboratory ID	16030131	16030132	16030133	16030166	16030135	16030134			
Sampling Date	3/03/2016	3/03/2016	3/03/2016	4/03/2016	3/03/2016	3/03/2016			
Conductivity (at 25°C) (µS/cm)	79	70	71	54	68	73	-	-	-
pH (pH Units)	6.1	6.4	6	5.8	5.5	6	-	-	-
Chloride	15	15	13	11	60	17	250 ^{6a, b}	-	-
Sulphate (as S)	< 5	< 5	< 5	< 5	< 5	< 5	250 ^{6a}	-	1000
Alkali Metals									
Calcium	1.3	1.3	2	3.3	3.7	1.7	-	-	1000
Magnesium	1.9	1.7	1.9	0.8	1	1.7	-	-	ID
Potassium	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	-
Sodium	10	9.3	8.2	4.8	5.9	9.6	200 ^{6a}	-	-
Alkalinity and Hardness									
Total Alkalinity (as CaCO ₃)	< 20	< 20	< 20	< 20	< 20	< 20	-	-	-
Hardness mg equivalent CaCO ₃ /L	11	10	13	12	13	11	200 ⁷	-	-
Heavy Metals									
Total Arsenic	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.01	-	0.5 up to 5 ⁸
Dissolved Arsenic	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.013 ⁹	-
Total Boron	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.4	-	5
Dissolved Boron	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	0.37 ¹⁰	-
Total Cadmium	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.004	-	0.01
Dissolved Cadmium	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	0.0002	-
Total Chromium	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.05 ¹¹	-	1
Dissolved Chromium	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.001 ^{10, 12}	-
Total Cobalt	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	-	1
Dissolved Cobalt	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	ID	-
Total Copper	< 0.001	< 0.001	< 0.001	0.015	< 0.001	< 0.001	2	-	0.4 (sheep); 1 (cattle)
Dissolved Copper	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.0014	-
Total Iron	< 0.05	0.1	0.72	0.92	0.09	0.06	0.2 ^{6c}	-	NST
Dissolved Iron	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	-	ID	-
Total Lead	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.01	-	0.1
Dissolved Lead	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.0034	-
Total Manganese	< 0.005	0.005	0.022	< 0.005	0.007	0.005	0.4	-	NST
Dissolved Manganese	< 0.005	< 0.005	0.014	< 0.005	0.007	< 0.005	-	1.9 ¹⁰	-
Total Mercury	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001	< 0.0001	0.007 ¹³	-	0.002
Dissolved Mercury	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	-	0.0006 ¹⁴	-
Total Nickel	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.08	-	1
Dissolved Nickel	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	0.011	-
Total Thallium	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	-	-
Dissolved Thallium	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	ID	-
Total Zinc	0.006	0.006	0.01	0.016	0.007	0.012	1.5 ^{6a}	-	20
Dissolved Zinc	0.006	0.006	0.009	0.006	0.007	0.012	-	0.008 ¹⁰	-
Micro-organisms									
Coliform Escherichia 97w (MPN/100 mL)	185	5	135	153	194	12	< 1	-	-
Coliform Total (97w) (MPN/100 mL)	> 2,420	613	> 2,420	> 2,420	> 2,420	687	-	-	-
Faecal Coliform (Presumptive) (cfu/100 mL)	62	4	92	102	90	4	-	-	100
Nitrogen Species									
Ammoniacal Nitrogen	< 0.010	< 0.010	< 0.010	0.021	< 0.010	< 0.010	1.5 ¹⁵	0.9 ¹⁰	-
Nitrate	1.470	0.730	0.410	0.144	0.085	0.168	50 ¹⁶	0.7	400
Nitrite	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.2 ¹⁷ , 3 ¹⁶	-	30

- Notes:
- All results in mg/L unless otherwise stated.
 - Maxiumum Acceptable Values (MAV) from Tables 2.1 and 2.2, Guideline Values for aesthetic determinands from Table 2.5 of the *Drinking-water Standards for New Zealand 2005 (Revised 2008)* (Ministry of Health, 2008).
 - Criteria from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council (ANZECC, 2000).
 - ANZECC (2000) tigger values for protection of 95% of aquatic species. Applicable guideline values for surface water.
 - ANZECC (2000) trigger values (low risk) for livestock drinking water.
 - Guideline value only, for the following aesthetic qualities: a - taste, b - corrosion, c - staining of laundry and snitary ware, d -odour.
 - Aesthetic guideline value, high hardness causes scale deposition, scum formation. Low hardness (<100) may be more corrosive.
 - May be tolerated if not provided as a food additive and natural levels in the diet are low.
 - Trigger value is for AsV.
 - Trigger value may not protect key test species from chronic toxicity.
 - MAV is for total chromium. Limited information on health effects.
 - Trigger vale is for CrVI.
 - MAV is for inorganic mercury.
 - Trigger value is for inorganic mercury.
 - Aesthetic guideline value, odour threshold in alkaline conditions.
 - The short-term exposure MAVs for nitrate and nitrite have been established to protect against methaemoglobinaemia in bottle-fed infants.
 - Long-term exposure MAV.

ID	Insufficient data to derive a reliable trigger value (ANZECC, 2000).
NST	Not sufficiently toxic.
3.6	Sample result exceeds the Guideline Value for aesthetic determinands from the NZ Drinking-water Standards for New Zealand.
153	Sample result exceeds the Maxiumum Acceptable Value from the NZ Drinking-water Standards for New Zealand.
0.001	Value equals or exceeds ANZECC (2000) Trigger Values for Protection of Freshwater Species (95%).
105	Value equals or exceeds ANZECC (2000) Trigger Values (low risk) for livestock drinking water quality.

Appendix A

Tabulated Field Results

Table A.1: Field Parameters

Well ID	Type	Sample Date + Time	Field pH	Electrical Conductivity (µS/cm)	Oxygen Reduction Potential (mV)	DO (mg/L)	Temp (°C)	Turbidity (NTU)	Ferrous Iron (ppm)	Colour	Odour	Estimated Flow (L/min)	Comments
GW01	Well	2/03/2016 10:00:00 a.m	7.64	232.5	25.3	3.27	17.9	39.9	1	Turbid with slight iron floc	Organic	55	Well for farm use (significant use when milking). Used for drinking water during dry periods.
GW02	Well	2/03/2016 8:55 a.m	5.23	115.4	371.1	7.36	16.7	2.9	0.1	Clear	None	40 to 60	Well used constantly, 3x houses rely on it.
GW03	Well	1/03/2016 2:40 p.m	5.46	66	Not measured	Not measured	16.6	7.2	2.5	Turbid with slight iron floc	None	40 to 60	Well recently refurbished. Flow of water was intermittent during pumping.
GW05	Well	2/03/2016 2:10 p.m	6.4	104	202.5	7.31	17	27.9	0.1	Clear	None	60	Well in good condition. Supplies ~3 households.
GW06	Well	4/03/2016 10:50 a.m	8.26	406.9	19.7	2.17	17.5	139	0.4	Slightly turbid	Slightly organic	15	Well in good condition. Has not been used since Powhiri burnt down 2yrs ago.
GW07	Spring	3/03/2016 10:15 a.m	7.12	74.6	185.1	7.58	16	0.45	0	Clear	None	< 5	May be used for potable supply?
GW08	Spring	3/03/2016 11:30 a.m	9.9	67.8	99.7	6.9	16.8	1.77	Not measured	Clear	None	20	Decreases flow over summer. Can pump 3000L/hr according to owner
GW09	Spring	3/03/2016 9:00 a.m	5.3	66.6	235.2	6.13	15.8	0.89	0.1	Clear	None	< 5	Used for drinking water for ~4 households + Marae. Open farmland above spring.
GW10	Spring	4/03/2016 9:00 a.m	8.7	54.6	146.2	3.69	19.5	5.18	0.1	Clear	None	< 5	Leech in pool at head of stream. Water used for washing milk plant. Current owners only here since June. Cow poo in spring below point where exiting ground. Sampled collected above in small pool.
GW11	Spring	3/03/2016 1:10 p.m	5.36	65.4	235.6	3.95	17.7	8.04	0.1	Clear	None	< 5	Flow estimation rough. Leech with black/yellow longitudinal stripes present in pool. Unable to collect water for stygofauna from head pool so collected from larger pool 5 m downstream.
GW12	Spring	3/03/2016 1:55 p.m	6.64	71.1	190.4	5.85	15.4	7.64	0.1	Clear	None	< 5	Further downstream water is used for stock. Unable to collect water for stygofauna from head pool so collected from larger pool 5 m downstream.

Appendix B

Data Quality Evaluation (QA/QC)

Table B.1: Quality Assurance / Quality Control Results ¹

Sample ID	GW03	MWA	% RPD ²	GW04	MWC	% RPD ²	GW09	MWE	% RPD ²	MWB	MWD	MWF	MWG
Description		Duplicate of GW03			Duplicate of GW04			Duplicate of GW09		Field Blank (collected @ GW03)	Field Blank (collected @ GW05)	Field Blank (collected @ GW12)	Field Blank (collected @ GW06)
Eurofins Laboratory ID	M16-Ma09391	M16-Ma09401		M16-Ma09392	M16-Ma09403		M16-Ma09397	M16-Ma09405		M16-Ma09402	M16-Ma09404	M16-Ma09406	M16-Ma09407
WDC Laboratory ID	16030026	16030027		16030092	16030091		16030133	16030129		16030028	16030094	16030130	16030168
Sampling Date	1/03/2016	1/03/2016		2/03/2016	2/03/2016		3/03/2016	3/03/2016		1/03/2016	2/03/2016	3/03/2016	4/03/2016
Conductivity (at 25°C) (µS/cm)	65	64	2	100	100	0	71	71	0	1.4	1.3	6.3	1.2
pH (pH Units)	5.7	6.1	7	6	6.2	3	6	6	0	5.5	4.5	6.1	5.5
Chloride	15	15	0	15	14	7	13	12	8	< 1	< 1	< 1	< 1
Sulphate (as S)	< 5	< 5	0	< 5	< 5	0	< 5	16	105	< 5	< 5	< 5	< 5
Alkali Metals													
Calcium	< 0.5	< 0.5	0	1.1	1	10	2	2	0	< 0.5	< 0.5	< 0.5	< 0.5
Magnesium	1.3	1.2	8	1.8	1.7	6	1.9	2	5	< 0.5	< 0.5	< 0.5	< 0.5
Potassium	< 0.5	< 0.5	0	5.3	5.1	4	< 0.5	< 0.5	0	< 0.5	< 0.5	< 0.5	< 0.5
Sodium	9	8.1	11	13	12	8	8.2	8.1	1	< 0.5	< 0.5	< 0.5	< 0.5
Alkalinity and Hardness													
Total Alkalinity (as CaCO ₃)	< 20	< 20	0	22	29	27	< 20	< 20	0	< 20	< 20	< 20	< 20
Hardness mg equivalent CaCO ₃ /L	6.1	6	2	10	9.7	3	13	13	0	< 5	< 5	< 5	< 5
Heavy Metals													
Total Arsenic	< 0.001	< 0.001	0	0.048	0.052	8	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Arsenic	< 0.001	< 0.001	0	0.037	0.036	3	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Total Boron	< 0.05	< 0.05	0	< 0.05	< 0.05	0	< 0.05	< 0.05	0	< 0.05	< 0.05	< 0.05	< 0.05
Dissolved Boron	< 0.05	< 0.05	0	< 0.05	< 0.05	0	< 0.05	< 0.05	0	< 0.05	< 0.05	< 0.05	< 0.05
Total Cadmium	< 0.0002	< 0.0002	0	< 0.0002	< 0.0002	0	< 0.0002	< 0.0002	0	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dissolved Cadmium	< 0.0002	< 0.0002	0	< 0.0002	< 0.0002	0	< 0.0002	< 0.0002	0	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Total Chromium	< 0.001	< 0.001	0	< 0.001	< 0.001	0	0.002	0.002	0	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Chromium	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Total Cobalt	0.002	0.001	67	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Cobalt	0.001	0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Total Copper	0.002	0.002	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Copper	< 0.001	0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Total Iron	2.5	1.8	33	5.4	3.3	48	0.72	0.72	0	< 0.05	< 0.05	< 0.05	< 0.05
Dissolved Iron	1.9	1.8	5	2.8	1.8	43	< 0.05	0.05	0	< 0.05	< 0.05	< 0.05	< 0.05
Total Lead	< 0.001	< 0.001	0	0.002	0.002	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Lead	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Total Manganese	0.13	0.13	0	0.057	0.062	8	0.022	0.022	0	< 0.005	< 0.005	< 0.005	< 0.005
Dissolved Manganese	0.12	0.13	8	0.056	0.053	6	0.014	0.015	7	< 0.005	< 0.005	< 0.005	< 0.005
Total Mercury	< 0.0001	< 0.0001	0	0.0016	0.0017	6	< 0.0001	< 0.0001	0	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Dissolved Mercury	< 0.0001	< 0.0001	0	< 0.0001	< 0.0001	0	< 0.0001	< 0.0001	0	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Total Nickel	0.001	0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Nickel	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Total Thallium	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Thallium	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	0	< 0.001	< 0.001	< 0.001	< 0.001
Total Zinc	0.055	0.05	10	0.008	0.007	13	0.01	0.01	0	0.009	0.007	0.005	0.007
Dissolved Zinc	0.045	0.049	9	0.008	0.007	13	0.009	0.01	11	0.008	0.007	0.005	0.006
Bacteria													
Coliform Escherichia 97w (MPN/100mL)	< 1	< 1	0	> 2420	> 2420	0	135	11	170	< 1	< 1	< 1	< 1
Coliform Total (97w) (MPN/100mL)	6	51	158	> 2420	> 2420	0	2,420	980	85	< 1	< 1	< 1	< 1
Faecal Coliform (Presumptive) (cfu/100mL)	< 10	< 10	0	12,000	12,182	2	92	8	168	< 10	< 1	< 2	< 2
Nitrogen Species													
Ammoniacal Nitrogen	< 0.01	< 0.01	0	0.101	0.099	2	< 0.01	< 0.01	0	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate	0.185	0.188	2	0.006	0.006	0	0.410	0.41	0	< 0.002	< 0.002	< 0.002	< 0.002
Nitrite	0.003	0.002	40	0.002	0.002	0	< 0.002	< 0.002	0	< 0.002	< 0.002	< 0.002	< 0.002

Notes:

1. Sample results in mg/L, unless otherwise stated.
2. RPD = Standard Relative Percentage Difference.

158

RPD greater than 30%

Appendix C

Calibration Records



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Environmental, Industrial & Scientific Equipment

CERTIFICATE OF CALIBRATION AND COMPLIANCE

Customer: Pattle Delamore Partners – Aprille Gillon / James Conway
Instrument: YSI ProDSS
Date Checked: 29/02/2016

Envco certifies that the above instrument has been calibrated in accordance with the manufacturers' instructions. The instrument has been tested and assessed to ensure compliance with the approval documents and the relevant standards to which it is approved.

Parameter	Standard	Meter	Standard	Meter	Standard	Meter
Conductivity	1413 μ S/cm	1413 μ S/cm				
DO	0%	0.0%	100%	99.9%		
pH	4.00	3.99	7.00	6.98		
ORP			263mV	263mV		
Turbidity (FNU)	0.0	-0.0	124	123.6	1010	998

Please check that all items are received and all returned. Please clean equipment before returning. A charge may apply to any unclean items. Any damaged or lost items are the liability of the renter.

Sent		Returned
<input checked="" type="checkbox"/>	Handheld	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Cable and Sensors, 10 m	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Black Sensor Guard	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Clear Calibration Cup	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Flow Cell + 2 hose barbs	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Quick Reference Guide	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Battery Charging Equipment	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Case	<input type="checkbox"/>

Technician Signature:

COMMENTS: ☒ ☒

The Environmental Collective Ltd

94 Newton Road, Eden Terrace, Auckland 1010, New Zealand

www.envcoglobal.com | info@envcoglobal.com | Phone NZ 0800 623 336 or +64 (09) 307 3285 | Fax +64 (09) 307 3287

Certificate of Analysis

Pattle Delamore Partners Ltd
PDP House Level 4, 235 Broadway
Newmarket
Auckland New Zealand 1023



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: Aslan Perwick

Report 492376-W-V2

Project name

Project ID

A02982700

Received Date

Mar 09, 2016

Client Sample ID			GW01 Water	GW02 Water	GW03 Water	GW04 Water
Sample Matrix			M16-Ma09389	M16-Ma09390	M16-Ma09391	M16-Ma09392
Eurofins mgt Sample No.			Mar 02, 2016	Mar 02, 2016	Mar 01, 2016	Mar 02, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Chloride	1	mg/L	13	21	15	15
Conductivity (at 25°C)	1	uS/cm	240	120	65	100
pH	0.1	pH Units	7.6	5.4	5.7	6.0
Sulphate (as S)	5	mg/L	< 5	< 5	< 5	< 5
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	110	< 20	< 20	22
Heavy Metals						
Arsenic	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.048
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.037
Boron	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	< 0.001	0.002	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001	< 0.001	0.001	< 0.001
Copper	0.001	mg/L	0.001	0.004	0.002	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	0.003	< 0.001	< 0.001
Iron	0.05	mg/L	3.6	< 0.05	2.5	5.4
Iron (filtered)	0.05	mg/L	0.75	< 0.05	1.9	2.8
Lead	0.001	mg/L	0.002	< 0.001	< 0.001	0.002
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	0.072	0.027	0.13	0.057
Manganese (filtered)	0.005	mg/L	0.069	0.025	0.12	0.056
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	0.0016
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.001	< 0.001	0.001	< 0.001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	0.001	mg/L	0.097	0.012	0.055	0.008
Zinc (filtered)	0.001	mg/L	0.009	0.011	0.045	0.008

Client Sample ID			GW01 Water	GW02 Water	GW03 Water	GW04 Water
Sample Matrix			M16-Ma09389	M16-Ma09390	M16-Ma09391	M16-Ma09392
Eurofins mgt Sample No.			Mar 02, 2016	Mar 02, 2016	Mar 01, 2016	Mar 02, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Alkali Metals						
Calcium	0.5	mg/L	17	2.2	< 0.5	1.1
Magnesium	0.5	mg/L	11	3.0	1.3	1.8
Potassium	0.5	mg/L	2.4	< 0.5	< 0.5	5.3
Sodium	0.5	mg/L	20	15	9.0	13
Hardness Set						
Hardness mg equivalent CaCO ₃ /L	5	mg/L	85	18	6.1	10

Client Sample ID			GW05 Water	GW06 Water	GW07 Water	GW08 Water
Sample Matrix			M16-Ma09393	M16-Ma09394	M16-Ma09395	M16-Ma09396
Eurofins mgt Sample No.			Mar 02, 2016	Mar 04, 2016	Mar 03, 2016	Mar 03, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Chloride	1	mg/L	18	13	15	15
Conductivity (at 25°C)	1	uS/cm	110	430	79	70
pH	0.1	pH Units	5.6	7.7	6.1	6.4
Sulphate (as S)	5	mg/L	< 5	< 5	< 5	< 5
Alkalinity (speciated)						
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	210	< 20	< 20
Heavy Metals						
Arsenic	0.001	mg/L	< 0.001	0.002	< 0.001	< 0.001
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Boron	0.05	mg/L	< 0.05	0.16	< 0.05	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05	0.10	< 0.05	< 0.05
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	0.004	< 0.001	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	0.005	< 0.001	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
Copper	0.001	mg/L	< 0.001	0.006	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Iron	0.05	mg/L	< 0.05	1.0	< 0.05	0.10
Iron (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Lead	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	0.025	0.19	< 0.005	0.005
Manganese (filtered)	0.005	mg/L	0.022	0.16	< 0.005	< 0.005
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.001	0.010	< 0.001	< 0.001
Nickel (filtered)	0.001	mg/L	< 0.001	0.002	< 0.001	< 0.001
Thallium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	0.001	mg/L	0.019	0.024	0.006	0.006
Zinc (filtered)	0.001	mg/L	0.018	0.013	0.006	0.006

Client Sample ID			GW05 Water	GW06 Water	GW07 Water	GW08 Water
Sample Matrix			M16-Ma09393	M16-Ma09394	M16-Ma09395	M16-Ma09396
Eurofins mgt Sample No.			Mar 02, 2016	Mar 04, 2016	Mar 03, 2016	Mar 03, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Alkali Metals						
Calcium	0.5	mg/L	1.9	51	1.3	1.3
Magnesium	0.5	mg/L	2.9	14	1.9	1.7
Potassium	0.5	mg/L	< 0.5	1.0	< 0.5	< 0.5
Sodium	0.5	mg/L	13	23	10	9.3
Hardness Set						
Hardness mg equivalent CaCO ₃ /L	5	mg/L	17	180	11	10

Client Sample ID			GW09 Water	GW10 Water	GW11 Water	GW12 Water
Sample Matrix			M16-Ma09397	M16-Ma09398	M16-Ma09399	M16-Ma09400
Eurofins mgt Sample No.			Mar 03, 2016	Mar 04, 2016	Mar 03, 2016	Mar 03, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Chloride	1	mg/L	13	11	60	17
Conductivity (at 25°C)	1	uS/cm	71	54	68	73
pH	0.1	pH Units	6.0	5.8	5.5	6.0
Sulphate (as S)	5	mg/L	< 5	< 5	< 5	< 5
Alkalinity (speciated)						
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	< 20	< 20
Heavy Metals						
Arsenic	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Boron	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.002	< 0.001	< 0.001	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper	0.001	mg/L	< 0.001	0.015	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Iron	0.05	mg/L	0.72	0.92	0.09	0.06
Iron (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.06
Lead	0.001	mg/L	< 0.001	0.002	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	0.022	< 0.005	0.007	0.005
Manganese (filtered)	0.005	mg/L	0.014	< 0.005	0.007	< 0.005
Mercury	0.0001	mg/L	< 0.0001	0.0002	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.001	< 0.001	0.001	< 0.001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	0.001	mg/L	0.010	0.016	0.007	0.012
Zinc (filtered)	0.001	mg/L	0.009	0.006	0.007	0.012

Client Sample ID			GW09 Water	GW10 Water	GW11 Water	GW12 Water
Sample Matrix			M16-Ma09397	M16-Ma09398	M16-Ma09399	M16-Ma09400
Eurofins mgt Sample No.			Mar 03, 2016	Mar 04, 2016	Mar 03, 2016	Mar 03, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Alkali Metals						
Calcium	0.5	mg/L	2.0	3.3	3.7	1.7
Magnesium	0.5	mg/L	1.9	0.8	1.0	1.7
Potassium	0.5	mg/L	< 0.5	< 0.5	< 0.5	< 0.5
Sodium	0.5	mg/L	8.2	4.8	5.9	9.6
Hardness Set						
Hardness mg equivalent CaCO ₃ /L	5	mg/L	13	12	13	11

Client Sample ID			MWA Water	MWB Water	MWC Water	MWD Water
Sample Matrix			M16-Ma09401	M16-Ma09402	M16-Ma09403	M16-Ma09404
Eurofins mgt Sample No.			Mar 01, 2016	Mar 01, 2016	Mar 02, 2016	Mar 02, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Chloride	1	mg/L	15	< 1	14	< 1
Conductivity (at 25°C)	1	uS/cm	64	1.4	100	1.3
pH	0.1	pH Units	6.1	5.5	6.2	4.5
Sulphate (as S)	5	mg/L	< 5	< 5	< 5	< 5
Alkalinity (speciated)						
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	29	< 20
Heavy Metals						
Arsenic	0.001	mg/L	< 0.001	< 0.001	0.052	< 0.001
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	0.036	< 0.001
Boron	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
Cobalt (filtered)	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
Copper	0.001	mg/L	0.002	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
Iron	0.05	mg/L	1.8	< 0.05	3.3	< 0.05
Iron (filtered)	0.05	mg/L	1.8	< 0.05	1.8	< 0.05
Lead	0.001	mg/L	< 0.001	< 0.001	0.002	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	0.13	< 0.005	0.062	< 0.005
Manganese (filtered)	0.005	mg/L	0.13	< 0.005	0.053	< 0.005
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	0.0017	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc	0.001	mg/L	0.050	0.009	0.007	0.007
Zinc (filtered)	0.001	mg/L	0.049	0.008	0.007	0.007

Client Sample ID			MWA Water	MWB Water	MWC Water	MWD Water
Sample Matrix			M16-Ma09401	M16-Ma09402	M16-Ma09403	M16-Ma09404
Eurofins mgt Sample No.			Mar 01, 2016	Mar 01, 2016	Mar 02, 2016	Mar 02, 2016
Date Sampled						
Test/Reference	LOR	Unit				
Alkali Metals						
Calcium	0.5	mg/L	< 0.5	< 0.5	1.0	< 0.5
Magnesium	0.5	mg/L	1.2	< 0.5	1.7	< 0.5
Potassium	0.5	mg/L	< 0.5	< 0.5	5.1	< 0.5
Sodium	0.5	mg/L	8.1	< 0.5	12	< 0.5
Hardness Set						
Hardness mg equivalent CaCO ₃ /L	5	mg/L	6.0	< 5	9.7	< 5

Client Sample ID			MWE Water	MWF Water	MWG Water
Sample Matrix			M16-Ma09405	M16-Ma09406	M16-Ma09407
Eurofins mgt Sample No.			Mar 03, 2016	Mar 03, 2016	Mar 04, 2016
Date Sampled					
Test/Reference	LOR	Unit			
Chloride	1	mg/L	12	< 1	< 1
Conductivity (at 25°C)	1	uS/cm	71	6.3	1.2
pH	0.1	pH Units	6.0	6.1	5.5
Sulphate (as S)	5	mg/L	16	< 5	< 5
Alkalinity (speciated)					
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	< 20
Heavy Metals					
Arsenic	0.001	mg/L	< 0.001	< 0.001	< 0.001
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Boron	0.05	mg/L	< 0.05	< 0.05	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.002	< 0.001	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	< 0.001	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Copper	0.001	mg/L	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Iron	0.05	mg/L	0.72	< 0.05	< 0.05
Iron (filtered)	0.05	mg/L	0.05	< 0.05	< 0.05
Lead	0.001	mg/L	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	0.022	< 0.005	< 0.005
Manganese (filtered)	0.005	mg/L	0.015	< 0.005	< 0.005
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	< 0.001	< 0.001	< 0.001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Thallium	0.001	mg/L	< 0.001	< 0.001	< 0.001
Thallium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Zinc	0.001	mg/L	0.010	0.005	0.007
Zinc (filtered)	0.001	mg/L	0.010	0.005	0.006

Client Sample ID			MWE	MWF	MWG
Sample Matrix			Water	Water	Water
Eurofins mgt Sample No.			M16-Ma09405	M16-Ma09406	M16-Ma09407
Date Sampled			Mar 03, 2016	Mar 03, 2016	Mar 04, 2016
Test/Reference	LOR	Unit			
Alkali Metals					
Calcium	0.5	mg/L	2.0	< 0.5	< 0.5
Magnesium	0.5	mg/L	2.0	< 0.5	< 0.5
Potassium	0.5	mg/L	< 0.5	< 0.5	< 0.5
Sodium	0.5	mg/L	8.1	< 0.5	< 0.5
Hardness Set					
Hardness mg equivalent CaCO ₃ /L	5	mg/L	13	< 5	< 5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chloride	Melbourne	Mar 10, 2016	28 Day
- Method: MGT 1100A			
Conductivity (at 25°C)	Melbourne	Mar 10, 2016	28 Day
- Method: LTM-INO-4030			
pH	Melbourne	Mar 10, 2016	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Sulphate (as S)	Melbourne	Mar 10, 2016	28 Day
- Method: In house MGT1110A (SO4 by Discrete Analyser)			
Alkalinity (speciated)	Melbourne	Mar 10, 2016	14 Day
- Method: APHA 2320 Alkalinity by Titration			
Heavy Metals	Melbourne	Mar 10, 2016	180 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Heavy Metals (filtered)	Melbourne	Mar 10, 2016	180 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Mar 10, 2016	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Hardness Set			
Calcium	Melbourne	Mar 10, 2016	180 Day
- Method: USEPA 6010 Alkali Metals			
Magnesium	Melbourne	Mar 10, 2016	180 Day
- Method: USEPA 6010 Alkali Metals			
Alkali Metals	Melbourne	Mar 10, 2016	180 Day
- Method: USEPA 6010 Alkali Metals			
Hardness mg equivalent CaCO3/L	Melbourne	Mar 10, 2016	28 Day
- Method: APHA 2340B Hardness by Calculation			

Company Name: Pattle Delamore Partners Ltd
Address: PDP House Level 4, 235 Broadway
Newmarket
Auckland New Zealand 1023

Order No.: A02982700
Report #: 492376
Phone: 0011 64 9 523 6900
Fax: 0011 64 9 523 6901

Received: Mar 9, 2016 4:58 PM
Due: Mar 17, 2016
Priority: 5 Day
Contact Name: Aslan Perwick

Project Name:
Project ID: A02982700

Eurofins | mgt Client Manager: Onur Mehmet

Sample Detail					Hardness Set		Zinc (filtered)		Zinc		Total Alkalinity (as CaCO3)		Thallium (filtered)		Thallium		Sulphate (as S)		Sodium		Potassium		pH		Nickel (filtered)		Nickel		Mercury (filtered)		Mercury		Manganese (filtered)		Manganese		Lead (filtered)		Lead		Iron (filtered)		Iron		Copper (filtered)		Copper		Conductivity (at 25°C)		Cobalt (filtered)		Cobalt		Chromium (filtered)		Chromium		Chloride		Cadmium (filtered)		Cadmium		Boron (filtered)		Boron		Arsenic (filtered)		Arsenic																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

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Eurofins | mgt Client Manager: Onur Mehmet

Sample Detail					Hardness Set	
					Zinc (filtered)	
					Zinc	
					Total Alkalinity (as CaCO3)	
					Thallium (filtered)	
Thallium						
Sulphate (as S)						
Sodium						
Potassium						
pH						
Nickel (filtered)						
Nickel						
Mercury (filtered)						
Mercury						
Manganese (filtered)						
Manganese						
Lead (filtered)						
Lead						
Iron (filtered)						
Iron						
Copper (filtered)						
Copper						
Conductivity (at 25°C)						
Cobalt (filtered)						
Cobalt						
Chromium (filtered)						
Chromium						
Chloride						
Cadmium (filtered)						
Cadmium						
Boron (filtered)						
Boron						
Arsenic (filtered)						
Arsenic						

Laboratory where analysis is conducted						
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X
Sydney Laboratory - NATA Site # 18217						
Brisbane Laboratory - NATA Site # 20794						
External Laboratory						
GW10	Mar 04, 2016		Water	M16-Ma09398	X	X
GW11	Mar 03, 2016		Water	M16-Ma09399	X	X
GW12	Mar 03, 2016		Water	M16-Ma09400	X	X
MWA	Mar 01, 2016		Water	M16-Ma09401	X	X
MWB	Mar 01, 2016		Water	M16-Ma09402	X	X
MWC	Mar 02, 2016		Water	M16-Ma09403	X	X
MWD	Mar 02, 2016		Water	M16-Ma09404	X	X
MWE	Mar 03, 2016		Water	M16-Ma09405	X	X
MWF	Mar 03, 2016		Water	M16-Ma09406	X	X
MWG	Mar 04, 2016		Water	M16-Ma09407	X	X

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (Eurofins mgt uses NATA accredited in-house method LTM-GEN-7010)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/L	< 1			1	Pass	
Sulphate (as S)	mg/L	< 5			5	Pass	
Method Blank							
Alkalinity (speciated)							
Total Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Boron	mg/L	< 0.05			0.05	Pass	
Boron (filtered)	mg/L	< 0.05			0.05	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Cobalt	mg/L	< 0.001			0.001	Pass	
Cobalt (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese	mg/L	< 0.005			0.005	Pass	
Manganese (filtered)	mg/L	< 0.005			0.005	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Thallium	mg/L	< 0.001			0.001	Pass	
Thallium (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.001			0.001	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Chloride	%	101			70-130	Pass	
Sulphate (as S)	%	104			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Total Alkalinity (as CaCO ₃)	%	103			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	97			80-120	Pass	
Arsenic (filtered)	%	97			80-120	Pass	
Cadmium	%	98			80-120	Pass	
Cadmium (filtered)	%	98			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium			%	97			80-120	Pass	
Chromium (filtered)			%	97			80-120	Pass	
Cobalt			%	96			80-120	Pass	
Cobalt (filtered)			%	96			80-120	Pass	
Copper			%	95			80-120	Pass	
Copper (filtered)			%	95			80-120	Pass	
Iron			%	94			80-120	Pass	
Iron (filtered)			%	94			80-120	Pass	
Lead			%	97			80-120	Pass	
Lead (filtered)			%	97			80-120	Pass	
Manganese			%	95			80-120	Pass	
Manganese (filtered)			%	95			80-120	Pass	
Mercury			%	101			75-125	Pass	
Mercury (filtered)			%	101			70-130	Pass	
Nickel			%	95			80-120	Pass	
Nickel (filtered)			%	95			80-120	Pass	
Thallium			%	98			80-120	Pass	
Thallium (filtered)			%	98			80-120	Pass	
Zinc			%	98			80-120	Pass	
Zinc (filtered)			%	98			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	98			70-130	Pass	
Magnesium			%	107			70-130	Pass	
Potassium			%	95			70-130	Pass	
Sodium			%	101			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M16-Ma09389	CP	%	97			75-125	Pass	
Cadmium	M16-Ma09389	CP	%	97			75-125	Pass	
Chromium	M16-Ma09389	CP	%	96			75-125	Pass	
Cobalt	M16-Ma09389	CP	%	95			75-125	Pass	
Copper	M16-Ma09389	CP	%	95			75-125	Pass	
Lead	M16-Ma09389	CP	%	97			75-125	Pass	
Manganese	M16-Ma09389	CP	%	93			75-125	Pass	
Mercury	M16-Ma09389	CP	%	103			70-130	Pass	
Nickel	M16-Ma09389	CP	%	94			75-125	Pass	
Thallium	M16-Ma09389	CP	%	96			75-125	Pass	
Zinc	M16-Ma09389	CP	%	88			75-125	Pass	
Spike - % Recovery									
Alkalinity (speciated)				Result 1					
Total Alkalinity (as CaCO ₃)	M16-Ma09390	CP	%	119			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	M16-Ma09390	CP	%	92			70-130	Pass	
Cadmium (filtered)	M16-Ma09390	CP	%	93			70-130	Pass	
Chromium (filtered)	M16-Ma09390	CP	%	91			70-130	Pass	
Cobalt (filtered)	M16-Ma09390	CP	%	91			75-125	Pass	
Copper (filtered)	M16-Ma09390	CP	%	91			70-130	Pass	
Iron (filtered)	M16-Ma09390	CP	%	88			70-130	Pass	
Lead (filtered)	M16-Ma09390	CP	%	102			70-130	Pass	
Manganese (filtered)	M16-Ma09390	CP	%	89			70-130	Pass	
Mercury (filtered)	M16-Ma09390	CP	%	100			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel (filtered)	M16-Ma09390	CP	%	91			70-130	Pass	
Thallium (filtered)	M16-Ma09390	CP	%	103			75-125	Pass	
Zinc (filtered)	M16-Ma09390	CP	%	93			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	M16-Ma09396	CP	%	106			70-130	Pass	
Sulphate (as S)	M16-Ma09396	CP	%	104			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M16-Ma09398	CP	%	94			70-130	Pass	
Magnesium	M16-Ma09398	CP	%	103			70-130	Pass	
Potassium	M16-Ma09398	CP	%	89			70-130	Pass	
Sodium	M16-Ma09398	CP	%	94			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M16-Ma09399	CP	%	96			75-125	Pass	
Cadmium	M16-Ma09399	CP	%	96			75-125	Pass	
Chromium	M16-Ma09399	CP	%	95			75-125	Pass	
Cobalt	M16-Ma09399	CP	%	94			75-125	Pass	
Copper	M16-Ma09399	CP	%	95			75-125	Pass	
Iron	M16-Ma09399	CP	%	82			75-125	Pass	
Lead	M16-Ma09399	CP	%	94			75-125	Pass	
Manganese	M16-Ma09399	CP	%	94			75-125	Pass	
Mercury	M16-Ma09399	CP	%	98			70-130	Pass	
Nickel	M16-Ma09399	CP	%	94			75-125	Pass	
Thallium	M16-Ma09399	CP	%	94			75-125	Pass	
Zinc	M16-Ma09399	CP	%	96			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	M16-Ma09400	CP	%	94			70-130	Pass	
Cadmium (filtered)	M16-Ma09400	CP	%	94			70-130	Pass	
Chromium (filtered)	M16-Ma09400	CP	%	92			70-130	Pass	
Cobalt (filtered)	M16-Ma09400	CP	%	91			75-125	Pass	
Copper (filtered)	M16-Ma09400	CP	%	91			70-130	Pass	
Iron (filtered)	M16-Ma09400	CP	%	83			70-130	Pass	
Lead (filtered)	M16-Ma09400	CP	%	91			70-130	Pass	
Manganese (filtered)	M16-Ma09400	CP	%	91			70-130	Pass	
Mercury (filtered)	M16-Ma09400	CP	%	86			70-130	Pass	
Nickel (filtered)	M16-Ma09400	CP	%	89			70-130	Pass	
Thallium (filtered)	M16-Ma09400	CP	%	91			75-125	Pass	
Zinc (filtered)	M16-Ma09400	CP	%	93			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	M16-Ma09407	CP	%	104			70-130	Pass	
Sulphate (as S)	M16-Ma09407	CP	%	108			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25°C)	M16-Ma09389	CP	uS/cm	240	250	2.0	30%	Pass	
pH	M16-Ma09389	CP	pH Units	7.6	7.5	pass	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Total Alkalinity (as CaCO ₃)	M16-Ma09389	CP	mg/L	110	110	<1	30%	Pass	

Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	M16-Ma09389	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Boron	M16-Ma09389	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Cadmium	M16-Ma09389	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	M16-Ma09389	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cobalt	M16-Ma09389	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	M16-Ma09389	CP	mg/L	0.001	0.001	2.0	30%	Pass
Iron	M16-Ma09389	CP	mg/L	3.6	3.4	6.0	30%	Pass
Lead	M16-Ma09389	CP	mg/L	0.002	0.003	5.0	30%	Pass
Manganese	M16-Ma09389	CP	mg/L	0.072	0.078	8.0	30%	Pass
Mercury	M16-Ma09389	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	M16-Ma09389	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Thallium	M16-Ma09389	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	M16-Ma09389	CP	mg/L	0.097	0.10	3.0	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic (filtered)	M16-Ma09390	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Boron (filtered)	M16-Ma09390	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Cadmium (filtered)	M16-Ma09390	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	M16-Ma09390	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cobalt (filtered)	M16-Ma09390	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	M16-Ma09390	CP	mg/L	0.003	0.004	9.0	30%	Pass
Iron (filtered)	M16-Ma09390	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Lead (filtered)	M16-Ma09390	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Manganese (filtered)	M16-Ma09390	CP	mg/L	0.025	0.027	7.0	30%	Pass
Mercury (filtered)	M16-Ma09390	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	M16-Ma09390	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Thallium (filtered)	M16-Ma09390	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc (filtered)	M16-Ma09390	CP	mg/L	0.011	0.012	6.0	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Chloride	M16-Ma09396	CP	mg/L	15	14	4.4	30%	Pass
Sulphate (as S)	M16-Ma09396	CP	mg/L	< 5	< 5	<1	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	M16-Ma09398	CP	mg/L	3.3	3.2	3.0	30%	Pass
Magnesium	M16-Ma09398	CP	mg/L	0.8	0.8	4.0	30%	Pass
Potassium	M16-Ma09398	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Sodium	M16-Ma09398	CP	mg/L	4.8	4.6	4.0	30%	Pass
Duplicate								
Hardness Set				Result 1	Result 2	RPD		
Hardness mg equivalent CaCO ₃ /L	M16-Ma09398	CP	mg/L	12	11	3.0	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Conductivity (at 25°C)	M16-Ma09399	CP	uS/cm	68	68	<1	30%	Pass
pH	M16-Ma09399	CP	pH Units	5.5	5.5	pass	30%	Pass
Duplicate								
Alkalinity (speciated)				Result 1	Result 2	RPD		
Total Alkalinity (as CaCO ₃)	M16-Ma09399	CP	mg/L	< 20	< 20	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	M16-Ma09399	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Boron	M16-Ma09399	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Cadmium	M16-Ma09399	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	M16-Ma09399	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass

Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Cobalt	M16-Ma09399	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	M16-Ma09399	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron	M16-Ma09399	CP	mg/L	0.09	0.08	6.0	30%	Pass
Lead	M16-Ma09399	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Manganese	M16-Ma09399	CP	mg/L	0.007	0.007	<1	30%	Pass
Mercury	M16-Ma09399	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	M16-Ma09399	CP	mg/L	0.001	< 0.001	7.0	30%	Pass
Thallium	M16-Ma09399	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	M16-Ma09399	CP	mg/L	0.007	0.007	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic (filtered)	M16-Ma09400	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Boron (filtered)	M16-Ma09400	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Cadmium (filtered)	M16-Ma09400	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	M16-Ma09400	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cobalt (filtered)	M16-Ma09400	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	M16-Ma09400	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron (filtered)	M16-Ma09400	CP	mg/L	0.06	< 0.05	12	30%	Pass
Lead (filtered)	M16-Ma09400	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Manganese (filtered)	M16-Ma09400	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Mercury (filtered)	M16-Ma09400	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	M16-Ma09400	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Thallium (filtered)	M16-Ma09400	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc (filtered)	M16-Ma09400	CP	mg/L	0.012	0.011	7.0	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Chloride	M16-Ma09407	CP	mg/L	< 1	< 1	<1	30%	Pass
Sulphate (as S)	M16-Ma09407	CP	mg/L	< 5	< 5	<1	30%	Pass

Comments

Re-created report with amended sample id's.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)



Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

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Attention

James Conway
Pattle Delamore Partners Ltd

AMENDED REPORT: This report replaces that issued on 10-03-16
at customer request, some sample references have been changed

Laboratory Analysis Report

Sample Information

Site Name General Potable Water Untreated
Batch 1603B015
Sampled By .Customer
Sample Received 01-03-16 1547

Results

Your Reference Secondary Reference Notes Our Reference Sample Collection		Supply 1 Sup1 GW03 16030026 01-03-16 1430	Supply 2 Sup2 MWA 16030027 01-03-16 1430	Supply 3 Sup3 MWB 16030028 01-03-16 1430
Ammoniacal Nitrogen.	mg/L	< 0.010	< 0.010	< 0.010
Coliform Escherichia 97w (E. coli)	MPN/100mL	< 1	< 1	< 1
Coliform Total (97w)	MPN/100mL	6 ± 3-13	51 ± 36-72	< 1
Faecal Coliform (Presumptive)	cfu/100mL	< 10	< 10	< 10
Nitrogen (Nitrate Trace).	mg/L	0.185	0.188	< 0.002
Nitrogen (Nitrite Trace).	mg/L	0.003	0.002	< 0.002

Test Method Information

Method Used	Reference	Method Type
Ammoniacal Nitrogen.	APHA 4500-NH3 F	Subcontracted
Coliform Escherichia 97w (E. coli)	APHA Section 9223 B (Colilert)	IANZ
Coliform Total (97w)	APHA Section 9223 B (Colilert)	IANZ
Faecal Coliform (Presumptive)	APHA section 9222D	IANZ
Nitrogen (Nitrate Trace).	APHA 4500NO3 I	Subcontracted
Nitrogen (Nitrite Trace).	APHA 4500NO3 I	Subcontracted

End of Report

Results are based on sample(s) as received, every effort is made to ensure these results are accurate.
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Analysis is certified correct by the Key Technical Personnel.

Signed Lois Howe Lois Howe

Report Creation Date
05-04-16 1149



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Attention

James Conway
Pattle Delamore Partners

**AMENDED REPORT: This report replaces that issued on 10-03-16
at customer request, some sample references have been changed**

Laboratory Analysis Report

Sample Information

Site Name General Potable Water Untreated
Batch 1603B031
Sampled By
Sample Received 02-03-16 1603

Results

Your Reference Secondary Reference Notes Our Reference Sample Collection		Supply 1 Sup1 GW02 16030089 02-03-16 0845	Supply 1 Sup1 GW01 16030090 02-03-16 1000	Supply 1 Sup1 MWC 16030091 02-03-16 1235	Supply 1 Sup1 GW04 16030092 02-03-16 1235
Ammoniacal Nitrogen.	mg/L	< 0.010	< 0.010	0.099	0.101
Coliform Escherichia 97w (E. coli)	MPN/100mL	< 1	< 1	> 2420	> 2420
Coliform Total (97w)	MPN/100mL	5 ± 2-12	< 1	> 2420	> 2420
Faecal Coliform (Presumptive)	cfu/100mL	< 1	< 1	12182 ± 100	12000 ± 100
Nitrogen (Nitrate).	mg/L	5.700	< 0.002	0.006	0.006
Nitrogen (Nitrite).	mg/L	< 0.002	< 0.002	0.002	0.002

Your Reference Secondary Reference Notes Our Reference Sample Collection		Supply 1 Sup1 GW05 16030093 02-03-16 1400	Supply 1 Sup1 MWD 16030094 02-03-16 1410
Ammoniacal Nitrogen.	mg/L	< 0.010	< 0.010
Coliform Escherichia 97w (E. coli)	MPN/100mL	< 1	< 1
Coliform Total (97w)	MPN/100mL	112 ± 80-154	< 1
Faecal Coliform (Presumptive)	cfu/100mL	< 1	< 1
Nitrogen (Nitrate).	mg/L	4.900	< 0.002
Nitrogen (Nitrite).	mg/L	< 0.002	< 0.002

Test Method Information

Method Used	Reference	Method Type
Ammoniacal Nitrogen.	APHA 4500-NH3 F	Subcontracted
Coliform Escherichia 97w (E. coli)	APHA Section 9223 B (Colilert)	IANZ
Coliform Total (97w)	APHA Section 9223 B (Colilert)	IANZ
Faecal Coliform (Presumptive)	APHA section 9222D	IANZ
Nitrogen (Nitrate).	APHA 4500NO3 I	Subcontracted
Nitrogen (Nitrite).	APHA 4500NO3 I	Subcontracted

End of Report

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Signed Lois Howe Lois Howe

Report Creation Date
05-04-16 1152



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Attention

James Conway
Pattle Delamore Partners

**AMENDED REPORT: This report replaces that issued on 16-03-16
at customer request, some sample references have been changed**

Laboratory Analysis Report

Sample Information

Site Name General Potable Water Untreated
Batch 1603B040
Sampled By .Customer
Sample Received 03-03-16 1547

Results

Your Reference Secondary Reference Notes Our Reference Sample Collection		Spring 1 Sprg1 MWE 16030129 03-03-16 0800	Spring 1 Sprg1 MWF 16030130	Spring 1 Sprg1 GW07 16030131	Spring 1 Sprg1 GW08 16030132
Ammoniacal Nitrogen.	mg/L	< 0.010	< 0.010	< 0.010	< 0.010
Coliform Escherichia 97w (E. coli)	MPN/100mL	11 ± 6-20	< 1	185 ± 132-256	5 ± 2-12
Coliform Total (97w)	MPN/100mL	980 ± 661-1410	< 1	> 2420	613 ± 401-879
Faecal Coliform (Presumptive)	cfu/100mL	8 ± 2	< 2	62 ± 2	4 ± 2
Nitrogen (Nitrate Trace).	mg/L	0.410	< 0.002	1.470	0.730
Nitrogen (Nitrite Trace).	mg/L	< 0.002	< 0.002	< 0.002	< 0.002

Your Reference Secondary Reference Notes Our Reference Sample Collection		Spring 1 Sprg1 GW09 16030133	Spring 1 Sprg1 GW12 16030134	Spring 1 Sprg1 GW11 16030135
Ammoniacal Nitrogen.	mg/L	< 0.010	< 0.010	< 0.010
Coliform Escherichia 97w (E. coli)	MPN/100mL	135 ± 97-184	12 ± 7-21	194 ± 130-280
Coliform Total (97w)	MPN/100mL	> 2420	687 ± 449-974	> 2420
Faecal Coliform (Presumptive)	cfu/100mL	92 ± 2	4 ± 2	90 ± 2
Nitrogen (Nitrate Trace).	mg/L	0.410	0.168	0.085
Nitrogen (Nitrite Trace).	mg/L	< 0.002	< 0.002	< 0.002

Test Method Information

Method Used	Reference	Method Type
Ammoniacal Nitrogen.	APHA 4500-NH3 F	Subcontracted
Coliform Escherichia 97w (E. coli)	APHA Section 9223 B (Colilert)	IANZ
Coliform Total (97w)	APHA Section 9223 B (Colilert)	IANZ
Faecal Coliform (Presumptive)	APHA section 9222D	IANZ
Nitrogen (Nitrate Trace).	APHA 4500NO3 I	Subcontracted
Nitrogen (Nitrite Trace).	APHA 4500NO3 I	Subcontracted

End of Report

Results are based on sample(s) as received, every effort is made to ensure these results are accurate.

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Analysis is certified correct by the Key Technical Personnel.

Signed Lois H. Howe Lois Howe

Report Creation Date
05-04-16 1153



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The tests specified in this report have been performed in accordance with IANZ terms of accreditation.

Laboratory

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**Attention**James Conway
Pattle Delamore Partners

AMENDED REPORT: This report replaces that issued on 14-03-16 at customer request, some sample references have been changed

Laboratory Analysis Report

Sample Information

Site Name	General Potable Water Untreated
Batch	1603B048
Sampled By	.Customer
Sample Received	04-03-16 1317

Results

<i>Your Reference</i> <i>Secondary Reference</i> <i>Notes</i> <i>Our Reference</i> <i>Sample Collection</i>		Spring 1	Spring 1	Spring 1
		Sprg1	Sprg1	Sprg1
		GW10	GW06	MWG
		16030166	16030167	16030168
		04-03-16 0900		
Ammoniacal Nitrogen.	mg/L	0.021	< 0.010	< 0.010
Coliform Escherichia 97w (E. coli)	MPN/100mL	153 ± 112-206	< 10	< 1
Coliform Total (97w)	MPN/100mL	> 2420	4611 ± 2927-6879	< 1
Faecal Coliform (Presumptive)	cfu/100mL	102 ± 2	1 ± 2	< 2
Nitrogen (Nitrate Trace).	mg/L	0.144	0.016	< 0.002
Nitrogen (Nitrite Trace).	mg/L	< 0.002	0.033	< 0.002

Test Method Information

Method Used	Reference	Method Type
Ammoniacal Nitrogen.	APHA 4500-NH3 F	Subcontracted
Coliform Escherichia 97w (E. coli)	APHA Section 9223 B (Colilert)	IANZ
Coliform Total (97w)	APHA Section 9223 B (Colilert)	IANZ
Faecal Coliform (Presumptive)	APHA section 9222D	IANZ
Nitrogen (Nitrate Trace).	APHA 4500NO3 I	Subcontracted
Nitrogen (Nitrite Trace).	APHA 4500NO3 I	Subcontracted

End of Report

Results are based on sample(s) as received, every effort is made to ensure these results are accurate.
 This report may not be reproduced except in full, without written consent of the signatory.
 Analysis is certified correct by the Key Technical Personnel.

Signed Lois Howe Lois HoweReport Creation Date
05-04-16 1153

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