TECHNICAL REPORT

Geochemical Assessment of Mining Waste Materials

Lake Vermont Meadowbrook Project

Prepared for: **Bowen Basin Coal Pty Ltd**

RGS

MINE WASTE AND WATER MANAGEMENT

TECHNICAL REPORT

Geochemical Assessment of Mining Waste Materials

Lake Vermont Meadowbrook Project

Prepared for: **Bowen Basin Coal Pty Ltd**

DOCUMENT CONTROL	
Report Name	**Geochemical Assessment of Mining Waste Materials**
Project Number	**2019038**
File Location	**2019038 (Meadowbrook)/Reporting**
Date	**19/06/2021**

DOCUMENT DISTRIBUTION			
Document Name	**Document Status**	**Distributed to**	**Date distributed**
Geochemical Assessment of Mining Waste Materials	Revision A	Bowen Basin Coal Pty Ltd	19/06/2021

Limitations and disclaimer:

This report documents the work undertaken by RGS Environmental Pty Ltd (RGS).

This report should be read in full. While the findings presented in this report are based on information that RGS considers reliable unless stated otherwise, the accuracy and completeness of source information cannot be guaranteed, although RGS has taken reasonable steps to verify the accuracy of such source data. RGS has made no independent verification of this information beyond the agreed scope of works and RGS assumes no responsibility for any inaccuracies or omissions outside of RGS's direct control. Furthermore, the information compiled in this report addresses the specific needs of the Client, so may not address the needs of third parties using this report for their own purposes. Thus, RGS and their employees accept no liability for any losses or damage for any action taken or not taken on the basis of any part of the contents of this report. Those acting on information provided in this report do so entirely at their own risk.

This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Table of Contents

List of Figures

List of Tables

List of Attachments

Glossary of Terms and Acronyms

Acidity	A measure of hydrogen ion (H+) concentration and certain dissolved metals in a solution when titrated to a set pH value; generally expressed as mg/L $CaCO_3$ equivalent.
Alkalinity	A measure of the capacity of a water to neutralise acidity.
ABA	Acid Base Account, an evaluation of the balance between acid generation and acid neutralisation processes. Determines the MPA and the inherent ANC, as defined below, and is commonly used in assessing the potential for AMD associated with mining.
AMD	Acid and metalliferous drainage caused by exposure of sulfide minerals in mine waste materials to oxygen and water. Typically characterised by low pH and elevated concentrations of salts, sulfate and metals.
ANC	Acid neutralising capacity of a sample as kg H_2SO_4 per tonne of sample. Commonly referred to as the buffering capacity.
ANC:MPA Ratio	Ratio of the ANC and MPA of a sample. Used to assess the risk of a sample generating acid conditions.
EC	Electrical Conductivity, expressed as µS/cm, is a measure of electrical conductance.
eCEC	Effective cation exchange capacity provides a measure of the amount of exchangeable cations (Ca, Mg, Na and K) in a sample.
ESP	Exchangeable sodium percentage provides a measure of the sodicity of a materials and propensity to erode.
KLC test	Kinetic leach column tests are procedures used to measure the geochemical/ weathering behaviour of a sample of mine material over time.
LoR	Limit of Reporting. Laboratory detection limit for the reporting of results for a particular geochemical test.
MPA	Maximum Potential Acidity calculated by multiplying the total sulfur content of a sample by 30.625 (stoichiometric factor) and expressed as kg H_2SO_4 per tonne.
NAF	Non-acid forming. Geochemical classification criterion for a sample that will not generate acid conditions.
NAF-Barren	Non-acid forming and barren of sulfur (i.e., ≤0.07% sulfur). Geochemical classification criterion for a sample that will not generate acid conditions.
NAPP	Net acid producing potential expressed as kg H_2SO_4 per tonne. NAPP is the balance between the capacity of a sample to generate acidity (MPA) minus its capacity to neutralise acidity (ANC).
NMD	Neutral mine drainage typically caused by exposure of sulfide minerals in mine waste materials to oxygen and water and then neutralisation by gangue minerals. Typically characterised by neutral pH and elevated concentrations of salts, sulfate and metals.
PAF	Potentially acid forming. Geochemical classification criterion for a sample that has the potential to generate acid conditions.
Scr	Chromium Reducible Sulfur test which infers sulfide sulfur content in a sample
Static test	Procedure for characterising the geochemical nature of a sample at one point in time. Static tests may include measurements of mineral and chemical composition of a sample and the Acid Base Account.
Total Sulfur	Total sulfur content of a sample generally measured using a 'Leco' analyser expressed as % S.
Uncertain	Geochemical classification criterion for a sample where the potential to generate acid conditions remains uncertain and may require further analysis.

1 Introduction

1.1 Background

The Lake Vermont Meadowbrook Project (the Project) is being developed by Bowen Basin Coal Pty Ltd (the proponent) and is an extension of the existing Lake Vermont Coal Mine. Bowen Basin Coal is a private company owned by the Lake Vermont Joint Venture; the Jellinbah Group (Jellinbah) manages the operations of the Joint Venture and is leading the development of the Project on behalf of participants.

The Project is located in the Bowen Basin of Central Queensland, approximately 25 km north-east of Dysart and 165 km of Mackay in Queensland (**Figure A1**, **Attachment A**). The Project is located to the north of the current open-cut operations at Lake Vermont Coal Mine and consists of a double-seam underground mine along with a single small-scale open cut pit.

The Project is expected to produce up to seven million tonnes per annum of Run of Mine (ROM) coal over a projected mine life of 20 to 25 years. The output from the Project will supplement the scheduled decline in production at the Lake Vermont Coal Mine.

A Terms of Reference (ToR) for the preparation of an Environmental Impact Statement (EIS) has been prepared and issued for the Project.

RGS Environmental Pty Ltd (RGS) was commissioned by AARC Environmental Solutions (AARC) on behalf of Bowen Basin Coal to complete a geochemical assessment of mining waste materials that will be produced as part of the Project. The objective of the assessment is to determine the geochemical nature of the mining waste materials as part of the technical studies being completed to support the development of the EIS for the Project.

1.2 Local Geology

The Project is located in the eastern limb of the Bowen Basin, adjacent to the boundary between the Collinsville Shelf and the Nebo Synclinorium. To the west, the Collinsville Shelf is characterised by thin sediment dipping gently to the east, with minor structural deformation. The boundary between the Collinsville Shelf and the Nebo Synclinorium is marked by the Isaac Fault, a major regional thrust fault. This fault separates the sediments of the Rewan Group and Rangal Coal Measures on the west, from the highly folded and faulted sediments of the Fort Cooper Coal Measures and Rangal Coal Measures (Isaac Block) to the east.

The target coal seams of the Project are the Leichhardt Lower and Vermont Lower Coal Seams, located within the Rangal Coal Measures. The Rangal Coal Measures are the upper-most coal-bearing unit of the Permian sedimentary units within the Bowen Basin. Stratigraphically, the Rangal Coal Measures are overlain by the Sagittarius Sandstone (which is the basal unit of the Rewan Group) and underlain by the Yarrabee Tuff. The Rangal Coal Measures are composed of fine to medium-grained sandstones, siltstones and mudstones, carbonaceous mudstones, claystones and coal seams.

A stratigraphic column of the region is shown in **Figure A2** (**Attachment A**).

1.3 Scope of Work

The objective of the work program was to complete a geochemical assessment of the overburden, interburden, coal and potential coal reject materials produced as part of the Project. The scope of work included:

- Selection of representative drill holes from the 2020 resource drilling program to be used in the geochemical assessment;
- Coordination of the geochemical analysis programs;
- Geochemical characterisation of overburden and interburden from within the proposed underground and open pit extents and coal and potential coal reject material from the target coal seams; and

- Preparation of a Geochemical Assessment Report based on existing information and sample analyses and discussion of any potential acid and metalliferous drainage (AMD), salinity and/or sodicity issues related to the Project (this report).

The geochemical test program was designed to assess the degree of risk from AMD, oxidation of pyrite, leachability of metals/metalloids, and characterisation of standard soil parameters including salinity, cation exchange capacity and major metal/metalloid compositions. The work program was completed in accordance with relevant industry guidelines (DME, 1995; DEHP 2013; COA, 2016a,b,c; and INAP, 2009).

1.4 Report Structure

Background information on the sources of potential impacts on water quality from coal mines is presented in **Section 2**. The detailed methodology used for the geochemical sampling and testing program is described in **Section 3**. The geochemical results obtained from the testing program on the samples are presented in **Section 4**.

A discussion of the acid forming potential of the mining waste materials, and any potential impact on contact water is presented in **Section 5**. The main conclusions and recommendations generated from the assessment for the Project are presented in **Section 6**. A complete list of references relied upon to complete this report are presented in **Section 7**.

2 Sources of Potential Impacts on Water Quality

2.1 Coal and Sulfur

Sulfur in coal is derived from two sources, which include the original plant materials and ambient fluids in the coal forming environment. Abundance of sulfur in coal is controlled by depositional environments and the genesis of the coal seams and overlying strata. Typically, low-sulfur coal seams were deposited in an alluvial environment and the peat was not influenced by seawater. The sulfur in these low-sulfur coals is derived mostly from its parent plant materials.

In contrast, high sulfur coal seams are generally associated with marine strata where sulfate in the seawater diffuses into the peat and is reduced by microorganisms to hydrogen sulfide, elemental sulfur and polysulfides. During early genesis in such a reducing environment, ferric iron is reduced to ferrous iron, which reacts with hydrogen sulfide to form iron monosulfide. Iron monosulfide is later transformed by reaction with elemental sulfur into reactive sulfide minerals such as pyrite or marcasite.

Organic sulfur is formed by reaction of reduced sulfur species with the humic substances formed by bacterial decomposition of peat. Organic sulfur species in coals are mainly thiols, sulfides, di-sulfides, and thiophene and its derivatives. The thiophenic fraction of organic sulfur increases with the carbon content of coals. Organic sulfur compounds formed in peat are mostly thiols and sulfides, which gradually convert to thiophenes with increasing coal maturation. Thus, the organic sulfur species in coal evolve during the history of coal formation.

At coal mines, Potentially Acid Forming (PAF) materials can be associated with specific coal seams (including roof, parting and floor materials), as well as some carbonaceous materials (e.g. mudstone) and uneconomic coal seams. It should be noted that for many coal materials the total sulfur concentration is dominated by low risk organic sulfur rather than sulfur in a reactive form such as pyrite or marcasite. The reactive forms of sulfide can be determined using sulfur speciation tests.

Coal reject (coarse reject and tailing) materials generated through washing the coal can also have elevated sulfur concentration and depending upon the coal seam or blend of coal seams being washed at the time may be classified as PAF or Non-Acid Forming (NAF). In some cases, reactive pyrite/marcasite can preferentially report to either the coarse reject or tailing streams and affect the material classification.

Weathered overburden materials generally have low sulfur concentrations as any reactive sulfur has long since reacted and leached from these materials. Some interburden strata can be PAF, although again the material characteristics are generally governed by the depositional environment in which the coal seams were formed.

2.2 Presence of Sulfur and Potential Impacts on Water Quality

As coal and other geological units are blasted and then extracted from the deposit, the process of chemical weathering increases. If the geological units contain sulfide minerals such as pyrite, the chemical weathering process can increase exponentially due to the oxidation of pyrite and the production of sulfuric acid. The maximum potential acidity (MPA) that the material can produce is calculated by multiplying the total sulfur content in a sample by a stoichiometric factor (30.6), which assumes that all sulfur is present as pyrite and that all pyrite will oxidise to produce acidity. In cases where the materials have some acid neutralising capacity (ANC) the acidity that is produced by the oxidation of pyrite can be neutralised.

If there is more MPA than ANC, the material can potentially produce acidic drainage and the presence of the acidity will increase the concentrations of salts in the form of major ions (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, Cl^{-} and SO_4^{2-}), metals (e.g., Al, Fe, Mn and Zn) and metalloids (e.g., Mo and Se). This type of drainage is referred to AMD, although it will also contain elevated concentrations of salts (COA, 2016c).

If there is more ANC than MPA, the material may retain neutral (or alkaline) pH conditions. However, the acid production and neutralisation reactions may still produce elevated concentrations of salts and potentially some metals/metalloids. This type of drainage is referred to as neutral metalliferous drainage (NMD) or saline drainage (SD).

The potential for a material containing sulfide minerals to produce acidity is also influenced by the way the material is stored or contained. For example, if the material is fine-grained and is contained within a saturated environment the potential for the sulfide minerals to oxidise and produce acidity is lower than if the material is stored in a free draining, oxygenated environment.

The classification of the samples can be derived using the Net Acid Producing Potential (NAPP) or an ANC:MPA ratio. In some instances, the classification can be confirmed using the Net Acid Generation (NAG) test, although in coal mines the standard single addition NAG test should be used with caution for carbonaceous materials, coal or coal reject, as samples with elevated organic carbon content can cause interference with the standard NAG test due to partial oxidation of carbonaceous materials. This can lead to (false positive) low NAG_{pH} values and high acidities in NAG solutions unrelated to any acid generation from sulfides (ACARP, 2008).

In most instances the NAPP calculation and/or ANC:MPA ratio can be used as a screening tool to provide an indication of whether a material may be classified as PAF, Uncertain or NAF. The material classification can be further confirmed by using kinetic geochemical tests on selected mine materials and/or field trials.

When sufficient information is available regarding the geochemical characteristics of the various mining waste materials, a smaller suite of geochemical tests/data may be used to classify a larger number of samples (e.g., total sulfur data) and improve the level of confidence in the overall classification of bulk mine materials (e.g., in coal mines sulfur isopachs and ultimately a sulfur grid layer model can be used to delineate the likely location of any PAF materials) and assist in the refinement of mining material management strategies.

2.3 Neutral Metalliferous Drainage and Saline Drainage Potential

NMD and SD can occur even if the mined materials do not produce acidic drainage. SD can occur if sodium (and other major ions such as chloride) are leached from the mined materials. In Australia the presence of sodium is from rock weathering, and the accumulation of aerosols.

Sulfate is an anion that is also common in neutral pH drainage and is typically present due to the oxidation (and subsequent in-situ neutralisation) of sulfide minerals.

3 Methodology

RGS personnel (Dr. Alan Robertson) worked closely with Jellinbah geology personnel to facilitate the development of an appropriate sampling and geochemical testing plan for obtaining representative samples of overburden, interburden, coal and potential coal reject materials associated with the Project.

Samples from nine drill holes were provided to RGS for geochemical sampling from the 2020 resource drilling program (LV2694, LV2696, LV2697, LV2698C, LV2703, LV2704, LV2715C, LV2720C and LV2723C). The location of the collars of these drill holes with respect to the mine area is shown in **Figure A3** (**Attachment A**).

3.1 Sample Selection and Preparation

The sampling methodology used to obtain geochemical samples from the Project was undertaken in accordance with relevant guideline documents. Whilst there are no specific regulatory requirements regarding the number of samples required, existing risk-based technical guidelines for the geochemical assessment of mining waste materials in Australia (AMIRA, 2002; COA, 2016c; DME, 1995 and DEHP; 2013) and worldwide (INAP, 2009) were used by RGS as a framework for the sampling program. A total of 143 samples were collected and tested (**Table 3.1**).

Table 3.1: Samples included in geochemical assessment

Drill Hole	Number of samples	Drill Hole	Number of samples
LV2694	20	LV2718C	2
LV2696	40	LV2720C	4
LV2697	26	LV2723C	4
LV2698	4	LV2724C	2
LV2703	13	LV2726C	2
LV2704	1	LV2730S	16
LV2715C	3	LV2731	2
LV2716C	4	**Total**	**143**

The samples represent the overburden, interburden, coal and potential coal reject material expected to be encountered during proposed mining activities at the Project, from below surface to approximately 420 m depth. This covers the stratigraphic profile from the surface to the base of the Vermont Lower Seam.

Table 3.2 details the number of samples of each type of material collected and used in the geochemical assessment. The number of samples was selected to provide a good statistical representation of the amount and types of mining materials encountered at the project, considering the risk profile indicated from the geology at the Project. Samples were collected by Jellinbah personnel and dispatched to ALS Environmental Laboratory (ALS) in Stafford, QLD for geochemical testing.

Once received, samples were prepared by crushing, subsampling and and pulverising to less than 75 µm size. This method of sample preparation results in a homogenous sample, but also generates a large sample surface area in contact with the resultant assay solution. This provides a greater potential for dissolution and reaction and represents an assumed initial 'worst case' scenario for these materials. A list of the 143 overburden, interburden, potential coal reject and coal samples included in this study is provided in **Table C1** (**Attachment C**). A list of composite samples included in this study is provided in **Table C2** (**Attachment C**).

Table 3.2: Material types used for geochemical testing

Representative sample material	Lithology	Number of samples
Overburden	Soil, clay, sand and gravel	22
	Sandstone	17
	Siltstone and mudstone	18
	Carbonaceous siltstone and coal	3
Interburden	Sandstone	15
	Siltstone and mudstone	15
Roof, floor and parting	Roof	18
	Floor	16
	Parting	5
	Coal	14
	Total	**143 samples**

Once received, samples were prepared by crushing, subsampling and and pulverising to less than 75 µm size. This method of sample preparation results in a homogenous sample, but also generates a large sample surface area in contact with the resultant assay solution. This provides a greater potential for dissolution and reaction and represents an assumed initial 'worst case' scenario for these materials. A list of the 143 overburden, interburden, potential coal reject and coal samples included in this study is provided in **Table C1** (**Attachment C**). A list of composite samples included in this study is provided in **Table C2** (**Attachment C**).

3.2 Geochemical Test Program

A series of static geochemical and physical tests were completed on the collected samples. The test program was designed to assess the degree of risk from the presence and potential oxidation of sulfides, and generation and the presence/leaching of soluble metals/metalloids and salts. The assessment also included characterisation of standard soil parameters including salinity, sodicity, cation exchange capacity, exchangeable sodium percentage, moisture content, and major metal concentrations.

A summary of the parameters involved in completing a static and kinetic geochemical characterisation and assessment of mine materials is provided in **Attachment B**.

3.2.1 Static Tests

Static geochemical tests provide a 'snapshot' of the characteristics of a sample material at a single point in time. These tests were staged to screen individual samples before selecting either individual and/or composite samples for more detailed static test work.

The Acid Base Account (ABA) was used as a screening procedure whereby the acid-neutralising and acid-generating characteristics of a material are assessed. All 143 samples were screened using ABA by geochemical testing for the following parameters:

- pH [1:5 w:v, sample:deionised water];
- Electrical conductivity (EC) [1:5 w:v, sample:deionised water];
- Total sulfur [LECO method]; and
- Acid neutralising capacity (ANC) [AMIRA, 2002 method].

The results of the ABA screening assessment are discussed in **Section 4.1**. After the results of the ABA screening test were received and interpreted, 25 samples with total sulfur content greater than 0.1 %S were also tested for sulfide sulfur as chromium reducible sulfur (Scr) using the Australian Standard (AS 4969.7, 2008) method.

From the total sulfur (or Scr where available), maximum potential acidity (MPA) and net acid producing potential (NAPP) values were calculated. Scr data was preferentially used, as it provides a more accurate representation of the potential MPA and NAPP, as acid generation primarily forms from the reactive sulfide measured by this method.

After the results of the initial static geochemical tests were received and reviews, 127 selected samples were used to create 18 composite samples. The composites were determined based on the lithology, stratigraphy and geochemistry of the original samples. The 18 composite samples were sent for whole rock multi-element testing at ALS. The samples were tested for:

- Paste pH and EC [1:5 w:v, sample:deionised water];
- Total and soluble major cations (Ca, Mg, K, Na) [HCl and HNO_3 acid digest followed by ICP-AES/MS];
- Soluble major anions (Cl, SO_4, F) [ICP-AES/MS and PC Titrator (1:5 w:v water extracts)];
- Acidity and alkalinity as $CaCO_3$ mg/L [PC Titrator (1:5 w:v water extracts)];
- Total metals (Al, Ag, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, P, Pb, Sb, Se, Th, U and Zn) [HCl and HNO_3 acid digest followed by FIMS and/or ICP-AES/MS]; and
- Soluble metals (Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Sb, Se, SiO_2, Th, U, V and Zn) [ICP-AES/MS and FIMS (1:5 w:v water extracts)].

Ten (10) of the 18 composite samples representing overburden and interburden materials were also tested for exchangeable cations (Ca, Mg, Na and K) [ICP-AES] as material representing these samples may potentially be used as part of final landforms. The exchangeable cation results were used to calculate the effective cation exchange capacity (CEC) and exchangeable sodium percentage (ESP). Sample moisture content was also measured (dried at 105-110°C) and recorded.

The ALS test results for the static geochemical test program are provided in **Attachment E**. Summary results tables are provided in **Attachment C** and discussed in **Section 4**.

3.2.2 Kinetic Tests

Following the receipt and interpretation of the static geochemical test results, five kinetic leach column (KLC) tests were set up at the RGS laboratory using the material from the overburden and interburden sandstone and siltstone composite samples. The KLC test program began in May 2020 and KLC tests were operated for a period of six months within that time period until February 2021 (some samples were received by RGS and tested later than others). A description of the material represented by each KLC is shown below in **Table 3.3**.

Table 3.3: KLC material description

KLC Sample Number	Description
KLC1	Overburden sandstone
KLC2	Overburden siltstone
KLC3	Interburden sandstone
KLC4	Interburden siltstone
KLC5	Coal

Approximately 2 kg of each composite sample was accurately weighed and used in each of the KLC tests. Heat lamps were used daily to simulate sunshine and ensure that the KLC materials were unsaturated and subject to oxidising conditions between leaching events (this is essentially an assumed “worst case” scenario for sulfide oxidation and potential acid/salt generation). Further details and a schematic of the KLC test arrangement used by RGS are provided in **Attachment B**.

All leachate samples collected from the KLC tests were assayed at ALS Brisbane for:

- pH and EC;
- Acidity and alkalinity [PC Titrator];
- Dissolved metals/metalloids (Al, As, B, Cd, Co, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, V, Zn) [ICP-AES/MS];
- Dissolved major cations (Ca, K, Mg, Na and K) [ICP-AES/MS]; and
- Dissolved major anions (Cl, SO_4) and F [ICP-AES/MS].

KLC test results tables and trends are summarised in **Attachment D**.

The full set of as-received ALS test results for the KLC test program are provided in **Attachment E**.

The KLC test results are discussed in **Section 4.7**.

4 Geochemical Test Results

4.1 Acid-base Account Results for Overburden and Interburden

Acid-Base Account results for the 90 overburden and interburden samples from the Project are presented in **Table C3 (Attachment C)** and summarised below. Results are shown by lithology and stratigraphy to facilitate interpretation.

4.1.1 pH and EC

The $pH_{(1:5)}$ of deionised water used in the pH tests typically ranges from 5.0 to 6.5. The pH of the 90 samples ranges from 6.8 to 10.3 (median 9.7) (**Figure 4.1**) Weathered overburden material shows a range of neutral to alkaline pH values, while most other overburden and interburden materials are typically more alkaline. This indicates that the materials represented by the samples, at least initially, will add alkalinity to contact water.

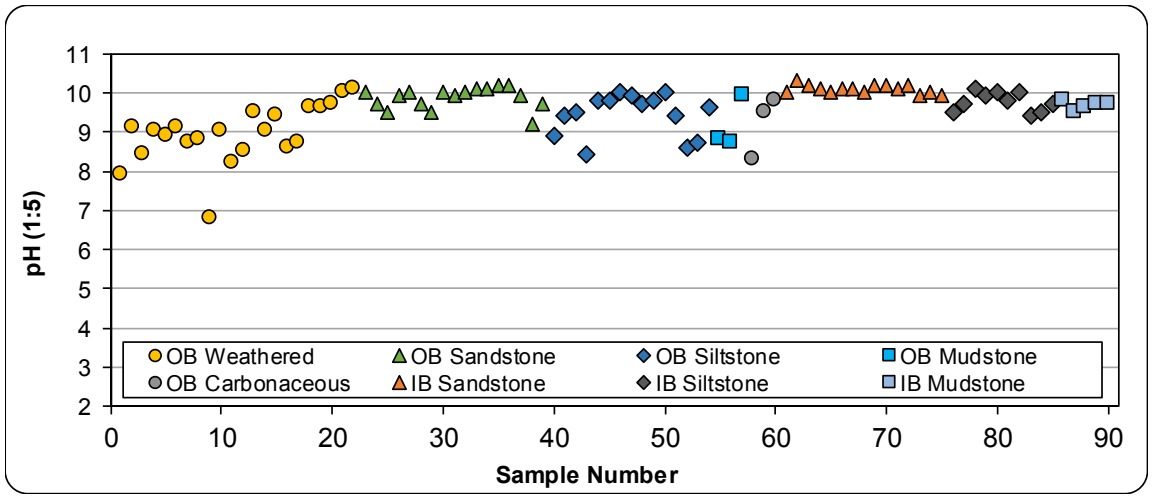


Figure 4.1: pH results for overburden and interburden

The $EC_{(1:5)}$ of the samples ranges from 180 to 2,700 µS/cm (median 427 µS/cm) (**Figure 4.2**). The EC results indicate that initial leachate from materials represented by these samples is likely to have a low to moderate salinity value. Again the weathered overburden typically has a wider EC range and higher EC value than most other overburden and interburden materials.

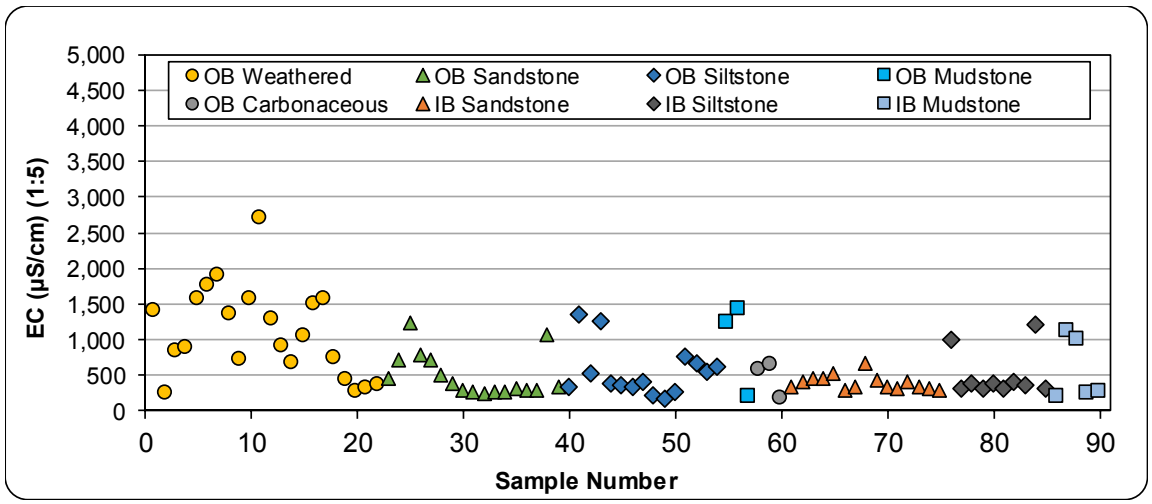


Figure 4.2: EC results for overburden and interburden

To provide additional context, the $pH_{(1:5)}$ and $EC_{(1:5)}$ results for overburden and interburden samples are classified against pH and salinity criteria for mining waste materials, as defined by the Queensland DME (1995) technical guidelines for the environmental management of exploration and mining (**Table 4-1**).

Based on the median pH and EC values, the overburden samples tested are generally regarded as having a 'Very High' soil pH and 'Medium' salinity characteristics, as indicated by the distribution of samples corresponding to each pH and salinity class. Similarly, the median pH and EC results for the interburden samples tested reflect 'Very High' and 'Low' salinity characteristics, respectively.

Table 4-1: Salinity and pH criteria for assessment of overburden and interburden

Overburden	Very Low	Low	Medium	High	Very High
$pH_{1:5}$	< 4.5	4.5 – 5.5	5.5 – 7.0	7.0 – 9.0	> 9.0 (Median – 9.5)
$EC_{1:5}$ (µS/cm)	< 150	150 – 450	450 – 900 (Median – 603)	900 – 2,000	> 2,000
Interburden	**Very Low**	**Low**	**Medium**	**High**	**Very High**
$pH_{1:5}$	< 4.5	4.5 – 5.5	5.5 – 7.0	7.0 – 9.0	> 9.0 (Median – 10.0)
$EC_{1:5}$ (µS/cm)	< 150	150 – 450 (Median – 387)	450 – 900	900 – 2,000	> 2,000

Note: Adapted from DME, 1995. Highlighted cells show the category corresponding to the median pH and EC values (orange shading) for the overburden and interburden samples, respectively.

The pH and EC tests were completed on pulverised samples (≤ 75 µm) with a large surface area in contact with the leaching solution, thereby providing greater potential for dissolution and reaction, and represent an assumed 'worst case' scenario. It is also expected that the salinity of leachate from low sulfur mining waste materials will diminish with time as salts are flushed from the rock matrix and a state of equilibrium develops. At that point, the salinity of seepage/runoff should stabilise at a lower asymptotic concentration relative to the weathering/erosion of the materials.

4.1.2 Sulfur

The total sulfur content of the 90 overburden and interburden samples ranges from below the laboratory limit of reporting (LoR) to a maximum of 0.17 %S and is considered to be low. The median total sulfur content for the samples is 0.01 %S, compared with the median crustal abundance value of 0.07 %S in unmineralised soils (INAP, 2009; Bowen, 1979). This sulfur concentration is generally rounded up to 0.1 %S. and materials containing less than 0.1 %S are considered to be essentially barren of sulfur, represent background concentrations and have a negligible capacity to generate acidity.

Figure 4.3 shows the total sulfur content of the sample materials and illustrates that most of the samples have very low sulfur content. Two samples (fine grained siltstone and mudstone interburden) have a sulfur content greater than 0.1 %S although the values are still low at less than 0.2 %S.

4.1.3 Sulfide sulfur

The chromium reducible sulfur (Scr) content was measured in two interburden samples with a total sulfur value greater than 0.1 %S using the Scr method as these were the only two samples that could theoretically generate any appreciable acidity. The Scr results indicate that a portion of the total sulfur in these samples is likely to be present as organic sulfur or sulfate, which have negligible capacity to generate acidity. Essentially only the siltstone interburden sample contains sufficient sulfide sulfur to generate acidity.

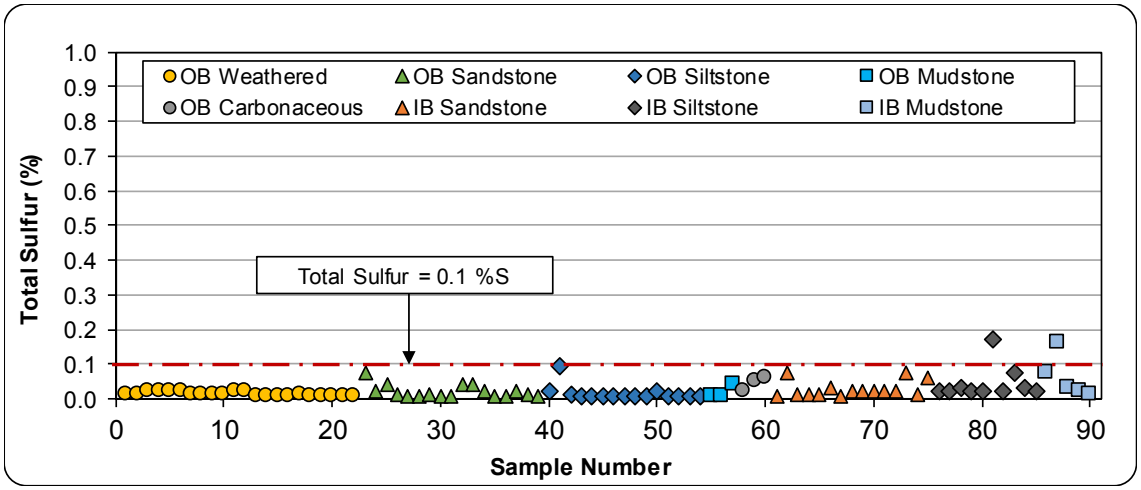


Figure 4.3: Total sulfur results for overburden and interburden

4.1.4 Maximum Potential Acidity

The maximum potential acidity (MPA) results for the samples ranges from 0.2 to 4.6 kg H_2SO_4/t, with a median value of 0.3 kg H_2SO_4/t. Hence, as a bulk material, the amount of acidity that could potentially be produced from the material represented by the samples is negligible.

4.1.5 Acid Neutralising Capacity

The acid neutralising capacity (ANC) for the samples ranges from 7.9 to 260.0 kg H_2SO_4/t, with a median value of 41.9 kg H_2SO_4/t and is more than two orders of magnitude greater than the median MPA.

4.1.6 Net Acid Producing Potential

Net acid producing potential (NAPP) is the capacity of a sample to generate acidity (MPA) minus its capacity to neutralise acidity (ANC). The calculated NAPP value ranges from -259.8 to -7.6 kg H_2SO_4/t and has a negative median value of -41.2 kg H_2SO_4/t.

The NAPP data is presented in **Figure 4.4** and illustrates that all of the overburden and interburden samples tested have a NAPP value that is negative.

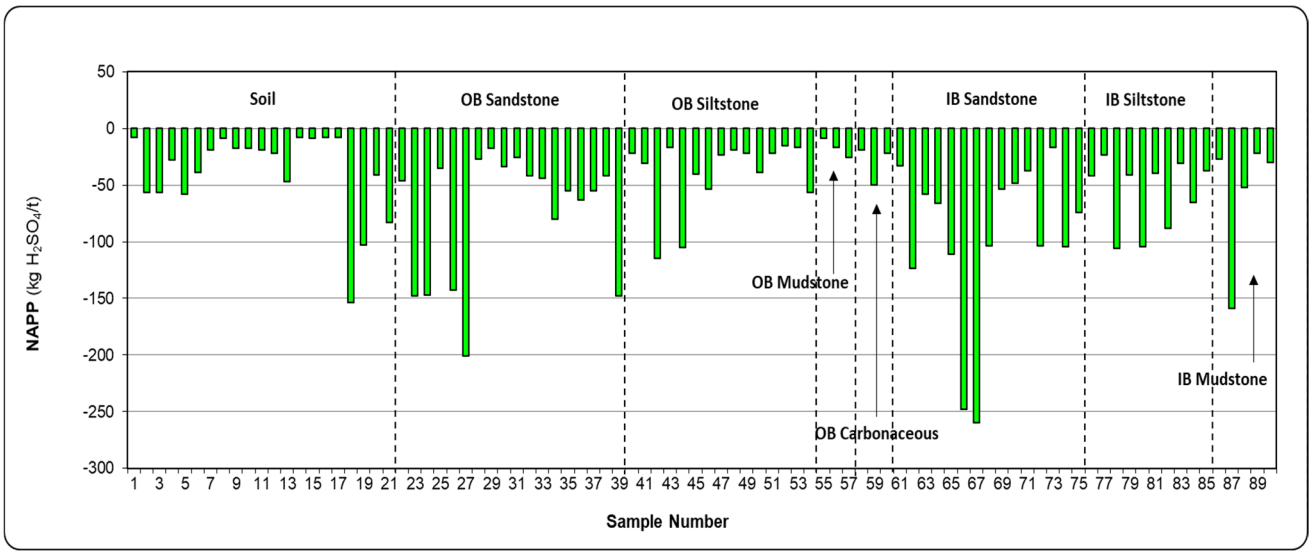


Figure 4.4: NAPP results for overburden and interburden

4.1.7 ANC:MPA Ratio

The ANC:MPA ratio of the samples ranges from 8.7 to 1,698 (median 97.2). **Figure 4.5** shows a plot of the ANC versus MPA values for the samples. ANC:MPA ratio lines have been plotted on the graph to illustrate the factor of safety associated with the samples in terms of the potential for the generation of AMD. Generally, samples with an ANC:MPA ratio of greater than 2 are considered to represent material with a low to negligible risk of acid generation and a high factor of safety in terms of the potential for AMD (COA, 2016c; INAP, 2009). All of the 90 samples tested fall into in the negligible risk category.

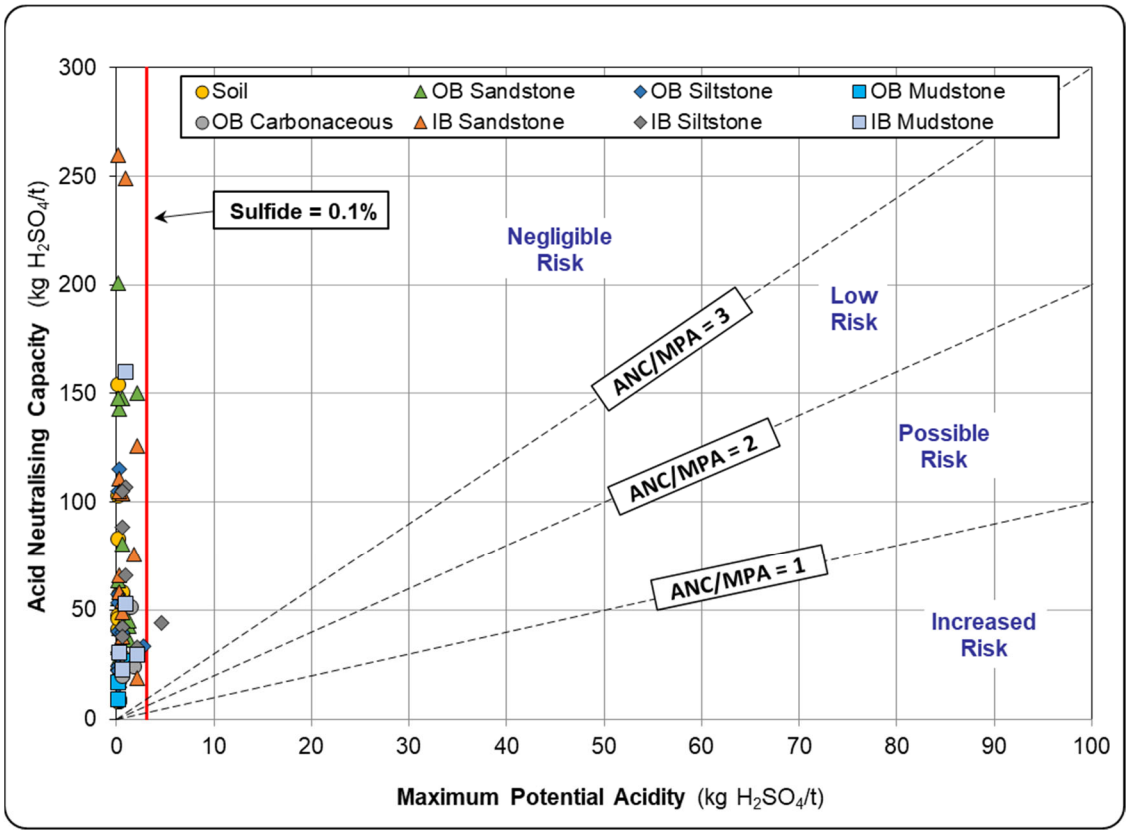


Figure 4.5: ANC vs MPA for overburden and interburden

4.1.8 Geochemical Classification

The Acid Base Account data presented in **Attachment C** and discussed in this section have been used to classify the acid forming nature of the samples. These classification criteria reflect Australian (COA, 2016c) and international (INAP, 2009) guidelines for the classification of mining waste materials. The criteria used by RGS to classify the acid forming nature of the 90 samples from the project, and a breakdown of the number of samples in each classification category is provided in **Table 4.2**.

The data presented in **Table 4.2** illustrate that all the 90 overburden and interburden samples tested are classified as non-acid forming (barren) (NAF barren) or NAF as a result of the low levels of total sulfur and excess ANC present in these samples. This excess ANC is likely to provide a significant source of buffering to any unexpected acidity that may be generated from the materials.

Table 4.2: Geochemical classification criteria

Geochemical Classification	Total Sulfur[1] (%)	NAPP (kg H_2SO_4/t)	ANC:MPA Ratio	No. Samples (n = 90)
Non-Acid Forming (Barren)[2]	≤ 0.1	-	-	89
Non-Acid Forming	> 0.1	≤ -5	≥ 2	1
Uncertain	> 0.1	> -5 and ≤ +5	< 2	0
Potentially Acid Forming (Low Capacity)	> 0.1	> +5	< 2	0
Potentially Acid Forming	> 0.1	> +10	< 2	0

Notes:
1. If total sulfur is less than or equal to 0.1% S, the NAPP and ANC:MPA ratio are not required for material classification as the sample is essentially barren of oxidisable sulfur.
2. A sample classified as NAF can be further described as 'barren' if the total sulfur and/or sulfide sulfur content is less than or equal to 0.1 %S, as the sample essentially has negligible acid generating capacity.

4.2 Acid-base Account Results for Potential Coal Reject and Coal

Acid-Base Account results for the 53 potential coal reject (roof and floor) and coal samples from the project are presented in **Table C3 (Attachment C)** and summarised below. Results are shown by materials type to facilitate interpretation.

4.2.1 pH and EC

The pH of deionised water used in the pH tests typically ranges from 5.0 to 6.5. The $pH_{(1:5)}$ of the 53 samples lies within the range of 6.7 to 10.1 with a median value of pH 9.6 (**Figure 4.6**).

Coal samples from the Vermont Lower and Leichhardt Lower Coal Seams show a range of neutral to slightly alkaline pH values, while the three coal samples from the Vermont Seam and potential coal reject samples show more alkaline pH values. This indicates that the materials represented by the potential coal reject samples will, at least initially, add alkalinity to contact water.

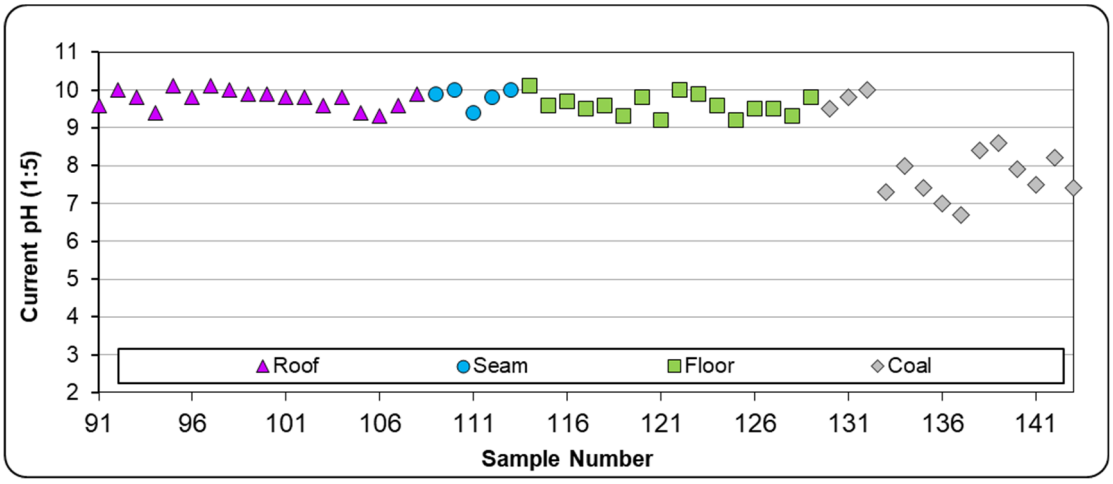


Figure 4.6: pH results for potential coal reject and coal

The $EC_{(1:5)}$ of the samples ranges from 12 to 968 µS/cm (median 233 µS/cm) (**Figure 4.7**). The EC results indicate that initial leachate from materials represented by these samples is likely to have a low salinity value. Coal samples from the Vermont Lower and Leichhardt Lower Coal Seams have the lowest EC values, while in comparison, the three coal samples from the Vermont Seam and potential coal reject samples typically have a wider range and higher EC values.

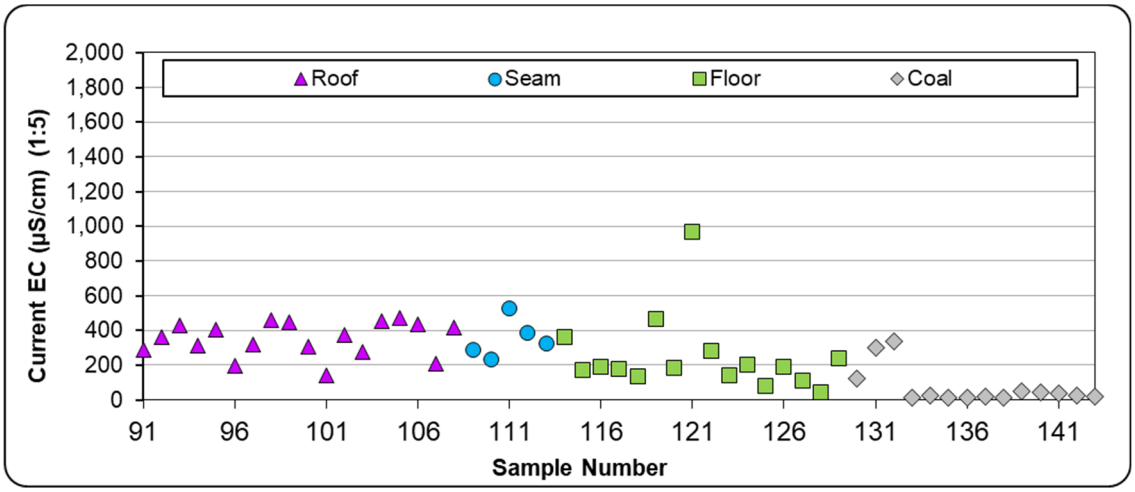


Figure 4.7: Electrical conductivity results for potential coal reject and coal

To provide additional context, the $pH_{(1:5)}$ and $EC_{(1:5)}$ results for potential coal reject and coal samples are classified against pH and salinity criteria for mining waste materials, as defined by the Queensland DME (1995) technical guidelines for the environmental management of exploration and mining (**Table 4.3**).

Based on the median pH and EC values, the potential coal reject samples tested are generally regarded as having a 'Very High' soil pH and 'Low' salinity characteristics, as indicated by the distribution of samples corresponding to each pH and salinity class. Similarly, the median pH and EC results for the interburden samples tested reflect 'Very High' and 'Very Low' salinity characteristics, respectively.

Table 4.3: Salinity and pH criteria for assessment of potential coal reject and coal

Potential Coal Reject	Very Low	Low	Medium	High	Very High

$pH_{1:5}$	< 4.5	4.5 – 5.5	5.5 – 7.0	7.0 – 9.0	> 9.0 (Median 9.8)
$EC_{1:5}$ (µS/cm)	< 150	150 – 450 (Median – 289)	450 – 900	900 – 2,000	> 2,000
Coal	Very Low	Low	Medium	High	Very High
$pH_{1:5}$	< 4.5	4.5 – 5.5	5.5 – 7.0	7.0 – 9.0 (Median – 8.0)	> 9.0
$EC_{1:5}$ (µS/cm)	< 150 (median 26)	150 – 450	450 – 900	900 – 2,000	> 2,000

Note: Adapted from DME, 1995. Highlighted cells show the category corresponding to the median pH and EC values (orange shading) for the overburden and interburden samples.

As previously discussed, the pH and EC tests were completed on pulverised samples with a particle size of ≤75 µm. This results in a large surface area in contact with the leaching solution, providing a greater potential for dissolution and reaction, and therefore represent a 'worst case' scenario.

It is also expected that the salinity of leachate (as represented by EC) from low sulfide sulfur potential coal reject and coal materials will diminish with time as salts are flushed from the material and a state of equilibrium develops. At that point, the salinity of seepage/runoff should stabilise at a lower asymptotic concentration relative to the weathering/erosion of materials.

4.2.2 Sulfur

The total sulfur content of the samples ranges from below the laboratory LoR to a maximum of 0.66 %S and is considered to be relatively low. Approximately half of the 53 samples (27 samples) have a total sulfur content less than 0.1 %S. Material represented by these samples has negligible potential to generate acidity.

Figure 4.8 shows the total sulfur content of the sample materials and illustrates that the samples cover a range of total sulfur values, with the lowest sulfur values found in some of the roof and floor samples. The total sulfur content is greater than 0.3 % S in one roof, two parting and two coal samples although only a portion is likely to be in a sulfur form that could generate acidity as detailed in **Section 4.2.3**.

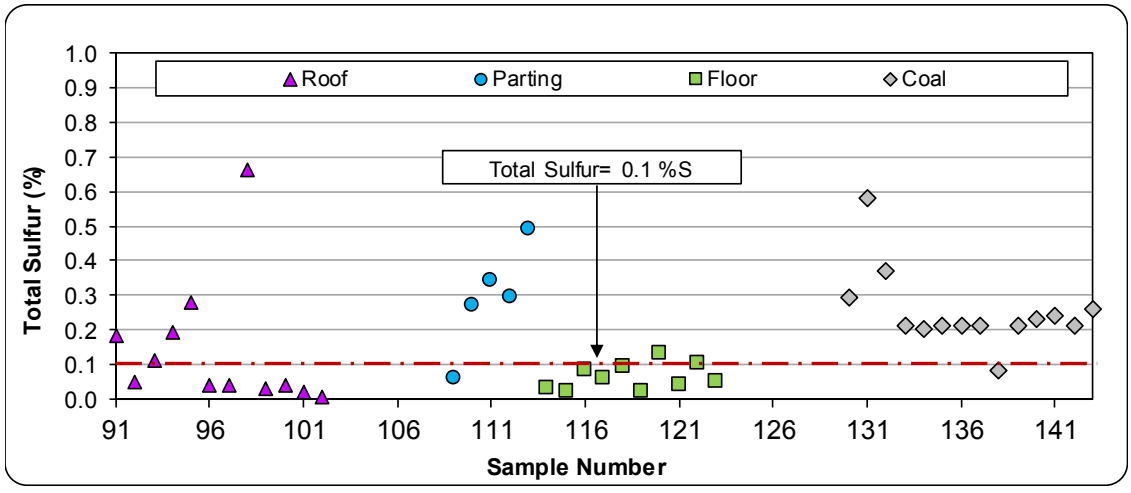


Figure 4.8: Total sulfur results for potential coal reject and coal

4.2.3 Sulfide sulfur

Figure 4.9 shows a plot of total sulfur versus sulfide sulfur (as Scr) for the 26 samples with a total sulfur value over 0.1 %S. The results show a sulfide sulfur content ranging from 0.01 to 0.43 %Scr, with a median value of 0.02 %Scr. The results indicate that a variable proportion of the total sulfur content of the samples may be present as sulfide sulfur (5% to 88%) (most likely pyrite/marcasite) and may have some potential to generate

acidity. However, the remainder of the total sulfur is likely to be present as organic sulfur or sulfate, which have negligible capacity to generate acidity. For the coal samples, the majority of the total sulfur present in the non-sulfide sulfur form which will not generate acidity.

4.2.4 Maximum Potential Acidity

The MPA results for the samples range from 0.2 to 13.2 kg H_2SO_4/t (median 1.2 kg H_2SO_4/t). Hence, as a bulk material, the amount of acidity that could potentially be produced from the material represented by the samples is relatively low.

4.2.5 Acid Neutralising Capacity

The ANC results for the samples range from 6.5 to 199.0 kg H_2SO_4/t (median 20.5 kg H_2SO_4/t) and is more than an order of magnitude greater than the median MPA.

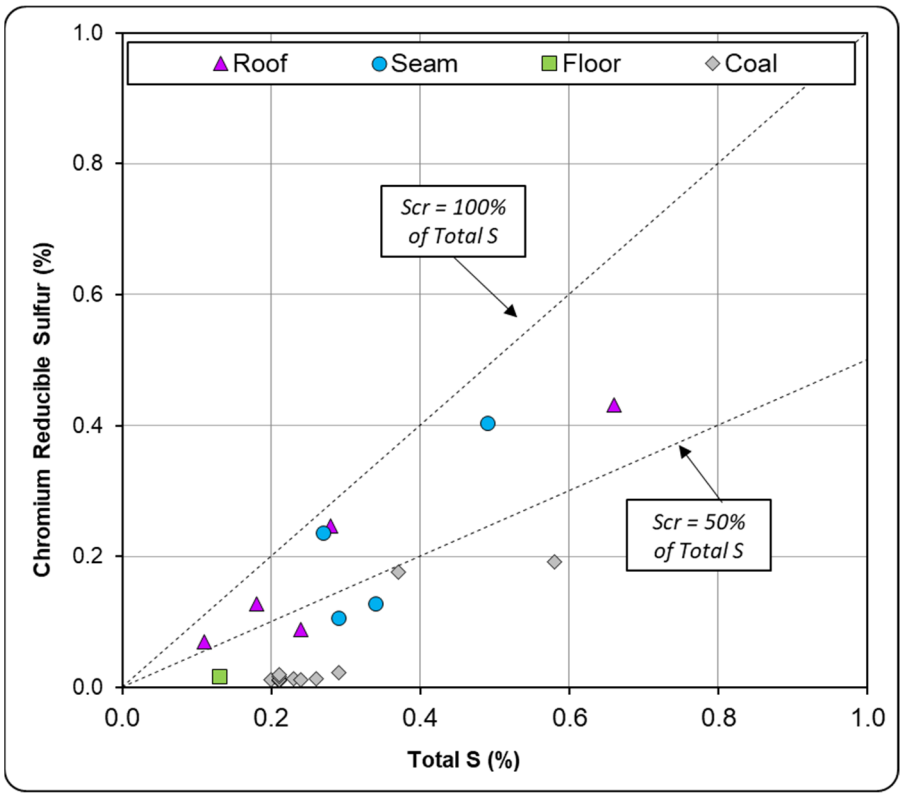


Figure 4.9: Total sulfur versus sulfide sulfur for potential coal reject and coal

4.2.6 Net Acid Producing Potential

Net acid producing potential (NAPP) is the capacity of a sample to generate acidity (MPA) minus its capacity to neutralise acidity (ANC). The calculated NAPP values ranges from -190.4 to -0.1 kg H_2SO_4/t, and have a negative median value of -19.7 kg H_2SO_4/t.

The NAPP data is presented in **Figure 4.10** and illustrates that all of the potential coal reject and coal samples have a NAPP value that is negative

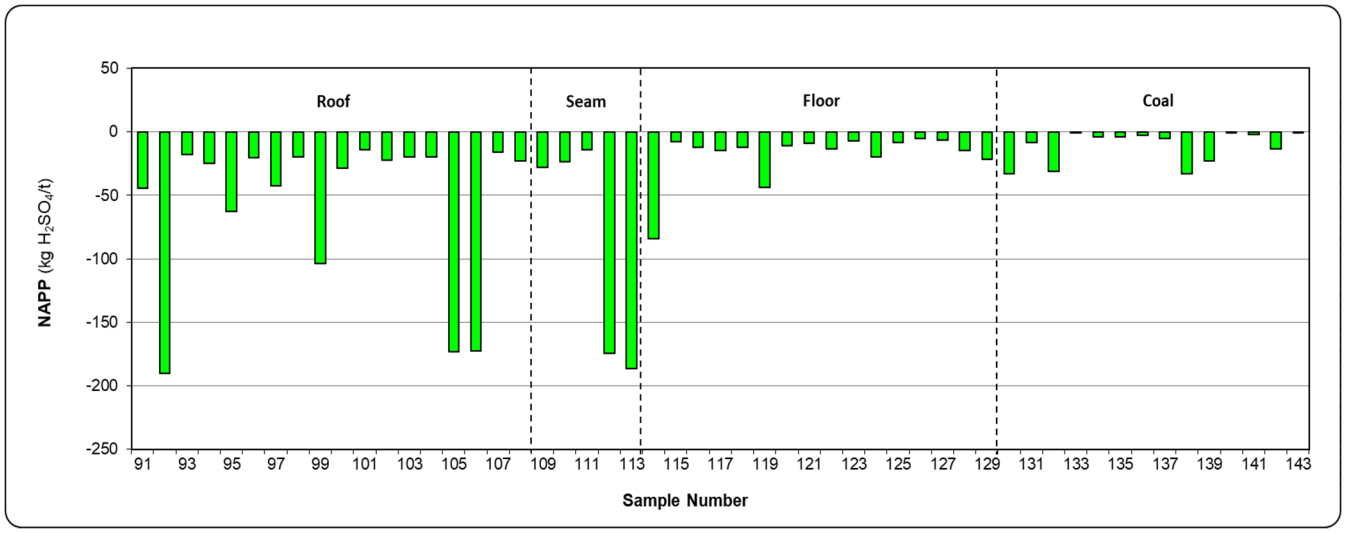


Figure 4.10: NAPP results for potential coal reject and coal

4.2.7 ANC:MPA Ratio

The ANC:MPA ratio of the samples ranges from 2.4 to 1,130, with a median value of 16.3. **Figure 4.11** shows a plot of the ANC versus MPA values for the samples. ANC:MPA ratio lines have been plotted on the graph to illustrate the factor of safety associated with the samples in terms of the potential for the generation of AMD. Generally, samples with an ANC:MPA ratio of greater than 2 are considered to represent material with a low to negligible risk of acid generation and a high factor of safety in terms of the potential for AMD (COA, 2016c; INAP, 2009). Of the 53 potential coal reject and coal samples tested, the vast majority (51 samples) fall into in the negligible risk category and two samples plot in the low risk category.

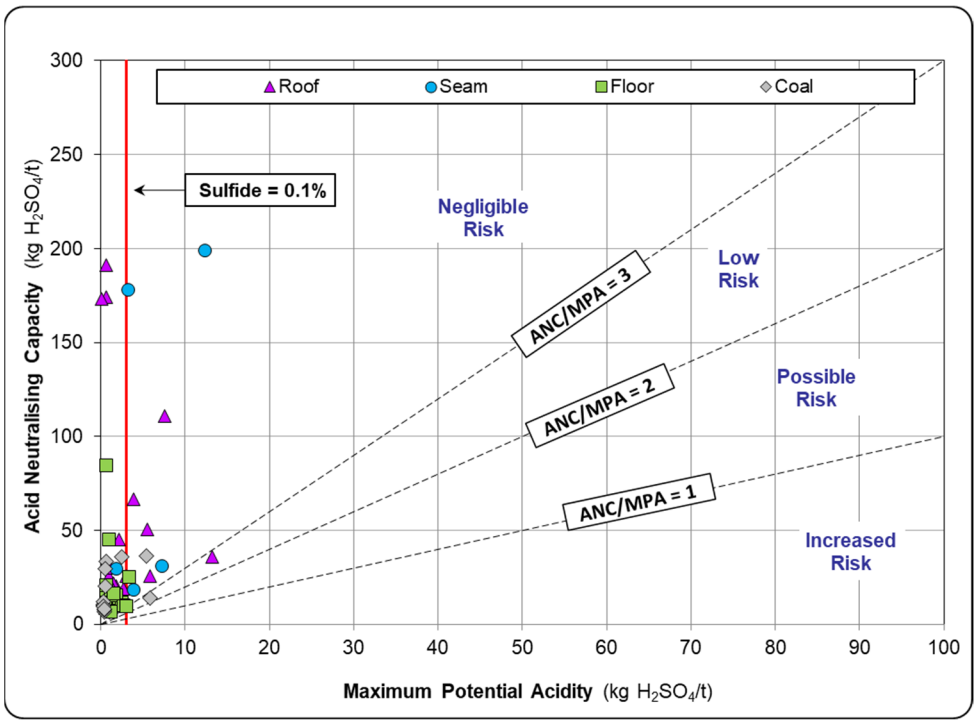


Figure 4.11: ANC vs MPA for potential coal reject and coal

4.2.8 Geochemical Classification

The Acid Base Account test data presented in **Attachment C** and discussed in this section have been used to classify the acid forming nature of the samples (COA, 2016c, INAP, 2009). **Table 4.4** summarises the criteria used by RGS to classify the acid forming nature of the 53 potential coal reject and coal samples from the Project, and a breakdown of the number of samples in each classification category.

Table 4.4: Geochemical classification criteria

Geochemical Classification	Total Sulfur[1] (%)	NAPP (kg H_2SO_4/t)	ANC:MPA Ratio	No. Samples (n = 53)
Non-Acid Forming (Barren)[2]	≤ 0.1	-	-	43
Non-Acid Forming	> 0.1	≤ -5	≥ 2	10
Uncertain	>0.1 0.1	> -5 and ≤ +5	< 2	0
Potentially Acid Forming (Low Capacity)	> 0.1	> +5	< 2	0
Potentially Acid Forming	> 0.1	> +10	< 2	0

Notes:
1. If total sulfur is less ≤ 0.1% S, the NAPP and ANC:MPA ratio are not required for classification due to the lack of oxidisable sulfur.
2. A sample classified as NAF can be further described as 'barren' if the total sulfur and/or sulfide sulfur content is less than or equal to 0.1% S, as the sample essentially has negligible acid generating capacity.

The data presented in **Table 4.4** illustrate that majority of samples tested are classified as NAF barren or as NAF as a result of the relatively low levels of total sulfur and excess ANC present in these samples. This excess ANC is likely to provide a significant source of buffering to any unexpected acidity that may be generated from the materials.

4.2.9 Total sulfur distribution in coal

RGS was provided with total sulfur data from the coal quality laboratory for a range of 139 coal samples (including coal seam roof and floor samples) that are a separate dataset from the geochemistry samples discussed earlier in this report. Based on the total sulfur content of the samples from the Project target seams at the time the data was received (Leichhardt Lower and Vermont Lower) it is likely that the coal materials will have similar geochemical characteristics to the potential coal reject and coal materials described earlier in this section. The coal quality dataset results for total sulfur are shown in the form of a histogram in **Figure 4.12**.

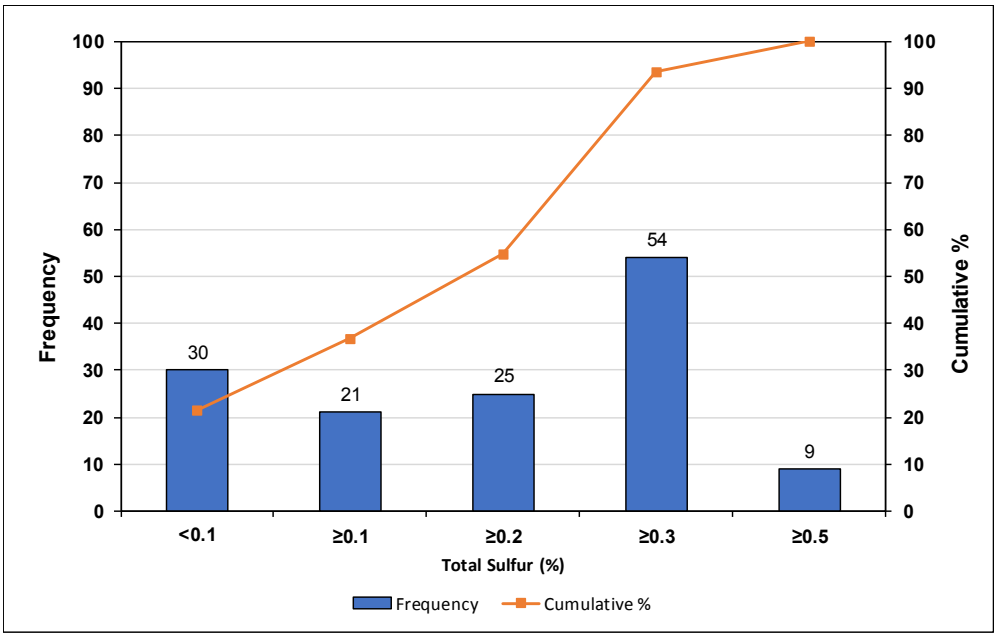


Figure 4.12: Distribution of total sulfur in coal

The results demonstrate that majority of the coal samples (94%) have a total sulfur concentration covering a similar range to that reported for potential coal reject and coal samples in Section 4.2.2 (

Figure 4.12); and based upon the Scr results for coal described in **Section 4.2.3**, are likely to have low sulfide content and low capacity to generate acidity. I addition, the excess ANC and negative NAPP values for coal described earlier in this section indicate that the risk of acid generation from bulk coal materials is low to negligible.

In terms of the ROM coal stockpile at the Project and based on the Acid Base Account and additional total sulfur data, it is expected that the quality of any leachate from this facility will be similar to that for potential coal reject materials described in **Section 4.2**. As is standard practice at many coal mining operations, any surface runoff and seepage from the temporary ROM coal stockpile will be monitored for quality and managed in the mine water management system as part of the Project Water Management Plan.

4.3 Multi-element Concentration in Solids

Multi-element assays were carried out on the 18 composite samples to identify any elements (metals/ metalloids) present in these materials at concentrations that may be of environmental concern with respect to revegetation and surface water/groundwater quality. The total concentration of metals/metalloids for individual elements in these materials can be relevant for revegetation activities and/or where the potential exists for human contact (e.g., if the material was to be used off-site).

The results from the multi-element testing (for total metals/metalloids) are shown in **Table C4** (**Attachment C**). For comparison, guideline values from the National Environmental Protection Measure (NEPM) (NEPC, 2013) are shown for key elements. Where no guideline values are listed, none are specified in the NEPM. All major, minor and trace elements tested returned values below those listed in the applied NEPM guideline for Health-Based Investigation Level – HIL(C); public open spaces – recreational land use. One minor exception to this is molybdenum concentration in Composite 15 (Vermont seam roof and floor sample), which has a concentration (2.2 mg/kg) marginally greater than the applied NEPM guideline limit of 2 mg/kg.

4.4 Geochemical Abundance Index

Total metal/metalloid concentrations in mining waste materials can be compared to the median crustal abundance for un-mineralised soils (Bowen, 1979, COA, 2016c and INAP, 2009). The extent of enrichment is reported as the Geochemical Abundance Index (GAI), which relates the actual concentration in a sample with the median (or average) crustal abundance on a $\log_{10}$ scale. The GAI is expressed in integer increments from 0 to 6, where a GAI value of 0 indicates that the element is present at a concentration less than, or similar to,

the median crustal abundance; and a GAI value of 6 indicates approximately a 100-fold enrichment above median crustal abundance (see **Table 4.5**).

Table 4.5: Geochemical abundance index values and enrichment factors

GAI	Enrichment Factor	GAI	Enrichment Factor
0	Less than 3-fold enrichment	**4**	24 – 48 fold enrichment
1	3 – 6 fold enrichment	**5**	48 – 96 fold enrichment
2	6 – 12 fold enrichment	**6**	Greater than 96 fold enrichment
3	12 – 24 fold enrichment		

As a general rule, a GAI of 3 or greater signifies enrichment that may warrant further examination. This is particularly the case with some environmentally important 'trace' elements, such as arsenic, chromium, cadmium, copper, lead, selenium and zinc, more so than with major rock-forming elements, such as aluminium, calcium, iron, manganese and sodium.

Elements identified as enriched may not necessarily be a concern for revegetation, drainage water quality or public health, but their significance should still be evaluated. While the GAI provides an indication of metals/metalloids that may be enriched relative to the global median crustal abundance, the following points should also be considered:

- The median crustal abundance varies between different literature sources, therefore affecting the calculated GAI values.
- If a sample is shown to be enriched relative to the median crustal abundance, there is no direct correlation that that sample will also leach metals/metalloids at elevated concentrations. The mobility of metals/metalloids is dependent on mineralogy, adsorption/desorption and the environment in which it occurs.
- Whilst some element concentrations can be elevated relative to the median crustal abundance, the nature of an ore deposit means the background levels are generally expected to be elevated.

Similarly, because an element is not enriched does not mean it will never be a concern, because under some conditions (e.g., low pH) the solubility of common environmentally important elements such as aluminium, copper, cadmium, iron and zinc increase significantly.

Table C4 (**Attachment C**) provides total metal/metalloid concentrations for the 18 composite samples described in **Section 3.1**. The relative enrichment of metals/metalloids in these samples compared to median crustal abundance (GAI) is presented in **Table C5** (**Attachment C**). The GAI results indicate that all of the metals/metalloids measured are not enriched compared to median crustal abundance in materials represented by the selected samples.

The potential solubility of any metals/metalloids in the materials was investigated further through water extract tests and KLC tests as presented in **Sections 4.6** and **4.7**, respectively.

4.5 Soil Properties

To investigate the soil properties of the 10 composite samples classified as overburden or interburden, a series of physical tests were conducted. The tests included cation exchange capacity (CEC) and exchangeable sodium percentage (ESP). The composite samples representing potential coal reject and coal materials were not tested for CEC or ESP as these materials will not be used as part of site rehabilitation activities.

The results of these tests are shown in **Table C4** (**Attachment C**) and summarised in the following sections.

4.5.1 Sodicity

Sodicity occurs when exchangeable sodium on the cation-exchange complex leads to clay dispersion in the soil (Hazelton and Murphy, 2016). Sodicity is of interest as it can result in surface crusting and low infiltration and hydraulic conductivity within affected soils.

The ESP results for the 10 composite samples are presented in **Table C4** (**Attachment C**) and range from 17.3 to 38.9 %, with a mean value of 32.9 %. Under the rating for Australian soils established by Isbell (2002) and Northcote and Skene (1972) shown in **Table 4.6**, the overburden and interburden samples are considered to be strongly sodic, and may be prone to dispersion.

Table 4.6: Ratings for exchangeable sodium percentage

ESP Rating[1]	ESP Percentage
Non-sodic	< 6
Moderate	6 – 14
Strong	> 14%

[1] Ratings are based on Isbell (2002) and Northcote and Skene (1972).

4.5.2 Cation Exchange Capacity

CEC measures the capacity of a soil to hold and exchange cations, which provides a buffering effect to changes in pH and available nutrient levels (Hazelton and Murphy, 2016).

The total cation exchange capacity (CEC) and individual exchangeable cation values for the 10 composite samples are presented in **Table C4** (**Attachment C**). The results show that the CEC of the samples ranges from low to high, (9.6 to 23.5 meq/100g), and have a mean CEC value of 16.7 meq/100g (**Table 4.7**).

Table 4.7: Ratings for cation exchange capacity

CEC Rating[1]	CEC (meq/100g)
Very low	<6
Low	6 – 12
Moderate	12 – 25
High	25 – 40
Very high	>40

[1] Ratings are taken from Hazelton and Murphy (2007)

The individual exchangeable cation values are summarised in **Table 4.8**. The Ca:Mg ratio ranges from 0.4 to 1.2, and the samples range from calcium deficient to low in calcium (Hazelton and Murphy, 2016). This low Ca:Mg ratio supports the ESP finding in Section 4.5.1 that the overburden and interburden materials represented by the composite samples may be prone to dispersion.

For materials with a low CEC value and low calcium concentration, some soil and fertiliser addition may be required to provide a reasonable growth medium for vegetation roots if planned rehabilitation includes revegetation activities.

Table 4.8: Summary of exchangeable cation levels

Cation	Minimum (meq/100g)	Maximum (meq/100g)	Average (meq/100g)
Na^+	3.5	8.0	5.2
K^+	0.2	0.5	0.3
Ca^{2+}	2.6	9.7	4.3
Mg^{2+}	2.7	10.4	6.2

4.5.3 Moisture Content

The moisture content of the 13 composite samples ranged from 5.5 to 22.5 %, with an average moisture content of 11.8 %.

4.6 Water Quality Static Tests

There are no specific regulatory criteria for metal/metalloid concentrations in leachate from mining waste materials on mine sites in Queensland. As such, RGS has compared the multi-element results in 1:5 sample:water (w:v) extracts from the 18 composite overburden, interburden, potential coal reject and coal samples (as described in **Sections 4.3** and **4.4**) with the Australian guideline values for freshwater aquatic ecosystems and livestock drinking water (ANZECC & ARMCANZ, 2000; superseded by AWQG, 2018). These guidelines are provided for context only and are not intended to be interpreted as "maximum permissible levels" for site water storage or discharge.

It should also be recognised that direct comparison of geochemical data with guideline values can be misleading. For the purpose of this study, guideline values are only provided for broad context and should not be interpreted as arbitrary "maximum" or "trigger" values. Using sample pulps (ground to passing 75 µm) provides a high surface area to solution ratio, which encourages mineral reaction and dissolution of the solid phase. The results on screening tests on water extract solutions is assumed to represent a "worst case" scenario for initial surface runoff and seepage from mining waste materials.

The results from multi-element testing of the water extracts collected from the 18 composite samples are presented in **Table C6** (**Attachment C**). The pH of the water extracts ranges from pH 8.9 to 10.1 (median 9.8), and all the samples are considered to be alkaline. Seventeen (17) of the samples had pH values above the pH range (6 to 9) for 95 % species protection in freshwater aquatic ecosystems (AWQG, 2018).

The total alkalinity value in the water extract samples is dominated by bicarbonate although some carbonate is also present. The total alkalinity ranges from 224 to 6,220 mg $CaCO_3$/L (median 583 mg $CaCO_3$/L). All samples returned acidity values below the laboratory limit of reporting (LoR), and as such the net alkalinity value is strongly positive. The results confirm that the bulk materials represented by the samples tested have excess ANC and should provide a significant source of buffering to any unexpected acidity generated.

The EC in the water extracts ranges from 107 to 1,040 µS/cm (median 529 µS/cm) and is typically low. The results confirm that these materials generally have low to medium salinity values and relatively low concentrations of dissolved solids when in initial contact with water.

The range in concentrations for the major ions in solution in the water extracts are provided in **Table 4.9**. The water extract solutions were generally dominated by sodium, chloride and sulfate with lesser concentrations of other major ions tested. The median concentrations for all major ions were below the water quality guidelines for livestock drinking water.

The concentration of fluoride was generally low in most composite samples and slightly elevated on one soil sample compared to the applied livestock drinking water quality guideline value (2 mg/L).

Table 4.9: Major ion concentrations in solution

Ion	Minimum (mg/L)	Maximum (mg/L)	Median (mg/L)
Calcium (Ca)	<2	4	<2
Magnesium (Mg)	<2	4	<2
Potassium (K)	<2	<2	<2
Sodium (Na)	<2	360	124
Chloride (Cl)	6	552	103
Fluoride (F)	<0.2	2.8	0.6
Sulfate (SO_4)	<2	92	34

The concentration of the dissolved trace metals/metalloids tested in the 18 water extracts is generally low and below the laboratory LoR for most analytes. samples. The main exceptions are aluminium (11 samples) and arsenic (11 samples) and copper (1 sample), which are greater than the applied water quality guideline of 95 % species protection for freshwater aquatic ecosystems (AWQG, 2018). However, all water extract concentration results are below the applied guideline values for livestock drinking water (AWQG, 2018)

The slightly elevated dissolved aluminium and arsenic concentrations in these water extracts may in some part be due to the formation of colloidal materials in the water extracts, which can pass through the (0.45 µm filter) filtration stage used in the standard laboratory preparation procedure. This can occur due to the physical preparation of the sample at the laboratory to pass a 75 µm particle size. However, given the pH values in the water extracts are slightly alkaline to alkaline, it is likely that the dissolved aluminium and arsenic concentration results are accurate.

Overall, the results indicate that dissolved metal/metalloid concentrations in initial surface runoff and seepage from the sample materials are expected to be low and are unlikely to pose a significant risk to the quality of surface and groundwater resources at the Project. Notwithstanding, it is recommended that the suite of parameters tested and presented in **Table C6** (**Attachment C**) be periodically included in the water quality monitoring program for the site.

4.7 Water Quality Kinetic Tests

As described in **Section 3.2.2** and **Attachment B**, a KLC test program was completed for five representative composite samples of overburden and interburden, potential coal reject material and coal for a period of six months under a monthly watering and leaching cycle. The five KLC tests cover the range of overburden and interburden, potential coal reject materials, and coal likely to be generated by the Project.

A description of the individual samples and materials represented by each KLC test is summarised in **Table 4.10** and detailed in **Table C7** (**Attachment C**).

Table 4.10: KLC material description

KLC Sample #	Description
KLC1	Overburden sandstone
KLC2	Overburden and interburden siltstone
KLC3	Interburden sandstone
KLC4	Potential coal reject
KLC5	Coal (Leichhardt Lower and Vermont Lower)

The KLC tests were completed within the period May 2020 to February 2021 and were operated to align with relevant mining industry guidelines for such tests (AMIRA, 2002; COA, 2016c).

The leachate results from the KLC test program are presented alongside Australian water quality guideline values for livestock drinking water quality (AWQG, 2018). These guidelines are provided for context only and are not intended to be interpreted as "maximum permissible levels" for site water storage or discharge.

It should be noted that the KLC samples were crushed to pass a 10 mm sieve size, where required, and therefore have a high surface area for potential geochemical reaction. The ratio of sample to water in the KLC tests was generally between 2:1 and 3:1 (w/v) (i.e., concentrated), whereas the ratio of sample to water generally used in tests where results can (arbitrarily) be compared against guideline concentrations to provide relevant context is two orders of magnitude more dilute at 1:5 (w/v). Whilst arbitrary comparisons against guideline concentrations can be helpful in some situations to provide relevant context, such comparisons cannot be directly extrapolated to the field situation at the Project.

The monthly test results for the composite KLC test samples are presented in **Attachment D**. Tables **KLC1** to **KLC5** provide the KLC test data for the six month test period, selected components of which are also shown graphically. The KLC test results indicate that:

- Leachate from the KLC tests has a pH in the range of 6.21 to 10.09 and typically end up in the pH range 8 to 9 after six months of leaching . It should be noted that the pH of the deionised water used in the KLC tests over the test period has a pH value ranging from 6.1 to 6.7. The pH of the collected KLC leachate is therefore greater than the pH of the deionised water used in the KLC tests. These results indicate that pH values in contact water over time are likely to be located in the slightly alkaline range.
- Leachate from the KLC tests has an EC value in the range of 34 to 571 µS/cm. The EC values are consistently low across the test materials and (apart from coal – **KLC5**) generally show a reducing trend. Given that the ratio of sample to water in the KLC tests is concentrated (i.e., generally between 2:1 or 3:1 (w/v)) these results indicate that EC values from most bulk mine waste materials exposed to oxidising conditions will be relatively low.
- The acidity value in leachate from the five KLC tests is generally low (<5 mg/L, as $CaCO_3$) and at times below the laboratory LoR (<1 mg/L, as $CaCO_3$) throughout the test period. The alkalinity values in leachate from the KLC tests are elevated, and more than sufficient to create positive net alkalinity values (i.e., the alkalinity is greater than the acidity) over the test period.
- The concentration of major ions in leachate from the four KLC tests is typically dominated by variable concentrations of sodium, chloride and sulfate. Lower concentrations of other major ions are also present in leachate from these materials.
- The sulfate release rate from the five KLC samples is generally quite low and stable over the test period with all values less than 50 mg/L. The sulfate concentration in leachate from all of the KLC tests is generally at least two orders of magnitude less than the applied livestock drinking water quality guideline value of 1,000 mg/L (AWQG, 2018).
- The sulfate generation rate results obtained for the five KLC test samples have been used to determine the rate of sulfide oxidation in these materials. Most sulfate salts generated from sulfide reaction involving materials with a relatively low sulfide sulfur concentration are highly soluble, and therefore will be collected in column leachate. The dissolved sulfate (and calcium) concentrations in most of the KLC leachate are typically much less than the solubility limit of gypsum ($CaSO_4$), for example, which indicates that sulfate generation is not controlled by gypsum dissolution in the KLC test materials. Therefore, the sulfate concentrations and oxidation rate calculations provide reasonable estimates of these parameters and the results align well with existing static and dynamic geochemical data derived from a wide range of mine waste materials (AMIRA, 1995). The sulfate generation rate and associated sulfide oxidation rate for the KLC tests are shown in **Table 4.9**.
- The sulfate generation rate from the KLC samples ranges from 1.02 to 5.86 mg/kg/week which is equivalent to a sulfide oxidation rate ranging from 4.42×10^{-10} to 2.41×10^{-9} kg $O_2/m^3/s$. Mining waste materials with an oxidation rate less than 5×10^{-8} kg $O_2/m^3/s$ and a moderate ANC level have an increased factor of safety and are likely to generate leachate that is pH neutral or slightly alkaline and/or has a low level of acidity (AMIRA, 1995; Bennett *et al*., 2000). Hence, all of the mining materials tested fall into this

category. Overall, the KLC results reflect the range of material characteristics predicted from the static geochemical test results described in **Sections 4.1** and **4.2**.

Table 4.11: Sulfate Generation and Sulfide Oxidation Rates for KLC tests

KLC Sample Number	Sample Description	Sulfate Generation Rate (mg/kg/week)	Oxidation Rate (kg $O_2/m^3/s$)
KLC1	Overburden sandstone	2.29	9.47×10^{-10}
KLC2	Overburden and interburden siltstone	1.99	8.20×10^{-10}
KLC3	Interburden sandstone	3.86	1.59×10^{-9}
KLC4	Potential coal rejects	5.86	2.41×10^{-9}
KLC5	Coal	1.02	4.42×10^{-10}

- The KLC sample materials retain at least ~84.6 % of their inherent total sulfur content after six months of exposure to idealised oxidising conditions, which reflects low inherent sulfide concentration in the sample materials, slow rate of sulfide oxidation (and low potential for acid generation) for these materials.
- The KLC sample materials retain at least ~99.9 % of their inherent ANC value after six months of exposure to idealised oxidising conditions, which reflects the slow release of alkalinity from these materials.
- The concentration of trace metals/metalloids in the leachate from the KLC test materials is generally low and typically below the laboratory LoR. Most trace metals/metalloids are therefore sparingly soluble at the slight to moderately alkaline pH of the KLC leachate. The concentrations of all metals/metalloids are below the applied water quality guideline criteria for livestock drinking water ((AWQG, 2018). The results indicate that dissolved metal/metalloid concentrations in leachate from bulk mine waste materials will be relatively low.

Potential implications of these results with respect to the management of the interburden, potential coal reject and coal materials at the Project are discussed further in **Section 5**.

5 Discussion

5.1 AMD potential and management

The results of the static and kinetic test program described in Section 4 indicate that the AMD potential of the material represented by the samples is negligible. Material represented by the overburden, interburden, potential coal reject and coal samples tested is classified as NAF, due to excess ANC and low oxidisable sulfur content. The material represented by these samples has a low risk of acid generation and a high factor of safety with respect to potential AMD.

5.2 Physical characteristics

Dispersive materials can impact surface water environments through increasing the sediment load present in surface waters, increasing the turbidity of surface waters. Overall, the results of the physical characterisation tests described in this report indicate that the overburden and interburden materials are sodic and may be susceptible to dispersion and erosion and therefore should be managed appropriately. The dispersive characteristics of the overburden and interburden materials may be improved to some extent with the addition of gypsum to the material or use of a vegetated topsoil cover. If a source of rock mulch materials is available, this could also be used to help to stabilise revegetated surface slopes. In addition, fertiliser and organic matter addition may need to be considered for overburden and interburden materials considered for use in rehabilitation of final landforms to provide a reasonable growth medium for revegetation and rehabilitation purposes. The optimum rehabilitation strategy should be based on successful strategies used at nearby mines dealing with sodic materials and/or based on rehabilitation field trials when the mine is operational.

5.3 Multi-element composition and enrichment

The multi-element concentrations of overburden, interburden, potential coal reject and coal samples are presented in **Sections 4.3** and **4.4**, along with a comparison against applied guideline values and median crustal abundance in unmineralised soils. The results indicate that these materials represented by these samples are not significantly enriched with metals/metalloids compared to applied guideline values and median crustal abundance in unmineralised soils. As such, all mine waste materials are not expected to present environmental issues associated with metal/metalloid concentrations for revegetation and rehabilitation.

5.4 Water quality

The static geochemical test results presented in this report indicate that the surface runoff and seepage from NAF mining waste materials are likely to be slightly alkaline to alkaline in pH and have a low EC value indicating low salinity levels (and low concentrations of dissolved solids). Surface runoff and seepage from mining waste materials is likely to be towards the upper end of the range (pH 6 to 9) recommended for 95 % species protection in freshwater aquatic ecosystems as set out in Australian Water Quality Guidelines (AWQG, 2018).

The major ion concentrations in leachate from mining waste materials are relatively low and dominated by sodium, chloride, sulfate and bicarbonate. Lower concentrations of other major ions are also likely to be present in leachate from the materials. The sulfate concentration in leachate from all mining waste samples is well below the applied AWQG (2018) livestock water quality guideline criterion (1,000 mg/L).

Static water extract tests suggest that some dissolved metal/metalloid concentrations (e.g., aluminium and arsenic) may be elevated compared to the applied guideline values for 95 % species protection in freshwater aquatic ecosystems (at 0.055 and 0.024 mg/L respectively) but are well within applied livestock drinking water quality guideline levels (AWQ, 2018).

It is therefore expected that the potential risk to the quality of surface water and groundwater resources from surface water and groundwater in contact with mining waste materials at the Project will be relatively low.

6 Conclusions and recommendations

6.1 Conclusions

RGS has completed a geochemistry assessment of the overburden, interburden, potential coal reject and coal materials at the Lake Vermont Meadowbrook Project. The main findings of the geochemistry assessment are:

- The samples tested have a low sulfur content, excess ANC and are classified as NAF. These materials have negligible risk of acid generation and a high factor of safety with respect to potential for the generation of acidity.
- Initial and ongoing surface runoff and seepage from the overburden, interburden, potential coal reject and coal materials is expected to be slightly alkaline to alkaline and have a relatively low level of salinity.
- There is no significant metal/metalloid enrichment in the mining materials tested compared to applied guideline values and median crustal abundance in unmineralised soils.
- Most metals/metalloids are sparingly soluble at the alkaline pH of leachate expected from bulk NAF mining waste materials. Dissolved metal/metalloid concentrations in surface runoff and leachate from bulk NAF mining waste materials are expected to be low and unlikely to pose a significant risk to the quality of surface and groundwater resources at relevant storage facilities.
- The overburden interburden materials should be amenable to revegetation as part of rehabilitation activities, although addition of gypsum, fertiliser, organic matter (and a rock mulch material on surface batter slopes) may need to be considered for sodic materials to limit dispersion and erosion and to provide a reasonable growth medium for revegetation and rehabilitation.

6.2 Recommendations

As a result of the geochemistry assessment work completed to date on mining waste materials at the Project, two recommendations are provided to minimise the risk of any significant environmental harm to the immediate and downstream receiving environment.

- Confirmatory sampling and geochemical testing of coal reject (coarse reject and tailing) materials from processing of the various coal seams/blends should be completed from time to time when the Project is operational and bulk materials become available. The test program should include both static and kinetic geochemical tests if any PAF materials are identified.
- Surface water and seepage from the spoil and coal reject storage areas should be contained and monitored to ensure that key water quality parameters remain within appropriate criteria. Water quality monitoring parameters should include pH, EC and total suspended solids (TSS) on a quarterly basis and the suite of water quality analyses described in **Table C6** (**Attachment C**) of this report opportunistically (nominally on an annual basis).

7 References

ACARP (2008). Development of ARD Assessment for Coal Process Wastes. ACARP Project C15034. Report prepared by Environmental Geochemistry International and Levay and Co. Environmental Services, ACeSSS University of South Australia, July 2008.

AMIRA (1995). Mine Waste Management: *Project P387 Prediction and Identification of Acid Forming Mine Waste*. Australian Minerals Industry Research Association, Report prepared by EGi Pty Ltd, August 1995.

AMIRA (2002). *ARD Test Handbook: Project 387A Prediction and Kinetic Control of Acid Mine Drainage, Australian Minerals Industry Research Association*. Ian Wark Research Institute and Environmental Geochemistry International Pty Ltd, May 2002.

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

AWQG (2018). Australian and New Zealand Water Quality Guidelines 2018 that supersede the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000).

AS 4969.7-2008. *Analysis of acid sulfate soil – Dried samples – Methods of test. Method 7: Determination of chromium reducible sulfur (Scr)*. Standards Australia, June 2008.

Bennett, J.W., Comarmond, M.J. and Jeffery, J.J. (2000). *Comparison of Oxidation Rates of Sulfidic Mining wastes Measured in the Laboratory and Field*. Australian Centre for Mining Environmental Research, Brisbane.

Bowen, H.J.M. (1979). *Environmental Chemistry of the Elements*. Academic Press, New York.

COA (2016a). *Leading Practice Sustainable Development Program for the Mining Industry. Mine Rehabilitation*. September 2016. Commonwealth of Australia, Canberra ACT.

COA (2016b). *Leading Practice Sustainable Development Program for the Mining Industry. Mine Closure*. September 2016. Commonwealth of Australia, Canberra ACT.

COA (2016c). *Leading Practice Sustainable Development Program for the Mining Industry. Managing Acid and Metalliferous Drainage*. September 2016. Commonwealth of Australia, Canberra ACT.

DEHP (2013). *Application Requirements for Activities with Impacts to Land Guideline.* Queensland Department of Environment and Heritage Protection.

DME (1995). *Draft Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland, Technical Guideline – Assessment and Management of Acid Drainage and Saline/Sodic Wastes*. Queensland Department of Minerals and Energy (DME).

Hazelton and Murphy (2016). *Interpreting Soil Test Results: What do all the numbers mean?* CSIRO Publishing, Victoria.

INAP (2009). *Global Acid Rock Drainage Guide (GARD Guide)*. Document prepared by Golder Associates on behalf of the International Network on Acid Prevention (INAP). June 2009 (http://www.inap.com.au/).

Isbell, RF. (2002). *The Australian Soil Classification (revised edition)*. CSIRO Publishing. Victoria.

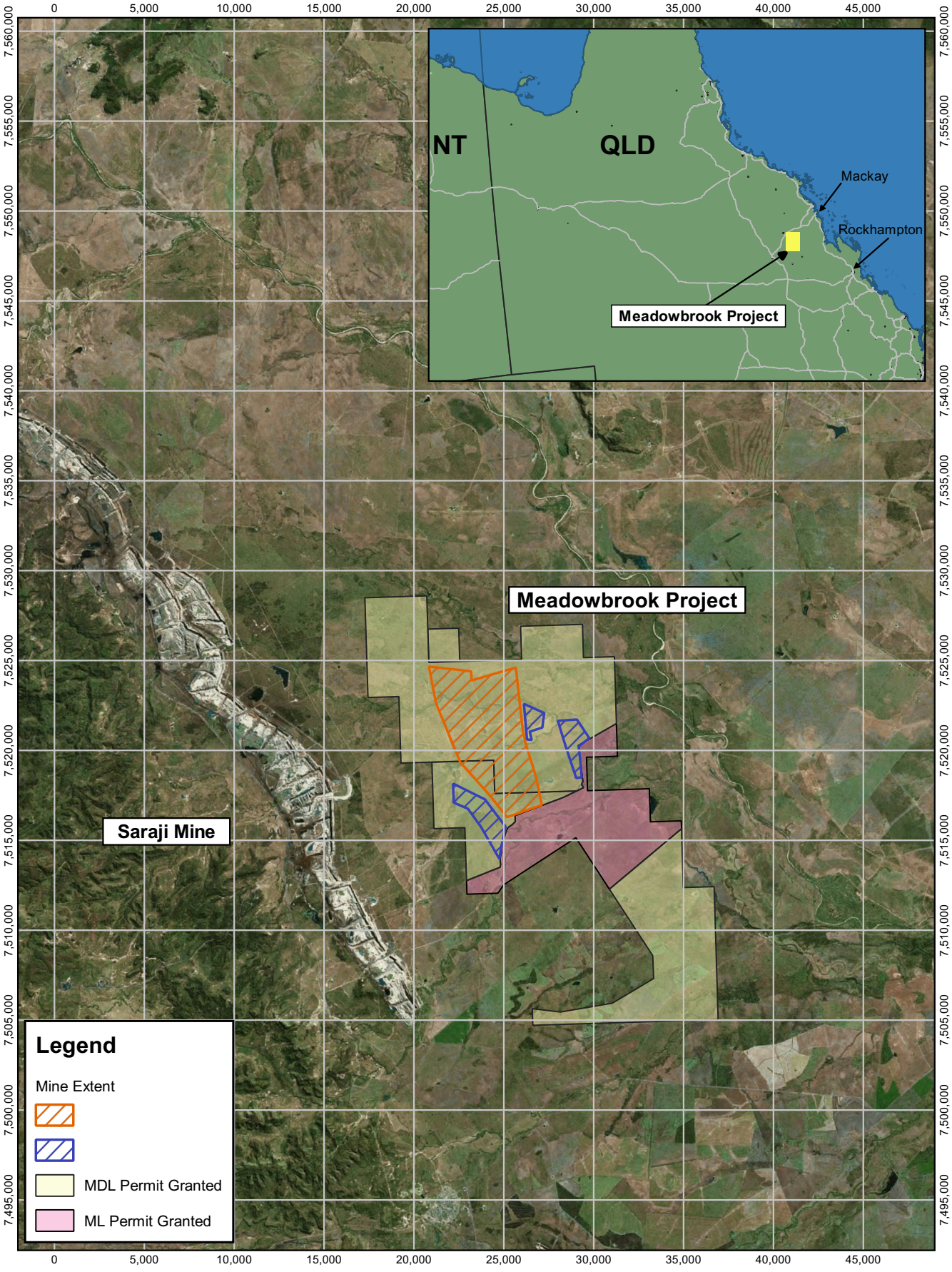
National Environmental Protection Council (NEPC) (2013). *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), Amendment of Schedule B1-B7 of 1999 version*. Commonwealth of Australia, Canberra ACT.

Northcote, KH., Skene, JKM. (1972). *Australian Soils with Saline and Sodic properties*. CSIRO Australia, Soil Publication No. 27, Canberra.

NEPC (2013). *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)*, Amendment of Schedule B1-B7 of 1999 version. National Environmental Protection Council (NEPC).

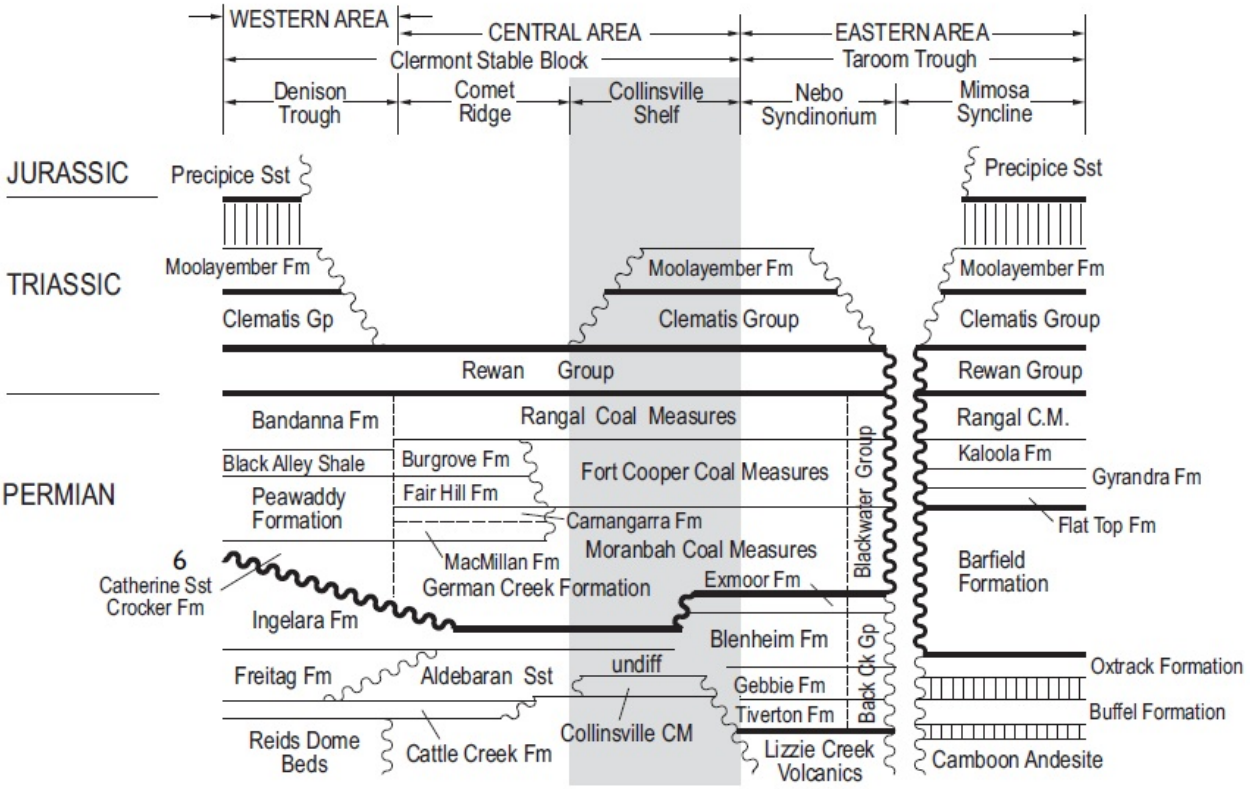
Stewart, W., Miller, S., Thomas, J.E., and Smart R. (2003). Evaluation of the Effects of Organic Matter on the Net Acid Generation (NAG) Test. p. 211-222. In: Proceedings of the Sixth International Conference on Acid Rock drainage (Cairns, 12-18th July 2003).

Attachment A Figures



Source: Bing Maps

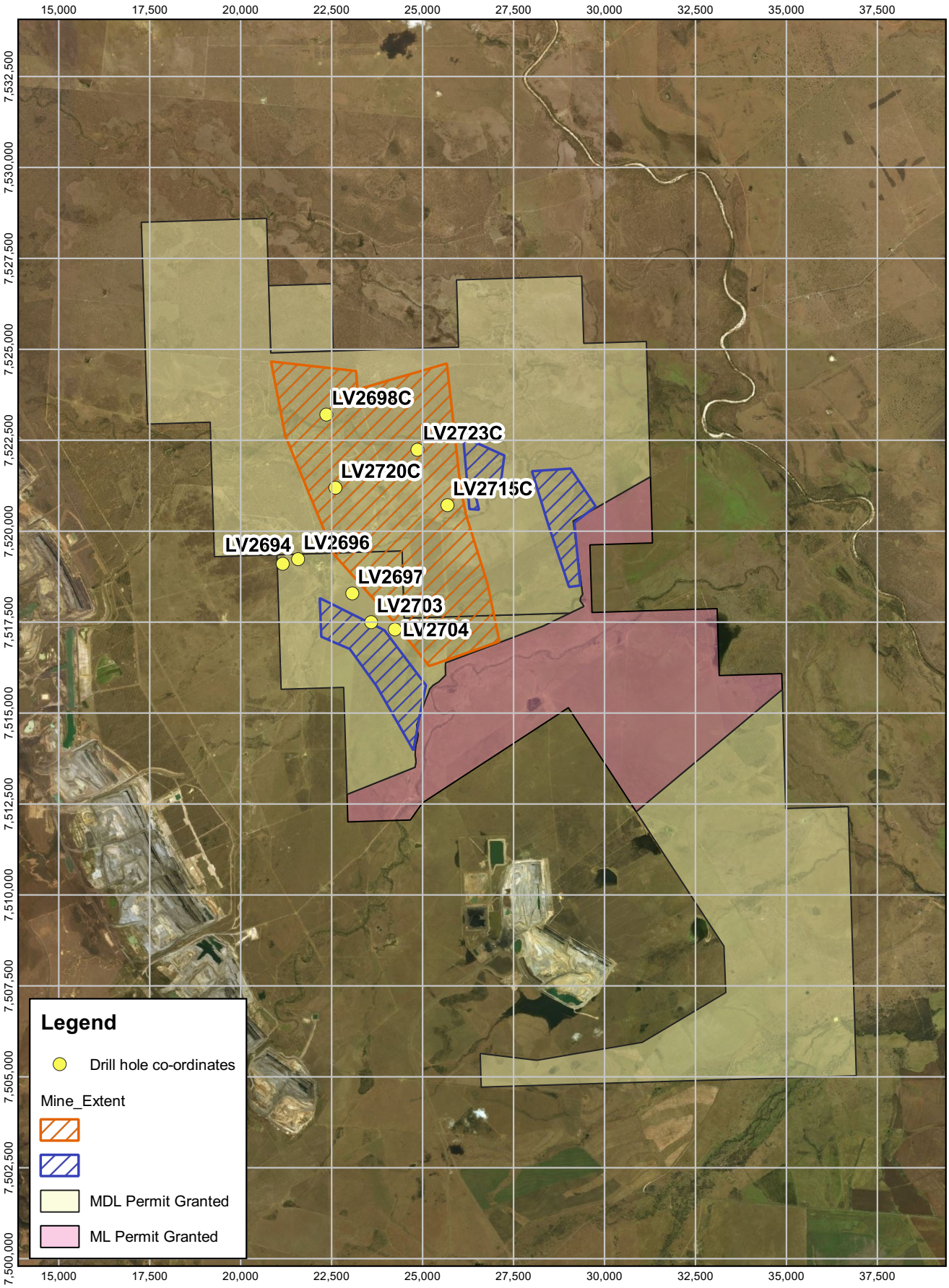
RGS	Scale 1:300,000 Datum: GDA84: Zone 55	Geochemical Assessment of Mining Waste Materials	0 4000 8000 12000 m
	Meadowbrook_v2.qgz; Location of Meadowbrook Project	**Location of Meadowbrook Project**	Figure: A1 Job Number: 2019038 31/03/2021 N



Source: Modified from Beeston, 1986

Source: Beeston, 1986

RGS	Scale: not to scale	Geochemical Assessment of Mining Waste Materials	
	Meadowbrook_v2_LJ.qgz Regional Stratigraphy	**Regional Stratigraphic column**	Figure: A2 Job Number: 2019038 31/03/2021



Source: Bing Maps

RGS	Scale 1:150,000 Datum: GDA84: Zone 55	Geochemical Assessment of Mining Waste Materials	0 1500 3000 4500 6000 7500 m
	eadowbrook_v2_LJ.qg Drill hole locations	**Drill Hole Locations**	Figure: A3 Job Number: 2019038 14/09/2020 N

Attachment B Geochemical Assessment of Mining Waste Materials

GEOCHEMICAL ASSESSMENT OF MINING WASTE MATERIALS

ACID GENERATION AND PREDICTION

Acid generation is caused by the exposure of sulfide minerals, most commonly pyrite (FeS_2), to atmospheric oxygen and water. Sulfur assay results are used to calculate the maximum acid that could be generated by the sample by either directly determining the pyritic S content or assuming that all sulfur not present as sulfate occurs as pyrite. Pyrite reacts under oxidising conditions to generate acid according to the following overall reaction:

$$FeS_2 + 15/4\ O_2 + 7/2\ H_2O \rightarrow Fe(OH)_3 + 2\ H_2SO_4$$

According to this reaction, the maximum potential acidity (MPA) of a sample containing 1%S as pyrite would be 30.6 kg H_2SO_4/t. The chemical components of the acid generation process consist of the above sulfide oxidation reaction and acid neutralization, which is mainly provided by inherent carbonates and to a lesser extent silicate materials. The amount and rate of acid generation is determined by the interaction and overall balance of the acid generation and neutralisation components.

Net Acid Producing Potential

The net acid producing potential (NAPP) is used as an indicator of materials that may be of concern with respect to acid generation. The NAPP calculation represents the balance between the maximum potential acidity (MPA) of a sample, which is derived from the sulfide sulfur content, and the acid neutralising capacity (ANC) of the material, which is determined experimentally. By convention, the NAPP result is expressed in units of kg H_2SO_4/t sample. If the capacity of the solids to neutralise acid (ANC) exceeds their capacity to generate acid (MPA), then the NAPP of the material is negative. Conversely, if the MPA exceeds the ANC, the NAPP of the material is positive. A NAPP assessment involves a series of analytical tests that include:

Determination of pH and EC

pH and EC measured on 1:5 w/w water extract. This gives an indication of the inherent acidity and salinity of the waste material when initially exposed in a waste emplacement area.

Total sulfur content and Maximum Potential Acidity (MPA)

Total sulfur content is determined by the Leco high temperature combustion method. The total sulfur content is then used to calculate the MPA, which assumes that the entire sulfur content is present as reactive pyrite. Direct determination of the pyritic sulfur content can provide a more accurate estimate of the MPA.

Acid neutralising capacity (ANC)

By addition of acid to a known weight of sample, then titration with NaOH to determine the amount of residual acid. The ANC measures the capacity of a sample to react with and neutralise acid. The ANC can be further evaluated by slow acid titration to a set end-point in the Acid Buffering Characteristic Curve (ABCC) test through calculation of the amount of acid consumed and evaluation of the resultant titration curve.

Net Acid Generation (NAG)

The net acid generation (NAG) test involves the addition of hydrogen peroxide to a sample of mine rock or process residue to oxidise reactive sulfide, then measurement of pH and titration of any net acidity produced by the acid generation and neutralisation reactions occurring in the sample. A significant NAG result (i.e., final $NAG_{pH} < 4.5$) indicates that the sample is potentially acid forming (PAF) and the test provides a direct measure of the net amount of acid remaining in the sample after all acid generating and acid neutralising reactions have taken place. A $NAG_{pH} > 4.5$ indicates that the sample is non-acid forming (NAF). The NAG test can provide a direct assessment of the potential for a material to produce acid after a period of exposure and weathering and is used to refine the results of the theoretical NAPP predictions. The NAG test can be used as a stand-alone test but it is recommended that this only be considered after site specific calibration work is carried out. The standard NAG test is generally unsuitable for coal mining projects as the high organic content of some materials can cause erroneous results (Stewart et al., 2003; ACARP, 2008).

ASSESSMENT OF ELEMENT ENRICHMENT AND SOLUBILITY

In mineralised areas it is common to find a suite of enriched elements that have resulted from natural geological processes. Multi-element scans are carried out to identify any elements that are present in a material (or readily leachable from a material) at concentrations that may be of environmental concern with respect to surface water quality, revegetation and public health. The samples are generally analysed for the following elements:

Major elements	Al, Ca, Fe, K, Mg, Na and S.
Minor elements	As, B, Cd, Co, Cr, Cu, F, Hg, Mn, Mo, Ni, Pb, Sb, Se and Zn.

The concentration of these elements in samples can be directly compared with relevant state or national environmental and health-based concentration guideline criteria to determine the level of significance. Water extracts are used to determine the immediate element solubilities under the existing sample pH conditions of the sample. The following tests are normally carried out:

Multi-element composition of solids.

Multi-element composition of solid samples determined using a combination of ICP-mass spectroscopy (ICP-MS), ICP-optical emission spectroscopy (OES), and atomic absorption spectrometry (AAS).

Multi-element composition of water extracts (1:5 sample:deionised water).

Multi-element composition of water extracts from solid samples determined using a combination of ICP-mass spectroscopy (ICP-MS), ICP-optical emission spectroscopy (OES), and atomic absorption spectrometry (AAS).

Under some conditions (*e.g.* low pH) the solubility and mobility of common environmentally important elements can increase significantly. If element mobility under initial pH conditions is deemed likely and/or subsequent low pH conditions may occur, kinetic leach column test work may be completed on representative samples.

KINETIC LEACH COLUMN TESTS

Kinetic leach column (KLC) tests can be used to provide information on the reaction kinetics of mine waste materials. The major objectives of kinetics tests are to:

- Provide time-dependent data on the kinetics and rate of acid generation and acid neutralising reactions under laboratory controlled (or onsite conditions);
- Investigate metal release and drainage/seepage quality; and
- Assess treatment options such as addition of alkaline materials.

The KLC tests simulate the weathering process that leads to acid and base generation and reaction under laboratory controlled or site conditions. The kinetic tests allow an assessment of the acid forming characteristics and indicate the rate of acid generation, over what period it will occur, and what management controls may be required.

In KLC tests, water is added to a sample and the mixture allowed to leach products and by-products of acid producing and consuming reactions. Samples of leachate are then collected and analysed. Intermittent water application is applied to simulate rainfall and heat lamps are used to simulate sunshine. These tests provide real-time information and may have to continue for months or years. Monitoring includes trends in pH, sulfate, acidity or alkalinity, and metals, for example. The pH of the collected leachate simulates the acid drainage process, acidity or alkalinity levels indicate the rate of acid production and acid neutralisation, and sulfate production can be related to the rate of sulfide oxidation. Metal concentration data provides an assessment of metal solubility and leaching behaviour.

Figure B.1 shows the kinetic leach column set up typically used by RGS adapted from *AMIRA, 2002*. The columns are placed under heat lamps to allow the sample to dry between water additions to ensure adequate oxygen ingress into the sample material.

Approximately 2 kg of sample is accurately weighed and used in the leach columns and depending on the physical nature of the material and particle size can be used on an as-received basis (*i.e.* no crushing as with process residues) or crushed to nominal 5-10 mm particle size (as with waste rock). The sample in the column is initially leached with deionised water at a rate of about 400 ml/kg of sample and the initial leachate from the columns collected and analysed. Subsequent column leaching is carried out at a rate of about 400 ml/kg per month and again collected and analysed. The leaching rate can be varied to better simulate expected site conditions or satisfy test program data requirements. The column must be exposed to drying conditions in between watering events. The residual water content and air void content in the column can be determined by comparing the wet and dry column weights. A heat lamp is generally used above the sample during daylight hours to maintain the leach column surface temperature at about 30^{o}C.

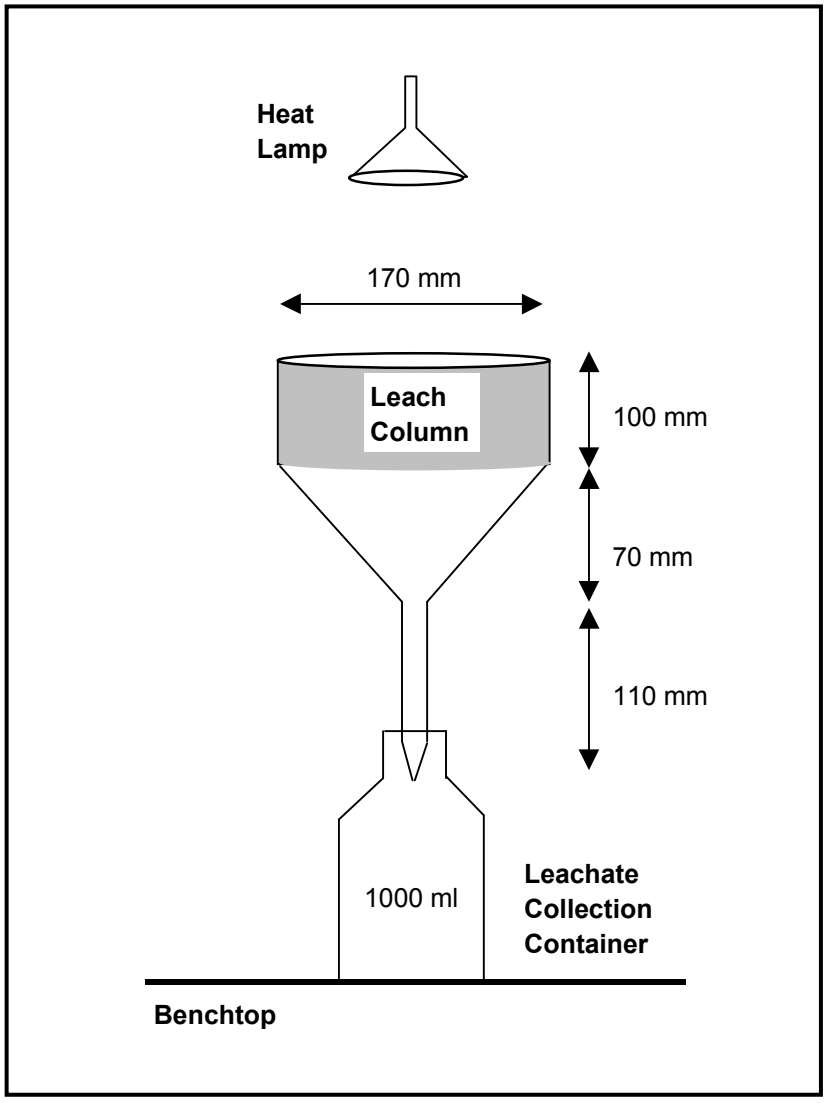


Figure B.1: Kinetic leach column setup

Attachment C Static Geochemical Test Results

Table C1: List of Overburden, Interburden, Coal and Potential Coal Reject Samples

RGS Sample No.	ALS Sample ID	Meadowbrook Sample ID	Drillhole ID	Sample Lithology	Sample Type	From	To	Interval
						(m)		
Overburden								
1	EB2010668001	2694M01	LV2694	Soil	Overburden	0.00	1.00	1.00
2	EB2010668021	2696M01	LV2696	Soil	Overburden	0.00	1.00	1.00
3	EB2010668061	2697M1	LV2697	Soil	Overburden	0.00	1.00	1.00
4	EB2010668087	2703M01	LV2703	Soil	Overburden	0.00	1.00	1.00
5	EB2010668002	2694M02	LV2694	Clay	Overburden	1.00	5.00	4.00
6	EB2010668003	2694M03	LV2694	Clay	Overburden	7.00	11.00	4.00
7	EB2010668005	2694M05	LV2694	Clay	Overburden	14.00	17.00	3.00
8	EB2010668006	2694M06	LV2694	Clay	Overburden	20.50	21.50	1.00
9	EB2010668088	2703M02	LV2703	Clay	Overburden	5.00	6.00	1.00
10	EB2010668004	2694M04	LV2694	Sand	Overburden	11.00	12.00	1.00
11	EB2010668007	2694M07	LV2694	Sand	Overburden	22.00	26.00	4.00
12	EB2010668008	2694M08	LV2694	Sand	Overburden	30.00	31.00	1.00
13	EB2010668022	2696M02	LV2696	Sand	Overburden	5.00	6.00	1.00
14	EB2010668023	2696M03	LV2696	Sand	Overburden	10.00	11.00	1.00
15	EB2010668024	2696M04	LV2696	Sand	Overburden	11.00	12.00	1.00
16	EB2010668025	2696M05	LV2696	Sand	Overburden	13.00	17.00	4.00
17	EB2010668026	2696M06	LV2696	Sand	Overburden	20.00	21.00	1.00
18	EB2010668062	2697M2	LV2697	Sand	Overburden	5.00	6.00	1.00
19	EB2010668089	2703M03	LV2703	Sand	Overburden	7.00	8.00	1.00
20	EB2010668090	2703M04	LV2703	Sand	Overburden	11.00	12.00	1.00
21	EB2010668063	2697M3	LV2697	Gravel	Overburden	10.00	11.00	1.00
22	EB2010668064	2697M4	LV2697	Gravel	Overburden	15.00	16.00	1.00
23	EB2010668010	2694M10	LV2694	Sandstone	Overburden	37.00	38.00	1.00
24	EB2010668011	2694M11	LV2694	Sandstone	Overburden	38.00	43.00	5.00
25	EB2010668014	2694M14	LV2694	Sandstone	Overburden	54.00	58.00	4.00
26	EB2010668015	2694M15	LV2694	Sandstone	Overburden	61.00	63.00	2.00
27	EB2010668016	2694M16	LV2694	Sandstone	Overburden	67.00	68.00	1.00
28	EB2010668031	2696M11	LV2696	Sandstone	Overburden	44.50	46.00	1.50
29	EB2010668033	2696M13	LV2696	Sandstone	Overburden	50.50	55.00	4.50
30	EB2010668037	2696M17	LV2696	Sandstone	Overburden	70.00	73.30	3.30
31	EB2010668038	2696M18	LV2696	Sandstone	Overburden	73.30	81.00	7.70
32	EB2010668070	2697M10	LV2697	Sandstone	Overburden	42.00	43.00	1.00
33	EB2010668071	2697M11	LV2697	Sandstone	Overburden	47.00	48.00	1.00
34	EB2010668072	2697M12	LV2697	Sandstone	Overburden	50.00	52.70	2.70
35	EB2010668076	2697M16	LV2697	Sandstone	Overburden	70.00	71.00	1.00
36	EB2010668077	2697M17	LV2697	Sandstone	Overburden	75.00	76.00	1.00
37	EB2010668069	2697M9	LV2697	Sandstone	Overburden	35.00	38.00	3.00
38	EB2010668091	2703M05	LV2703	Sandstone	Overburden	16.00	17.00	1.00
39	EB2010668093	2703M07	LV2703	Sandstone	Overburden	26.00	27.00	1.00
40	EB2010668009	2694M09	LV2694	Siltstone	Overburden	33.00	36.00	3.00
41	EB2010668013	2694M13	LV2694	Siltstone	Overburden	49.80	51.50	1.70
42	EB2010668017	2694M17	LV2694	Siltstone	Overburden	71.80	73.00	1.20
43	EB2010668029	2696M09	LV2696	Siltstone	Overburden	35.00	36.00	1.00
44	EB2010668030	2696M10	LV2696	Siltstone	Overburden	40.00	41.00	1.00
45	EB2010668032	2696M12	LV2696	Siltstone	Overburden	48.00	50.50	2.50
46	EB2010668034	2696M14	LV2696	Siltstone	Overburden	60.00	61.00	1.00
47	EB2010668035	2696M15	LV2696	Siltstone	Overburden	62.30	66.00	3.70
48	EB2010668036	2696M16	LV2696	Siltstone	Overburden	66.00	70.00	4.00
49	EB2010668039	2696M19	LV2696	Siltstone	Overburden	81.00	86.00	5.00
50	EB2010668073	2697M13	LV2697	Siltstone	Overburden	54.00	55.00	1.00
51	EB2010668065	2697M5	LV2697	Siltstone	Overburden	19.00	20.00	1.00
52	EB2010668066	2697M6	LV2697	Siltstone	Overburden	24.00	25.00	1.00
53	EB2010668067	2697M7	LV2697	Siltstone	Overburden	29.00	30.00	1.00
54	EB2010668092	2703M06	LV2703	Siltstone	Overburden	22.00	23.00	1.00
55	EB2010668027	2696M07	LV2696	Mudstone	Overburden	24.00	26.00	2.00
56	EB2010668028	2696M08	LV2696	Mudstone	Overburden	30.00	31.00	1.00
57	EB2010668075	2697M15	LV2697	Mudstone	Overburden	67.00	68.00	1.00
58	EB2010668068	2697M8	LV2697	Weathered Coal	Overburden	31.50	32.50	1.00
59	EB2010668012	2694M12	LV2694	Carbonaceous Siltstone	Overburden	47.00	47.50	0.50
60	EB2010668074	2697M14	LV2697	Carbonaceous Siltstone	Overburden	65.00	66.00	1.00
Interburden								
61	EB2010668041	2696M21	LV2696	Sandstone	Interburden (Phillips to Leichhardt)	93.50	96.00	2.50
62	EB2010668043	2696M23	LV2696	Sandstone	Interburden (Leichhardt to Vermont Upper)	99.50	102.00	2.50
63	EB2010668044	2696M24	LV2696	Sandstone	Interburden (Leichhardt to Vermont Upper)	102.00	107.00	5.00
64	EB2010668045	2696M25	LV2696	Sandstone	Interburden (Leichhardt to Vermont Upper)	107.00	112.00	5.00
65	EB2010668046	2696M26	LV2696	Sandstone	Interburden (Leichhardt to Vermont Upper)	112.00	117.00	5.00
66	EB2010668047	2696M27	LV2696	Sandstone	Interburden (Leichhardt to Vermont Upper)	121.00	122.00	1.00
67	EB2010668048	2696M28	LV2696	Sandstone	Interburden (Leichhardt to Vermont Upper)	122.00	127.00	5.00
68	EB2010668050	2696M30	LV2696	Sandstone	Interburden (Leichhardt to Vermont Upper)	134.00	136.00	2.00
69	EB2010668053	2696M33	LV2696	Sandstone	Interburden (Vermont Upper to Vermont Lower)	146.70	149.00	2.30
70	EB2010668054	2696M34	LV2696	Sandstone	Interburden (Vermont Upper to Vermont Lower)	152.00	154.00	2.00
71	EB2010668055	2696M35	LV2696	Sandstone	Interburden (Vermont Upper to Vermont Lower)	156.00	159.00	3.00
72	EB2010668056	2696M36	LV2696	Sandstone	Interburden (Vermont Upper to Vermont Lower)	164.00	165.95	1.95
73	EB2010668059	2696M39	LV2696	Sandstone	Interburden (below Vermont Lower)	174.00	175.00	1.00
74	EB2010668081	2697M21	LV2697	Sandstone	Interburden (Vermont Upper to Vermont Lower)	87.50	89.00	1.50
75	EB2010668095	2703M09	LV2703	Sandstone	Interburden (Vermont Upper to Vermont Lower)	39.00	42.00	3.00
76	EB2010668020	2694M20	LV2694	Siltstone	Interburden (below Vermont Lower)	83.00	84.00	1.00
77	EB2010668049	2696M29	LV2696	Siltstone	Interburden (Leichhardt to Vermont Upper)	129.00	130.15	1.15
78	EB2010668060	2696M40	LV2696	Siltstone	Interburden (below Vermont Lower)	175.00	178.00	3.00
79	EB2010668082	2697M22	LV2697	Siltstone	Interburden (Vermont Upper to Vermont Lower)	95.00	97.00	2.00
80	EB2010668083	2697M23	LV2697	Siltstone	Interburden (Vermont Upper to Vermont Lower)	100.50	102.00	1.50
81	EB2010668085	2697M25	LV2697	Siltstone	Interburden (below Vermont Lower)	111.00	112.00	1.00
82	EB2010668086	2697M26	LV2697	Siltstone	Interburden (below Vermont Lower)	116.00	117.00	1.00
83	EB2010668096	2703M10	LV2703	Siltstone	Interburden (Vermont Upper to Vermont Lower)	48.00	49.00	1.00
84	EB2010668099	2703M14	LV2703	Siltstone	Interburden (below Vermont Lower)	68.00	69.00	1.00
85	EB2014520001	2715M01	LV2715C	Siltstone	Interburden (Leichhardt to Vermont Lower)	312.88	313.11	0.23
86	EB2010668080	2697M20	LV2697	Mudstone	Interburden (Vermont Upper to Vermont Lower)	82.05	85.00	2.95
87	EB2010668101	2703M12	LV2703	Mudstone	Interburden (below Vermont Lower)	60.50	61.50	1.00
88	EB2010668098	2703M13	LV2703	Mudstone	Interburden (below Vermont Lower)	64.00	65.00	1.00
89	EB2014520002	2715M02	LV2715C	Mudstone	Interburden (below Vermont Lower)	318.13	318.23	0.10
90	EB2014520003	2715M03	LV2715C	Mudstone	Interburden (below Vermont Lower)	318.49	318.83	0.34

Table C1: List of Overburden, Interburden, Coal and Potential Coal Reject Samples

RGS Sample No.	ALS Sample ID	Meadowbrook Sample ID	Drillhole ID	Sample Lithology	Sample Type	From	To	Interval
						(m)		
Roof, floor, partings and coal								
91	EB2010668040	2696M20	LV2696	Sandstone	Floor (Phillips 1)	90.20	91.00	0.80
92	EB2011337002	2698M02	LV2698C	Carbonaceous Mudstone	Floor (Leichhardt Lower)	352.27	352.69	0.42
93	EB2015372002	2720M02	LV2720C	Siltstone	Floor (Leichhardt Lower)	294.00	294.30	0.30
94	EB2016692002	2723M02	LV2723C	Sandstone	Floor (Leichhardt Lower)	393.80	394.10	0.30
95	EB2010668019	2694M19	LV2694	Siltstone	Floor (Vermont Lower)	79.15	80.15	1.00
96	EB2011337004	2698M04	LV2698	Carbonaceous Mudstone	Floor (Vermont Upper)	387.00	387.28	0.28
97	EB2010668094	2703M08	LV2703	Carbonaceous Siltstone	Floor (Vermont Upper)	29.50	31.00	1.50
98	EB2015372004	2720M04	LV2720C	Coaly Mudstone	Floor (Vermont Lower)	326.25	326.55	0.30
99	EB2016692004	2723M04	LV2723C	Siltstone	Floor (Vermont Lower)	422.20	422.51	0.31
100	EB2011337001	2698M01	LV2698	Carbonaceous Mudstone	Roof (Leichhardt Lower)	348.20	348.52	0.32
101	EB2015372001	2720M01	LV2720C	Sandstone	Roof (Leichhardt Lower)	289.90	290.18	0.28
102	EB2016692001	2723M01	LV2723C	Mudstone	Roof (Leichhardt Lower)	388.07	388.45	0.38
103	EB2010668097	2703M11	LV2703	Sandstone	Roof (Vermont Lower)	53.00	54.30	1.30
104	EB2010668078	2697M18	LV2697	Sandstone	Roof (Vermont Upper)	77.00	79.60	2.60
105	EB2010668051	2696M31	LV2696	Siltstone	Roof (Vermont Upper)	138.00	139.40	1.40
106	EB2011337003	2698M03	LV2698	Coaly Mudstone	Roof (Vermont Upper)	383.05	383.37	0.32
107	EB2015372003	2720M03	LV2720C	Mudstone	Roof (Vermont Lower)	321.39	321.73	0.34
108	EB2016692003	2723M03	LV2723C	Mudstone	Roof (Vermont Lower)	417.62	417.90	0.28
109	EB2010668042	2696M22	LV2696	Carbonaceous Siltstone	Roof/seam/floor (Leichhardt)	97.00	97.95	0.95
110	EB2010668057	2696M37	LV2696	Carbonaceous Siltstone	Roof/seam/floor (Vermont Lower)	165.95	166.49	0.54
111	EB2010668018	2694M18	LV2694	Coal	Seam (Vermont Lower)	74.75	75.65	0.90
112	EB2010668058	2696M38	LV2696	Coal	Seam (Vermont Lower)	166.49	167.77	1.28
113	EB2010668084	2697M24	LV2697	Coal	Seam (Vermont Lower)	105.20	106.00	0.80
114	EB2010668052	2696M32	LV2696	Carbonaceous Siltstone	Seam (Vermont Upper)	139.40	140.80	1.40
115	EB2010668079	2697M19	LV2697	Coaly Shale	Seam (Vermont Upper)	79.60	80.30	0.70
116	EB2017550001	2730M01	LV2730S	Roof (Leichhardt Lower)	Potential Coal Rejects	352.99	353.3	0.32
117	EB2017550002	2730M02	LV2730S	Floor (Leichhardt Lower)	Potential Coal Rejects	358.15	358.4	0.29
118	EB2015788001	2716C10	LV2716C	Roof (Vermont)	Potential Coal Rejects	276.98	277.15	0.17
119	EB2015788004	2716C13	LV2716C	Floor (Vermont)	Potential Coal Rejects	277.55	278.02	0.47
120	EB2015788006	2718C07	LV2718C	Roof (Vermont)	Potential Coal Rejects	307.40	307.49	0.09
121	EB2017550003	2730M03	LV2730S	Roof (Vermont Lower)	Potential Coal Rejects	382.55	382.9	0.30
122	EB2017550004	2730M04	LV2730S	Floor (Vermont Lower)	Potential Coal Rejects	387.45	387.8	0.30
123	EB2015788002	2716C11	LV2716C	Coal (Vermont)	Coal	277.15	277.35	0.20
124	EB2015788003	2716C12	LV2716C	Coal (Vermont)	Coal	277.35	277.55	0.20
125	EB2015788005	2718C08	LV2718C	Coal (Vermont)	Coal	307.86	308.14	0.28
126	EB2018983001	2731M01	LV2731	Roof (Vermont Lower)	Potential Coal Rejects	502.44	502.54	0.10
127	EB2018983002	2731M02	LV2731	Floor (Vermont Lower)	Potential Coal Rejects	507.34	507.47	0.13
128	EB2018983003	2724M01	LV2724	Roof (Vermont Lower)	Potential Coal Rejects	204.79	205.18	0.39
129	EB2018983004	2724M02	LV2724	Floor (Vermont Lower)	Potential Coal Rejects	209.49	209.89	0.40
130	EB2018983005	2726M01	LV2726	Roof (Vermont Lower)	Potential Coal Rejects	214.64	214.95	0.31
131	EB2018983006	2726M02	LV2726	Floor (Vermont Lower)	Potential Coal Rejects	218.93	219.2	0.25
132	EB2020779001	2730S01	---	LHL	Leichhardt Lower (coal)	353.58	354.37	0.79
133	EB2020779002	2730S02	---	LHL	Leichhardt Lower (coal)	354.37	355.11	0.74
134	EB2020779003	2730S03	---	LHL	Leichhardt Lower (coal)	355.11	355.91	0.80
135	EB2020779004	2730S04	---	LHL	Leichhardt Lower (coal)	355.93	356.68	0.75
136	EB2020779005	2730S05	---	LHL	Leichhardt Lower (coal)	356.68	357.45	0.77
137	EB2020779006	2730S06	---	LHL	Leichhardt Lower (coal)	357.45	358.15	0.70
138	EB2020779007	2730S07	---	VL	Vermont Lower (coal)	382.94	383.71	0.77
139	EB2020779008	2730S08	---	VL	Vermont Lower (coal)	383.97	384.77	0.80
140	EB2020779009	2730S09	---	VL	Vermont Lower (coal)	384.77	385.55	0.78
141	EB2020779010	2730S10	---	VL	Vermont Lower (coal)	385.55	386.33	0.78
142	EB2020779011	2730S11	---	VL	Vermont Lower (coal)	386.33	386.79	0.46
143	EB2020779012	2730S12	---	VL_FLR	Floor (Vermont Lower)	386.97	387.45	0.48

Table C2: Acid Base Account Test Results for Overburden, Interburden, Potential Coal Reject and Coal and Composite Sample Makeup

RGS Sample ID	ALS Sample ID	Deposit	Meadowbrook Sample ID	Drill Hole ID	Sample Lithology	Sample Type	From	To	Interval	pH[1]	EC[1]	Total S	Scr	MPA[2]	ANC[2]	NAPP[2]	ANC:MPA Ratio	Sample Classification[3]	Composite ID
							(m)				(µS/cm)	(%)		(kgH_2SO_4/t)					
Overburden and Interburden																			
1	EB2010668001	Meadowbrook	2694M01	LV2694	Soil	Overburden	0.00	1.00	1.00	7.9	1400	0.01		0.3	7.9	-7.6	25.8	Non Acid Forming (Barren)	
2	EB2010668021	Meadowbrook	2696M01	LV2696	Soil	Overburden	0.00	1.00	1.00	9.1	242	0.01		0.3	57.1	-56.8	186.4	Non Acid Forming (Barren)	Composite 1
3	EB2010668061	Meadowbrook	2697M1	LV2697	Soil	Overburden	0.00	1.00	1.00	8.4	841	0.02		0.6	57.2	-56.6	93.4	Non Acid Forming (Barren)	
4	EB2010668087	Meadowbrook	2703M01	LV2703	Soil	Overburden	0.00	1.00	1.00	9.0	894	0.02		0.6	28.4	-27.8	46.4	Non Acid Forming (Barren)	
5	EB2010668002	Meadowbrook	2694M02	LV2694	Clay	Overburden	1.00	5.00	4.00	8.9	1580	0.02		0.6	58.3	-57.7	95.2	Non Acid Forming (Barren)	
6	EB2010668003	Meadowbrook	2694M03	LV2694	Clay	Overburden	7.00	11.00	4.00	9.1	1770	0.02		0.6	39.5	-38.9	64.5	Non Acid Forming (Barren)	
7	EB2010668005	Meadowbrook	2694M05	LV2694	Clay	Overburden	14.00	17.00	3.00	8.7	1910	0.01		0.3	19	-18.7	62.0	Non Acid Forming (Barren)	Composite 2
8	EB2010668006	Meadowbrook	2694M06	LV2694	Clay	Overburden	20.50	21.50	1.00	8.8	1350	0.01		0.3	9	-8.7	29.4	Non Acid Forming (Barren)	
9	EB2010668088	Meadowbrook	2703M02	LV2703	Clay	Overburden	5.00	6.00	1.00	6.8	713	0.01		0.3	17.5	-17.2	57.1	Non Acid Forming (Barren)	
10	EB2010668004	Meadowbrook	2694M04	LV2694	Sand	Overburden	11.00	12.00	1.00	9.0	1570	0.01		0.3	18.1	-17.8	59.1	Non Acid Forming (Barren)	
11	EB2010668007	Meadowbrook	2694M07	LV2694	Sand	Overburden	22.00	26.00	4.00	8.2	2700	0.02		0.6	19.6	-19.0	32.0	Non Acid Forming (Barren)	
12	EB2010668008	Meadowbrook	2694M08	LV2694	Sand	Overburden	30.00	31.00	1.00	8.5	1290	0.02		0.6	22.8	-22.2	37.2	Non Acid Forming (Barren)	
13	EB2010668022	Meadowbrook	2696M02	LV2696	Sand	Overburden	5.00	6.00	1.00	9.5	917	0.005		0.2	47.3	-47.1	308.9	Non Acid Forming (Barren)	
14	EB2010668023	Meadowbrook	2696M03	LV2696	Sand	Overburden	10.00	11.00	1.00	9.0	674	0.005		0.2	8.1	-7.9	52.9	Non Acid Forming (Barren)	
15	EB2010668024	Meadowbrook	2696M04	LV2696	Sand	Overburden	11.00	12.00	1.00	9.4	1040	0.005		0.2	8.8	-8.6	57.5	Non Acid Forming (Barren)	
16	EB2010668025	Meadowbrook	2696M05	LV2696	Sand	Overburden	13.00	17.00	4.00	8.6	1510	0.005		0.2	8	-7.8	52.2	Non Acid Forming (Barren)	Composite 3
17	EB2010668026	Meadowbrook	2696M06	LV2696	Sand	Overburden	20.00	21.00	1.00	8.7	1570	0.01		0.3	8.3	-8.0	27.1	Non Acid Forming (Barren)	
18	EB2010668062	Meadowbrook	2697M2	LV2697	Sand	Overburden	5.00	6.00	1.00	9.6	754	0.005		0.2	154	-153.8	1005.7	Non Acid Forming (Barren)	
19	EB2010668089	Meadowbrook	2703M03	LV2703	Sand	Overburden	7.00	8.00	1.00	9.6	431	0.005		0.2	103	-102.8	672.7	Non Acid Forming (Barren)	
20	EB2010668090	Meadowbrook	2703M04	LV2703	Sand	Overburden	11.00	12.00	1.00	9.7	272	0.005		0.2	41.2	-41.0	269.1	Non Acid Forming (Barren)	
21	EB2010668063	Meadowbrook	2697M3	LV2697	Gravel	Overburden	10.00	11.00	1.00	10.0	327	0.005		0.2	83.2	-83.0	543.3	Non Acid Forming (Barren)	
22	EB2010668064	Meadowbrook	2697M4	LV2697	Gravel	Overburden	15.00	16.00	1.00	10.1	362	0.005		0.2	46.2	-46.0	301.7	Non Acid Forming (Barren)	
23	EB2010668010	Meadowbrook	2694M10	LV2694	Sandstone	Overburden	37.00	38.00	1.00	10.0	465	0.07		2.1	150	-147.9	70.0	Non Acid Forming (Barren)	
24	EB2010668011	Meadowbrook	2694M11	LV2694	Sandstone	Overburden	38.00	43.00	5.00	9.7	713	0.02		0.6	148	-147.4	241.6	Non Acid Forming (Barren)	
25	EB2010668014	Meadowbrook	2694M14	LV2694	Sandstone	Overburden	54.00	58.00	4.00	9.5	1230	0.04		1.2	36.1	-34.9	29.5	Non Acid Forming (Barren)	
26	EB2010668015	Meadowbrook	2694M15	LV2694	Sandstone	Overburden	61.00	63.00	2.00	9.9	789	0.01		0.3	143	-142.7	466.9	Non Acid Forming (Barren)	
27	EB2010668016	Meadowbrook	2694M16	LV2694	Sandstone	Overburden	67.00	68.00	1.00	10.0	708	0.005		0.2	201	-200.8	1312.7	Non Acid Forming (Barren)	
28	EB2010668031	Meadowbrook	2696M11	LV2696	Sandstone	Overburden	44.50	46.00	1.50	9.7	517	0.005		0.2	27.5	-27.3	179.6	Non Acid Forming (Barren)	
29	EB2010668033	Meadowbrook	2696M13	LV2696	Sandstone	Overburden	50.50	55.00	4.50	9.5	383	0.01		0.3	17.9	-17.6	58.4	Non Acid Forming (Barren)	
30	EB2010668037	Meadowbrook	2696M17	LV2696	Sandstone	Overburden	70.00	73.30	3.30	10.0	303	0.005		0.2	33.7	-33.5	220.1	Non Acid Forming (Barren)	
31	EB2010668038	Meadowbrook	2696M18	LV2696	Sandstone	Overburden	73.30	81.00	7.70	9.9	267	0.005		0.2	25.9	-25.7	169.1	Non Acid Forming (Barren)	Composite 4
32	EB2010668070	Meadowbrook	2697M10	LV2697	Sandstone	Overburden	42.00	43.00	1.00	10.0	256	0.04		1.2	42.7	-41.5	34.9	Non Acid Forming (Barren)	
33	EB2010668071	Meadowbrook	2697M11	LV2697	Sandstone	Overburden	47.00	48.00	1.00	10.1	263	0.04		1.2	44.9	-43.7	36.7	Non Acid Forming (Barren)	
34	EB2010668072	Meadowbrook	2697M12	LV2697	Sandstone	Overburden	50.00	52.70	2.70	10.1	274	0.02		0.6	80.8	-80.2	131.9	Non Acid Forming (Barren)	
35	EB2010668076	Meadowbrook	2697M16	LV2697	Sandstone	Overburden	70.00	71.00	1.00	10.2	319	0.005		0.2	55.3	-55.1	361.1	Non Acid Forming (Barren)	
36	EB2010668077	Meadowbrook	2697M17	LV2697	Sandstone	Overburden	75.00	76.00	1.00	10.2	287	0.005		0.2	63.5	-63.3	414.7	Non Acid Forming (Barren)	
37	EB2010668069	Meadowbrook	2697M9	LV2697	Sandstone	Overburden	35.00	38.00	3.00	9.9	291	0.02		0.6	55.6	-55.0	90.8	Non Acid Forming (Barren)	
38	EB2010668091	Meadowbrook	2703M05	LV2703	Sandstone	Overburden	16.00	17.00	1.00	9.2	1080	0.01		0.3	41.8	-41.5	136.5	Non Acid Forming (Barren)	
39	EB2010668093	Meadowbrook	2703M07	LV2703	Sandstone	Overburden	26.00	27.00	1.00	9.7	332	0.005		0.2	148	-147.8	966.5	Non Acid Forming (Barren)	

Table C2: Acid Base Account Test Results for Overburden, Interburden, Potential Coal Reject and Coal and Composite Sample Makeup

RGS Sample ID	ALS Sample ID	Deposit	Meadowbrook Sample ID	Drill Hole ID	Sample Lithology	Sample Type	From	To	Interval	pH[1]	EC[1]	Total S	Scr	MPA[2]	ANC[2]	NAPP[2]	ANC: MPA Ratio	Sample Classification[3]	Composite ID
							(m)				(µS/cm)	(%)		(kgH_2SO_4/t)					
40	EB2010668009	Meadowbrook	2694M09	LV2694	Siltstone	Overburden	33.00	36.00	3.00	8.9	352	0.02		0.6	22.7	-22.1	37.1	Non Acid Forming (Barren)	
41	EB2010668013	Meadowbrook	2694M13	LV2694	Siltstone	Overburden	49.80	51.50	1.70	9.4	1360	0.09		2.8	33.5	-30.7	12.2	Non Acid Forming (Barren)	
42	EB2010668017	Meadowbrook	2694M17	LV2694	Siltstone	Overburden	71.80	73.00	1.20	9.5	522	0.01		0.3	115	-114.7	375.5	Non Acid Forming (Barren)	
43	EB2010668029	Meadowbrook	2696M09	LV2696	Siltstone	Overburden	35.00	36.00	1.00	8.4	1270	0.005		0.2	17	-16.8	111.0	Non Acid Forming (Barren)	
44	EB2010668030	Meadowbrook	2696M10	LV2696	Siltstone	Overburden	40.00	41.00	1.00	9.8	382	0.005		0.2	105	-104.8	685.7	Non Acid Forming (Barren)	
45	EB2010668032	Meadowbrook	2696M12	LV2696	Siltstone	Overburden	48.00	50.50	2.50	9.8	365	0.005		0.2	40.4	-40.2	263.8	Non Acid Forming (Barren)	
46	EB2010668034	Meadowbrook	2696M14	LV2696	Siltstone	Overburden	60.00	61.00	1.00	10.0	330	0.005		0.2	53.5	-53.3	349.4	Non Acid Forming (Barren)	
47	EB2010668035	Meadowbrook	2696M15	LV2696	Siltstone	Overburden	62.30	66.00	3.70	9.9	415	0.005		0.2	23.9	-23.7	156.1	Non Acid Forming (Barren)	Composite 5
48	EB2010668036	Meadowbrook	2696M16	LV2696	Siltstone	Overburden	66.00	70.00	4.00	9.7	220	0.005		0.2	18.9	-18.7	123.4	Non Acid Forming (Barren)	
49	EB2010668039	Meadowbrook	2696M19	LV2696	Siltstone	Overburden	81.00	86.00	5.00	9.8	180	0.005		0.2	22.2	-22.0	145.0	Non Acid Forming (Barren)	
50	EB2010668073	Meadowbrook	2697M13	LV2697	Siltstone	Overburden	54.00	55.00	1.00	10.0	278	0.02		0.6	39.7	-39.1	64.8	Non Acid Forming (Barren)	
51	EB2010668065	Meadowbrook	2697M5	LV2697	Siltstone	Overburden	19.00	20.00	1.00	9.4	760	0.005		0.2	22.1	-21.9	144.3	Non Acid Forming (Barren)	
52	EB2010668066	Meadowbrook	2697M6	LV2697	Siltstone	Overburden	24.00	25.00	1.00	8.6	663	0.005		0.2	15.5	-15.3	101.2	Non Acid Forming (Barren)	
53	EB2010668067	Meadowbrook	2697M7	LV2697	Siltstone	Overburden	29.00	30.00	1.00	8.7	563	0.005		0.2	16.9	-16.7	110.4	Non Acid Forming (Barren)	
54	EB2010668092	Meadowbrook	2703M06	LV2703	Siltstone	Overburden	22.00	23.00	1.00	9.6	622	0.005		0.2	57	-56.8	372.2	Non Acid Forming (Barren)	
55	EB2010668027	Meadowbrook	2696M07	LV2696	Mudstone	Overburden	24.00	26.00	2.00	8.8	1230	0.005		0.2	9.1	-8.9	59.4	Non Acid Forming (Barren)	
56	EB2010668028	Meadowbrook	2696M08	LV2696	Mudstone	Overburden	30.00	31.00	1.00	8.7	1420	0.005		0.2	16.8	-16.6	109.7	Non Acid Forming (Barren)	Composite 6
57	EB2010668075	Meadowbrook	2697M15	LV2697	Mudstone	Overburden	67.00	68.00	1.00	9.9	202	0.04		1.2	26.6	-25.4	21.7	Non Acid Forming (Barren)	
58	EB2010668068	Meadowbrook	2697M8	LV2697	Weathered Coal	Overburden	31.50	32.50	1.00	8.3	584	0.02		0.6	19.5	-18.9	31.8	Non Acid Forming (Barren)	
59	EB2010668012	Meadowbrook	2694M12	LV2694	Carbonaceous Siltstone	Overburden	47.00	47.50	0.50	9.5	643	0.05		1.5	51.2	-49.7	33.4	Non Acid Forming (Barren)	Composite 7
60	EB2010668074	Meadowbrook	2697M14	LV2697	Carbonaceous Siltstone	Overburden	65.00	66.00	1.00	9.8	183	0.06		1.8	24.1	-22.3	13.1	Non Acid Forming (Barren)	
61	EB2010668041	Meadowbrook	2696M21	LV2696	Sandstone	Interburden	93.50	96.00	2.50	10.0	343	0.005		0.2	33	-32.8	215.5	Non Acid Forming (Barren)	
62	EB2010668043	Meadowbrook	2696M23	LV2696	Sandstone	Interburden	99.50	102.00	2.50	10.3	416	0.07		2.1	126	-123.9	58.8	Non Acid Forming (Barren)	
63	EB2010668044	Meadowbrook	2696M24	LV2696	Sandstone	Interburden	102.00	107.00	5.00	10.2	454	0.01		0.3	58.3	-58.0	190.4	Non Acid Forming (Barren)	
64	EB2010668045	Meadowbrook	2696M25	LV2696	Sandstone	Interburden	107.00	112.00	5.00	10.1	452	0.01		0.3	66.2	-65.9	216.2	Non Acid Forming (Barren)	
65	EB2010668046	Meadowbrook	2696M26	LV2696	Sandstone	Interburden	112.00	117.00	5.00	10.0	522	0.01		0.3	111	-110.7	362.4	Non Acid Forming (Barren)	
66	EB2010668047	Meadowbrook	2696M27	LV2696	Sandstone	Interburden	121.00	122.00	1.00	10.1	286	0.03		0.9	249	-248.1	271.0	Non Acid Forming (Barren)	
67	EB2010668048	Meadowbrook	2696M28	LV2696	Sandstone	Interburden	122.00	127.00	5.00	10.1	343	0.005		0.2	260	-259.8	1698.0	Non Acid Forming (Barren)	
68	EB2010668050	Meadowbrook	2696M30	LV2696	Sandstone	Interburden	134.00	136.00	2.00	10.0	675	0.02		0.6	104	-103.4	169.8	Non Acid Forming (Barren)	Composite 8
69	EB2010668053	Meadowbrook	2696M33	LV2696	Sandstone	Interburden	146.70	149.00	2.30	10.2	438	0.02		0.6	54.3	-53.7	88.7	Non Acid Forming (Barren)	
70	EB2010668054	Meadowbrook	2696M34	LV2696	Sandstone	Interburden	152.00	154.00	2.00	10.2	334	0.02		0.6	49.1	-48.5	80.2	Non Acid Forming (Barren)	
71	EB2010668055	Meadowbrook	2696M35	LV2696	Sandstone	Interburden	156.00	159.00	3.00	10.1	318	0.02		0.6	37.7	-37.1	61.6	Non Acid Forming (Barren)	
72	EB2010668056	Meadowbrook	2696M36	LV2696	Sandstone	Interburden	164.00	165.95	1.95	10.2	409	0.02		0.6	104	-103.4	169.8	Non Acid Forming (Barren)	
73	EB2010668059	Meadowbrook	2696M39	LV2696	Sandstone	Interburden	174.00	175.00	1.00	9.9	342	0.07		2.1	18.7	-16.6	8.7	Non Acid Forming (Barren)	
74	EB2010668081	Meadowbrook	2697M21	LV2697	Sandstone	Interburden	87.50	89.00	1.50	10.0	318	0.01		0.3	105	-104.7	342.9	Non Acid Forming (Barren)	
75	EB2010668095	Meadowbrook	2703M09	LV2703	Sandstone	Interburden	39.00	42.00	3.00	9.9	294	0.06		1.8	75.8	-74.0	41.3	Non Acid Forming (Barren)	
76	EB2010668020	Meadowbrook	2694M20	LV2694	Siltstone	Interburden	83.00	84.00	1.00	9.5	1000	0.02		0.6	42.1	-41.5	68.7	Non Acid Forming (Barren)	
77	EB2010668049	Meadowbrook	2696M29	LV2696	Siltstone	Interburden	129.00	130.15	1.15	9.7	325	0.02		0.6	24.2	-23.6	39.5	Non Acid Forming (Barren)	
78	EB2010668060	Meadowbrook	2696M40	LV2696	Siltstone	Interburden	175.00	178.00	3.00	10.1	389	0.03		0.9	107	-106.1	116.5	Non Acid Forming (Barren)	
79	EB2010668082	Meadowbrook	2697M22	LV2697	Siltstone	Interburden	95.00	97.00	2.00	9.9	316	0.02		0.6	42	-41.4	68.6	Non Acid Forming (Barren)	
80	EB2010668083	Meadowbrook	2697M23	LV2697	Siltstone	Interburden	100.50	102.00	1.50	10.0	387	0.02		0.6	105	-104.4	171.4	Non Acid Forming (Barren)	Composite 9
81	EB2010668085	Meadowbrook	2697M25	LV2697	Siltstone	Interburden	111.00	112.00	1.00	9.8	323	0.17	0.150	4.6	44	-39.4	9.6	Non Acid Forming	
82	EB2010668086	Meadowbrook	2697M26	LV2697	Siltstone	Interburden	116.00	117.00	1.00	10.0	424	0.02		0.6	88.6	-88.0	144.7	Non Acid Forming (Barren)	
83	EB2010668096	Meadowbrook	2703M10	LV2703	Siltstone	Interburden	48.00	49.00	1.00	9.4	364	0.07		2.1	32.9	-30.8	15.3	Non Acid Forming (Barren)	
84	EB2010668099	Meadowbrook	2703M14	LV2704	Siltstone	Interburden	68.00	69.00	1.00	9.5	1220	0.03		0.9	66.2	-65.3	72.1	Non Acid Forming (Barren)	
86	EB2010668080	Meadowbrook	2697M20	LV2697	Mudstone	Interburden	82.05	85.00	2.95	9.8	205	0.07		2.1	29.4	-27.3	13.7	Non Acid Forming (Barren)	
87	EB2010668101	Meadowbrook	2703M12	LV2703	Mudstone	Interburden	60.50	61.50	1.00	9.5	1110	0.16	0.032	1.0	160	-159.0	163.3	Non Acid Forming (Barren)	Composite 10
88	EB2010668098	Meadowbrook	2703M13	LV2703	Mudstone	Interburden	64.00	65.00	1.00	9.6	992	0.03		0.9	52.7	-51.8	57.4	Non Acid Forming (Barren)	

Table C2: Acid Base Account Test Results for Overburden, Interburden, Potential Coal Reject and Coal and Composite Sample Makeup

RGS Sample ID	ALS Sample ID	Deposit	Meadowbrook Sample ID	Drill Hole ID	Sample Lithology	Sample Type	From (m)	To (m)	Interval (m)	pH[1]	EC[1] (µS/cm)	Total S (%)	Scr (%)	MPA[2] (kgH2SO4/t)	ANC[2] (kgH2SO4/t)	NAPP[2] (kgH2SO4/t)	ANC:MPA Ratio	Sample Classification[3]	Composite ID
Potential Coal Reject and Coal																			
94	EB2010668051	Meadowbrook	2696M31	LV2696	Roof (Vermont Upper)	Potential Coal Rejects	138.00	139.40	1.40	9.8	199	0.05		1.5	21.8	-20.3	14.2	Non Acid Forming (Barren)	Composite 11
95	EB2010668078	Meadowbrook	2697M18	LV2697	Roof (Vermont Upper)	Potential Coal Rejects	77.00	79.60	2.60	10.1	319	0.11	0.070	2.1	44.9	-42.8	20.9	Non Acid Forming (Barren)	
97	EB2010668097	Meadowbrook	2703M11	LV2703	Roof (Vermont Lower)	Potential Coal Rejects	53.00	54.30	1.30	9.9	449	0.28	0.246	7.5	111	-103.5	14.7	Non Acid Forming	
98	EB2015372003	Meadowbrook	2720M03	LV2720C	Roof (Vermont Lower)	Potential Coal Rejects	321.39	321.73	0.34	9.9	308	0.04		1.2	30	-28.8	24.5	Non Acid Forming (Barren)	
100	EB2010668052	Meadowbrook	2696M32	LV2696	Parting (Vermont Upper)	Potential Coal Rejects	139.40	140.80	1.40	9.9	288	0.06		1.8	29.7	-27.9	16.2	Non Acid Forming (Barren)	Composite 12
101	EB2010668079	Meadowbrook	2697M19	LV2697	Parting (Vermont Upper)	Potential Coal Rejects	79.60	80.30	0.70	10.0	233	0.27	0.236	7.2	30.9	-23.7	4.3	Non Acid Forming	
102	EB2010668018	Meadowbrook	2694M18	LV2694	Parting (Vermont Upper)	Potential Coal Rejects	74.75	75.65	0.90	9.4	529	0.34	0.128	3.9	18.2	-14.3	4.6	Non Acid Forming	
103	EB2010668058	Meadowbrook	2696M38	LV2696	Parting (Vermont Upper)	Potential Coal Rejects	166.49	167.77	1.28	9.8	387	0.29	0.106	3.2	178	-174.8	54.8	Non Acid Forming (Barren)	
104	EB2010668084	Meadowbrook	2697M24	LV2697	Parting (Vermont Upper)	Potential Coal Rejects	105.20	106.00	0.80	10.0	323	0.49	0.403	12.3	199	-186.7	16.1	Non Acid Forming	
105	EB2010668040	Meadowbrook	2696M20	LV2696	Floor (Phillips 1)	Potential Coal Rejects	90.20	91.00	0.80	10.1	363	0.02		0.6	84.7	-84.1	138.3	Non Acid Forming (Barren)	
109	EB2010668094	Meadowbrook	2703M08	LV2703	Floor (Vermont Upper)	Potential Coal Rejects	29.50	31.00	1.50	9.3	466	0.03		0.9	44.9	-44.0	48.9	Non Acid Forming (Barren)	Composite 13
111	EB2010668019	Meadowbrook	2694M19	LV2694	Floor (Vermont Lower)	Potential Coal Rejects	79.15	80.15	1.00	9.2	968	0.08		2.5	11.6	-9.2	4.7	Non Acid Forming (Barren)	
115	EB2010668042	Meadowbrook	2696M22	LV2696	Roof/seam/floor (Leichhardt)	Potential Coal Rejects	97.00	97.95	0.95	10.1	403	0.18	0.128	3.9	66.4	-62.5	16.9	Non Acid Forming	
116	EB2017550001	Meadowbrook	2730M01	LV2730S	Roof (Leichhardt Lower)	Potential Coal Rejects	352.99	353.31	0.32	9.4	313	0.03		0.9	25.8	-24.9	28.1	Non Acid Forming (Barren)	Composite 14
117	EB2017550002	Meadowbrook	2730M02	LV2730S	Floor (Leichhardt Lower)	Potential Coal Rejects	358.15	358.44	0.29	9.6	137	0.04		1.2	13.8	-12.6	11.3	Non Acid Forming (Barren)	
118	EB2015788001	Meadowbrook	2716C10	LV2716C	Roof (Vermont)	Potential Coal Rejects	276.98	277.15	0.17	9.6	210	0.24	0.088	2.7	19	-16.3	7.1	Non Acid Forming (Barren)	
119	EB2015788004	Meadowbrook	2716C13	LV2716C	Floor (Vermont)	Potential Coal Rejects	277.55	278.02	0.47	9.8	240	0.11		3.4	25	-21.6	7.4	Non Acid Forming (Barren)	
120	EB2015788006	Meadowbrook	2718C07	LV2718C	Roof (Vermont)	Potential Coal Rejects	307.40	307.49	0.09	9.9	418	0.10		3.1	25.8	-22.7	8.4	Non Acid Forming (Barren)	Composite 15
121	EB2017550003	Meadowbrook	2730M03	LV2730S	Roof (Vermont Lower)	Potential Coal Rejects	382.55	382.85	0.30	9.6	274	0.03		0.9	20.8	-19.9	22.6	Non Acid Forming (Barren)	
122	EB2017550004	Meadowbrook	2730M04	LV2730S	Floor (Vermont Lower)	Potential Coal Rejects	387.45	387.75	0.30	9.6	201	0.02		0.6	20.5	-19.9	33.5	Non Acid Forming (Barren)	
123	EB2015788002	Meadowbrook	2716C11	LV2716C	Coal (Vermont)	Coal	277.15	277.35	0.20	9.5	121	0.29	0.022	0.7	33.5	-32.8	49.7	Non Acid Forming (Barren)	
124	EB2015788003	Meadowbrook	2716C12	LV2716C	Coal (Vermont)	Coal	277.35	277.55	0.20	9.8	303	0.58	0.192	5.9	14.1	-8.2	2.4	Non Acid Forming	Composite 16
125	EB2015788005	Meadowbrook	2718C08	LV2718C	Coal (Vermont)	Coal	307.86	308.14	0.28	10.0	335	0.37	0.176	5.4	36.3	-30.9	6.7	Non Acid Forming	
126	EB2018983001	Meadowbrook	2731M01	LV2731	Roof (Vermont Lower)	Potential Coal Rejects	502.44	502.54	0.10	9.8	451	0.04		1.2	20.9	-19.7	17.1	Non Acid Forming (Barren)	
127	EB2018983002	Meadowbrook	2731M02	LV2731	Floor (Vermont Lower)	Potential Coal Rejects	507.34	507.47	0.13	9.2	78	0.13	0.016	0.5	8.8	-8.3	18.0	Non Acid Forming (Barren)	
128	EB2018983003	Meadowbrook	2724M01	LV2724	Roof (Vermont Lower)	Potential Coal Rejects	204.79	205.18	0.39	9.4	471	0.02		0.6	174	-173.4	284.1	Non Acid Forming (Barren)	Composite 17
129	EB2018983004	Meadowbrook	2724M02	LV2724	Floor (Vermont Lower)	Potential Coal Rejects	209.49	209.89	0.40	9.5	188	0.04		1.2	6.7	-5.5	5.5	Non Acid Forming (Barren)	
130	EB2018983005	Meadowbrook	2726M01	LV2726	Roof (Vermont Lower)	Potential Coal Rejects	214.64	214.95	0.31	9.3	437	0.005		0.2	173	-172.8	1129.8	Non Acid Forming (Barren)	
131	EB2018983006	Meadowbrook	2726M02	LV2726	Floor (Vermont Lower)	Potential Coal Rejects	218.93	219.18	0.25	9.5	108	0.1		3.1	9.4	-6.3	3.1	Non Acid Forming (Barren)	
132	EB2020779001	Meadowbrook	2730S01	---	Leichhardt Lower	Coal	353.58	354.37	0.79	8.4	14	0.08		2.5	35.9	-33.4	14.7	Non Acid Forming (Barren)	Composite 18
133	EB2020779002	Meadowbrook	2730S02	---	Leichhardt Lower	Coal	354.37	355.11	0.74	8.6	50	0.21	0.016	0.5	29.4	-23	60.0	Non Acid Forming (Barren)	
134	EB2020779003	Meadowbrook	2730S03	---	Leichhardt Lower	Coal	355.11	355.91	0.80	7.9	42	0.23	0.013	0.4	7.5	-0.5	18.8	Non Acid Forming (Barren)	
135	EB2020779004	Meadowbrook	2730S04	---	Leichhardt Lower	Coal	355.93	356.68	0.75	7.5	38	0.24	0.012	0.4	9.6	-2.2	26.1	Non Acid Forming (Barren)	
136	EB2020779005	Meadowbrook	2730S05	---	Leichhardt Lower	Coal	356.68	357.45	0.77	8.2	27	0.21	0.019	0.6	20.2	-13.8	34.7	Non Acid Forming (Barren)	
137	EB2020779006	Meadowbrook	2730S06	---	Leichhardt Lower	Coal	357.45	358.15	0.70	7.4	17	0.26	0.013	0.4	8.2	-0.2	20.6	Non Acid Forming (Barren)	
138	EB2020779007	Meadowbrook	2730S07	---	Vermont Lower	Coal	382.94	383.71	0.77	7.3	15	0.21	0.013	0.4	6.5	-0.07	16.3	Non Acid Forming (Barren)	
139	EB2020779008	Meadowbrook	2730S08	---	Vermont Lower	Coal	383.97	384.77	0.80	8.0	25	0.2	0.012	0.4	10	-3.9	27.2	Non Acid Forming (Barren)	
140	EB2020779009	Meadowbrook	2730S09	---	Vermont Lower	Coal	384.77	385.55	0.78	7.4	12	0.21	0.012	0.4	10.6	-4.2	28.8	Non Acid Forming (Barren)	
141	EB2020779010	Meadowbrook	2730S10	---	Vermont Lower	Coal	385.55	386.33	0.78	7.0	15	0.21	0.010	0.3	9.3	-2.9	30.4	Non Acid Forming (Barren)	
142	EB2020779011	Meadowbrook	2730S11	---	Vermont Lower	Coal	386.33	386.79	0.46	6.7	16	0.21	0.011	0.3	12	-5.6	35.6	Non Acid Forming (Barren)	

Table C3: Acid Base Account Test Results for Overburden, Interburden, Potential Coal Reject and Coal

RGS Sample ID	ALS Sample ID	Deposit	Sample ID	Drill Hole ID	Sample Lithology	Sample Type	From	To	Interval	pH[1]	EC[1]	Total S	Scr	MPA[2]	ANC[2]	NAPP[2]	ANC:MPA Ratio	Sample Classification[3]
							(m)				(µS/cm)	(%)		(kgH_2SO_4/t)				
Overburden and Interburden																		
1	EB2010668001	Meadowbrook	2694M01	LV2694	Soil	Overburden	0.00	1.00	1.00	7.9	1,400	0.01		0.3	7.9	-7.6	25.8	Non Acid Forming (Barren)
2	EB2010668021	Meadowbrook	2696M01	LV2696	Soil	Overburden	0.00	1.00	1.00	9.1	242	0.01		0.3	57.1	-56.8	186.4	Non Acid Forming (Barren)
3	EB2010668061	Meadowbrook	2697M1	LV2697	Soil	Overburden	0.00	1.00	1.00	8.4	841	0.02		0.6	57.2	-56.6	93.4	Non Acid Forming (Barren)
4	EB2010668087	Meadowbrook	2703M01	LV2703	Soil	Overburden	0.00	1.00	1.00	9.0	894	0.02		0.6	28.4	-27.8	46.4	Non Acid Forming (Barren)
5	EB2010668002	Meadowbrook	2694M02	LV2694	Clay	Overburden	1.00	5.00	4.00	8.9	1,580	0.02		0.6	58.3	-57.7	95.2	Non Acid Forming (Barren)
6	EB2010668003	Meadowbrook	2694M03	LV2694	Clay	Overburden	7.00	11.00	4.00	9.1	1,770	0.02		0.6	39.5	-38.9	64.5	Non Acid Forming (Barren)
7	EB2010668005	Meadowbrook	2694M05	LV2694	Clay	Overburden	14.00	17.00	3.00	8.7	1,910	0.01		0.3	19	-18.7	62.0	Non Acid Forming (Barren)
8	EB2010668006	Meadowbrook	2694M06	LV2694	Clay	Overburden	20.50	21.50	1.00	8.8	1,350	0.01		0.3	9	-8.7	29.4	Non Acid Forming (Barren)
9	EB2010668088	Meadowbrook	2703M02	LV2703	Clay	Overburden	5.00	6.00	1.00	6.8	713	0.01		0.3	17.5	-17.2	57.1	Non Acid Forming (Barren)
10	EB2010668004	Meadowbrook	2694M04	LV2694	Sand	Overburden	11.00	12.00	1.00	9.0	1,570	0.01		0.3	18.1	-17.8	59.1	Non Acid Forming (Barren)
11	EB2010668007	Meadowbrook	2694M07	LV2694	Sand	Overburden	22.00	26.00	4.00	8.2	2,700	0.02		0.6	19.6	-19.0	32.0	Non Acid Forming (Barren)
12	EB2010668008	Meadowbrook	2694M08	LV2694	Sand	Overburden	30.00	31.00	1.00	8.5	1,290	0.02		0.6	22.8	-22.2	37.2	Non Acid Forming (Barren)
13	EB2010668022	Meadowbrook	2696M02	LV2696	Sand	Overburden	5.00	6.00	1.00	9.5	917	0.005		0.2	47.3	-47.1	308.9	Non Acid Forming (Barren)
14	EB2010668023	Meadowbrook	2696M03	LV2696	Sand	Overburden	10.00	11.00	1.00	9.0	674	0.005		0.2	8.1	-7.9	52.9	Non Acid Forming (Barren)
15	EB2010668024	Meadowbrook	2696M04	LV2696	Sand	Overburden	11.00	12.00	1.00	9.4	1,040	0.005		0.2	8.8	-8.6	57.5	Non Acid Forming (Barren)
16	EB2010668025	Meadowbrook	2696M05	LV2696	Sand	Overburden	13.00	17.00	4.00	8.6	1,510	0.005		0.2	8	-7.8	52.2	Non Acid Forming (Barren)
17	EB2010668026	Meadowbrook	2696M06	LV2696	Sand	Overburden	20.00	21.00	1.00	8.7	1,570	0.01		0.3	8.3	-8.0	27.1	Non Acid Forming (Barren)
18	EB2010668062	Meadowbrook	2697M2	LV2697	Sand	Overburden	5.00	6.00	1.00	9.6	754	0.005		0.2	154	-153.8	1005.7	Non Acid Forming (Barren)
19	EB2010668089	Meadowbrook	2703M03	LV2703	Sand	Overburden	7.00	8.00	1.00	9.6	431	0.005		0.2	103	-102.8	672.7	Non Acid Forming (Barren)
20	EB2010668090	Meadowbrook	2703M04	LV2703	Sand	Overburden	11.00	12.00	1.00	9.7	272	0.005		0.2	41.2	-41.0	269.1	Non Acid Forming (Barren)
21	EB2010668063	Meadowbrook	2697M3	LV2697	Gravel	Overburden	10.00	11.00	1.00	10.0	327	0.005		0.2	83.2	-83.0	543.3	Non Acid Forming (Barren)
22	EB2010668064	Meadowbrook	2697M4	LV2697	Gravel	Overburden	15.00	16.00	1.00	10.1	362	0.005		0.2	46.2	-46.0	301.7	Non Acid Forming (Barren)
23	EB2010668010	Meadowbrook	2694M10	LV2694	Sandstone	Overburden	37.00	38.00	1.00	10.0	465	0.07		2.1	150	-147.9	70.0	Non Acid Forming (Barren)
24	EB2010668011	Meadowbrook	2694M11	LV2694	Sandstone	Overburden	38.00	43.00	5.00	9.7	713	0.02		0.6	148	-147.4	241.6	Non Acid Forming (Barren)
25	EB2010668014	Meadowbrook	2694M14	LV2694	Sandstone	Overburden	54.00	58.00	4.00	9.5	1,230	0.04		1.2	36.1	-34.9	29.5	Non Acid Forming (Barren)
26	EB2010668015	Meadowbrook	2694M15	LV2694	Sandstone	Overburden	61.00	63.00	2.00	9.9	789	0.01		0.3	143	-142.7	466.9	Non Acid Forming (Barren)
27	EB2010668016	Meadowbrook	2694M16	LV2694	Sandstone	Overburden	67.00	68.00	1.00	10.0	708	0.005		0.2	201	-200.8	1312.7	Non Acid Forming (Barren)
28	EB2010668031	Meadowbrook	2696M11	LV2696	Sandstone	Overburden	44.50	46.00	1.50	9.7	517	0.005		0.2	27.5	-27.3	179.6	Non Acid Forming (Barren)
29	EB2010668033	Meadowbrook	2696M13	LV2696	Sandstone	Overburden	50.50	55.00	4.50	9.5	383	0.01		0.3	17.9	-17.6	58.4	Non Acid Forming (Barren)
30	EB2010668037	Meadowbrook	2696M17	LV2696	Sandstone	Overburden	70.00	73.30	3.30	10.0	303	0.005		0.2	33.7	-33.5	220.1	Non Acid Forming (Barren)
31	EB2010668038	Meadowbrook	2696M18	LV2696	Sandstone	Overburden	73.30	81.00	7.70	9.9	267	0.005		0.2	25.9	-25.7	169.1	Non Acid Forming (Barren)
32	EB2010668070	Meadowbrook	2697M10	LV2697	Sandstone	Overburden	42.00	43.00	1.00	10.0	256	0.04		1.2	42.7	-41.5	34.9	Non Acid Forming (Barren)
33	EB2010668071	Meadowbrook	2697M11	LV2697	Sandstone	Overburden	47.00	48.00	1.00	10.1	263	0.04		1.2	44.9	-43.7	36.7	Non Acid Forming (Barren)
34	EB2010668072	Meadowbrook	2697M12	LV2697	Sandstone	Overburden	50.00	52.70	2.70	10.1	274	0.02		0.6	80.8	-80.2	131.9	Non Acid Forming (Barren)
35	EB2010668076	Meadowbrook	2697M16	LV2697	Sandstone	Overburden	70.00	71.00	1.00	10.2	319	0.005		0.2	55.3	-55.1	361.1	Non Acid Forming (Barren)
36	EB2010668077	Meadowbrook	2697M17	LV2697	Sandstone	Overburden	75.00	76.00	1.00	10.2	287	0.005		0.2	63.5	-63.3	414.7	Non Acid Forming (Barren)
37	EB2010668069	Meadowbrook	2697M9	LV2697	Sandstone	Overburden	35.00	38.00	3.00	9.9	291	0.02		0.6	55.6	-55.0	90.8	Non Acid Forming (Barren)
38	EB2010668091	Meadowbrook	2703M05	LV2703	Sandstone	Overburden	16.00	17.00	1.00	9.2	1,080	0.01		0.3	41.8	-41.5	136.5	Non Acid Forming (Barren)
39	EB2010668093	Meadowbrook	2703M07	LV2703	Sandstone	Overburden	26.00	27.00	1.00	9.7	332	0.005		0.2	148	-147.8	966.5	Non Acid Forming (Barren)
40	EB2010668009	Meadowbrook	2694M09	LV2694	Siltstone	Overburden	33.00	36.00	3.00	8.9	352	0.02		0.6	22.7	-22.1	37.1	Non Acid Forming (Barren)
41	EB2010668013	Meadowbrook	2694M13	LV2694	Siltstone	Overburden	49.80	51.50	1.70	9.4	1,360	0.09		2.8	33.5	-30.7	12.2	Non Acid Forming (Barren)
42	EB2010668017	Meadowbrook	2694M17	LV2694	Siltstone	Overburden	71.80	73.00	1.20	9.5	522	0.01		0.3	115	-114.7	375.5	Non Acid Forming (Barren)
43	EB2010668029	Meadowbrook	2696M09	LV2696	Siltstone	Overburden	35.00	36.00	1.00	8.4	1,270	0.005		0.2	17	-16.8	111.0	Non Acid Forming (Barren)
44	EB2010668030	Meadowbrook	2696M10	LV2696	Siltstone	Overburden	40.00	41.00	1.00	9.8	382	0.005		0.2	105	-104.8	685.7	Non Acid Forming (Barren)
45	EB2010668032	Meadowbrook	2696M12	LV2696	Siltstone	Overburden	48.00	50.50	2.50	9.8	365	0.005		0.2	40.4	-40.2	263.8	Non Acid Forming (Barren)
46	EB2010668034	Meadowbrook	2696M14	LV2696	Siltstone	Overburden	60.00	61.00	1.00	10.0	330	0.005		0.2	53.5	-53.3	349.4	Non Acid Forming (Barren)
47	EB2010668035	Meadowbrook	2696M15	LV2696	Siltstone	Overburden	62.30	66.00	3.70	9.9	415	0.005		0.2	23.9	-23.7	156.1	Non Acid Forming (Barren)
48	EB2010668036	Meadowbrook	2696M16	LV2696	Siltstone	Overburden	66.00	70.00	4.00	9.7	220	0.005		0.2	18.9	-18.7	123.4	Non Acid Forming (Barren)
49	EB2010668039	Meadowbrook	2696M19	LV2696	Siltstone	Overburden	81.00	86.00	5.00	9.8	180	0.005		0.2	22.2	-22.0	145.0	Non Acid Forming (Barren)
50	EB2010668073	Meadowbrook	2697M13	LV2697	Siltstone	Overburden	54.00	55.00	1.00	10.0	278	0.02		0.6	39.7	-39.1	64.8	Non Acid Forming (Barren)
51	EB2010668065	Meadowbrook	2697M5	LV2697	Siltstone	Overburden	19.00	20.00	1.00	9.4	760	0.005		0.2	22.1	-21.9	144.3	Non Acid Forming (Barren)
52	EB2010668066	Meadowbrook	2697M6	LV2697	Siltstone	Overburden	24.00	25.00	1.00	8.6	663	0.005		0.2	15.5	-15.3	101.2	Non Acid Forming (Barren)
53	EB2010668067	Meadowbrook	2697M7	LV2697	Siltstone	Overburden	29.00	30.00	1.00	8.7	563	0.005		0.2	16.9	-16.7	110.4	Non Acid Forming (Barren)
54	EB2010668092	Meadowbrook	2703M06	LV2703	Siltstone	Overburden	22.00	23.00	1.00	9.6	622	0.005		0.2	57	-56.8	372.2	Non Acid Forming (Barren)

Table C3: Acid Base Account Test Results for Overburden, Interburden, Potential Coal Reject and Coal

RGS Sample ID	ALS Sample ID	Deposit	Sample ID	Drill Hole ID	Sample Lithology	Sample Type	From	To	Interval	pH[1]	EC[1]	Total S	Scr	MPA[2]	ANC[2]	NAPP[2]	ANC:MPA Ratio	Sample Classification[3]
							(m)				(µS/cm)	(%)		(kgH_2SO_4/t)				
55	EB2010668027	Meadowbrook	2696M07	LV2696	Mudstone	Overburden	24.00	26.00	2.00	8.8	1,230	0.005		0.2	9.1	-8.9	59.4	Non Acid Forming (Barren)
56	EB2010668028	Meadowbrook	2696M08	LV2696	Mudstone	Overburden	30.00	31.00	1.00	8.7	1,420	0.005		0.2	16.8	-16.6	109.7	Non Acid Forming (Barren)
57	EB2010668075	Meadowbrook	2697M15	LV2697	Mudstone	Overburden	67.00	68.00	1.00	9.9	202	0.04		1.2	26.6	-25.4	21.7	Non Acid Forming (Barren)
58	EB2010668068	Meadowbrook	2697M8	LV2697	Weathered Coal	Overburden	31.50	32.50	1.00	8.3	584	0.02		0.6	19.5	-18.9	31.8	Non Acid Forming (Barren)
59	EB2010668012	Meadowbrook	2694M12	LV2694	Carbonaceous Siltstone	Overburden	47.00	47.50	0.50	9.5	643	0.05		1.5	51.2	-49.7	33.4	Non Acid Forming (Barren)
60	EB2010668074	Meadowbrook	2697M14	LV2697	Carbonaceous Siltstone	Overburden	65.00	66.00	1.00	9.8	183	0.06		1.8	24.1	-22.3	13.1	Non Acid Forming (Barren)
61	EB2010668041	Meadowbrook	2696M21	LV2696	Sandstone	Interburden	93.50	96.00	2.50	10.0	343	0.005		0.2	33	-32.8	215.5	Non Acid Forming (Barren)
62	EB2010668043	Meadowbrook	2696M23	LV2696	Sandstone	Interburden	99.50	102.00	2.50	10.3	416	0.07		2.1	126	-123.9	58.8	Non Acid Forming (Barren)
63	EB2010668044	Meadowbrook	2696M24	LV2696	Sandstone	Interburden	102.00	107.00	5.00	10.2	454	0.01		0.3	58.3	-58.0	190.4	Non Acid Forming (Barren)
64	EB2010668045	Meadowbrook	2696M25	LV2696	Sandstone	Interburden	107.00	112.00	5.00	10.1	452	0.01		0.3	66.2	-65.9	216.2	Non Acid Forming (Barren)
65	EB2010668046	Meadowbrook	2696M26	LV2696	Sandstone	Interburden	112.00	117.00	5.00	10.0	522	0.01		0.3	111	-110.7	362.4	Non Acid Forming (Barren)
66	EB2010668047	Meadowbrook	2696M27	LV2696	Sandstone	Interburden	121.00	122.00	1.00	10.1	286	0.03		0.9	249	-248.1	271.0	Non Acid Forming (Barren)
67	EB2010668048	Meadowbrook	2696M28	LV2696	Sandstone	Interburden	122.00	127.00	5.00	10.1	343	0.005		0.2	260	-259.8	1698.0	Non Acid Forming (Barren)
68	EB2010668050	Meadowbrook	2696M30	LV2696	Sandstone	Interburden	134.00	136.00	2.00	10.0	675	0.02		0.6	104	-103.4	169.8	Non Acid Forming (Barren)
69	EB2010668053	Meadowbrook	2696M33	LV2696	Sandstone	Interburden	146.70	149.00	2.30	10.2	438	0.02		0.6	54.3	-53.7	88.7	Non Acid Forming (Barren)
70	EB2010668054	Meadowbrook	2696M34	LV2696	Sandstone	Interburden	152.00	154.00	2.00	10.2	334	0.02		0.6	49.1	-48.5	80.2	Non Acid Forming (Barren)
71	EB2010668055	Meadowbrook	2696M35	LV2696	Sandstone	Interburden	156.00	159.00	3.00	10.1	318	0.02		0.6	37.7	-37.1	61.6	Non Acid Forming (Barren)
72	EB2010668056	Meadowbrook	2696M36	LV2696	Sandstone	Interburden	164.00	165.95	1.95	10.2	409	0.02		0.6	104	-103.4	169.8	Non Acid Forming (Barren)
73	EB2010668059	Meadowbrook	2696M39	LV2696	Sandstone	Interburden	174.00	175.00	1.00	9.9	342	0.07		2.1	18.7	-16.6	8.7	Non Acid Forming (Barren)
74	EB2010668081	Meadowbrook	2697M21	LV2697	Sandstone	Interburden	87.50	89.00	1.50	10.0	318	0.01		0.3	105	-104.7	342.9	Non Acid Forming (Barren)
75	EB2010668095	Meadowbrook	2703M09	LV2703	Sandstone	Interburden	39.00	42.00	3.00	9.9	294	0.06		1.8	75.8	-74.0	41.3	Non Acid Forming (Barren)
76	EB2010668020	Meadowbrook	2694M20	LV2694	Siltstone	Interburden	83.00	84.00	1.00	9.5	1,000	0.02		0.6	42.1	-41.5	68.7	Non Acid Forming (Barren)
77	EB2010668049	Meadowbrook	2696M29	LV2696	Siltstone	Interburden	129.00	130.15	1.15	9.7	325	0.02		0.6	24.2	-23.6	39.5	Non Acid Forming (Barren)
78	EB2010668060	Meadowbrook	2696M40	LV2696	Siltstone	Interburden	175.00	178.00	3.00	10.1	389	0.03		0.9	107	-106.1	116.5	Non Acid Forming (Barren)
79	EB2010668082	Meadowbrook	2697M22	LV2697	Siltstone	Interburden	95.00	97.00	2.00	9.9	316	0.02		0.6	42	-41.4	68.6	Non Acid Forming (Barren)
80	EB2010668083	Meadowbrook	2697M23	LV2697	Siltstone	Interburden	100.50	102.00	1.50	10.0	387	0.02		0.6	105	-104.4	171.4	Non Acid Forming (Barren)
81	EB2010668085	Meadowbrook	2697M25	LV2697	Siltstone	Interburden	111.00	112.00	1.00	9.8	323	0.17	0.150	4.6	44	-39.4	9.6	Non Acid Forming
82	EB2010668086	Meadowbrook	2697M26	LV2697	Siltstone	Interburden	116.00	117.00	1.00	10.0	424	0.02		0.6	88.6	-88.0	144.7	Non Acid Forming (Barren)
83	EB2010668096	Meadowbrook	2703M10	LV2703	Siltstone	Interburden	48.00	49.00	1.00	9.4	364	0.07		2.1	32.9	-30.8	15.3	Non Acid Forming (Barren)
84	EB2010668099	Meadowbrook	2703M14	LV2704	Siltstone	Interburden	68.00	69.00	1.00	9.5	1,220	0.03		0.9	66.2	-65.3	72.1	Non Acid Forming (Barren)
85	EB2014520001	Meadowbrook	2715M01	LV2715C	Siltstone	Interburden	312.88	313.11	0.23	9.7	316	0.02		0.6	37.7	-37.1	61.6	Non Acid Forming (Barren)
86	EB2010668080	Meadowbrook	2697M20	LV2697	Mudstone	Interburden	82.05	85.00	2.95	9.8	205	0.07		2.1	29.4	-27.3	13.7	Non Acid Forming (Barren)
87	EB2010668101	Meadowbrook	2703M12	LV2703	Mudstone	Interburden	60.50	61.50	1.00	9.5	1,110	0.16	0.032	1.0	160	-159.0	163.3	Non Acid Forming (Barren)
88	EB2010668098	Meadowbrook	2703M13	LV2703	Mudstone	Interburden	64.00	65.00	1.00	9.6	992	0.03		0.9	52.7	-51.8	57.4	Non Acid Forming (Barren)
89	EB2014520002	Meadowbrook	2715M02	LV2715C	Mudstone	Interburden	318.13	318.23	0.10	9.7	255	0.02		0.6	22.7	-22.1	37.1	Non Acid Forming (Barren)
90	EB2014520003	Meadowbrook	2715M03	LV2715C	Mudstone	Interburden	318.49	318.83	0.34	9.7	265	0.01		0.3	30.4	-30.1	99.3	Non Acid Forming (Barren)

Table C3: Acid Base Account Test Results for Overburden, Interburden, Potential Coal Reject and Coal

RGS Sample ID	ALS Sample ID	Deposit	Sample ID	Drill Hole ID	Sample Lithology	Sample Type	From	To	Interval	pH[1]	EC[1]	Total S	Scr	MPA[2]	ANC[2]	NAPP[2]	ANC:MPA Ratio	Sample Classification[3]
							(m)				(µS/cm)	(%)		(kgH_2SO_4/t)				
Potential Coal Reject																		
91	EB2011337001	Meadowbrook	2698M01	LV2698	Roof (Leichhardt Lower)	Potential Coal Rejects	348.20	348.52	0.32	9.6	289	0.18		5.5	50.2	-44.7	9.1	Non Acid Forming
92	EB2015372001	Meadowbrook	2720M01	LV2720C	Roof (Leichhardt Lower)	Potential Coal Rejects	289.90	290.18	0.28	10.0	363	0.02		0.6	191	-190.4	311.8	Non Acid Forming (Barren)
93	EB2016692001	Meadowbrook	2723M01	LV2723C	Roof (Leichhardt Lower)	Potential Coal Rejects	393.80	394.10	0.30	9.8	430	0.06		1.8	20.1	-18.3	10.9	Non Acid Forming (Barren)
116	EB2017550001	Meadowbrook	2730M01	LV2730S	Roof (Leichhardt Lower)	Potential Coal Rejects	352.99	353.31	0.32	9.4	313	0.03		0.9	25.8	-24.9	28.1	Non Acid Forming (Barren)
115	EB2010668042	Meadowbrook	2696M22	LV2696	Roof/seam/floor (Leichhardt)	Potential Coal Rejects	97.00	97.95	0.95	10.1	403	0.18	0.128	3.9	66.4	-62.5	16.9	Non Acid Forming
94	EB2010668051	Meadowbrook	2696M31	LV2696	Roof (Vermont Upper)	Potential Coal Rejects	138.00	139.40	1.40	9.8	199	0.05		1.5	21.8	-20.3	14.2	Non Acid Forming (Barren)
95	EB2010668078	Meadowbrook	2697M18	LV2697	Roof (Vermont Upper)	Potential Coal Rejects	77.00	79.60	2.60	10.1	319	0.11	0.070	2.1	44.9	-42.8	20.9	Non Acid Forming (Barren)
96	EB2011337003	Meadowbrook	2698M03	LV2698	Roof (Vermont Upper)	Potential Coal Rejects	383.05	383.37	0.32	10.0	459	0.19		5.8	25.5	-19.7	4.4	Non Acid Forming
97	EB2010668097	Meadowbrook	2703M11	LV2703	Roof (Vermont Lower)	Potential Coal Rejects	53.00	54.30	1.30	9.9	449	0.28	0.246	7.5	111	-103.5	14.7	Non Acid Forming
98	EB2015372003	Meadowbrook	2720M03	LV2720C	Roof (Vermont Lower)	Potential Coal Rejects	321.39	321.73	0.34	9.9	308	0.04		1.2	30	-28.8	24.5	Non Acid Forming (Barren)
99	EB2016692003	Meadowbrook	2723M03	LV2723C	Roof (Vermont Lower)	Potential Coal Rejects	417.62	417.90	0.28	9.8	141	0.04		1.2	15.6	-14.4	12.7	Non Acid Forming (Barren)
114	EB2010668057	Meadowbrook	2696M37	LV2696	Roof/seam/floor (Vermont Lower)	Potential Coal Rejects	165.95	166.49	0.54	9.8	376	0.66	0.431	13.2	35.8	-22.6	2.7	Non Acid Forming
121	EB2017550003	Meadowbrook	2730M03	LV2730S	Roof (Vermont Lower)	Potential Coal Rejects	382.55	382.85	0.30	9.6	274	0.03		0.9	20.8	-19.9	22.6	Non Acid Forming (Barren)
126	EB2018983001	Meadowbrook	2731M01	LV2731	Roof (Vermont Lower)	Potential Coal Rejects	502.44	502.54	0.10	9.8	451	0.04		1.2	20.9	-19.7	17.1	Non Acid Forming (Barren)
128	EB2018983003	Meadowbrook	2724M01	LV2724	Roof (Vermont Lower)	Potential Coal Rejects	204.79	205.18	0.39	9.4	471	0.02		0.6	174	-173.4	284.1	Non Acid Forming (Barren)
130	EB2018983005	Meadowbrook	2726M01	LV2726	Roof (Vermont Lower)	Potential Coal Rejects	214.64	214.95	0.31	9.3	437	0.005		0.2	173	-172.8	1129.8	Non Acid Forming (Barren)
118	EB2015788001	Meadowbrook	2716C10	LV2716C	Roof (Vermont)	Potential Coal Rejects	276.98	277.15	0.17	9.6	210	0.24	0.088	2.7	19	-16.3	7.1	Non Acid Forming (Barren)
120	EB2015788006	Meadowbrook	2718C07	LV2718C	Roof (Vermont)	Potential Coal Rejects	307.40	307.49	0.09	9.9	418	0.10		3.1	25.8	-22.7	8.4	Non Acid Forming (Barren)
100	EB2010668052	Meadowbrook	2696M32	LV2696	Parting (Vermont Upper)	Potential Coal Rejects	139.40	140.80	1.40	9.9	288	0.06		1.8	29.7	-27.9	16.2	Non Acid Forming (Barren)
101	EB2010668079	Meadowbrook	2697M19	LV2697	Parting (Vermont Upper)	Potential Coal Rejects	79.60	80.30	0.70	10.0	233	0.27	0.236	7.2	30.9	-23.7	4.3	Non Acid Forming
102	EB2010668018	Meadowbrook	2694M18	LV2694	Parting (Vermont Upper)	Potential Coal Rejects	74.75	75.65	0.90	9.4	529	0.34	0.128	3.9	18.2	-14.3	4.6	Non Acid Forming
103	EB2010668058	Meadowbrook	2696M38	LV2696	Parting (Vermont Upper)	Potential Coal Rejects	166.49	167.77	1.28	9.8	387	0.29	0.106	3.2	178	-174.8	54.8	Non Acid Forming (Barren)
104	EB2010668084	Meadowbrook	2697M24	LV2697	Parting (Vermont Upper)	Potential Coal Rejects	105.20	106.00	0.80	10.0	323	0.49	0.403	12.3	199	-186.7	16.1	Non Acid Forming
105	EB2010668040	Meadowbrook	2696M20	LV2696	Floor (Phillips 1)	Potential Coal Rejects	90.20	91.00	0.80	10.1	363	0.02		0.6	84.7	-84.1	138.3	Non Acid Forming (Barren)
106	EB2011337002	Meadowbrook	2698M02	LV2698	Floor (Leichhardt Lower)	Potential Coal Rejects	352.27	352.69	0.42	9.6	169	0.04		1.2	9.3	-8.1	7.6	Non Acid Forming (Barren)
107	EB2015372002	Meadowbrook	2720M02	LV2720C	Floor (Leichhardt Lower)	Potential Coal Rejects	294.00	294.30	0.30	9.7	192	0.03		0.9	13.2	-12.3	14.4	Non Acid Forming (Barren)
108	EB2016692002	Meadowbrook	2723M02	LV2723C	Floor (Leichhardt Lower)	Potential Coal Rejects	393.80	394.10	0.30	9.5	176	0.02		0.6	15.6	-15.0	25.5	Non Acid Forming (Barren)
117	EB2017550002	Meadowbrook	2730M02	LV2730S	Floor (Leichhardt Lower)	Potential Coal Rejects	358.15	358.44	0.29	9.6	137	0.04		1.2	13.8	-12.6	11.3	Non Acid Forming (Barren)
109	EB2010668094	Meadowbrook	2703M08	LV2703	Floor (Vermont Upper)	Potential Coal Rejects	29.50	31.00	1.50	9.3	466	0.03		0.9	44.9	-44.0	48.9	Non Acid Forming (Barren)
110	EB2011337004	Meadowbrook	2698M04	LV2698	Floor (Vermont Upper)	Potential Coal Rejects	387.00	387.28	0.28	9.8	184	0.02		0.6	11.6	-11.0	18.9	Non Acid Forming (Barren)
111	EB2010668019	Meadowbrook	2694M19	LV2694	Floor (Vermont Lower)	Potential Coal Rejects	79.15	80.15	1.00	9.2	968	0.08		2.5	11.6	-9.2	4.7	Non Acid Forming (Barren)
112	EB2015372004	Meadowbrook	2720M04	LV2720C	Floor (Vermont Lower)	Potential Coal Rejects	321.39	321.73	0.34	10.0	284	0.06		1.8	15.2	-13.4	8.3	Non Acid Forming (Barren)
113	EB2016692004	Meadowbrook	2723M04	LV2723C	Floor (Vermont Lower)	Potential Coal Rejects	422.20	422.51	0.31	9.9	139	0.09		2.8	10	-7.2	3.6	Non Acid Forming (Barren)
122	EB2017550004	Meadowbrook	2730M04	LV2730S	Floor (Vermont Lower)	Potential Coal Rejects	387.45	387.75	0.30	9.6	201	0.02		0.6	20.5	-19.9	33.5	Non Acid Forming (Barren)
127	EB2018983002	Meadowbrook	2731M02	LV2731	Floor (Vermont Lower)	Potential Coal Rejects	507.34	507.47	0.13	9.2	78	0.13	0.016	0.5	8.8	-8.3	18.0	Non Acid Forming (Barren)
129	EB2018983004	Meadowbrook	2724M02	LV2724	Floor (Vermont Lower)	Potential Coal Rejects	209.49	209.89	0.40	9.5	188	0.04		1.2	6.7	-5.5	5.5	Non Acid Forming (Barren)
131	EB2018983006	Meadowbrook	2726M02	LV2726	Floor (Vermont Lower)	Potential Coal Rejects	218.93	219.18	0.25	9.5	108	0.10		3.1	9.4	-6.3	3.1	Non Acid Forming (Barren)
143	EB2020779012	Meadowbrook	2730S12	LV2730S	Floor (Vermont Lower)	Potential Coal Rejects	386.97	387.45	0.48	9.3	46	0.05		1.5	16.3	-14.8	10.6	Non Acid Forming (Barren)
119	EB2015788004	Meadowbrook	2716C13	LV2716C	Floor (Vermont)	Potential Coal Rejects	277.55	278.02	0.47	9.8	240	0.11		3.4	25	-21.6	7.4	Non Acid Forming (Barren)
Coal																		
123	EB2015788002	Meadowbrook	2716C11	LV2716C	Coal (Vermont)	Coal	277.15	277.35	0.20	9.5	121	0.29	0.022	0.7	33.5	-32.8	49.7	Non Acid Forming (Barren)
124	EB2015788003	Meadowbrook	2716C12	LV2716C	Coal (Vermont)	Coal	277.35	277.55	0.20	9.8	303	0.58	0.192	5.9	14.1	-8.2	2.4	Non Acid Forming
125	EB2015788005	Meadowbrook	2718C08	LV2718C	Coal (Vermont)	Coal	307.86	308.14	0.28	10.0	335	0.37	0.176	5.4	36.3	-30.9	6.7	Non Acid Forming
138	EB2020779007	Meadowbrook	2730S07	LV2730S	Vermont Lower	Coal	382.94	383.71	0.77	7.3	15	0.21	0.013	0.4	6.5	-0.07	16.3	Non Acid Forming (Barren)
139	EB2020779008	Meadowbrook	2730S08	LV2730S	Vermont Lower	Coal	383.97	384.77	0.80	8.0	25	0.20	0.012	0.4	10	-3.9	27.2	Non Acid Forming (Barren)
140	EB2020779009	Meadowbrook	2730S09	LV2730S	Vermont Lower	Coal	384.77	385.55	0.78	7.4	12	0.21	0.012	0.4	10.6	-4.2	28.8	Non Acid Forming (Barren)
141	EB2020779010	Meadowbrook	2730S10	LV2730S	Vermont Lower	Coal	385.55	386.33	0.78	7.0	15	0.21	0.010	0.3	9.3	-2.9	30.4	Non Acid Forming (Barren)
142	EB2020779011	Meadowbrook	2730S11	LV2730S	Vermont Lower	Coal	386.33	386.79	0.46	6.7	16	0.21	0.011	0.3	12	-5.6	35.6	Non Acid Forming (Barren)
132	EB2020779001	Meadowbrook	2730S01	LV2730S	Leichhardt Lower	Coal	353.58	354.37	0.79	8.4	14	0.08		2.5	35.9	-33.4	14.7	Non Acid Forming (Barren)
133	EB2020779002	Meadowbrook	2730S02	LV2730S	Leichhardt Lower	Coal	354.37	355.11	0.74	8.6	50	0.21	0.016	0.5	29.4	-23	60.0	Non Acid Forming (Barren)
134	EB2020779003	Meadowbrook	2730S03	LV2730S	Leichhardt Lower	Coal	355.11	355.91	0.80	7.9	42	0.23	0.013	0.4	7.5	-0.5	18.8	Non Acid Forming (Barren)
135	EB2020779004	Meadowbrook	2730S04	LV2730S	Leichhardt Lower	Coal	355.93	356.68	0.75	7.5	38	0.24	0.012	0.4	9.6	-2.2	26.1	Non Acid Forming (Barren)
136	EB2020779005	Meadowbrook	2730S05	LV2730S	Leichhardt Lower	Coal	356.68	357.45	0.77	8.2	27	0.21	0.019	0.6	20.2	-13.8	34.7	Non Acid Forming (Barren)
137	EB2020779006	Meadowbrook	2730S06	LV2730S	Leichhardt Lower	Coal	357.45	358.15	0.70	7.4	17	0.26	0.013	0.4	8.2	-0.2	20.6	Non Acid Forming (Barren)

Table C4: Multi-Element Test Results for Overburden, Interburden, Potential Coal Reject and Coal

		RGS Sample Number →	Composite 1	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6	Composite 7	Composite 8	Composite 9	Composite 10
		ALS Laboratory ID →	EB2012066001	EB2012066002	EB2012066003	EB2012066004	EB2012066005	EB2012066006	EB2012066007	EB2012066008	EB2012066009	EB2012066010
		Sample description →										
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HILs)-C	Soil	Clay	Sand	Overburden Sandstone	Overburden Siltstone	Overburden Mudstone	Overburden Carbonaceous	Interburden Sandstone	Interburden Siltstone	Interburden Mudstone
Major Cations			All units mg/kg									
Calcium (Ca)	50	-	15,400	4,240	8,690	12,800	7,290	5,640	2,010	35,200	18,900	13,600
Magnesium (Mg)	50	-	2,820	2,270	5,030	7,200	5,600	3,550	4,810	7,530	6,580	5,280
Potassium (K)	50	-	540	290	250	620	570	560	600	480	630	610
Sodium (Na)	50	-	1,410	2,840	2,230	1,680	1,760	2,360	1,850	1,340	1,900	2,010
Major, Minor & Trace Elements			All units mg/kg									
Aluminium (Al)	50	-	7,000	4,220	4,440	12,400	10,500	8,100	8,350	7,860	6,910	6,140
Antimony (Sb)	5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic (As)	5	300	<5	<5	<5	6	<5	<5	<5	11	8	7
Barium (Ba)	10	-	270	380	150	50	90	110	40	60	110	60
Beryllium (Be)	1	90	<1	2	1	<1	<1	<1	<1	<1	<1	<1
Boron (B)	50	20,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium (Cd)	1	90	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (Cr) - hexavalent	2	300 **	25	19	19	14	15	10	9	11	8	6
Cobalt (Co)	2	300	9	51	51	14	13	10	8	13	9	12
Copper (Cu)	5	17,000	8	13	11	38	37	26	38	29	47	52
Iron (Fe)	50	-	12,700	28,100	22,500	39,800	34,500	23,900	19,500	38,700	37,500	23,600
Lead (Pb)	5	600	7	6	6	11	11	6	14	10	13	15
Manganese (Mn)	5	19,000	305	1,590	725	769	753	505	220	1,100	616	407
Mercury (Hg)	0.1	80	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum (Mp)	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel (Ni)	2	1,200	17	59	50	26	26	22	19	22	21	23
Reactive Phosphorus (P)	0.1	-	<0.1	<0.1	0	<0.1	0.1	0.2	<0.1	0.1	0.2	0.1
Selenium (Se)	5	700	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Silver (Ag)	2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Thorium (Th)	0.1	-	1.6	1.6	1.2	2	2.2	2.5	1.2	2.2	2.5	2.4
Uranium (U)	0.1	-	0.4	0.2	0.2	0.2	0.2	0.5	0.2	0.2	0.2	0.2
Zinc (Zn)	5	30,000	9	48	37	65	68	55	50	48	66	68
Exchangable Cations			All units meq/100g (except Exchangable Sodium & Moisture Content (%))									
Exch. Calcium	0.2	-	9.7	4.0	2.6	3.0	3.1	5.0	5.4	3.1	3.9	4.6
Exch. Magnesium	0.2	-	9.3	10.4	6.0	4.9	6.0	7.7	8.9	2.8	4.5	5.4
Exch. Potassium	0.2	-	0.4	0.4	<0.2	0.3	0.3	0.2	0.3	0.3	0.4	0.5
Exch. Sodium	0.2	-	4.0	8.0	4.5	4.1	5.0	7.2	6.3	3.5	5.6	5.1
Cation Exchange Capacity	0.2	-	23.5	22.8	13.4	12.2	14.3	20.0	20.9	9.6	14.5	15.7
Calcium:Magnesium Ratio	-	-	1.0	0.4	0.4	0.6	0.5	0.6	0.6	1.1	0.9	0.8
Magnesium:Potassium Ratio	-	-	24.8	27.6	-	16.6	22.0	35.8	25.8	10.8	10.1	9.9
Exchangable Sodium Percentage	0.2%	-	17.3	35.3	33.9	33.6	35.0	35.8	29.9	36.2	38.9	32.6
Moisture content	1.0%	-	7.9	8.3	6.9	12.8	13.2	14.9	22.5	5.5	13.7	13.8

Notes: < indicates less than the laboratory limit of reporting. Shaded cells exceed applied guideline limit.

** Guideline level for Cr(VI) = 300 mg/kg. Guideline level for Cr(III) = 24% of total Cr.

1. NEPC (2013). National Environmental Protection Council (NEPC). *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)* , Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table C4: Multi-Element Test Results for Overburden, Interburden, Potential Coal Reject and Coal

	RGS Sample Number →		Composite 11	Composite 12	Composite 13	Composite 14	Composite 15	Composite 16	Composite 17	Composite 18
	ALS Laboratory ID →		EB2012066011	EB2012066012	EB2012066013	EB2018662012	EB2018662013	EB2018662014	EB2021757018	EB2021757019
	Sample description →									
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HILs)-C	Roof	Seam (Vermont Lower)	Floor	Roof (Leichhardt)	Roof and Floor (Vermont)	Coal (Vermont)	Potential coal rejects (Vermont Lower)	Coal (Leichhart and Vermont)
Major Cations			All units mg/kg							
Calcium (Ca)	50	-	15,200	22,100	14,200	8,030	5,630	13,400	10,300	6,460
Magnesium (Mg)	50	-	6,380	5,520	4,710	5,010	3,790	1,570	2,970	1,460
Potassium (K)	50	-	590	460	540	1,370	1,210	650	1,250	290
Sodium (Na)	50	-	1,560	1,360	1,670	1,850	2,050	1,140	1,980	420
Major, Minor & Trace Elements			All units mg/kg							
Aluminium (Al)	50	-	9,570	6,320	5,920	10,400	7,140	3,100	4,560	2,610
Antimony (Sb)	5	-	<5	<5	<5	0.1	0.2	0.8	<0.1	<0.1
Arsenic (As)	5	300	8	<5	10	12	8	49	2	0.4
Barium (Ba)	10	-	90	70	30	136	135	110	214	38.6
Beryllium (Be)	1	90	<1	<1	<1	0.9	0.8	0.5	1	0.3
Boron (B)	50	20,000	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium (Cd)	1	90	<1	<1	<1	0.1	0.1	0.2	0.1	<0.1
Chromium (Cr) - hexavalent	2	300 **	9	5	9	9.1	6.5	2.1	3.6	2.4
Cobalt (Co)	2	300	16	7	7	12	21	7	5	1
Copper (Cu)	5	17,000	44	30	38	47	47	31	61	20
Iron (Fe)	50	-	39,000	44,900	19,800	50,100	51,600	44,700	16,600	13,600
Lead (Pb)	5	600	14	10	11	16	19	13	15	5
Manganese (Mn)	5	19,000	608	480	562	1,570	2,160	2,590	313	286
Mercury (Hg)	0.1	80	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
Molybdenum (Mp)	2	2	<2	<2	<2	0.7	2.2	0.5	0.9	0.2
Nickel (Ni)	2	1,200	26	13	17	19.1	24.8	8.1	9.2	1.6
Reactive Phosphorus (P)	0.1	-	0.2	<0.1	0.2	1.0	1.0	<0.1	0.3	<0.1
Selenium (Se)	5	700	<5	<5	<5	<1	<1	<1	<1	<1
Silver (Ag)	2	-	<2	<2	<2	0.1	0.2	<0.1	<0.1	<0.1
Thorium (Th)	0.1	-	2.2	1.6	1.7	1.8	3.8	4.0	1.6	1.0
Uranium (U)	0.1	-	0.2	0.3	0.2	0.3	0.6	0.9	0.2	0.3
Zinc (Zn)	5	30,000	66	45	86	91	76	53	42	17
Exchangable Cations			All units meq/100g (except Exchangable Sodium & Moisture Content (%))							
Exch. Calcium	0.2	-	-	-	-	-	-	-	-	-
Exch. Magnesium	0.2	-	-	-	-	-	-	-	-	-
Exch. Potassium	0.2	-	-	-	-	-	-	-	-	-
Exch. Sodium	0.2	-	-	-	-	-	-	-	-	-
Cation Exchange Capacity	0.2	-	-	-	-	-	-	-	-	-
Calcium:Magnesium Ratio	-	-	-	-	-	-	-	-	-	-
Magnesium:Potassium Ratio	-	-	-	-	-	-	-	-	-	-
Exchangable Sodium Percentage	0.2%	-	-	-	-	-	-	-	-	-
Moisture content	1.0%	-	-	-	-	-	-	-	-	-

Notes: < indicates less than the laboratory limit of reporting. Shaded cells exceed applied guideline limit.

** Guideline level for Cr(VI) = 300 mg/kg. Guideline level for Cr(III) = 24% of total Cr.

1. NEPC (2013). National Environmental Protection Council (NEPC). *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)* , Amendment of Schedule B1-B7 of 1999 version. Guideline on Investigation Levels for Soil and Groundwater. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table C5: Geochemical Abundance Index Results for Overburden, Interburden, Potential Coal Reject and Coal

	RGS Sample Number →		Composite 1	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6	Composite 7	Composite 8	Composite 9	Composite 10
	ALS Laboratory ID →		EB2012066001	EB2012066002	EB2012066003	EB2012066004	EB2012066005	EB2012066006	EB2012066007	EB2012066008	EB2012066009	EB2012066010
	Sample description →											
Parameters	Limit of Reporting	Median Crustal Abundance[1]	Soil	Clay	Sand	Overburden Sandstone	Overburden Siltstone	Overburden Mudstone	Overburden Carbonaceous	Interburden Sandstone	Interburden Siltstone	Interburden Mudstone
Major Elements	all units mg/kg		Geochemical Abundance Index									
Calcium (Ca)	50	15,000	0	0	0	0	0	0	0	1	0	0
Magnesium (Mg)	50	5,000	0	0	0	0	0	0	0	0	0	0
Potassium (K)	50	14,000	0	0	0	0	0	0	0	0	0	0
Sodium (Na)	50	5,000	0	0	0	0	0	0	0	0	0	0
Major, Minor & Trace Elements	all units mg/kg		Geochemical Abundance Index									
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0	0	0
Antimony (Sb)	5	5	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	5	6	0	0	0	0	0	0	0	0	0	0
Barium (Ba)	10	500	0	0	0	0	0	0	0	0	0	0
Beryllium (Be)	1	6	0	0	0	0	0	0	0	0	0	0
Boron (B)	50	100	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd)	1	0.35	0	0	0	0	0	0	0	0	0	0
Chromium (Cr) - hexavalent	2	70	0	0	0	0	0	0	0	0	0	0
Cobalt (Co)	2	8	0	2	2	0	0	0	0	0	0	0
Copper (Cu)	5	30	0	0	0	0	0	0	0	0	0	0
Iron (Fe)	50	40,000	0	0	0	0	0	0	0	0	0	0
Lead (Pb)	5	35	0	0	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	0	0	0	0	0	0
Mercury (Hg)	0.1	0.06	0	0	0	0	0	0	0	0	0	0
Molybdenum (Mo)	2	2	0	0	0	0	0	0	0	0	0	0
Nickel (Ni)	2	50	0	0	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	0.1	800	0	0	0	0	0	0	0	0	0	0
Selenium (Se)	5	0.4	2	2	2	2	2	2	2	2	2	2
Silver (Ag)	2	0.057	0	0	0	0	0	0	0	0	0	0
Thallium (Tl)	5	2.5	0	0	0	0	0	0	0	0	0	0
Uranium (U)	0.1	2	0	0	0	0	0	0	0	0	0	0
Zinc (Zn)	5	90	0	0	0	0	0	0	0	0	0	0

Notes: GAI's greater than or equal to 3 are highlighted.
1. Median Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009). When no GARD Guide value is available for a particular element, then values are taken from Bowen H.J.M.(1979) Environmental Chemistry of the Elements, pages 60-61.

Table C5: Geochemical Abundance Index Results for Overburden, Interburden, Potential Coal Reject and Coal

	RGS Sample Number →		Composite 11	Composite 12	Composite 13	Composite 14	Composite 15	Composite 16	Composite 17	Composite 18
	ALS Laboratory ID →		EB2012066011	EB2012066012	EB2012066013	EB2018662012	EB2018662013	EB2018662014	EB2021757018	EB2021757019
	Sample description →									
Parameters	Limit of Reporting	Median Crustal Abundance[1]	Roof	Seam (Vermont Lower)	Floor	Roof (Leichhardt)	Roof and Floor (Vermont)	Coal (Vermont)	Potential coal rejects (Vermont Lower)	Coal (Leichhart and Vermont)
Major Elements	all units mg/kg		Geochemical Abundance Index							
Calcium (Ca)	50	15,000	0	0	0	0	0	0	0	0
Magnesium (Mg)	50	5,000	0	0	0	0	0	0	0	0
Potassium (K)	50	14,000	0	0	0	0	0	0	0	0
Sodium (Na)	50	5,000	0	0	0	0	0	0	0	0
Major, Minor & Trace Elements	all units mg/kg		Geochemical Abundance Index							
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0
Antimony (Sb)	5	5	0	0	0	0	0	0	0	0
Arsenic (As)	5	6	0	0	0	0	0	2	0	0
Barium (Ba)	10	500	0	0	0	0	0	0	0	0
Beryllium (Be)	1	6	0	0	0	0	0	0	0	0
Boron (B)	50	100	0	0	0	0	0	0	0	0
Cadmium (Cd)	1	0.35	0	0	0	0	0	0	0	0
Chromium (Cr) - hexavalent	2	70	0	0	0	0	0	0	0	0
Cobalt (Co)	2	8	0	0	0	0	1	0	0	0
Copper (Cu)	5	30	0	0	0	0	0	0	0	0
Iron (Fe)	50	40,000	0	0	0	0	0	0	0	0
Lead (Pb)	5	35	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1000	0	0	0	0	1	1	0	0
Mercury (Hg)	0.1	0.06	0	0	0	0	0	1	0	0
Molybdenum (Mo)	2	2	0	0	0	0	0	0	0	0
Nickel (Ni)	2	50	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	0.1	800	0	0	0	0	0	0	0	0
Selenium (Se)	5	0.4	2	2	2	0	0	0	0	0
Silver (Ag)	2	0.057	0	0	0	0	1	0	0	0
Thallium (Tl)	5	2.5	0	0	0	0	0	0	0	0
Uranium (U)	0.1	2	0	0	0	0	0	0	0	0
Zinc (Zn)	5	90	0	0	0	0	0	0	0	0

Notes: GAI's greater than or equal to 3 are highlighted.

1. Average Crustal Abundance values sourced from the "GARD Guide", Chapter 5 (INAP, 2009). When no GARD Guide value is available for a particular elei then values are taken from Bowen H.J.M.(1979) Environmental Chemistry of the Elements, pages 60-61.

Table C6: Multi-Element Test Results for Water Extracts from Overburden, Interburden, Potential Coal Reject and Coal

		RGS Sample Number →		Composite 1	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6	Composite 7	Composite 8	Composite 9	Composite 10
		ALS Laboratory ID →		EB2012066001	EB2012066002	EB2012066003	EB2012066004	EB2012066005	EB2012066006	EB2012066007	EB2012066008	EB2012066009	EB2012066010
		Sample description →		Soil	Clay	Sand	Overburden Sandstone	Overburden Siltstone	Overburden Mudstone	Overburden Carbonaceous	Interburden Sandstone	Interburden Siltstone	Interburden Mudstone
		Water Quality Guidelines:											
Parameters	Limit of Reporting	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]										
pH	0.01 pH unit	6 to 9	-	8.9	9.3	9.6	10.0	9.8	9.4	9.4	10.1	10.1	9.9
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	825	597	1,040	582	634	767	410	455	565	672
Carbonate Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	69	52	34	52	34	34	18	74	34	34
Bicarbonate Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	1,760	636	618	704	308	206	210	784	428	480
Total Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	1,828	686	652	756	344	240	228	858	464	516
Acidity ($mgCaCO_3/L$)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Net Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	1,828	686	652	756	344	240	228	858	464	516
Major Ions	All units mg/L			All units mg/L									
Calcium (Ca)	2	-	1,000	4	2	<2	<2	<2	<2	<2	<2	<2	<2
Magnesium (Mg)	2	-	-	4	4	<2	<2	<2	<2	<2	<2	<2	<2
Potassium (K)	2	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sodium (Na)	2	-	-	176	360	204	124	140	164	106	94	124	152
Chloride (Cl)	2	-	-	202	552	292	112	156	230	102	54	104	176
Fluoride (F)	0.2	-	2	2.8	1.4	1.2	0.4	0.8	1.0	0.8	0.2	0.2	0.2
Sulfate (SO_4)	2	-	1,000	92	88	44	26	34	38	36	16	22	28
Trace Metals/Metalloids	All units mg/L			All units mg/L									
Aluminium (Al)	0.02	0.055	5	<0.02	<0.02	<0.02	0.06	0.04	<0.02	0.04	0.18	0.08	0.10
Antimony (Sb)	0.002	-	-	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.004	0.004	0.004	0.008
Arsenic (As) - trivalent	0.002	0.024 **	0.5	<0.002	<0.002	<0.002	0.046	0.008	0.002	0.020	0.196	0.140	0.126
Barium (Ba)	0.002	-	-	0.020	0.006	<0.002	0.004	<0.002	<0.002	<0.002	0.006	0.012	0.016
Beryllium (Be)	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron (B)	0.2	0.37	5	0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium (Cd)	0.002	0.0002	0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium (Cr) - total	0.002	0.001 (hex)*	1 (total)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt (Co)	0.002	-	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Copper (Cu)	0.002	0.0014	1	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (Fe)	0.2	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead (Pb)	0.002	0.0034	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Manganese (Mn)	0.002	1.90	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (Mo)	0.002	-	0.15	0.004	0.002	0.002	0.010	0.006	0.004	0.036	0.014	0.028	0.062
Nickel (Ni)	0.002	0.011	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium (Se)	0.02	0.011	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silica (SiO_2)	0.2	-	-	5.4	4.6	5.8	3.2	3.2	3.6	2.4	2.4	2.4	2.4
Thorium (Th)	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium (U)	0.002	-	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium (V)	0.02	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc (Zn)	0.01	0.008	20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

* Cr (VI) = hexavalent. ** 0.013 mg/L for pentavalent Arsenic (V).

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm

^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC. TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values.

1. ANZECC & ARMCANZ (2000). Trigger values for aquatic ecosystems (95% species protection level)

2. ANZECC & ARMCANZ (2000). Recommended guideline limits for Livestock Drinking Water.

Table C6: Multi-Element Test Results for Water Extracts from Overburden, Interburden, Potential Coal Reject and Coal

		RGS Sample Number →		Composite 11	Composite 12	Composite 13	Composite 14	Composite 15	Composite 16	Composite 17	Composite 18
		ALS Laboratory ID →		EB2012066011	EB2012066012	EB2012066013	EB2018662012	EB2018662013	EB2018662014	EB2021757018	EB2021757019
		Sample description →		Roof	Seam	Floor	Roof (Leichhardt)	Roof and Floor (Vermont)	Coal (Vermont)	Potential coal rejects (Vermont Lower)	Coal (Leichhart and Vermont)
		Water Quality Guidelines:									
Parameters	Limit of Reporting	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]								
pH	0.01 pH unit	6 to 9	-	10.1	10.0	9.8	9.6	9.7	9.8	9.8	9.7
Electrical Conductivity	1 µS/cm	<1,000#	3,580^	384	197	570	487	309	309	493	107
Carbonate Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	52	34	35	200	216	83	400	216
Bicarbonate Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	224	189	368	1,092	434	200	6,620	1,008
Total Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	274	224	402	1,292	650	284	6,220	792
Acidity ($mgCaCO_3/L$)	1 mg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Net Alkalinity ($mgCaCO_3/L$)	1 mg/L	-	-	274	224	402	1,292	650	284	6,220	792
Major Ions	All units mg/L			All units mg/L							
Calcium (Ca)	2	-	1,000	<2	<2	<2	<2	<2	<2	<2	<2
Magnesium (Mg)	2	-	-	<2	<2	<2	<2	<2	<2	<2	<2
Potassium (K)	2	-	-	<2	<2	<2	4	<2	<2	<2	<2
Sodium (Na)	2	-	-	92	108	128	104	72	74	<2	<2
Chloride (Cl)	2	-	-	32	88	128	22	12	6	12	6
Fluoride (F)	0.2	-	2	0.2	0.2	0.6	0.2	<0.2	0.8	<0.2	<0.2
Sulfate (SO_4)	2	-	1,000	18	34	36	20	34	18	4	<2
Trace Metals/Metalloids	All units mg/L			All units mg/L							
Aluminium (Al)	0.02	0.055	5	0.16	0.12	0.04	0.44	0.46	0.16	0.60	0.52
Antimony (Sb)	0.002	-	-	0.006	0.004	0.002	0.022	0.024	0.008	0.004	<0.002
Arsenic (As) - trivalent	0.002	0.024 **	0.5	0.200	0.044	0.182	0.444	0.330	0.030	0.138	0.006
Barium (Ba)	0.002	-	-	0.006	0.016	<0.002	0.020	0.004	0.016	0.016	0.010
Beryllium (Be)	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron (B)	0.2	0.37	5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium (Cd)	0.002	0.0002	0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium (Cr) - total	0.002	0.001 (hex)*	1 (total)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt (Co)	0.002	-	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Copper (Cu)	0.002	0.0014	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (Fe)	0.2	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead (Pb)	0.002	0.0034	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Manganese (Mn)	0.002	1.90	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury (Hg)	0.0001	0.0006	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (Mo)	0.002	-	0.15	0.056	0.036	0.024	0.046	0.260	0.012	0.028	0.002
Nickel (Ni)	0.002	0.011	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium (Se)	0.02	0.011	0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Silica (SiO_2)	0.2	-	-	2.6	1.8	2.8	6.4	7.6	5.8	10.0	3.8
Thorium (Th)	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium (U)	0.002	-	0.2	<0.002	<0.002	<0.002	0.040	0.060	0.040	<0.002	<0.002
Vanadium (V)	0.02	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	<0.02
Zinc (Zn)	0.01	0.008	20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

* Cr (VI) = hexavalent. ** 0.013 mg/L for pentavalent Arsenic (V).

for still water bodies only, moving rivers at low flow rates should not exceed 2,200µS/cm

^ calculated based on total dissolved solids (TDS) conversion rate of 0.67% of EC. TDS is an approximate measure of inorganic dissolved salts and should not exceed 2,400mg/L for livestock drinking water.

Notes: < indicates concentration less than the detection limit. Shaded cells exceed applied guideline values.

1. ANZECC & ARMCANZ (2000). Trigger values for aquatic ecosystems (95% species protection level)

2. ANZECC & ARMCANZ (2000). Recommended guideline limits for Livestock Drinking Water.

Table C7: Acid Base Account Test Results for Overburden, Interburden, Potential Coal Reject and Coal

RGS Sample ID	ALS Sample ID	Deposit	Client Sample ID	Drill Hole ID	Sample Lithology	Sample Type	From	To	Interval	pH[1]	EC[1]	Total S	Scr	MPA[2]	ANC[2]	NAPP[2]	ANC:MPA Ratio	Sample Classification[3]	KLC
							(m)				(µS/cm)	(%)		(kgH_2SO_4/t)					
23	EB2010668010	Meadowbrook	2694M10	LV2694	Sandstone	Overburden	37.00	38.00	1.00	10	465	0.07		2.1	150	-147.9	70.0	Non Acid Forming (Barren)	
24	EB2010668011	Meadowbrook	2694M11	LV2694	Sandstone	Overburden	38.00	43.00	5.00	9.7	713	0.02		0.6	148	-147.4	241.6	Non Acid Forming (Barren)	
25	EB2010668014	Meadowbrook	2694M14	LV2694	Sandstone	Overburden	54.00	58.00	4.00	9.5	1230	0.04		1.2	36.1	-34.9	29.5	Non Acid Forming (Barren)	
26	EB2010668015	Meadowbrook	2694M15	LV2694	Sandstone	Overburden	61.00	63.00	2.00	9.9	789	0.01		0.3	143	-142.7	466.9	Non Acid Forming (Barren)	
27	EB2010668016	Meadowbrook	2694M16	LV2694	Sandstone	Overburden	67.00	68.00	1.00	10	708	0.005		0.2	201	-200.8	1312.7	Non Acid Forming (Barren)	
28	EB2010668031	Meadowbrook	2696M11	LV2696	Sandstone	Overburden	44.50	46.00	1.50	9.7	517	0.005		0.2	27.5	-27.3	179.6	Non Acid Forming (Barren)	
29	EB2010668033	Meadowbrook	2696M13	LV2696	Sandstone	Overburden	50.50	55.00	4.50	9.5	383	0.01		0.3	17.9	-17.6	58.4	Non Acid Forming (Barren)	
30	EB2010668037	Meadowbrook	2696M17	LV2696	Sandstone	Overburden	70.00	73.30	3.30	10	303	0.005		0.2	33.7	-33.5	220.1	Non Acid Forming (Barren)	
31	EB2010668038	Meadowbrook	2696M18	LV2696	Sandstone	Overburden	73.30	81.00	7.70	9.9	267	0.005		0.2	25.9	-25.7	169.1	Non Acid Forming (Barren)	KLC1
32	EB2010668070	Meadowbrook	2697M10	LV2697	Sandstone	Overburden	42.00	43.00	1.00	10	256	0.04		1.2	42.7	-41.5	34.9	Non Acid Forming (Barren)	
33	EB2010668071	Meadowbrook	2697M11	LV2697	Sandstone	Overburden	47.00	48.00	1.00	10.1	263	0.04		1.2	44.9	-43.7	36.7	Non Acid Forming (Barren)	
34	EB2010668072	Meadowbrook	2697M12	LV2697	Sandstone	Overburden	50.00	52.70	2.70	10.1	274	0.02		0.6	80.8	-80.2	131.9	Non Acid Forming (Barren)	
35	EB2010668076	Meadowbrook	2697M16	LV2697	Sandstone	Overburden	70.00	71.00	1.00	10.2	319	0.005		0.2	55.3	-55.1	361.1	Non Acid Forming (Barren)	
36	EB2010668077	Meadowbrook	2697M17	LV2697	Sandstone	Overburden	75.00	76.00	1.00	10.2	287	0.005		0.2	63.5	-63.3	414.7	Non Acid Forming (Barren)	
37	EB2010668069	Meadowbrook	2697M9	LV2697	Sandstone	Overburden	35.00	38.00	3.00	9.9	291	0.02		0.6	55.6	-55.0	90.8	Non Acid Forming (Barren)	
38	EB2010668091	Meadowbrook	2703M05	LV2703	Sandstone	Overburden	16.00	17.00	1.00	9.2	1080	0.01		0.3	41.8	-41.5	136.5	Non Acid Forming (Barren)	
39	EB2010668093	Meadowbrook	2703M07	LV2703	Sandstone	Overburden	26.00	27.00	1.00	9.7	332	0.005		0.2	148	-147.8	966.5	Non Acid Forming (Barren)	
40	EB2010668009	Meadowbrook	2694M09	LV2694	Siltstone	Overburden	33.00	36.00	3.00	8.9	352	0.02		0.6	22.7	-22.1	37.1	Non Acid Forming (Barren)	
41	EB2010668013	Meadowbrook	2694M13	LV2694	Siltstone	Overburden	49.80	51.50	1.70	9.4	1360	0.09		2.8	33.5	-30.7	12.2	Non Acid Forming (Barren)	
42	EB2010668017	Meadowbrook	2694M17	LV2694	Siltstone	Overburden	71.80	73.00	1.20	9.5	522	0.01		0.3	115	-114.7	375.5	Non Acid Forming (Barren)	
43	EB2010668029	Meadowbrook	2696M09	LV2696	Siltstone	Overburden	35.00	36.00	1.00	8.4	1270	0.005		0.2	17	-16.8	111.0	Non Acid Forming (Barren)	
44	EB2010668030	Meadowbrook	2696M10	LV2696	Siltstone	Overburden	40.00	41.00	1.00	9.8	382	0.005		0.2	105	-104.8	685.7	Non Acid Forming (Barren)	
45	EB2010668032	Meadowbrook	2696M12	LV2696	Siltstone	Overburden	48.00	50.50	2.50	9.8	365	0.005		0.2	40.4	-40.2	263.8	Non Acid Forming (Barren)	
46	EB2010668034	Meadowbrook	2696M14	LV2696	Siltstone	Overburden	60.00	61.00	1.00	10	330	0.005		0.2	53.5	-53.3	349.4	Non Acid Forming (Barren)	
47	EB2010668035	Meadowbrook	2696M15	LV2696	Siltstone	Overburden	62.30	66.00	3.70	9.9	415	0.005		0.2	23.9	-23.7	156.1	Non Acid Forming (Barren)	
48	EB2010668036	Meadowbrook	2696M16	LV2696	Siltstone	Overburden	66.00	70.00	4.00	9.7	220	0.005		0.2	18.9	-18.7	123.4	Non Acid Forming (Barren)	
49	EB2010668039	Meadowbrook	2696M19	LV2696	Siltstone	Overburden	81.00	86.00	5.00	9.8	180	0.005		0.2	22.2	-22.0	145.0	Non Acid Forming (Barren)	
50	EB2010668073	Meadowbrook	2697M13	LV2697	Siltstone	Overburden	54.00	55.00	1.00	10	278	0.02		0.6	39.7	-39.1	64.8	Non Acid Forming (Barren)	
51	EB2010668065	Meadowbrook	2697M5	LV2697	Siltstone	Overburden	19.00	20.00	1.00	9.4	760	0.005		0.2	22.1	-21.9	144.3	Non Acid Forming (Barren)	KLC2
52	EB2010668066	Meadowbrook	2697M6	LV2697	Siltstone	Overburden	24.00	25.00	1.00	8.6	663	0.005		0.2	15.5	-15.3	101.2	Non Acid Forming (Barren)	
53	EB2010668067	Meadowbrook	2697M7	LV2697	Siltstone	Overburden	29.00	30.00	1.00	8.7	563	0.005		0.2	16.9	-16.7	110.4	Non Acid Forming (Barren)	
54	EB2010668092	Meadowbrook	2703M06	LV2703	Siltstone	Overburden	22.00	23.00	1.00	9.6	622	0.005		0.2	57	-56.8	372.2	Non Acid Forming (Barren)	
76	EB2010668020	Meadowbrook	2694M20	LV2694	Siltstone	Interburden	83.00	84.00	1.00	9.5	1000	0.02		0.6	42.1	-41.5	68.7	Non Acid Forming (Barren)	
77	EB2010668049	Meadowbrook	2696M29	LV2696	Siltstone	Interburden	129.00	130.15	1.15	9.7	325	0.02		0.6	24.2	-23.6	39.5	Non Acid Forming (Barren)	
78	EB2010668060	Meadowbrook	2696M40	LV2696	Siltstone	Interburden	175.00	178.00	3.00	10.1	389	0.03		0.9	107	-106.1	116.5	Non Acid Forming (Barren)	
79	EB2010668082	Meadowbrook	2697M22	LV2697	Siltstone	Interburden	95.00	97.00	2.00	9.9	316	0.02		0.6	42	-41.4	68.6	Non Acid Forming (Barren)	
80	EB2010668083	Meadowbrook	2697M23	LV2697	Siltstone	Interburden	100.50	102.00	1.50	10	387	0.02		0.6	105	-104.4	171.4	Non Acid Forming (Barren)	
81	EB2010668085	Meadowbrook	2697M25	LV2697	Siltstone	Interburden	111.00	112.00	1.00	9.8	323	0.17	0.150	4.6	44	-39.4	9.6	Non Acid Forming	
82	EB2010668086	Meadowbrook	2697M26	LV2697	Siltstone	Interburden	116.00	117.00	1.00	10	424	0.02		0.6	88.6	-88.0	144.7	Non Acid Forming (Barren)	
83	EB2010668096	Meadowbrook	2703M10	LV2703	Siltstone	Interburden	48.00	49.00	1.00	9.4	364	0.07		2.1	32.9	-30.8	15.3	Non Acid Forming (Barren)	
84	EB2010668099	Meadowbrook	2703M14	LV2704	Siltstone	Interburden	68.00	69.00	1.00	9.5	1220	0.03		0.9	66.2	-65.3	72.1	Non Acid Forming (Barren)	
61	EB2010668041	Meadowbrook	2696M21	LV2696	Sandstone	Interburden	93.50	96.00	2.50	10	343	0.005		0.2	33	-32.8	215.5	Non Acid Forming (Barren)	
62	EB2010668043	Meadowbrook	2696M23	LV2696	Sandstone	Interburden	99.50	102.00	2.50	10.3	416	0.07		2.1	126	-123.9	58.8	Non Acid Forming (Barren)	
63	EB2010668044	Meadowbrook	2696M24	LV2696	Sandstone	Interburden	102.00	107.00	5.00	10.2	454	0.01		0.3	58.3	-58.0	190.4	Non Acid Forming (Barren)	
64	EB2010668045	Meadowbrook	2696M25	LV2696	Sandstone	Interburden	107.00	112.00	5.00	10.1	452	0.01		0.3	66.2	-65.9	216.2	Non Acid Forming (Barren)	
65	EB2010668046	Meadowbrook	2696M26	LV2696	Sandstone	Interburden	112.00	117.00	5.00	10	522	0.01		0.3	111	-110.7	362.4	Non Acid Forming (Barren)	
66	EB2010668047	Meadowbrook	2696M27	LV2696	Sandstone	Interburden	121.00	122.00	1.00	10.1	286	0.03		0.9	249	-248.1	271.0	Non Acid Forming (Barren)	
67	EB2010668048	Meadowbrook	2696M28	LV2696	Sandstone	Interburden	122.00	127.00	5.00	10.1	343	0.005		0.2	260	-259.8	1698.0	Non Acid Forming (Barren)	
68	EB2010668050	Meadowbrook	2696M30	LV2696	Sandstone	Interburden	134.00	136.00	2.00	10	675	0.02		0.6	104	-103.4	169.8	Non Acid Forming (Barren)	KLC3
69	EB2010668053	Meadowbrook	2696M33	LV2696	Sandstone	Interburden	146.70	149.00	2.30	10.2	438	0.02		0.6	54.3	-53.7	88.7	Non Acid Forming (Barren)	
70	EB2010668054	Meadowbrook	2696M34	LV2696	Sandstone	Interburden	152.00	154.00	2.00	10.2	334	0.02		0.6	49.1	-48.5	80.2	Non Acid Forming (Barren)	
71	EB2010668055	Meadowbrook	2696M35	LV2696	Sandstone	Interburden	156.00	159.00	3.00	10.1	318	0.02		0.6	37.7	-37.1	61.6	Non Acid Forming (Barren)	
72	EB2010668056	Meadowbrook	2696M36	LV2696	Sandstone	Interburden	164.00	165.95	1.95	10.2	409	0.02		0.6	104	-103.4	169.8	Non Acid Forming (Barren)	
73	EB2010668059	Meadowbrook	2696M39	LV2696	Sandstone	Interburden	174.00	175.00	1.00	9.9	342	0.07		2.1	18.7	-16.6	8.7	Non Acid Forming (Barren)	
74	EB2010668081	Meadowbrook	2697M21	LV2697	Sandstone	Interburden	87.50	89.00	1.50	10	318	0.01		0.3	105	-104.7	342.9	Non Acid Forming (Barren)	
75	EB2010668095	Meadowbrook	2703M09	LV2703	Sandstone	Interburden	39.00	42.00	3.00	9.9	294	0.06		1.8	75.8	-74.0	41.3	Non Acid Forming (Barren)	
88	EB2010668051	Meadowbrook	2696M31	LV2696	Roof (Vermont Upper)	Potential Coal Rejects	138.00	139.40	1.40	9.8	199	0.05		1.5	21.8	-20.3	14.2	Non Acid Forming (Barren)	
89	EB2010668078	Meadowbrook	2697M18	LV2697	Roof (Vermont Upper)	Potential Coal Rejects	77.00	79.60	2.60	10.1	319	0.11	0.070	2.1	44.9	-42.8	20.9	Non Acid Forming (Barren)	
90	EB2010668097	Meadowbrook	2703M11	LV2703	Roof (Vermont Lower)	Potential Coal Rejects	53.00	54.30	1.30	9.9	449	0.28	0.246	7.5	111	-103.5	14.7	Non Acid Forming	
91	EB2010668052	Meadowbrook	2696M32	LV2696	Seam (Vermont Upper)	Potential Coal Rejects	139.40	140.80	1.40	9.9	288	0.06		1.8	29.7	-27.9	16.2	Non Acid Forming (Barren)	KLC4
92	EB2010668079	Meadowbrook	2697M19	LV2697	Seam (Vermont Upper)	Potential Coal Rejects	79.60	80.30	0.70	10	233	0.27	0.236	7.2	30.9	-23.7	4.3	Non Acid Forming	
93	EB2010668018	Meadowbrook	2694M18	LV2694	Seam (Vermont Lower)	Potential Coal Rejects	74.75	75.65	0.90	9.4	529	0.34	0.128	3.9	18.2	-14.3	4.6	Non Acid Forming	
94	EB2010668058	Meadowbrook	2696M38	LV2696	Seam (Vermont Lower)	Potential Coal Rejects	166.49	167.77	1.28	9.8	387	0.29	0.106	3.2	178	-174.8	54.8	Non Acid Forming (Barren)	
95	EB2010668084	Meadowbrook	2697M24	LV2697	Seam (Vermont Lower)	Potential Coal Rejects	105.20	106.00	0.80	10	323	0.49	0.403	12.3	199	-186.7	16.1	Non Acid Forming	
132	EB2020779001	Meadowbrook	2730S01		Leichhardt Lower	Coal	353.58	354.37	0.79	8.4	14	0.08		2.5	35.9	-33.4	14.7	Non Acid Forming (Barren)	
133	EB2020779002	Meadowbrook	2730S02		Leichhardt Lower	Coal	354.37	355.11	0.74	8.6	50	0.21	0.016	6.4	29.4	-23	4.6	Non Acid Forming (Barren)	
134	EB2020779003	Meadowbrook	2730S03		Leichhardt Lower	Coal	355.11	355.91	0.80	7.9	42	0.23	0.013	7.0	7.5	-0.5	1.1	Non Acid Forming (Barren)	
135	EB2020779004	Meadowbrook	2730S04		Leichhardt Lower	Coal	355.93	356.68	0.75	7.5	38	0.24	0.012	7.4	9.6	-2.2	1.3	Non Acid Forming (Barren)	
136	EB2020779005	Meadowbrook	2730S05		Leichhardt Lower	Coal	356.68	357.45	0.77	8.2	27	0.21	0.019	6.4	20.2	-13.8	3.1	Non Acid Forming (Barren)	
137	EB2020779006	Meadowbrook	2730S06		Leichhardt Lower	Coal	357.45	358.15	0.70	7.4	17	0.26	0.013	8.0	8.2	-0.2	1.0	Non Acid Forming (Barren)	KLC5
138	EB2020779007	Meadowbrook	2730S07		Vermont Lower	Coal	382.94	383.71	0.77	7.3	15	0.21	0.013	6.4	6.5	-0.07	1.0	Non Acid Forming (Barren)	
139	EB2020779008	Meadowbrook	2730S08		Vermont Lower	Coal	383.97	384.77	0.80	8	25	0.2	0.012	6.1	10	-3.9	1.6	Non Acid Forming (Barren)	
140	EB2020779009	Meadowbrook	2730S09		Vermont Lower	Coal	384.77	385.55	0.78	7.4	12	0.21	0.012	6.4	10.6	-4.2	1.6	Non Acid Forming (Barren)	
141	EB2020779010	Meadowbrook	2730S10		Vermont Lower	Coal	385.55	386.33	0.78	7	15	0.21	0.010	6.4	9.3	-2.9	1.4	Non Acid Forming (Barren)	
142	EB2020779011	Meadowbrook	2730S11		Vermont Lower	Coal	386.33	386.79	0.46	6.7	16	0.21	0.011	6.4	12	-5.6	1.9	Non Acid Forming (Barren)	

1. Current pH and EC values provided for 1:5 sample:water extracts
2. Scr = Chromium Reducible Sulfur; MPA = Maximum Potential Acidity; ANC = Acid Neutralising Capacity; and NAPP = Net Acid Producing Potential.
3. Sample classification criteria detail provided in report text.

* Where total sulfur or ANC results are less than the laboratory LoR a value of half of the LoR is used in Table C7.

Attachment D Kinetic Geochemical Test Results

KLC 1 - Overburden sandstone

Weight (kg)	1.93	**Total S (%)**	0.02	**ANC**	77.4
pH (1:5)	9.9	**Scr (%)**	-	**NAPP**	-76.8
EC (µS/cm)	499	**MPA**	0.6	**ANC:MPA**	140.4

Date			12-May-20	09-Jun-20	07-Jul-20	04-Aug-20	01-Sep-20	29-Sep-20	27-Oct-20
Number of Weeks			0	4	9	13	17	22	26
Leach Number			1	2	3	4	5	6	7
ALS Laboratory Number			EB2012596001	EB2015275001	EB2017832001	EB2020420001	EB2022978001	EB2025596001	EB2028067001
Volume On (L)			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Volume Off (L)			0.799	0.675	0.662	0.684	0.620	0.736	0.761
Cum. Volume (L)			0.80	1.47	2.14	2.82	3.44	4.18	4.94
Pore Volumes			0.6	1.1	1.6	2.1	2.5	3.1	3.7
pH (RGS Measurement)			8.37	9.91	9.03	9.36	9.73	8.38	8.18
pH (ALS Measurement)			7.76	9.35	9.10	9.15	8.62	7.65	7.10
pH (deionised water used in test)			6.10	6.75	6.73	6.48	6.23	6.59	6.62
EC (RGS Measurement) (µS/cm)			507	387	268	271	300	289	232
EC (ALS Measurement) (µS/cm)			576	399	259	325	352	282	248
Acidity (mg/L)*			5	<1	<1	<1	<1	2	<1
Alkalinity (mg/L)*			21	38	49	29	33	30	20
Net Alkalinity (mg/L)*			16	38	49	29	33	28	19
Major Ions (mg/L)	**LoR**	**WQ Guidelines#**							
Calcium (Ca)	1	1,000	5	2	2	2	2	2	2
Potassium (K)	1	-	1	1	<1	<1	1	<1	<1
Magnesium (Mg)	1	-	5	1	1	1	2	1	1
Sodium (Na)	1	-	102	74	52	63	70	54	45
Chloride (Cl)	1	-	152	86	49	62	69	52	39
Fluoride (F)	0.1	2	0.2	0.2	0.1	0.1	0.2	0.1	0.1
Sulfate (SO_4)	1	1,000	24	22	21	27	28	28	34
Trace metals/ metalloids (mg/L)	**LoR**	**LoR**							
Aluminium (Al)	0.01	5	0.09	0.72	0.49	0.47	0.63	0.20	0.16
Arsenic (As)	0.001	0.5	0.009	0.016	0.008	0.004	0.006	0.002	0.002
Boron (B)	0.05	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Cd)	0.0001	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Co)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	1	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.003
Iron (Fe)	0.05	1	<0.05	0.13	0.11	0.12	0.14	0.06	0.06
Manganese (Mn)	0.001	2	0.014	0.001	0.002	0.001	0.002	0.003	0.003
Molybdenum (Mo)	0.001	0.15	0.01	0.004	0.005	0.006	0.006	0.006	0.005
Nickel (Ni)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	0.005	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calculations**									
SO_4 Release Rate			10	8	7	10	9	11	13
Cumulative SO_4 Release			10	18	25	34	43	54	68
Ca Release Rate			2.1	0.7	0.7	0.7	0.6	0.8	0.8
Cumulative Ca Release			2.1	2.8	3.5	4.2	4.8	5.6	6.4
Mg Release Rate			2.1	0.4	0.3	0.4	0.6	0.4	0.4
Cumulative Mg Release			2.1	2.4	2.8	3.1	3.8	4.1	4.5
Residual ANC (%)			99.98	99.98	99.97	99.97	99.97	99.96	99.96
Residual Sulfur (%)			98.16	96.73	95.39	93.61	91.95	89.96	87.47
SO_4/(Ca+Mg) molar ratio			0.8	2.5	2.4	3.1	2.2	3.2	3.9

< indicates less than the analytical detection limit. * Acidity and alkalinity data calculated in mg $CaCO_3$/L.
** SO_4, Ca and Mg release rates calculated in mg/kg/flush.
Total S = Total Sulfur; Scr = Chromium Reducible Sulfur; and ANC = Acid Neutralising Capacity.
MPA = Maximum Potential Acidity, and NAPP = Net Acid Producing Potential.

ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, 2000, ANZECC (Australian and New Zealand Environment Conservation Council) and ARMCANZ (Agriculture and Resource Management Council of Australia and New Zealand). Livestock Drinking Water Levels (Irrigation Levels used for Fe and Mn).

KLC 2 - Siltstone (Overburden & Interburden)

Weight (kg)	2.01	Total S (%)	0.03	ANC	48.1
pH (1:5)	9.70	Scr (%)	0.150	NAPP	-47.3
EC (µS/cm)	543	MPA	0.8	ANC:MPA	62.8

Date			12-May-20	09-Jun-20	07-Jul-20	04-Aug-20	01-Sep-20	29-Sep-20	27-Oct-20
Number of Weeks			0	4	9	13	17	22	26
Leach Number			1	2	3	4	5	6	7
ALS Laboratory Number			EB2012596002	EB2015275002	EB2017832002	EB2020420002	EB2022978002	EB2025596002	EB2028067002
Volume On (L)			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Volume Off (L)			0.815	0.648	0.695	0.691	0.650	0.739	0.735
Cum. Volume (L)			0.82	1.46	2.16	2.85	3.50	4.24	4.97
Pore Volumes			0.6	1.1	1.6	2.1	2.6	3.1	3.7
pH (RGS Measurement)			8.31	9.67	9.93	9.77	9.65	8.47	8.61
pH (ALS Measurement)			7.55	8.99	9.39	9.13	7.99	7.43	7.07
pH (deionised water used in test)			6.10	6.75	6.73	6.48	6.23	6.59	6.62
EC (RGS Measurement) (µS/cm)			443	511	236	232	285	326	307
EC (ALS Measurement) (µS/cm)			508	530	230	282	335	323	326
Acidity (mg/L)*			3	<1	<1	<1	<1	2	<1
Alkalinity (mg/L)*			17	47	31	38	30	19	16
Net Alkalinity (mg/L)*			14	47	31	38	30	17	15
Major Ions (mg/L)	**LoR**	**WQ Guidelines#**							
Calcium (Ca)	1	1,000	6	3	4	6	3	3	3
Potassium (K)	1	-	<1	1	<1	<1	<1	<1	<1
Magnesium (Mg)	1	-	4	2	1	2	2	2	2
Sodium (Na)	1	-	90	97	42	50	61	59	59
Chloride (Cl)	1	-	139	125	41	52	61	67	72
Fluoride (F)	0.1	2	<0.1	0.2	0.1	<0.1	0.2	0.1	0.1
Sulfate (SO_4)	1	1,000	15	27	20	21	31	28	27
Trace metals/ metalloids (mg/L)	**LoR**	**LoR**							
Aluminium (Al)	0.01	5	0.06	0.31	0.52	0.3	0.30	0.10	0.12
Arsenic (As)	0.001	0.5	0.005	0.016	0.008	0.004	0.005	0.002	0.002
Boron (B)	0.05	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Cd)	0.0001	0.01	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Co)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001
Iron (Fe)	0.05	1	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Manganese (Mn)	0.001	2	0.01	0.002	0.001	<0.001	<0.001	0.002	0.002
Molybdenum (Mo)	0.001	0.15	0.012	0.007	0.005	0.005	0.008	0.007	0.006
Nickel (Ni)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	0.005	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calculations**									
SO_4 Release Rate			6	9	7	7	10	10	10
Cumulative SO_4 Release			6	15	22	29	39	49	59
Ca Release Rate			2.4	1.0	1.4	2.1	1.0	1.1	1.1
Cumulative Ca Release			2.4	3.4	4.8	6.8	7.8	8.9	10.0
Mg Release Rate			1.6	0.6	0.3	0.7	0.6	0.7	0.7
Cumulative Mg Release			1.6	2.3	2.6	3.3	3.9	4.7	5.4
Residual ANC (%)			99.97	99.96	99.95	99.94	99.93	99.92	99.90
Residual Sulfur (%)			99.19	98.03	97.10	96.14	94.80	93.42	92.10
SO_4/(Ca+Mg) molar ratio			0.5	1.8	1.5	0.9	2.1	1.9	1.8

< indicates less than the analytical detection limit. * Acidity and alkalinity data calculated in mg $CaCO_3$/L.
** SO_4, Ca and Mg release rates calculated in mg/kg/flush.
Total S = Total Sulfur; Scr = Chromium Reducible Sulfur; and ANC = Acid Neutralising Capacity.
MPA = Maximum Potential Acidity, and NAPP = Net Acid Producing Potential.

ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, 2000, ANZECC (Australian and New Zealand Environment Conservation Council) and ARMCANZ (Agriculture and Resource Management Council of Australia and New Zealand). Livestock Drinking Water Levels (Irrigation Levels used for Fe and Mn).

KLC 3 - Interburden sandstone

Weight (kg)	1.38	Total S (%)	0.03	ANC	96.8
pH (1:5)	10.10	Scr (%)	-	NAPP	-96.0
EC (µS/cm)	396	MPA	0.8	ANC:MPA	126.4

Date			12-May-20	09-Jun-20	07-Jul-20	04-Aug-20	01-Sep-20	29-Sep-20	27-Oct-20
Number of Weeks			0	4	9	13	17	22	26
Leach Number			1	2	3	4	5	6	7
ALS Laboratory Number			EB2012596003	EB2015275003	EB2017832003	EB2020420003	EB2022978003	EB2025596003	EB2028067003
Volume On (L)			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Volume Off (L)			0.634	0.645	0.623	0.649	0.558	0.658	0.657
Cum. Volume (L)			0.63	1.28	1.90	2.55	3.11	3.77	4.42
Pore Volumes			0.5	0.9	1.4	1.9	2.3	2.8	3.3
pH (RGS Measurement)			9.36	9.86	9.77	9.85	9.76	8.89	9.00
pH (ALS Measurement)			9.06	9.11	9.09	9.30	9.19	8.25	7.88
pH (deionised water used in test)			6.10	6.75	6.73	6.48	6.23	6.59	6.62
EC (RGS Measurement) (µS/cm)			571	536	415	387	276	285	242
EC (ALS Measurement) (µS/cm)			641	542	398	464	319	279	258
Acidity (mg/L)*			<1	<1	<1	<1	<1	<1	<1
Alkalinity (mg/L)*			46	46	44	40	53	38	38
Net Alkalinity (mg/L)*			46	46	44	40	53	38	37
Major Ions (mg/L)	**LoR**	**WQ Guidelines#**							
Calcium (Ca)	1	1,000	4	3	3	2	2	2	1
Potassium (K)	1	-	1	1	<1	1	1	<1	<1
Magnesium (Mg)	1	-	2	1	0.5	0.5	0.5	0.5	0.5
Sodium (Na)	1	-	122	102	84	81	64	56	52
Chloride (Cl)	1	-	164	128	80	83	42	30	23
Fluoride (F)	0.1	2	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Sulfate (SO_4)	1	1,000	26	33	33	41	33	41	43
Trace metals/ metalloids (mg/L)	**LoR**	**LoR**							
Aluminium (Al)	0.01	5	0.35	0.47	0.68	0.90	1.20	0.27	0.28
Arsenic (As)	0.001	0.5	0.06	0.043	0.027	0.023	0.024	0.009	0.008
Boron (B)	0.05	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Cd)	0.0001	0.01	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Co)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	1	0.002	<0.001	0.001	0.002	0.001	<0.001	0.001
Iron (Fe)	0.05	1	0.06	<0.05	0.08	0.10	0.10	<0.05	<0.05
Manganese (Mn)	0.001	2	0.009	0.003	0.004	0.002	0.002	0.003	0.003
Molybdenum (Mo)	0.001	0.15	0.012	0.009	0.01	0.014	0.012	0.013	0.013
Nickel (Ni)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	0.005	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calculations**									
SO_4 Release Rate			12	15	15	19	13	20	20
Cumulative SO_4 Release			12	27	42	62	75	94	115
Ca Release Rate			1.8	1.4	1.4	0.9	0.8	1.0	0.5
Cumulative Ca Release			1.8	3.2	4.6	5.5	6.3	7.3	7.8
Mg Release Rate			0.9	0.5	0.2	0.2	0.2	0.2	0.2
Cumulative Mg Release			0.9	1.4	1.6	1.8	2.0	2.3	2.5
Residual ANC (%)			99.99	99.99	99.98	99.98	99.98	99.97	99.97
Residual Sulfur (%)			98.41	96.35	94.36	91.78	90.00	87.39	84.66
SO_4/(Ca+Mg) molar ratio			1.5	3.0	3.6	6.1	4.9	6.1	9.8

< indicates less than the analytical detection limit. * Acidity and alkalinity data calculated in mg $CaCO_3$/L.
** SO_4, Ca and Mg release rates calculated in mg/kg/flush.
Total S = Total Sulfur; Scr = Chromium Reducible Sulfur; and ANC = Acid Neutralising Capacity.
MPA = Maximum Potential Acidity, and NAPP = Net Acid Producing Potential.

ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, 2000, ANZECC (Australian and New Zealand Environment Conservation Council) and ARMCANZ (Agriculture and Resource Management Council of Australia and New Zealand). Livestock Drinking Water Levels (Irrigation Levels used for Fe and Mn).

KLC 4 - Potential coal rejects

Weight (kg)	1.06	**Total S (%)**	0.24	**ANC**	79.2
pH (1:5)	9.90	**Scr (%)**	0.198	**NAPP**	-72.0
EC (µS/cm)	341	**MPA**	7.2	**ANC:MPA**	11.0

Date			**12-May-20**	**09-Jun-20**	**07-Jul-20**	**04-Aug-20**	**01-Sep-20**	**29-Sep-20**	**27-Oct-20**
Number of Weeks			**0**	**4**	**9**	**13**	**17**	**22**	**26**
Leach Number			**1**	**2**	**3**	**4**	**5**	**6**	**7**
ALS Laboratory Number			EB2012596004	EB2015275004	EB2017832004	EB2020420004	EB2022978004	EB2025596004	EB2028067004
Volume On (L)			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Volume Off (L)			0.760	0.718	0.757	0.756	0.674	0.756	0.802
Cum. Volume (L)			0.76	1.48	2.24	2.99	3.67	4.42	5.22
Pore Volumes			0.6	1.1	1.7	2.2	2.7	3.3	3.9
pH (RGS Measurement)			9.74	10.09	9.89	9.61	9.50	8.73	8.50
pH (ALS Measurement)			9.35	9.37	8.98	8.71	8.95	7.72	7.39
pH (deionised water used in test)			6.10	6.75	6.73	6.48	6.23	6.59	6.62
EC (RGS Measurement) (µS/cm)			330	256	180	175	204	215	163
EC (ALS Measurement) (µS/cm)			371	257	170	206	241	206	171
Acidity (mg/L)*			<1	<1	<1	<1	<1	2	<1
Alkalinity (mg/L)*			37	37	30	24	29	46	18
Net Alkalinity (mg/L)*			37	37	30	24	29	44	17
Major Ions (mg/L)	**LoR**	**WQ Guidelines#**							
Calcium (Ca)	1	1,000	2	2	2	2	2	2	2
Potassium (K)	1	-	<1	<1	<1	<1	1	<1	<1
Magnesium (Mg)	1	-	1	0.5	0.5	0.5	0.5	0.5	0.5
Sodium (Na)	1	-	72	47	35	34	46	40	32
Chloride (Cl)	1	-	77	34	16	19	21	17	11
Fluoride (F)	0.1	2	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Sulfate (SO_4)	1	1,000	24	33	30	37	43	43	39
Trace metals/ metalloids (mg/L)	**LoR**	**LoR**							
Aluminium (Al)	0.01	5	0.48	0.94	0.59	1.05	0.74	0.18	0.16
Arsenic (As)	0.001	0.5	0.038	0.024	0.012	0.01	0.012	0.006	0.004
Boron (B)	0.05	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Cd)	0.0001	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Co)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	1	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (Fe)	0.05	1	0.07	0.11	0.08	0.13	0.08	<0.05	<0.05
Manganese (Mn)	0.001	2	0.002	0.001	0.002	0.002	0.001	0.002	0.003
Molybdenum (Mo)	0.001	0.15	0.072	0.048	0.031	0.025	0.029	0.032	0.021
Nickel (Ni)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	0.005	20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calculations**									
SO_4 Release Rate			17.2	22.3	21.4	26.3	27	31	29
Cumulative SO_4 Release			17.2	39.4	60.8	87.1	114	145	174
Ca Release Rate			1.4	1.4	1.4	1.4	1.3	1.4	1.5
Cumulative Ca Release			1.4	2.8	4.2	5.6	6.9	8.3	9.8
Mg Release Rate			0.7	0.3	0.4	0.4	0.3	0.4	0.4
Cumulative Mg Release			0.7	1.1	1.4	1.8	2.1	2.4	2.8
Residual ANC (%)			99.99	99.99	99.98	99.97	99.97	99.96	99.96
Residual Sulfur (%)			99.76	99.44	99.14	98.77	98.38	97.95	97.53
SO_4/(Ca+Mg) molar ratio			2.7	4.9	4.4	5.5	6.4	6.4	5.8

< indicates less than the analytical detection limit. * Acidity and alkalinity data calculated in mg $CaCO_3$/L.
** SO_4, Ca and Mg release rates calculated in mg/kg/flush.
Total S = Total Sulfur; Scr = Chromium Reducible Sulfur; and ANC = Acid Neutralising Capacity.
MPA = Maximum Potential Acidity, and NAPP = Net Acid Producing Potential.

ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, 2000, ANZECC (Australian and New Zealand Environment Conservation Council) and ARMCANZ (Agriculture and Resource Management Council of Australia and New Zealand). Livestock Drinking Water Levels (Irrigation Levels used for Fe and Mn).

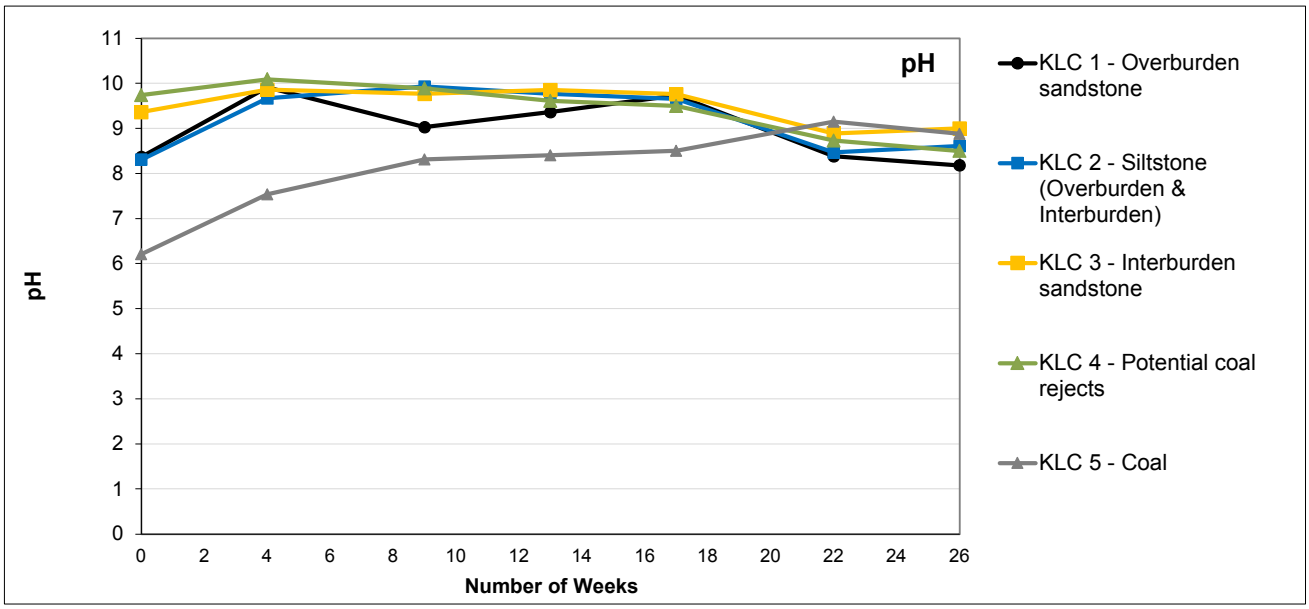
KLC 5 - Coal

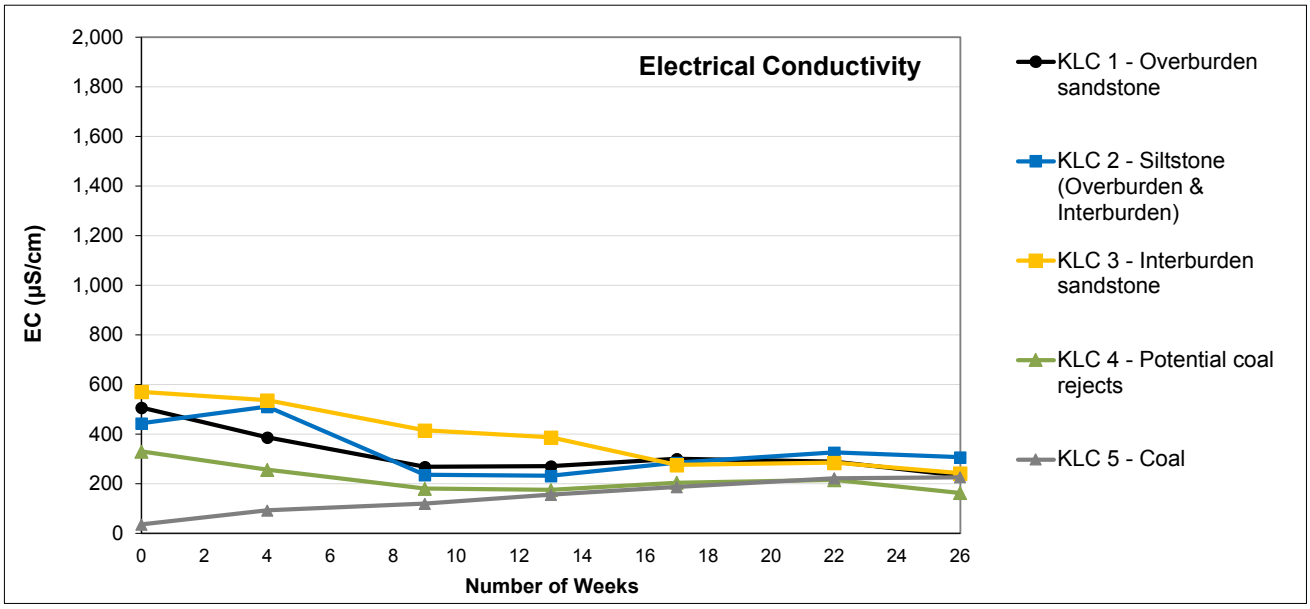
Weight (kg)	1.50	Total S (%)	0.21	ANC	14.5
pH (1:5)	7.67	Scr (%)	0.013	NAPP	-13.9
EC (µS/cm)	25	MPA	0.6	ANC:MPA	28.5

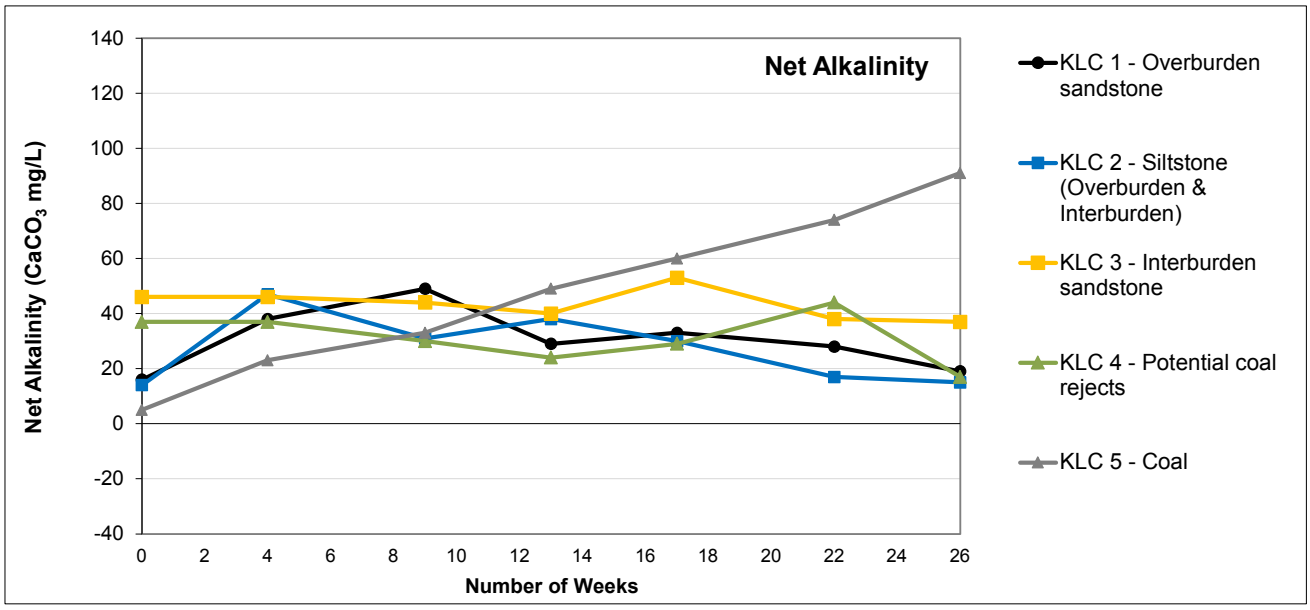
Date			20-Aug-20	17-Sep-20	15-Oct-20	12-Nov-20	10-Dec-20	08-Jan-21	04-Feb-21
Number of Weeks			0	4	9	13	17	22	26
Leach Number			1	2	3	4	5	6	7
ALS Laboratory Number			EB2021853001	EB2024510001	EB2027003001	EB2029751001	EB2032749001	EB2100364001	EB2103026001
Volume On (L)			1.0	1.0	1.0	1.0	1.0	1.0	1.0
Volume Off (L)			0.723	0.737	0.710	0.717	0.650	0.604	0.619
Cum. Volume (L)			0.72	1.46	2.17	2.89	3.54	4.14	4.76
Pore Volumes			0.5	1.1	1.6	2.1	2.6	3.1	3.5
pH (RGS Measurement)			6.21	7.54	8.31	8.40	8.50	9.15	8.88
pH (ALS Measurement)			6.63	7.63	7.89	7.92	7.72	8.83	8.54
pH (deionised water used in test)			6.07	6.80	6.21	6.05	6.27	5.86	6.65
EC (RGS Measurement) (µS/cm)			36	92	120	156	187	222	226
EC (ALS Measurement) (µS/cm)			34	92	114	160	184	210	249
Acidity (mg/L)*			1	2	<1	<1	<1	<1	<1
Alkalinity (mg/L)*			6	25	33	49	60	74	91
Net Alkalinity (mg/L)*			5	23	33	49	60	74	91
Major Ions (mg/L)	**LoR**	**WQ Guidelines#**							
Calcium (Ca)	1	1,000	0.5	0.5	0.5	0.5	0.5	0.5	2
Potassium (K)	1	-	<1	3	<1	<1	<1	<1	<1
Magnesium (Mg)	1	-	0.5	0.5	0.5	0.5	0.5	0.5	1
Sodium (Na)	1	-	6	18	25	34	42	50	54
Chloride (Cl)	1	-	6	11	12	14	15	14	17
Fluoride (F)	0.1	2	<0.1	0.1	<0.2	<0.2	0.2	0.3	0.3
Sulfate (SO_4)	1	1,000	5	4	3	4	5	6	7
Trace metals/ metalloids (mg/L)	**LoR**	**LoR**							
Aluminium (Al)	0.01	5	0.04	0.07	0.09	0.08	0.1	0.09	0.06
Arsenic (As)	0.001	0.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron (B)	0.05	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium (Cd)	0.0001	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt (Co)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.001	1	<0.001	<0.001	<0.001	0.01	0.002	0.002	0.003
Iron (Fe)	0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese (Mn)	0.001	2	0.001	0.029	<0.001	0.01	<0.001	<0.001	<0.001
Molybdenum (Mo)	0.001	0.15	<0.001	0.008	0.008	0.009	0.01	0.01	0.012
Nickel (Ni)	0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	0.001	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Sb)	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01
Vanadium	0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	0.005	20	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calculations**									
SO_4 Release Rate			3.4	2.8	2.0	2.7	3	3	4
Cumulative SO_4 Release			3.4	6.2	8.2	10.9	14	17	21
Ca Release Rate			0.3	0.3	0.3	0.3	0.3	0.3	1.2
Cumulative Ca Release			0.3	0.7	1.0	1.4	1.7	1.9	3.1
Mg Release Rate			0.3	0.3	0.3	0.3	0.3	0.3	0.6
Cumulative Mg Release			0.3	0.7	1.0	1.4	1.7	1.9	2.5
Residual ANC (%)			100.00	99.99	99.99	99.99	99.99	99.98	99.98
Residual Sulfur (%)			99.95	99.91	99.88	99.85	99.80	99.75	99.70
SO_4/(Ca+Mg) molar ratio			1.6	1.3	0.9	1.3	1.6	1.9	0.8

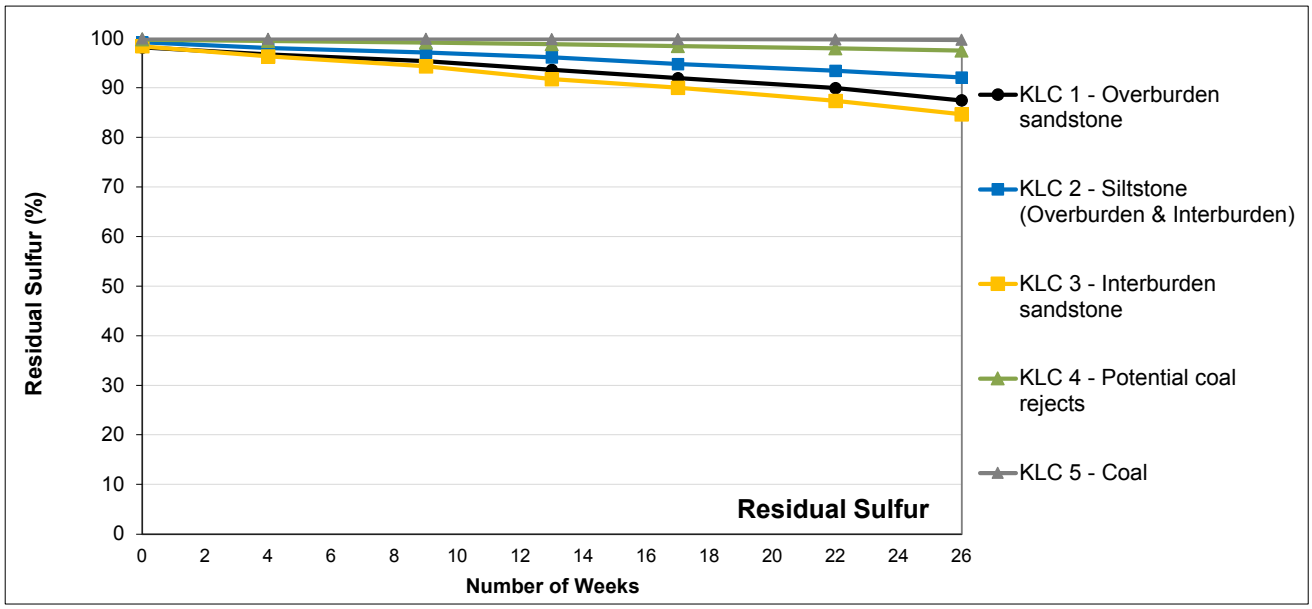
< indicates less than the analytical detection limit. * Acidity and alkalinity data calculated in mg $CaCO_3$/L.
** SO_4, Ca and Mg release rates calculated in mg/kg/flush.
Total S = Total Sulfur; Scr = Chromium Reducible Sulfur; and ANC = Acid Neutralising Capacity.
MPA = Maximum Potential Acidity, and NAPP = Net Acid Producing Potential.

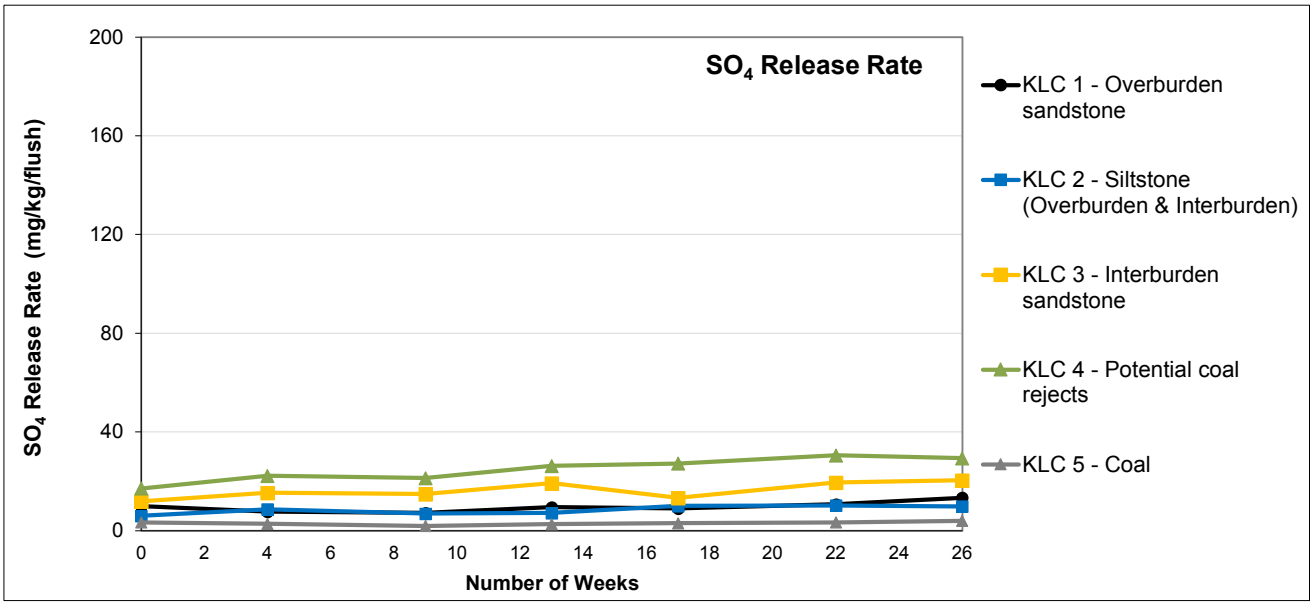
ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, 2000, ANZECC (Australian and New Zealand Environment Conservation Council) and ARMCANZ (Agriculture and Resource Management Council of Australia and New Zealand). Livestock Drinking Water Levels (Irrigation Levels used for Fe and Mn).

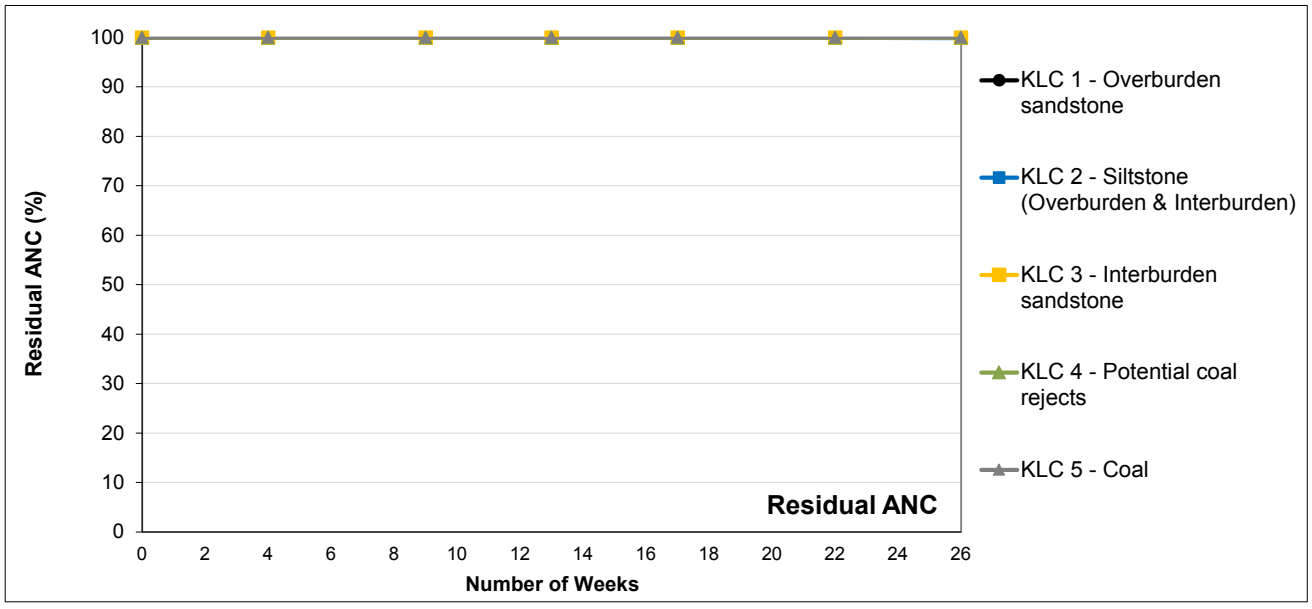

pH
pH
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

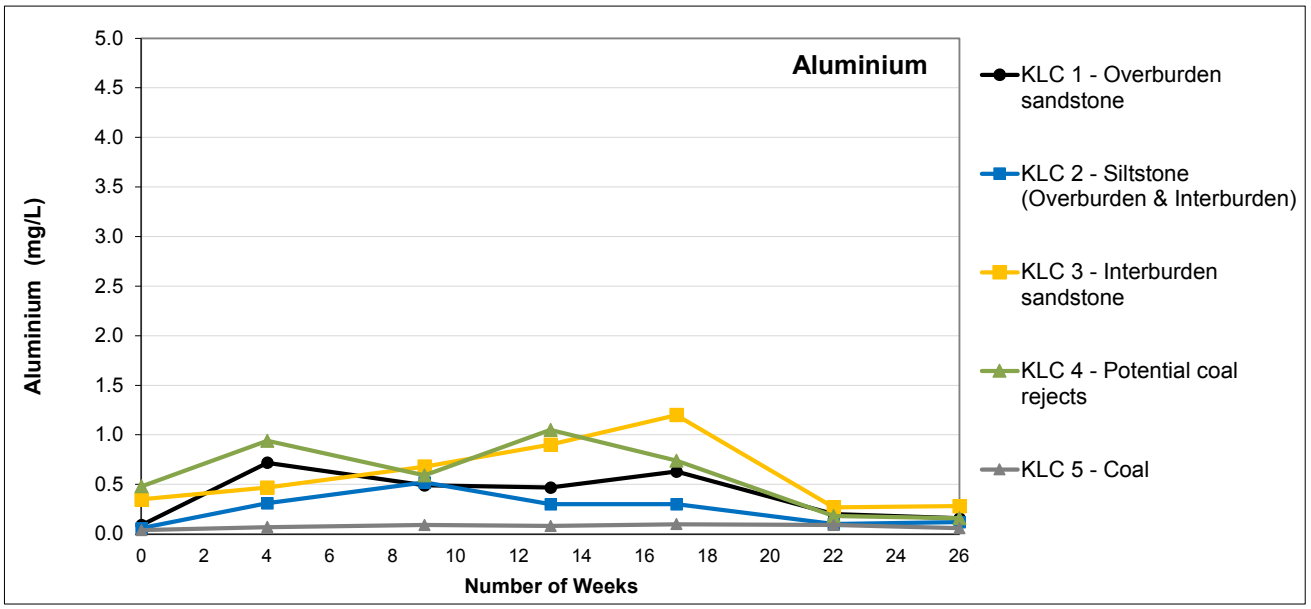

Electrical Conductivity
EC (µS/cm)
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

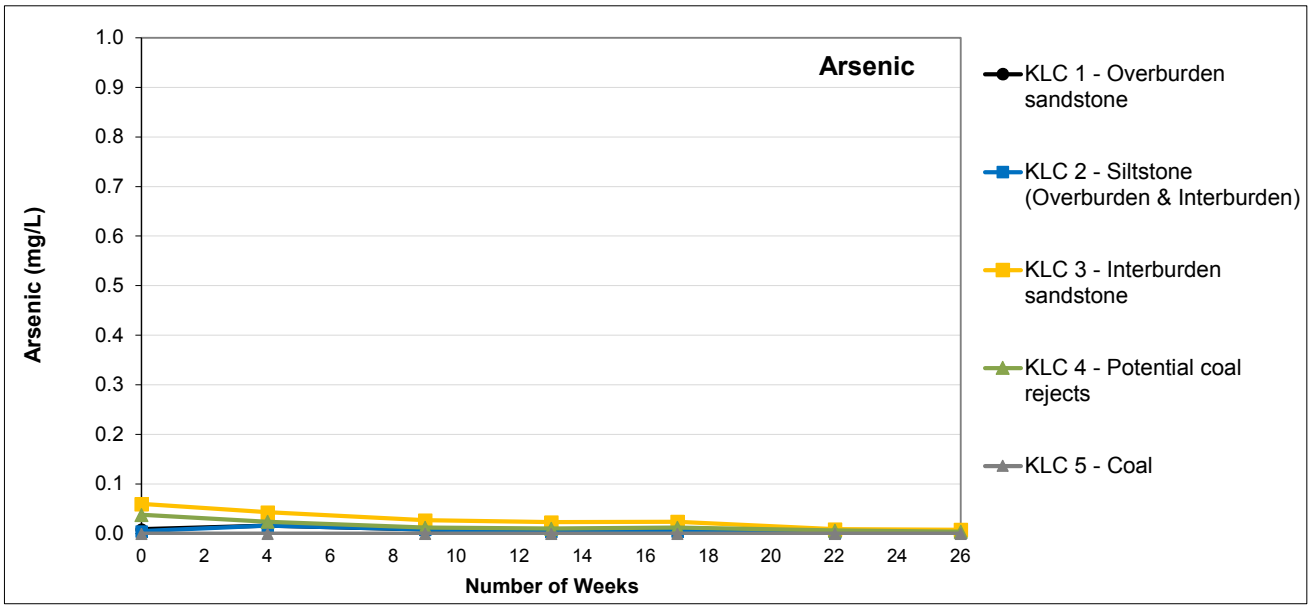

Net Alkalinity
Net Alkalinity (CaCO3 mg/L)
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

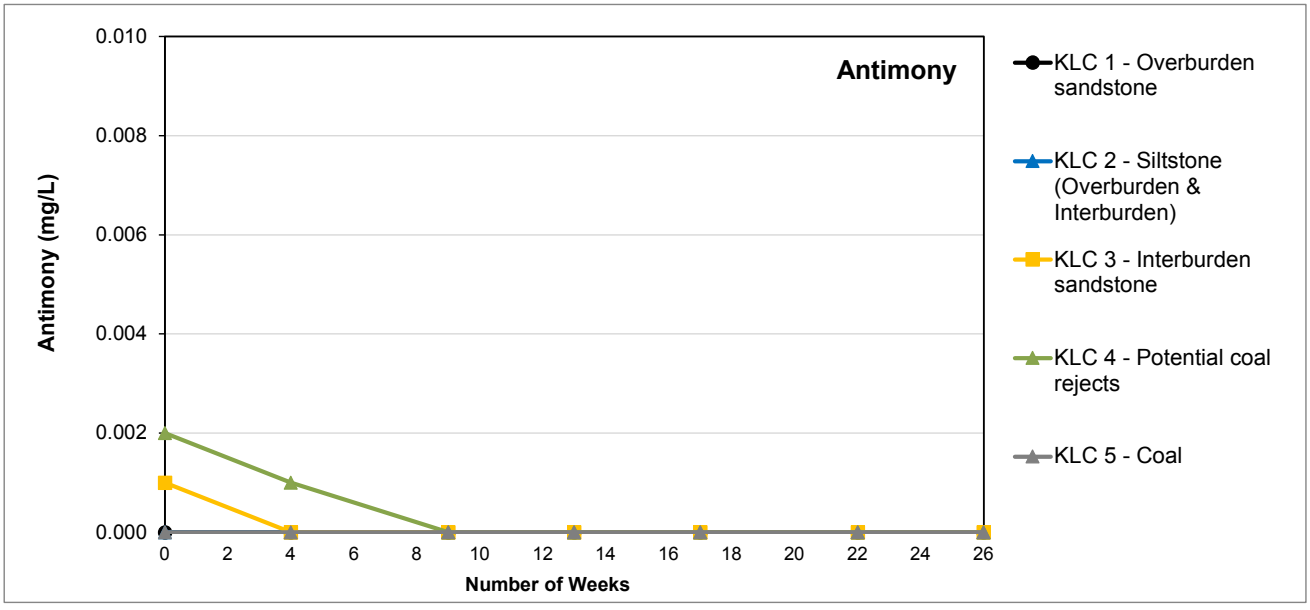

Residual Sulfur (%)
100
90
80
70
60
50
40
30
20
10
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
Residual Sulfur
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

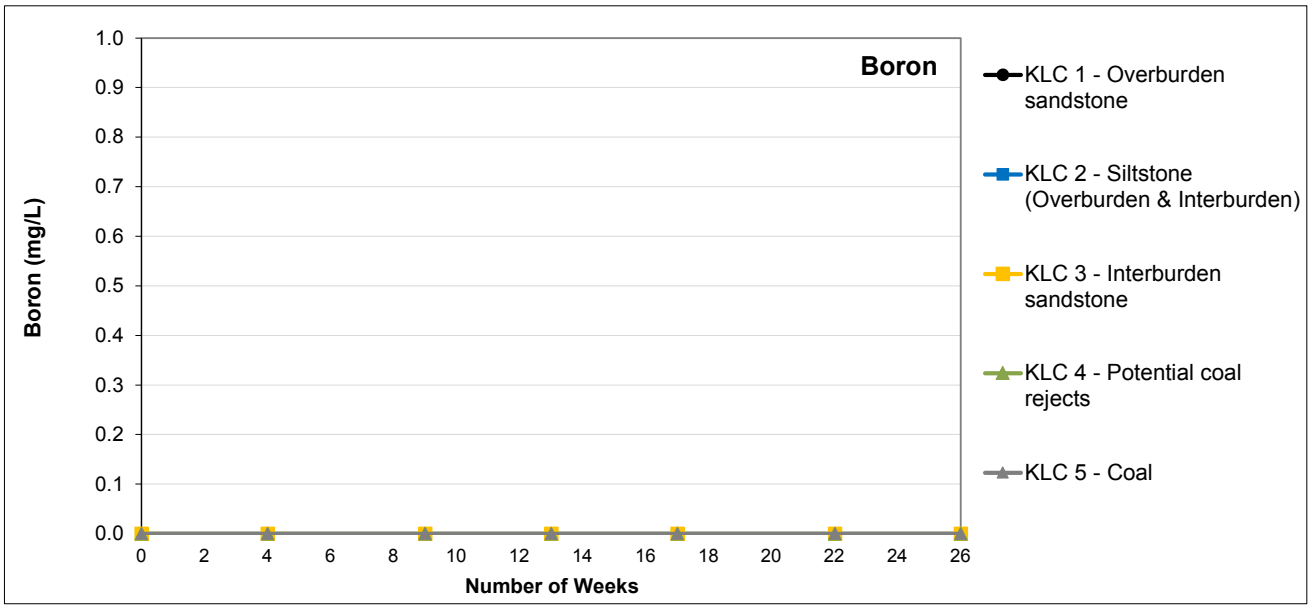

SO4 Release Rate (mg/kg/flush)
200
160
120
80
40
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
SO4 Release Rate
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

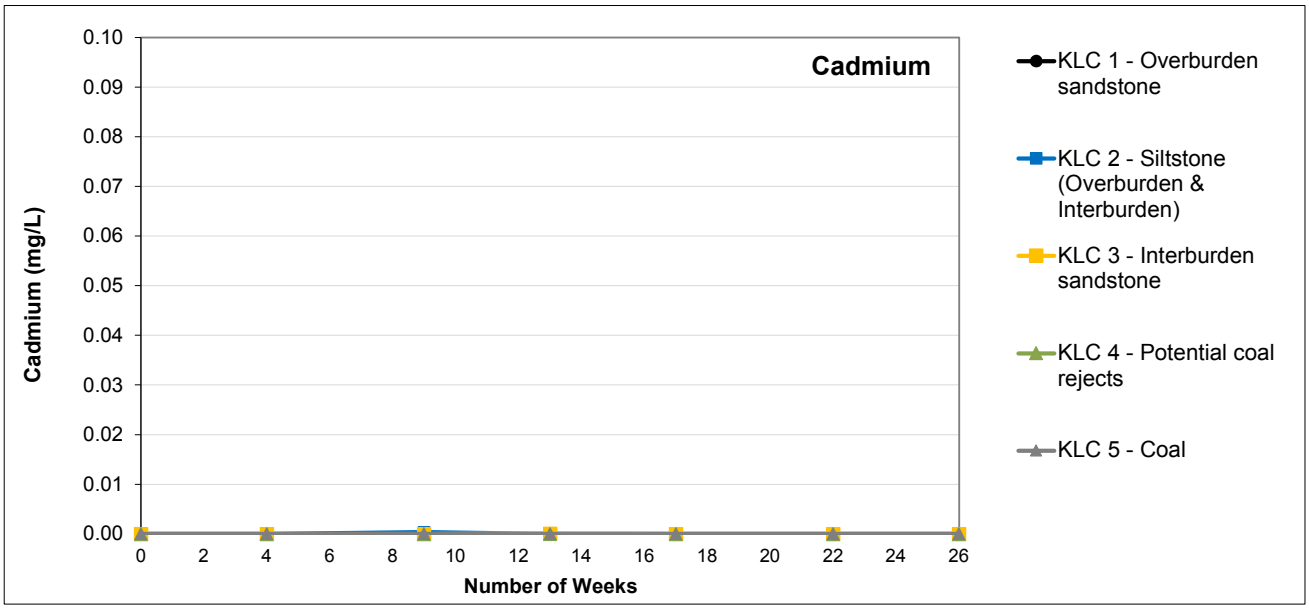

Residual ANC (%)
100
90
80
70
60
50
40
30
20
10
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
Residual ANC
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

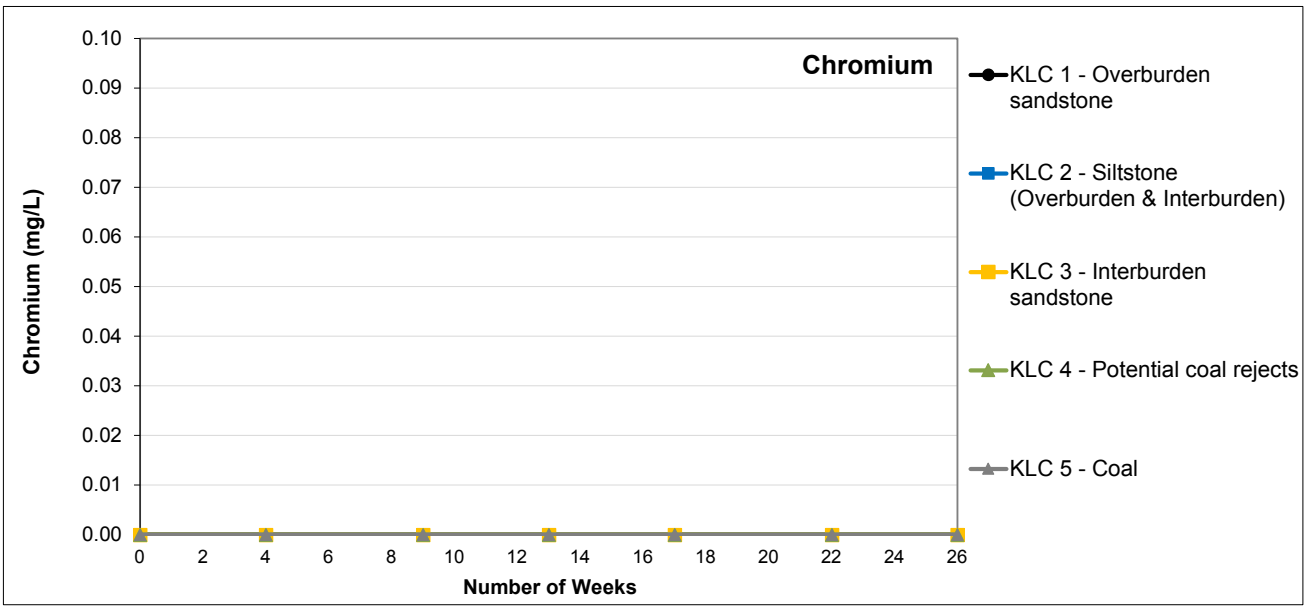

Aluminium
Aluminium (mg/L)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

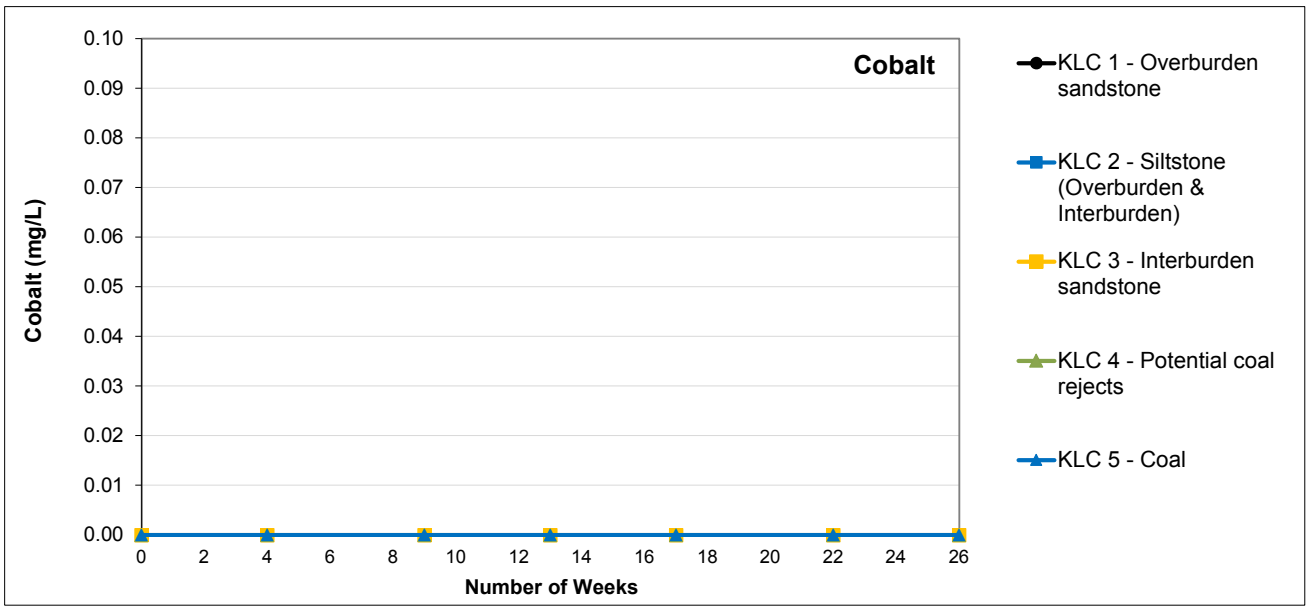

Arsenic
Arsenic (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

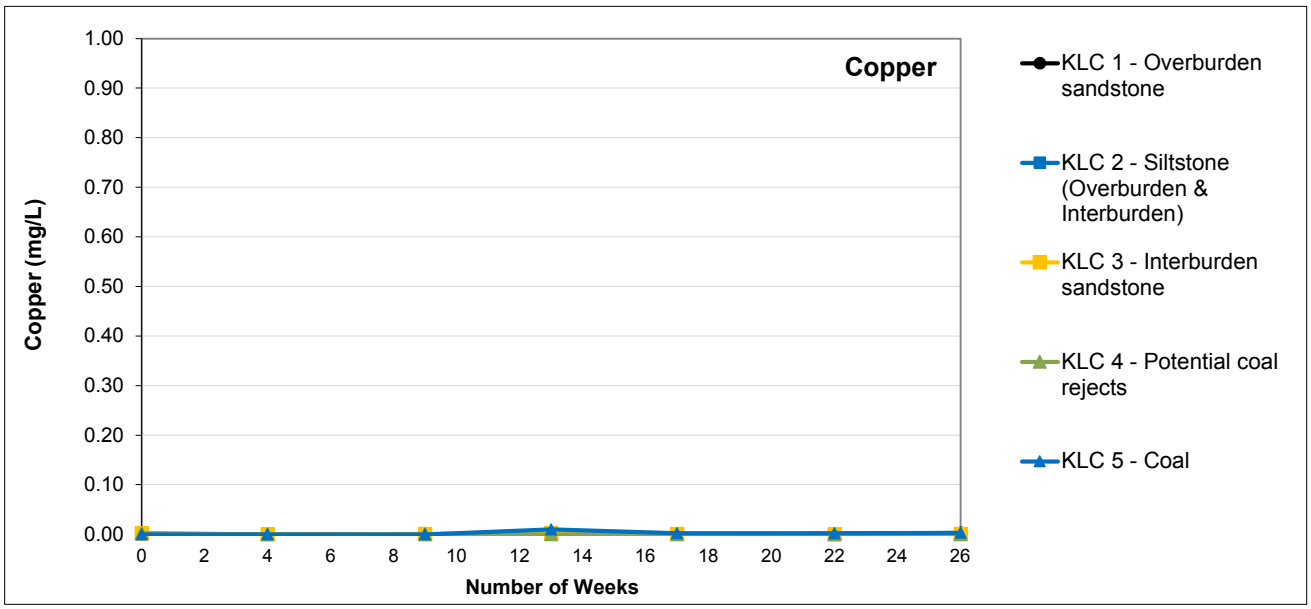

Antimony
Antimony (mg/L)
0.010
0.008
0.006
0.004
0.002
0.000
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

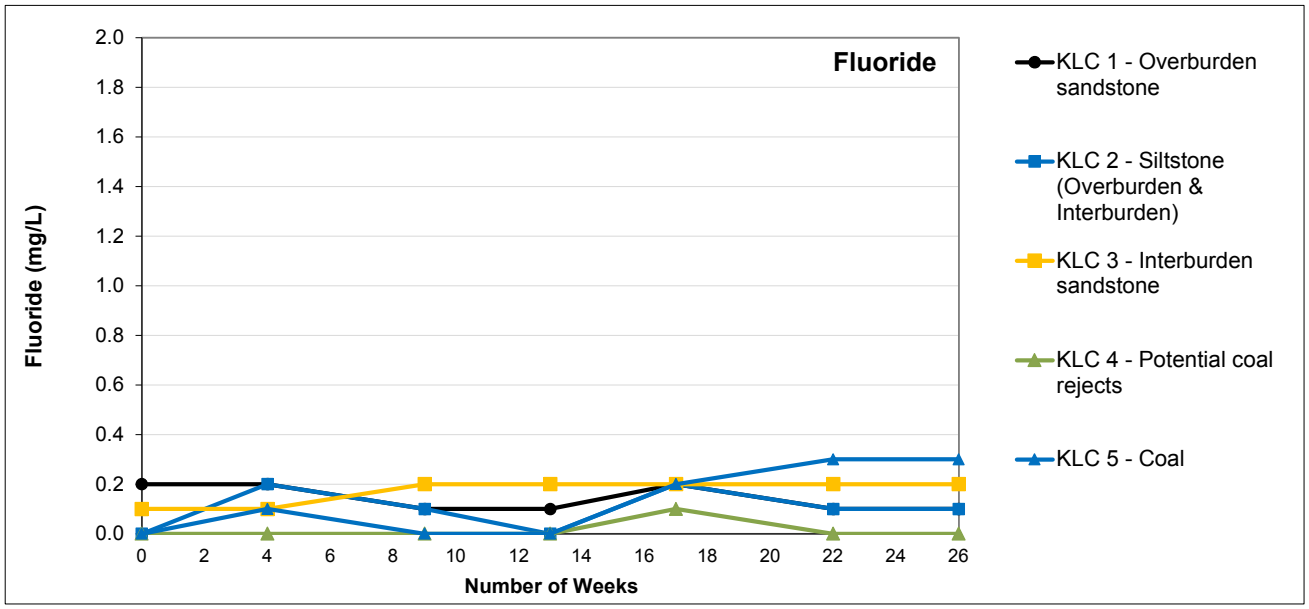

Boron
Boron (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

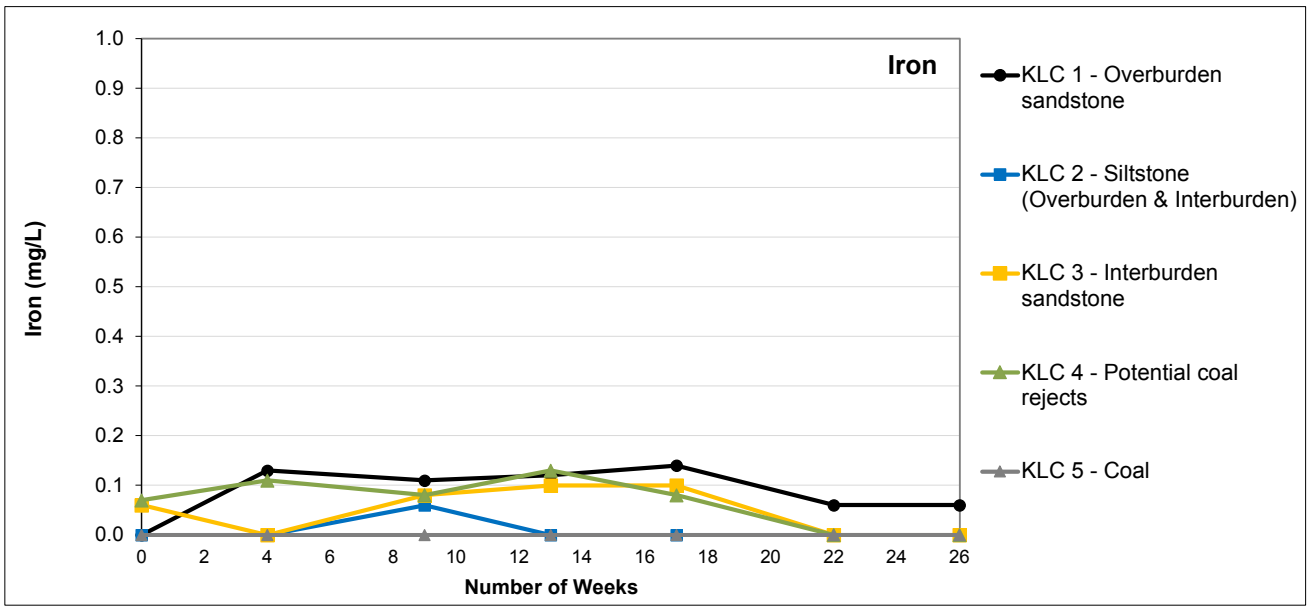

Cadmium
Cadmium (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

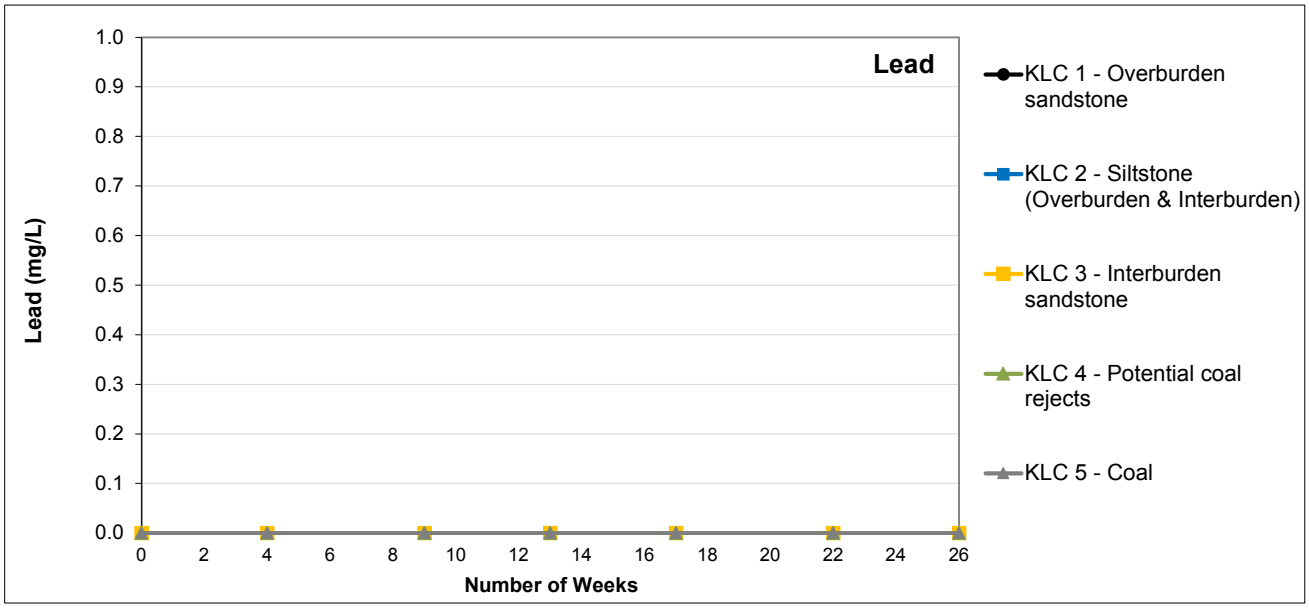

Chromium
Chromium (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

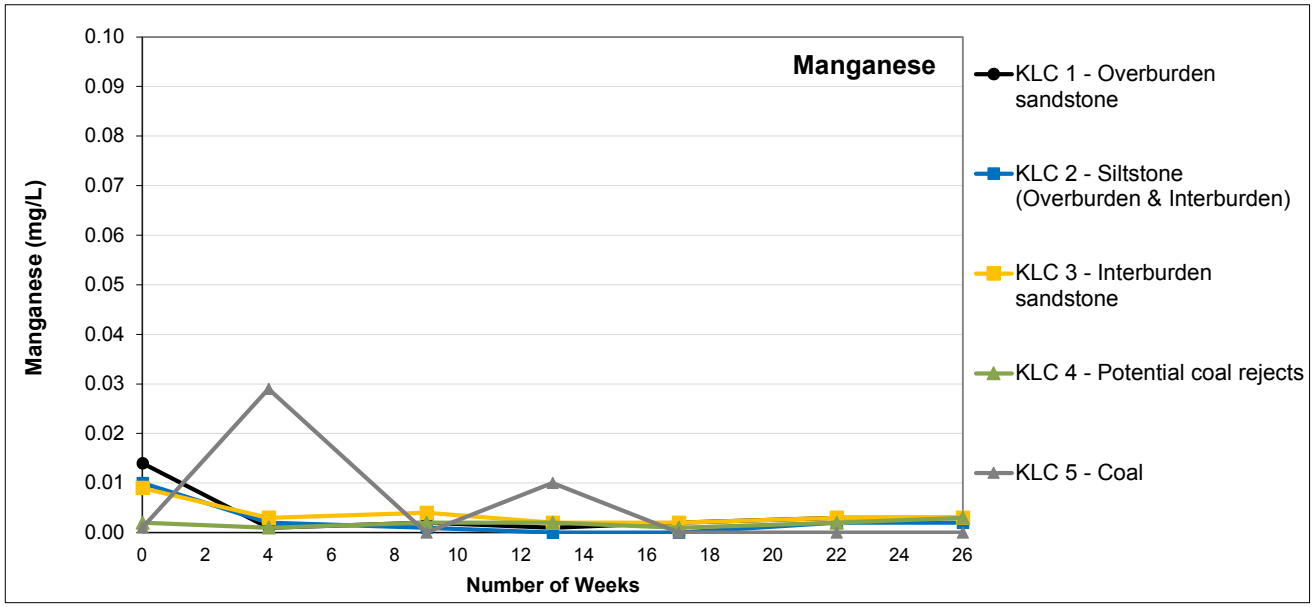

Cobalt
Cobalt (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

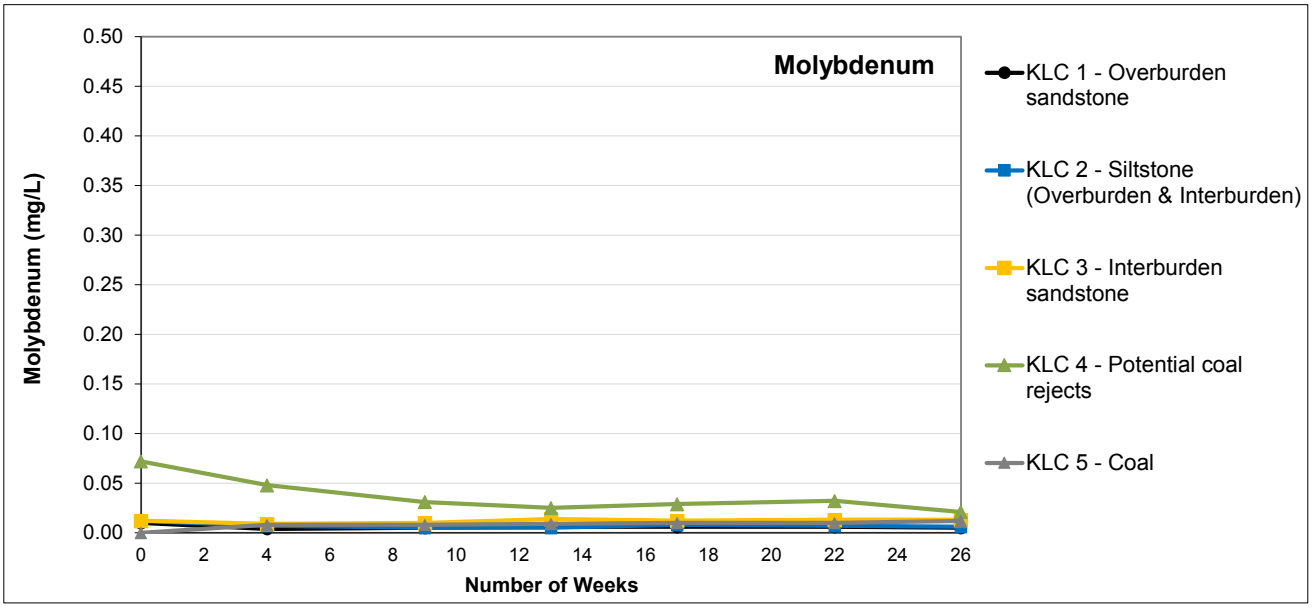

Copper
Copper (mg/L)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

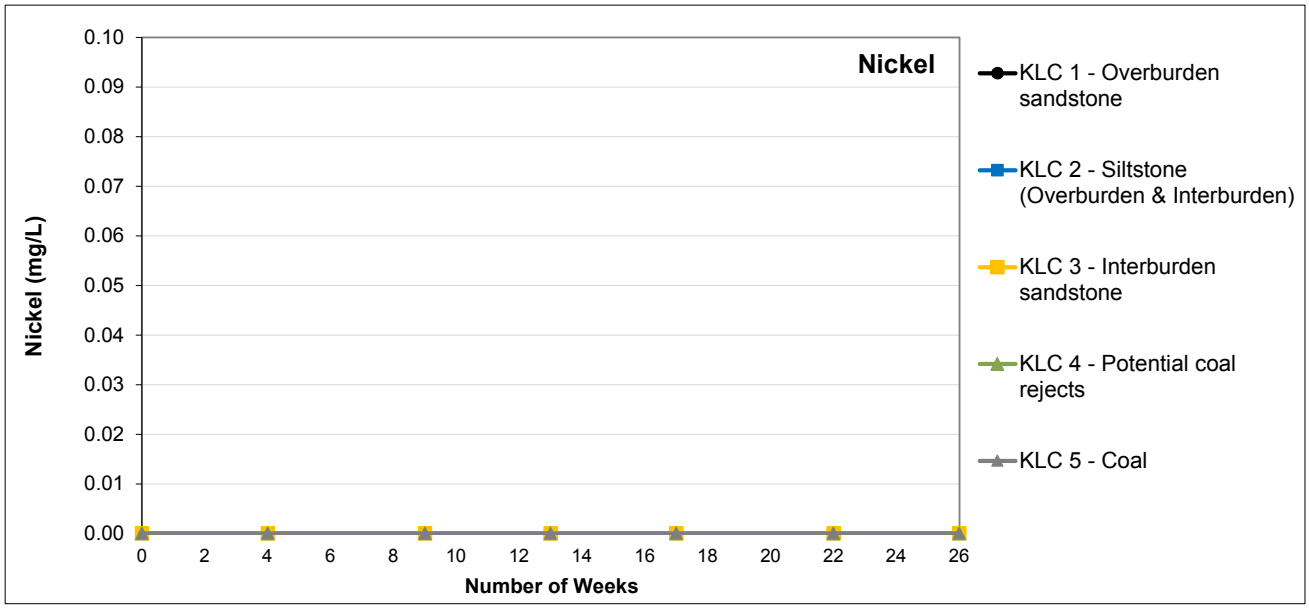

Fluoride
Fluoride (mg/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

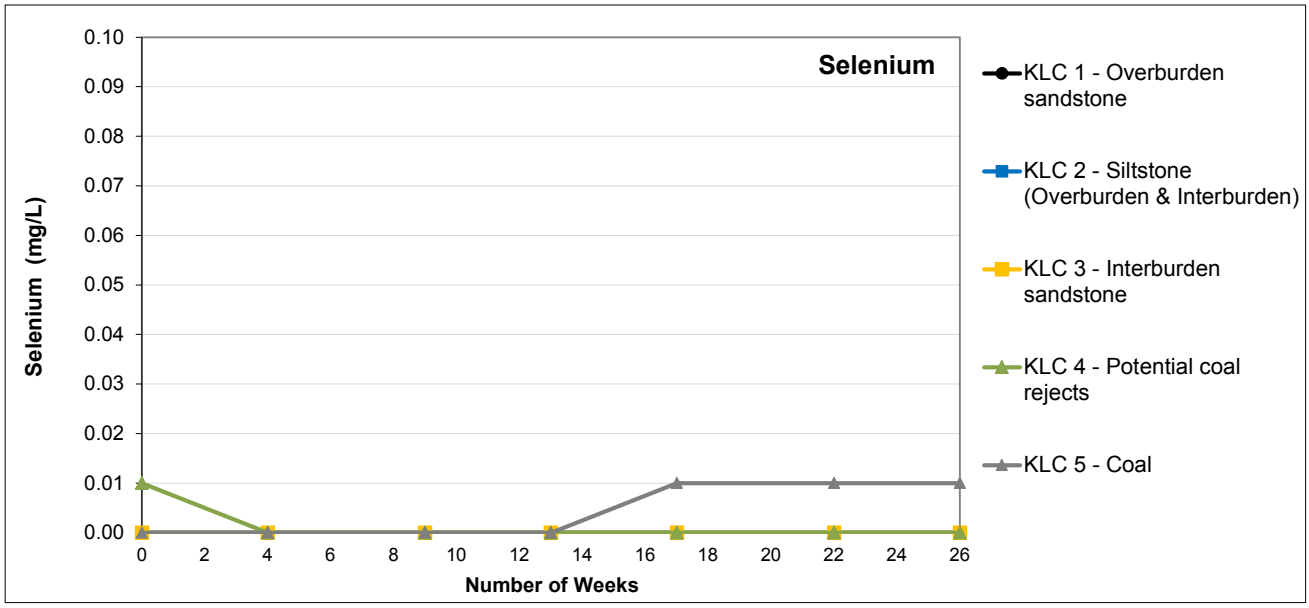

Iron
Iron (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

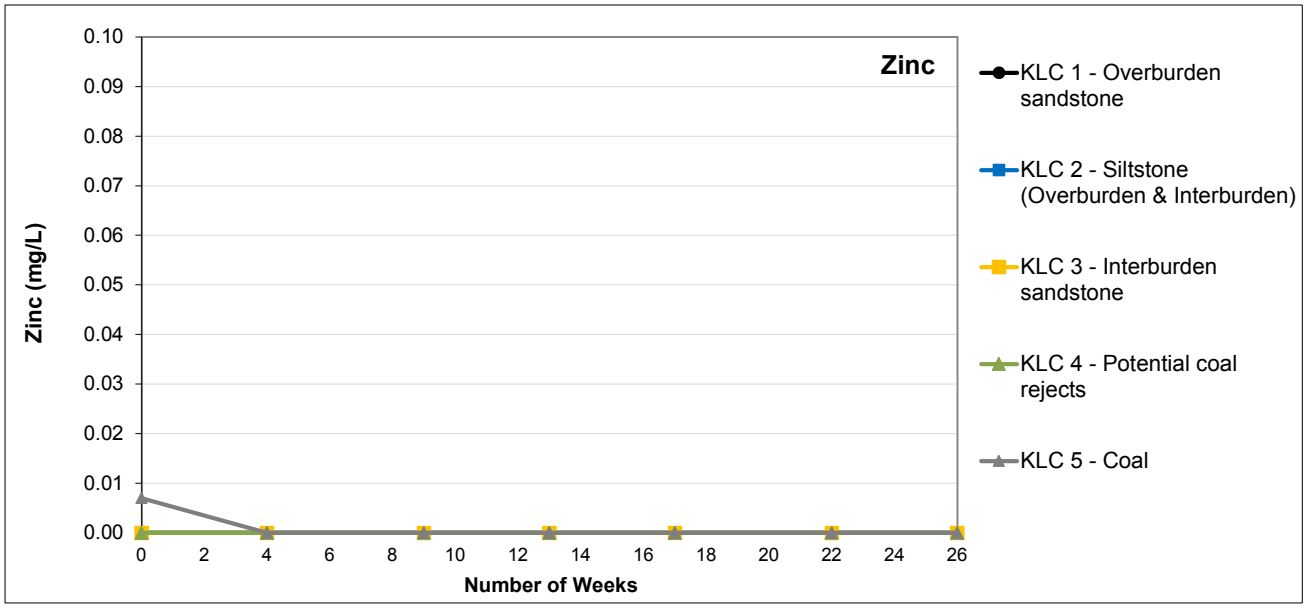

Lead
Lead (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal


Manganese
Manganese (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal


Molybdenum
Molybdenum (mg/L)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal


Nickel
Nickel (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal


Selenium
Selenium (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal


Zinc
Zinc (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Number of Weeks
KLC 1 - Overburden sandstone
KLC 2 - Siltstone (Overburden & Interburden)
KLC 3 - Interburden sandstone
KLC 4 - Potential coal rejects
KLC 5 - Coal

Attachment E ALS Laboratory Results

(Certificates of analysis)

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2010668**	Page	: 1 of 23
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038	Date Samples Received	: 17-Apr-2020 08:30
Order number	: ----	Date Analysis Commenced	: 20-Apr-2020
C-O-C number	: ----	Issue Date	: 27-Apr-2020 15:34
Sampler	: ----		
Site	: Meadowbrook (Jellinbah)		
Quote number	: EN/222		
No. of samples received	: 101		
No. of samples analysed	: 101		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2694M01	2694M02	2694M03	2694M04	2694M05
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-001	EB2010668-002	EB2010668-003	EB2010668-004	EB2010668-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	7.9	8.9	9.1	9.0	8.7
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-7.6	-57.7	-38.9	-17.8	-18.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	1400	1580	1770	1570	1910
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	7.9	58.3	39.5	18.1	19.0
ANC as CaCO3	----	0.1	% CaCO3	0.8	6.0	4.0	1.8	1.9
Fizz Rating	----	0	Fizz Unit	0	2	1	1	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	4.8	5.0	5.8	4.7	7.3
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	0.02	0.02	0.01	0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2694M06	2694M07	2694M08	2694M09	2694M10
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-006	EB2010668-007	EB2010668-008	EB2010668-009	EB2010668-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.8	8.2	8.5	8.9	10.0
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-8.7	-19.0	-22.2	-22.1	-148
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	1350	2700	1290	352	465
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	9.0	19.6	22.8	22.7	150
ANC as CaCO3	----	0.1	% CaCO3	0.9	2.0	2.3	2.3	15.4
Fizz Rating	----	0	Fizz Unit	0	1	1	1	3
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	9.7	26.8	8.3	16.8	9.0
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	0.02	0.02	0.02	0.07

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2694M11	2694M12	2694M13	2694M14	2694M15
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-011	EB2010668-012	EB2010668-013	EB2010668-014	EB2010668-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.7	9.5	9.4	9.5	9.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-147	-49.7	-30.7	-34.9	-143
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	713	643	1360	1230	789
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	148	51.2	33.5	36.1	143
ANC as CaCO3	----	0.1	% CaCO3	15.1	5.2	3.4	3.7	14.6
Fizz Rating	----	0	Fizz Unit	3	2	1	1	3
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	12.7	13.7	18.5	17.4	6.3
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.05	0.09	0.04	0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2694M16	2694M17	2694M18	2694M19	2694M20
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-016	EB2010668-017	EB2010668-018	EB2010668-019	EB2010668-020
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		10.0	9.5	9.4	9.2	9.5
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-201	-115	-7.8	-9.2	-41.5
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		708	522	529	968	1000
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		201	115	18.2	11.6	42.1
ANC as CaCO3	----	0.1	% CaCO3		20.5	11.8	1.8	1.2	4.3
Fizz Rating	----	0	Fizz Unit		3	3	1	1	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		5.4	9.6	8.6	9.3	8.7
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	0.01	0.34	0.08	0.02

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2696M01	2696M02	2696M03	2696M04	2696M05
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-021	EB2010668-022	EB2010668-023	EB2010668-024	EB2010668-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.1**	**9.5**	**9.0**	**9.4**	**8.6**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-56.8**	**-47.3**	**-8.1**	**-8.8**	**-8.0**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**242**	**917**	**674**	**1040**	**1510**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**57.1**	**47.3**	**8.1**	**8.8**	**8.0**
ANC as CaCO3	----	0.1	% CaCO3	**5.8**	**4.8**	**0.8**	**0.9**	**0.8**
Fizz Rating	----	0	Fizz Unit	**2**	**2**	**0**	**0**	**0**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**3.1**	**3.9**	**0.6**	**0.7**	**3.4**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.01**	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2696M06	2696M07	2696M08	2696M09	2696M10
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-026	EB2010668-027	EB2010668-028	EB2010668-029	EB2010668-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.7	8.8	8.7	8.4	9.8
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-8.0	-9.1	-16.8	-17.0	-105
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	1570	1230	1420	1270	382
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	8.3	9.1	16.8	17.0	105
ANC as CaCO3	----	0.1	% CaCO3	0.8	0.9	1.7	1.7	10.7
Fizz Rating	----	0	Fizz Unit	0	0	1	1	3
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	2.9	9.8	15.4	12.8	0.7
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2696M11	2696M12	2696M13	2696M14	2696M15
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-031	EB2010668-032	EB2010668-033	EB2010668-034	EB2010668-035
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.7	9.8	9.5	10.0	9.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-27.5	-40.4	-17.6	-53.5	-23.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	517	365	383	330	415
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	27.5	40.4	17.9	53.5	23.9
ANC as CaCO3	----	0.1	% CaCO3	2.8	4.1	1.8	5.4	2.4
Fizz Rating	----	0	Fizz Unit	1	2	1	2	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	1.6	1.3	2.6	0.7	4.7
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	<0.01	<0.01	0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2696M16	2696M17	2696M18	2696M19	2696M20
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-036	EB2010668-037	EB2010668-038	EB2010668-039	EB2010668-040
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		9.7	10.0	9.9	9.8	10.1
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-18.9	-33.7	-25.9	-22.2	-84.1
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		220	303	267	180	363
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		18.9	33.7	25.9	22.2	84.7
ANC as CaCO3	----	0.1	% CaCO3		1.9	3.4	2.6	2.3	8.6
Fizz Rating	----	0	Fizz Unit		1	1	1	1	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		2.8	1.9	2.4	3.7	1.6
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	<0.01	<0.01	0.02

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2696M21	2696M22	2696M23	2696M24	2696M25
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-041	EB2010668-042	EB2010668-043	EB2010668-044	EB2010668-045
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**10.0**	**10.1**	**10.3**	**10.2**	**10.1**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-33.0**	**-60.9**	**-124**	**-58.0**	**-65.9**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**343**	**403**	**416**	**454**	**452**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**33.0**	**66.4**	**126**	**58.3**	**66.2**
ANC as CaCO3	----	0.1	% CaCO3		**3.4**	**6.8**	**12.8**	**5.9**	**6.7**
Fizz Rating	----	0	Fizz Unit		**1**	**2**	**3**	**2**	**2**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**3.4**	**3.0**	**2.2**	**2.1**	**1.8**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	**0.18**	**0.07**	**0.01**	**0.01**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2696M26	2696M27	2696M28	2696M29	2696M30
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-046	EB2010668-047	EB2010668-048	EB2010668-049	EB2010668-050
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		10.0	10.1	10.1	9.7	10.0
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-111	-248	-260	-23.6	-103
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		522	286	343	325	675
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		111	249	260	24.2	104
ANC as CaCO3	----	0.1	% CaCO3		11.3	25.4	26.6	2.5	10.6
Fizz Rating	----	0	Fizz Unit		3	4	4	1	3
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		1.2	1.0	1.7	3.2	8.9
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.01	0.03	<0.01	0.02	0.02

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2696M31	2696M32	2696M33	2696M34	2696M35
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-051	EB2010668-052	EB2010668-053	EB2010668-054	EB2010668-055
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.8	9.9	10.2	10.2	10.1
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-20.3	-27.9	-53.7	-48.5	-37.1
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	199	288	438	334	318
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	21.8	29.7	54.3	49.1	37.7
ANC as CaCO3	----	0.1	% CaCO3	2.2	3.0	5.5	5.0	3.8
Fizz Rating	----	0	Fizz Unit	1	1	2	2	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	3.2	3.8	4.1	4.1	2.5
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.05	0.06	0.02	0.02	0.02

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2696M36	2696M37	2696M38	2696M39	2696M40
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-056	EB2010668-057	EB2010668-058	EB2010668-059	EB2010668-060
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	10.2	9.8	9.8	9.9	10.1
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-103	-15.6	-169	-16.6	-106
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	409	376	387	342	389
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	104	35.8	178	18.7	107
ANC as CaCO3	----	0.1	% CaCO3	10.6	3.6	18.1	1.9	10.9
Fizz Rating	----	0	Fizz Unit	3	1	3	1	3
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	2.8	3.5	5.9	5.5	5.5
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.02	0.66	0.29	0.07	0.03

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2697M1	2697M2	2697M3	2697M4	2697M5
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-061	EB2010668-062	EB2010668-063	EB2010668-064	EB2010668-065
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.4**	**9.6**	**10.0**	**10.1**	**9.4**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-56.6**	**-154**	**-83.2**	**-46.2**	**-22.1**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**841**	**754**	**327**	**362**	**760**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**57.2**	**154**	**83.2**	**46.2**	**22.1**
ANC as CaCO3	----	0.1	% CaCO3	**5.8**	**15.8**	**8.5**	**4.7**	**2.2**
Fizz Rating	----	0	Fizz Unit	**2**	**3**	**2**	**2**	**1**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**13.6**	**4.0**	**0.7**	**13.1**	**25.1**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2697M6	2697M7	2697M8	2697M9	2697M10
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-066	EB2010668-067	EB2010668-068	EB2010668-069	EB2010668-070
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		8.6	8.7	8.3	9.9	10.0
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-15.5	-16.9	-18.9	-55.0	-41.5
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		663	563	584	291	256
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		15.5	16.9	19.5	55.6	42.7
ANC as CaCO3	----	0.1	% CaCO3		1.6	1.7	2.0	5.7	4.4
Fizz Rating	----	0	Fizz Unit		1	1	1	2	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		27.7	33.4	34.4	25.0	17.8
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	0.02	0.02	0.04

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2697M11	2697M12	2697M13	2697M14	2697M15
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010668-071	EB2010668-072	EB2010668-073	EB2010668-074	EB2010668-075
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	10.1	10.1	10.0	9.8	9.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-43.7	-80.2	-39.1	-22.3	-25.4
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	263	274	278	183	202
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	44.9	80.8	39.7	24.1	26.6
ANC as CaCO3	----	0.1	% CaCO3	4.6	8.2	4.0	2.4	2.7
Fizz Rating	----	0	Fizz Unit	2	2	2	1	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	15.4	19.8	17.8	22.8	20.7
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.04	0.02	0.02	0.06	0.04

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2697M16	2697M17	2697M18	2697M19	2697M20
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-076	EB2010668-077	EB2010668-078	EB2010668-079	EB2010668-080
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		10.2	10.2	10.1	10.0	9.8
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-55.3	-63.5	-41.5	-22.6	-27.2
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		319	287	319	233	205
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		55.3	63.5	44.9	30.9	29.4
ANC as CaCO3	----	0.1	% CaCO3		5.6	6.5	4.6	3.2	3.0
Fizz Rating	----	0	Fizz Unit		2	2	2	1	1
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		16.3	15.8	19.0	17.4	20.9
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		<0.01	<0.01	0.11	0.27	0.07

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2697M21	2697M22	2697M23	2697M24	2697M25
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-081	EB2010668-082	EB2010668-083	EB2010668-084	EB2010668-085
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		10.0	9.9	10.0	10.0	9.8
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-105	-41.4	-104	-184	-38.8
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		318	316	387	323	323
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		105	42.0	105	199	44.0
ANC as CaCO3	----	0.1	% CaCO3		10.8	4.3	10.7	20.3	4.5
Fizz Rating	----	0	Fizz Unit		3	2	3	3	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		16.6	16.6	17.9	8.9	20.3
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.01	0.02	0.02	0.49	0.17

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2697M26	2703M01	2703M02	2703M03	2703M04
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-086	EB2010668-087	EB2010668-088	EB2010668-089	EB2010668-090
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**10.0**	**9.0**	**6.8**	**9.6**	**9.7**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-88.0**	**-27.8**	**-17.2**	**-103**	**-41.2**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**424**	**894**	**713**	**431**	**272**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**88.6**	**28.4**	**17.5**	**103**	**41.2**
ANC as CaCO3	----	0.1	% CaCO3		**9.0**	**2.9**	**1.8**	**10.5**	**4.2**
Fizz Rating	----	0	Fizz Unit		**2**	**1**	**1**	**2**	**2**
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**16.0**	**9.9**	**12.1**	**6.4**	**2.9**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.02**	**0.02**	**0.01**	<0.01	<0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2703M05	2703M06	2703M07	2703M08	2703M09
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-091	EB2010668-092	EB2010668-093	EB2010668-094	EB2010668-095
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		9.2	9.6	9.7	9.3	9.9
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-41.5	-57.0	-148	-44.0	-74.0
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		1080	622	332	466	294
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		41.8	57.0	148	44.9	75.8
ANC as CaCO3	----	0.1	% CaCO3		4.3	5.8	15.1	4.6	7.7
Fizz Rating	----	0	Fizz Unit		2	2	3	2	2
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		27.9	28.0	21.1	25.3	29.6
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.01	<0.01	<0.01	0.03	0.06

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2703M10	2703M11	2703M13	2703M14	pH & DI of leach
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010668-096	EB2010668-097	EB2010668-098	EB2010668-099	EB2010668-100
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		9.4	9.9	9.6	9.5	5.4
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		-30.8	-102	-51.8	-65.3	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		364	449	992	1220	<1
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		32.9	111	52.7	66.2	----
ANC as CaCO3	----	0.1	% CaCO3		3.4	11.4	5.4	6.7	----
Fizz Rating	----	0	Fizz Unit		1	3	2	2	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		22.0	20.7	20.5	17.5	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		0.07	0.28	0.03	0.03	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2703M12	----	----	----	----
				Client sampling date / time	15-Apr-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2010668-101	--------	--------	--------	--------
					Result	----	----	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**9.5**	----	----	----	----
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-155**	----	----	----	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**1110**	----	----	----	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**160**	----	----	----	----
ANC as CaCO3	----	0.1	% CaCO3		**16.4**	----	----	----	----
Fizz Rating	----	0	Fizz Unit		**3**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**20.9**	----	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.16**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2011455**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038	Date Samples Received	: 28-Apr-2020 15:17
Order number	: ----	Date Analysis Commenced	: 30-Apr-2020
C-O-C number	: ----	Issue Date	: 30-Apr-2020 14:03
Sampler	: DAVE WINTERBOTHAM		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 10		
No. of samples analysed	: 10		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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: SOIL (Matrix: SOIL)				Client sample ID	LV2694_2694M18_74-75	LV2696_2696M22_96-97	LV2696_2696M37_164-166	LV2696_2696M38_168-169	LV2697_2697M18_80-81
				Client sampling date / time	05-Apr-2020 00:00	06-Apr-2020 00:00	06-Apr-2020 00:00	06-Apr-2020 00:00	07-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2011455-001	EB2011455-002	EB2011455-003	EB2011455-004	EB2011455-005
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.128**	**0.129**	**0.431**	**0.106**	**0.070**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	LV2697_2697M19_83-84	LV2697_2697M24_106-107	LV2697_2697M25_111-112	LV2703_2703M11_53-54	LV2703_2703M12_-
				Client sampling date / time	07-Apr-2020 00:00	07-Apr-2020 00:00	07-Apr-2020 00:00	12-Apr-2020 00:00	12-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2011455-006	EB2011455-007	EB2011455-008	EB2011455-009	EB2011455-010
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.236**	**0.403**	**0.150**	**0.246**	**0.032**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2012066**	Page	: 1 of 11
Amendment	: **1**		
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook	Date Samples Received	: 01-May-2020 14:43
Order number	: ----	Date Analysis Commenced	: 07-May-2020
C-O-C number	: ----	Issue Date	: 25-May-2020 11:45
Sampler	: VERONICA CANALES		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 14		
No. of samples analysed	: 14		

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*
Dave Gitsham	Metals Instrument Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Dave Gitsham	Metals Instrument Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Senior Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Santusha Pandra	Senior Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ED037 (Alkalinity): NATA accreditation does not cover the performance of this service.
- ED038 (Acidity): NATA accreditation does not cover the performance of this service.
- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- Amendment (25/05/2020): This report has been amended and re-released to allow the reporting of additional analytical data. Total Cations results are now included.
- EG005T (Total Metals): Sample Composite 1 (EB2012066-001) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG005T (Total Metals): Sample Composite 2 (EB2012066-002) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EG020-T (Total Metals by ICP-MS): Sample Composite 11 (EB2012066-011) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- ED006 (Exchangeable Cations on Alkaline Soils): Unable to calculate Magnesium/Potassium Ratio result for some samples as required Exchangeable Magnesium and/or Potassium results are less than the limit of reporting.
- EG005T (Total Metals by ICP-AES): Sample Composite 11 (EB2012066 – 011) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	Composite 1	Composite 2	Composite 3	Composite 4	Composite 5
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2012066-001	EB2012066-002	EB2012066-003	EB2012066-004	EB2012066-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.9	9.3	9.6	10.0	9.8
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	825	597	1040	582	634
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.9	8.3	6.9	12.8	13.2
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	9.7	4.0	2.6	3.0	3.1
ø Exchangeable Magnesium	----	0.2	meq/100g	9.3	10.4	6.0	4.9	6.0
ø Exchangeable Potassium	----	0.2	meq/100g	0.4	0.4	<0.2	0.3	0.3
ø Exchangeable Sodium	----	0.2	meq/100g	4.0	8.0	4.5	4.1	5.0
ø Cation Exchange Capacity	----	0.2	meq/100g	23.5	22.8	13.4	12.2	14.3
ø Exchangeable Sodium Percent	----	0.2	%	17.3	35.3	33.9	33.6	35.0
ø Calcium/Magnesium Ratio	----	0.2	-	1.0	0.4	0.4	0.6	0.5
ø Magnesium/Potassium Ratio	----	0.2	-	24.8	27.6	----	16.6	22.0
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	9140	3430	3260	3780	1720
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	8800	3180	3090	3520	1540
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	343	258	172	258	172
ED038A: Acidity								
Acidity	----	1	mg/kg	<1	<1	<1	<1	<1
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	460	440	220	130	170
Silica	7631-86-9	1	mg/kg	27	23	29	16	16
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	1010	2760	1460	560	780
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	20	10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	20	20	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	880	1800	1020	620	700
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	1	1	<1	<1	<1
Iron	7439-89-6	1	mg/kg	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 1	Composite 2	Composite 3	Composite 4	Composite 5
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2012066-001	EB2012066-002	EB2012066-003	EB2012066-004	EB2012066-005
					Result	Result	Result	Result	Result
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		7000	4220	4440	12400	10500
Antimony	7440-36-0	5	mg/kg		<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg		270	380	150	50	90
Beryllium	7440-41-7	1	mg/kg		<1	2	1	<1	<1
Boron	7440-42-8	50	mg/kg		<50	<50	<50	<50	<50
Cobalt	7440-48-4	2	mg/kg		9	51	51	14	13
Iron	7439-89-6	50	mg/kg		12700	28100	22500	39800	34500
Manganese	7439-96-5	5	mg/kg		305	1590	725	769	753
Molybdenum	7439-98-7	2	mg/kg		<2	<2	<2	<2	<2
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg		<2	<2	<2	<2	<2
Calcium	7440-70-2	50	mg/kg		15400	4240	8690	12800	7290
Magnesium	7439-95-4	50	mg/kg		2820	2270	5030	7200	5600
Sodium	7440-23-5	50	mg/kg		1410	2840	2230	1680	1760
Potassium	7440-09-7	50	mg/kg		540	290	250	620	570
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	6	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		25	19	19	14	15
Copper	7440-50-8	5	mg/kg		8	13	11	38	37
Lead	7439-92-1	5	mg/kg		7	6	6	11	11
Nickel	7440-02-0	2	mg/kg		17	59	50	26	26
Zinc	7440-66-6	5	mg/kg		9	48	37	65	68
EG020S: Soluble Metals by ICPMS									
Arsenic	7440-38-2	0.01	mg/kg		<0.01	<0.01	<0.01	0.23	0.04
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	0.01	mg/kg		0.10	0.03	<0.01	0.02	<0.01
Beryllium	7440-41-7	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	7440-43-9	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	7440-47-3	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	7440-29-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/kg		0.02	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	7439-98-7	0.01	mg/kg		0.02	0.01	0.01	0.05	0.03
Nickel	7440-02-0	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 1	Composite 2	Composite 3	Composite 4	Composite 5
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2012066-001	EB2012066-002	EB2012066-003	EB2012066-004	EB2012066-005
					Result	Result	Result	Result	Result
EG020S: Soluble Metals by ICPMS - Continued									
Lead	7439-92-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Antimony	7440-36-0	0.01	mg/kg		<0.01	<0.01	<0.01	**0.01**	<0.01
Uranium	7440-61-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Aluminium	7429-90-5	0.1	mg/kg		<0.1	<0.1	<0.1	**0.3**	**0.2**
EG020T: Total Metals by ICP-MS									
Thorium	7440-29-1	0.1	mg/kg		**1.6**	**1.6**	**1.2**	**2.0**	**2.2**
Uranium	7440-61-1	0.1	mg/kg		**0.4**	**0.2**	**0.2**	**0.2**	**0.2**
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		**14**	**7**	**6**	**2**	**4**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		<0.1	<0.1	**0.1**	<0.1	**0.1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	Composite 6	Composite 7	Composite 8	Composite 9	Composite 10
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2012066-006	EB2012066-007	EB2012066-008	EB2012066-009	EB2012066-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.4	9.4	10.1	10.1	9.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	767	410	455	565	672
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	14.9	22.5	5.5	13.7	13.8
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	5.0	5.4	3.1	3.9	4.6
ø Exchangeable Magnesium	----	0.2	meq/100g	7.7	8.9	2.8	4.5	5.4
ø Exchangeable Potassium	----	0.2	meq/100g	0.2	0.3	0.3	0.4	0.5
ø Exchangeable Sodium	----	0.2	meq/100g	7.2	6.3	3.5	5.6	5.1
ø Cation Exchange Capacity	----	0.2	meq/100g	20.0	20.9	9.6	14.5	15.7
ø Exchangeable Sodium Percent	----	0.2	%	35.8	29.9	36.2	38.9	32.6
ø Calcium/Magnesium Ratio	----	0.2	-	0.6	0.6	1.1	0.9	0.8
ø Magnesium/Potassium Ratio	----	0.2	-	35.8	25.8	10.8	10.1	9.9
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	1200	1140	4290	2320	2580
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	1030	1050	3920	2140	2400
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	172	88	368	172	172
ED038A: Acidity								
Acidity	----	1	mg/kg	<1	<1	<1	<1	<1
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	190	180	80	110	140
Silica	7631-86-9	1	mg/kg	18	12	12	12	12
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	1150	510	270	520	880
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	<10	<10
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	820	530	470	620	760
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	<10	<10
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	<1	<1	<1	<1	<1
Iron	7439-89-6	1	mg/kg	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 6	Composite 7	Composite 8	Composite 9	Composite 10
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2012066-006	EB2012066-007	EB2012066-008	EB2012066-009	EB2012066-010
					Result	Result	Result	Result	Result
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		8100	8350	7860	6910	6140
Antimony	7440-36-0	5	mg/kg		<5	<5	<5	<5	<5
Barium	7440-39-3	10	mg/kg		110	40	60	110	60
Beryllium	7440-41-7	1	mg/kg		<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg		<50	<50	<50	<50	<50
Cobalt	7440-48-4	2	mg/kg		10	8	13	9	12
Iron	7439-89-6	50	mg/kg		23900	19500	38700	37500	23600
Manganese	7439-96-5	5	mg/kg		505	220	1100	616	407
Molybdenum	7439-98-7	2	mg/kg		<2	<2	<2	<2	<2
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg		<2	<2	<2	<2	<2
Calcium	7440-70-2	50	mg/kg		5640	2010	35200	18900	13600
Magnesium	7439-95-4	50	mg/kg		3550	4810	7530	6580	5280
Sodium	7440-23-5	50	mg/kg		2360	1850	1340	1900	2010
Potassium	7440-09-7	50	mg/kg		560	600	480	630	610
Arsenic	7440-38-2	5	mg/kg		<5	<5	11	8	7
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		10	9	11	8	6
Copper	7440-50-8	5	mg/kg		26	38	29	47	52
Lead	7439-92-1	5	mg/kg		6	14	10	13	15
Nickel	7440-02-0	2	mg/kg		22	19	22	21	23
Zinc	7440-66-6	5	mg/kg		55	50	48	66	68
EG020S: Soluble Metals by ICPMS									
Arsenic	7440-38-2	0.01	mg/kg		0.01	0.10	0.98	0.70	0.63
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Barium	7440-39-3	0.01	mg/kg		<0.01	<0.01	0.03	0.06	0.08
Beryllium	7440-41-7	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	7440-43-9	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	7440-48-4	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	7440-47-3	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Thorium	7440-29-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Copper	7440-50-8	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	7439-96-5	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	7439-98-7	0.01	mg/kg		0.02	0.18	0.07	0.14	0.31
Nickel	7440-02-0	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 6	Composite 7	Composite 8	Composite 9	Composite 10
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2012066-006	EB2012066-007	EB2012066-008	EB2012066-009	EB2012066-010
					Result	Result	Result	Result	Result
EG020S: Soluble Metals by ICPMS - Continued									
Lead	7439-92-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Antimony	7440-36-0	0.01	mg/kg		<0.01	**0.02**	**0.02**	**0.02**	**0.04**
Uranium	7440-61-1	0.01	mg/kg		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Aluminium	7429-90-5	0.1	mg/kg		<0.1	**0.2**	**0.9**	**0.4**	**0.5**
EG020T: Total Metals by ICP-MS									
Thorium	7440-29-1	0.1	mg/kg		**2.5**	**1.2**	**2.2**	**2.5**	**2.4**
Uranium	7440-61-1	0.1	mg/kg		**0.5**	**0.2**	**0.2**	**0.2**	**0.2**
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		**5**	**4**	**1**	**1**	**1**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		**0.2**	<0.1	**0.1**	**0.2**	**0.1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	Composite 11	Composite 12	Composite 13	pH & EC of DI water	----
			Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	06-May-2020 00:00	----
Compound	CAS Number	LOR	Unit	EB2012066-011	EB2012066-012	EB2012066-013	EB2012066-015	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**10.1**	**10.0**	**9.8**	**5.9**	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**384**	**197**	**570**	<1	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**12.8**	**8.9**	**12.7**	----	----
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	**3.4**	----	----	----	----
ø Exchangeable Magnesium	----	0.2	meq/100g	**2.7**	----	----	----	----
ø Exchangeable Potassium	----	0.2	meq/100g	**0.2**	----	----	----	----
ø Exchangeable Sodium	----	0.2	meq/100g	**3.8**	----	----	----	----
ø Cation Exchange Capacity	----	0.2	meq/100g	**10.2**	----	----	----	----
ø Exchangeable Sodium Percent	----	0.2	%	**37.7**	----	----	----	----
ø Calcium/Magnesium Ratio	----	0.2	-	**1.2**	----	----	----	----
ø Magnesium/Potassium Ratio	----	0.2	-	**10.9**	----	----	----	----
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	**1370**	**1120**	**2010**	----	----
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	**1120**	**944**	**1840**	----	----
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	**258**	**172**	**175**	----	----
ED038A: Acidity								
Acidity	----	1	mg/kg	<1	<1	<1	----	----
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**90**	**170**	**180**	----	----
Silica	7631-86-9	1	mg/kg	**13**	**9**	**14**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	**160**	**440**	**640**	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	<10	----	----
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	----	----
Sodium	7440-23-5	10	mg/kg	**460**	**540**	**640**	----	----
Potassium	7440-09-7	10	mg/kg	<10	<10	<10	----	----
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	<1	<1	<1	----	----
Iron	7439-89-6	1	mg/kg	<1	<1	<1	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 11	Composite 12	Composite 13	pH & EC of DI water	----
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	06-May-2020 00:00	----
Compound	CAS Number	LOR	Unit		EB2012066-011	EB2012066-012	EB2012066-013	EB2012066-015	--------
					Result	Result	Result	Result	----
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		**9570**	**6320**	**5920**	----	----
Antimony	7440-36-0	5	mg/kg		<5	<5	<5	----	----
Barium	7440-39-3	10	mg/kg		**90**	**70**	**30**	----	----
Beryllium	7440-41-7	1	mg/kg		<1	<1	<1	----	----
Boron	7440-42-8	50	mg/kg		<50	<50	<50	----	----
Cobalt	7440-48-4	2	mg/kg		**16**	**7**	**7**	----	----
Iron	7439-89-6	50	mg/kg		**39000**	**44900**	**19800**	----	----
Manganese	7439-96-5	5	mg/kg		**608**	**480**	**562**	----	----
Molybdenum	7439-98-7	2	mg/kg		<2	<2	<2	----	----
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	----	----
Silver	7440-22-4	2	mg/kg		<2	<2	<2	----	----
Calcium	7440-70-2	50	mg/kg		**15200**	**22100**	**14200**	----	----
Magnesium	7439-95-4	50	mg/kg		**6380**	**5520**	**4710**	----	----
Sodium	7440-23-5	50	mg/kg		**1560**	**1360**	**1670**	----	----
Potassium	7440-09-7	50	mg/kg		**590**	**460**	**540**	----	----
Arsenic	7440-38-2	5	mg/kg		**8**	<5	**10**	----	----
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg		**9**	**5**	**9**	----	----
Copper	7440-50-8	5	mg/kg		**44**	**30**	**38**	----	----
Lead	7439-92-1	5	mg/kg		**14**	**10**	**11**	----	----
Nickel	7440-02-0	2	mg/kg		**26**	**13**	**17**	----	----
Zinc	7440-66-6	5	mg/kg		**66**	**45**	**86**	----	----
EG020S: Soluble Metals by ICPMS									
Arsenic	7440-38-2	0.01	mg/kg		**1.00**	**0.22**	**0.91**	----	----
Selenium	7782-49-2	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
Barium	7440-39-3	0.01	mg/kg		**0.03**	**0.08**	<0.01	----	----
Beryllium	7440-41-7	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Cadmium	7440-43-9	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Cobalt	7440-48-4	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Chromium	7440-47-3	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Thorium	7440-29-1	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Copper	7440-50-8	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Manganese	7439-96-5	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Molybdenum	7439-98-7	0.01	mg/kg		**0.28**	**0.18**	**0.12**	----	----
Nickel	7440-02-0	0.01	mg/kg		<0.01	<0.01	<0.01	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 11	Composite 12	Composite 13	pH & EC of DI water	----
				Client sampling date / time	15-Apr-2020 00:00	15-Apr-2020 00:00	15-Apr-2020 00:00	06-May-2020 00:00	----
Compound	CAS Number	LOR	Unit		EB2012066-011	EB2012066-012	EB2012066-013	EB2012066-015	--------
					Result	Result	Result	Result	----
EG020S: Soluble Metals by ICPMS - Continued									
Lead	7439-92-1	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Antimony	7440-36-0	0.01	mg/kg		**0.03**	**0.02**	**0.01**	----	----
Uranium	7440-61-1	0.01	mg/kg		<0.01	<0.01	<0.01	----	----
Zinc	7440-66-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Vanadium	7440-62-2	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
Aluminium	7429-90-5	0.1	mg/kg		**0.8**	**0.6**	**0.2**	----	----
EG020T: Total Metals by ICP-MS									
Thorium	7440-29-1	0.1	mg/kg		**2.2**	**1.6**	**1.7**	----	----
Uranium	7440-61-1	0.1	mg/kg		**0.2**	**0.3**	**0.2**	----	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		**1**	**1**	**3**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		**0.2**	<0.1	**0.2**	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2011337**	Page	: 1 of 2
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038	Date Samples Received	: 27-Apr-2020 11:08
Order number	: ----	Date Analysis Commenced	: 05-May-2020
C-O-C number	: ----	Issue Date	: 07-May-2020 14:50
Sampler	: KEN O'REILLY		
Site	: Meadowbrook (Jellinbah)		
Quote number	: EN/222		
No. of samples received	: 4		
No. of samples analysed	: 4		

ilac-MRA NATA
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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**2698M01**	**2698M02**	**2698M03**	**2698M04**	**----**
			Client sampling date / time	20-Apr-2020 00:00	20-Apr-2020 00:00	20-Apr-2020 00:00	20-Apr-2020 00:00	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2011337-001**	**EB2011337-002**	**EB2011337-003**	**EB2011337-004**	**--------**
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.6**	**9.6**	**10.0**	**9.8**	**----**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-44.7**	**-8.1**	**-19.7**	**-11.0**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**289**	**169**	**459**	**184**	**----**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**50.2**	**9.3**	**25.5**	**11.6**	**----**
ANC as CaCO3	----	0.1	% CaCO3	**5.1**	**1.0**	**2.6**	**1.2**	**----**
Fizz Rating	----	0	Fizz Unit	**2**	**1**	**1**	**1**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.18**	**0.04**	**0.19**	**0.02**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2014520**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook	Date Samples Received	: 29-May-2020 15:00
Order number	: ----	Date Analysis Commenced	: 04-Jun-2020
C-O-C number	: ----	Issue Date	: 08-Jun-2020 16:40
Sampler	: JOSH MURRAY		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	EC and pH DI Water	----	----	----	----
				Client sampling date / time	21-May-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2014520-004	--------	--------	--------	--------
					Result	----	----	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**5.7**	----	----	----	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		<1	----	----	----	----

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Client sample ID	2715M01	2715M02	2715M03	----	----
			Client sampling date / time	21-May-2020 00:00	21-May-2020 00:00	21-May-2020 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2014520-001	EB2014520-002	EB2014520-003	--------	--------
				Result	Result	Result	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.7**	**9.7**	**9.7**	**----**	**----**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-37.1**	**-22.1**	**-30.1**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**316**	**255**	**265**	**----**	**----**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**37.7**	**22.7**	**30.4**	**----**	**----**
ANC as CaCO3	----	0.1	% CaCO3	**3.8**	**2.3**	**3.1**	**----**	**----**
Fizz Rating	----	0	Fizz Unit	**1**	**1**	**1**	**----**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.02**	**0.01**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2015372**	Page	: 1 of 2
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook (Jellinbah)	Date Samples Received	: 10-Jun-2020 10:00
Order number	: ----	Date Analysis Commenced	: 16-Jun-2020
C-O-C number	: ----	Issue Date	: 22-Jun-2020 16:23
Sampler	: KEN O'REILLY		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**SN #2720 M01**	**SN #2720 M02**	**SN #2720 M03**	**SN #2720 M04**	**----**
			Client sampling date / time	11-Jun-2020 00:00	11-Jun-2020 00:00	11-Jun-2020 00:00	11-Jun-2020 00:00	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2015372-001**	**EB2015372-002**	**EB2015372-003**	**EB2015372-004**	**--------**
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**10.0**	**9.7**	**9.9**	**10.0**	**----**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-190**	**-12.3**	**-28.8**	**-13.4**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**363**	**192**	**308**	**284**	**----**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**191**	**13.2**	**30.0**	**15.2**	**----**
ANC as CaCO3	----	0.1	% CaCO3	**19.5**	**1.3**	**3.1**	**1.6**	**----**
Fizz Rating	----	0	Fizz Unit	**3**	**1**	**1**	**1**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.02**	**0.03**	**0.04**	**0.06**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2016692**	Page	: 1 of 2
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook (Jellinbah)	Date Samples Received	: 24-Jun-2020 10:40
Order number	: ----	Date Analysis Commenced	: 26-Jun-2020
C-O-C number	: ----	Issue Date	: 01-Jul-2020 13:16
Sampler	: JEREMY GILES		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 4		
No. of samples analysed	: 4		

ilac-MRA NATA
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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **SOLID** (Matrix: **SOIL**)			Client sample ID	**2723M01 siltstone and mudstone**	**2723M02 siltstone and sandstone**	**2723M03 mudstone**	**2723M04 siltstone**	**----**
			Client sampling date / time	19-Jun-2020 00:00	19-Jun-2020 00:00	19-Jun-2020 00:00	19-Jun-2020 00:00	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2016692-001**	**EB2016692-002**	**EB2016692-003**	**EB2016692-004**	**--------**
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.8**	**9.5**	**9.8**	**9.9**	**----**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-18.3**	**-15.0**	**-14.4**	**-7.2**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**430**	**176**	**141**	**139**	**----**
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**20.1**	**15.6**	**15.6**	**10.0**	**----**
ANC as CaCO3	----	0.1	% CaCO3	**2.0**	**1.6**	**1.6**	**1.0**	**----**
Fizz Rating	----	0	Fizz Unit	**1**	**1**	**1**	**1**	**----**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**1.1**	**1.3**	**1.3**	**0.8**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.06**	**0.02**	**0.04**	**0.09**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2015788**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook (Jellinbah)	Date Samples Received	: 15-Jun-2020 11:50
Order number	: ----	Date Analysis Commenced	: 01-Jul-2020
C-O-C number	: ----	Issue Date	: 07-Jul-2020 16:31
Sampler	: KEN O'REILLY		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 6		
No. of samples analysed	: 6		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)			Client sample ID	LV2716C - 2716C10	LV2716C - 2716C11	LV2716C - 2716C12	LV2716C - 2716C13	LV2718C - 2718C08
			Client sampling date / time	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00
Compound	CAS Number	LOR	Unit	EB2015788-001	EB2015788-002	EB2015788-003	EB2015788-004	EB2015788-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.6	9.5	9.8	9.8	10.0
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-11.6	-24.6	3.6	-21.6	-25.0
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	210	121	303	240	335
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	19.0	33.5	14.1	25.0	36.3
ANC as CaCO3	----	0.1	% CaCO3	1.9	3.4	1.4	2.6	3.7
Fizz Rating	----	0	Fizz Unit	1	1	1	1	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	3.1	2.4	2.4	2.6	1.7
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.24	0.29	0.58	0.11	0.37

Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)				Client sample ID	LV2718C - 2718C07	----	----	----	----
				Client sampling date / time	30-Jun-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2015788-006	--------	--------	--------	--------
					Result	----	----	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**9.9**	----	----	----	----
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-22.7**	----	----	----	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**418**	----	----	----	----
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**25.8**	----	----	----	----
ANC as CaCO3	----	0.1	% CaCO3		**2.6**	----	----	----	----
Fizz Rating	----	0	Fizz Unit		**1**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**1.8**	----	----	----	----
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.10**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2017550**	Page	: 1 of 2
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook (Jellinbah)	Date Samples Received	: 02-Jul-2020 14:40
Order number	: ----	Date Analysis Commenced	: 07-Jul-2020
C-O-C number	: ----	Issue Date	: 10-Jul-2020 12:14
Sampler	: JOSH MURRAY		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 5		
No. of samples analysed	: 5		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: **ROCK** (Matrix: **SOIL**)			Client sample ID	**2730M01**	**2730M02**	**2730M03**	**2730M04**	**pH and EC of DI Water**
			Client sampling date / time	29-Jun-2020 00:00	29-Jun-2020 00:00	29-Jun-2020 00:00	29-Jun-2020 00:00	29-Jun-2020 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2017550-001**	**EB2017550-002**	**EB2017550-003**	**EB2017550-004**	**EB2017550-005**
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.4**	**9.6**	**9.6**	**9.6**	**5.5**
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-24.9**	**-12.6**	**-19.9**	**-19.9**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**313**	**137**	**274**	**201**	<1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**25.8**	**13.8**	**20.8**	**20.5**	**----**
ANC as CaCO3	----	0.1	% CaCO3	**2.6**	**1.4**	**2.1**	**2.1**	**----**
Fizz Rating	----	0	Fizz Unit	**1**	**1**	**1**	**1**	**----**
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.03**	**0.04**	**0.03**	**0.02**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2018983**	Page	: 1 of 5
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook (Jellinbah)	Date Samples Received	: 17-Jul-2020 08:40
Order number	: ----	Date Analysis Commenced	: 21-Jul-2020
C-O-C number	: ----	Issue Date	: 29-Jul-2020 11:00
Sampler	: JEREMY GILES		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 7		
No. of samples analysed	: 7		

ilac-MRA NATA
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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Client sample ID	2731M01	2731M02	2724M01	2724M02	2726M01
				Client sampling date / time	16-Jul-2020 00:00	16-Jul-2020 00:00	16-Jul-2020 00:00	16-Jul-2020 00:00	16-Jul-2020 00:00
Compound	CAS Number	LOR	Unit		EB2018983-001	EB2018983-002	EB2018983-003	EB2018983-004	EB2018983-005
					Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		**9.8**	**9.2**	**9.4**	**9.5**	**9.3**
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t		**-19.7**	**-4.8**	**-173**	**-5.5**	**-173**
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		**451**	**78**	**471**	**188**	**437**
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t		**20.9**	**8.8**	**174**	**6.7**	**173**
ANC as CaCO3	----	0.1	% CaCO3		**2.1**	**0.9**	**17.7**	**0.7**	**17.6**
Fizz Rating	----	0	Fizz Unit		**1**	**1**	**3**	**1**	**3**
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%		**0.04**	**0.13**	**0.02**	**0.04**	<0.01

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)				Client sample ID	2726M02	----	----	----	----
				Client sampling date / time	16-Jul-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2018983-006	--------	--------	--------	--------	
				Result	----	----	----	----	
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit	**9.5**	----	----	----	----	
EA009: Net Acid Production Potential									
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-6.3**	----	----	----	----	
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm	**108**	----	----	----	----	
EA013: Acid Neutralising Capacity									
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**9.4**	----	----	----	----	
ANC as CaCO3	----	0.1	% CaCO3	**1.0**	----	----	----	----	
Fizz Rating	----	0	Fizz Unit	**1**	----	----	----	----	
ED042T: Total Sulfur by LECO									
Sulfur - Total as S (LECO)	----	0.01	%	**0.10**	----	----	----	----	

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**pH and EC of deionised water**	----	----	----	----
			Client sampling date / time	16-Jul-2020 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2018983-007**	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.0**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2020779**	Page	: 1 of 6
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook (Jellinbah)	Date Samples Received	: 28-Jul-2020 12:00
Order number	: ----	Date Analysis Commenced	: 07-Aug-2020
C-O-C number	: ----	Issue Date	: 17-Aug-2020 17:13
Sampler	: KEN O'REILLY		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 13		
No. of samples analysed	: 13		

ilac-MRA NATA
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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ASS: EA013 (ANC) Fizz Rating: 0- None; 1- Slight; 2- Moderate; 3- Strong; 4- Very Strong; 5- Lime.

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Client sample ID	2730S01	2730S02	2730S03	2730S04	2730S05
			Client sampling date / time	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00
Compound	CAS Number	LOR	Unit	EB2020779-001	EB2020779-002	EB2020779-003	EB2020779-004	EB2020779-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.4	8.6	7.9	7.5	8.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-33.4	-23.0	-0.5	-2.2	-13.8
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	14	50	42	38	27
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	35.9	29.4	7.5	9.6	20.2
ANC as CaCO3	----	0.1	% CaCO3	3.7	3.0	0.8	1.0	2.0
Fizz Rating	----	0	Fizz Unit	1	1	1	1	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	3.0	3.7	5.1	3.2	4.4
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.08	0.21	0.23	0.24	0.21

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Client sample ID	2730S06	2730S07	2730S08	2730S09	2730S10
			Client sampling date / time	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00
Compound	CAS Number	LOR	Unit	EB2020779-006	EB2020779-007	EB2020779-008	EB2020779-009	EB2020779-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	7.4	7.3	8.0	7.4	7.0
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-0.2	-0.07	-3.9	-4.2	-2.9
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	17	15	25	12	15
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	8.2	6.5	10.0	10.6	9.3
ANC as CaCO3	----	0.1	% CaCO3	0.8	0.7	1.0	1.1	0.9
Fizz Rating	----	0	Fizz Unit	1	1	1	1	1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	3.2	3.6	4.5	3.6	4.4
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.26	0.21	0.20	0.21	0.21

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Client sample ID	2730S11	2730S12	----	----	----
			Client sampling date / time	06-Aug-2020 00:00	06-Aug-2020 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2020779-011	EB2020779-012	--------	--------	--------
				Result	Result	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.7**	**9.3**	----	----	----
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	**-5.6**	**-14.8**	----	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**16**	**46**	----	----	----
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	**12.0**	**16.3**	----	----	----
ANC as CaCO3	----	0.1	% CaCO3	**1.2**	**1.7**	----	----	----
Fizz Rating	----	0	Fizz Unit	**1**	**1**	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**3.2**	**3.0**	----	----	----
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	**0.21**	**0.05**	----	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**pH and EC of Deionised water**	**----**	**----**	**----**	**----**
			Client sampling date / time	07-Aug-2020 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2020779-013**	**--------**	**--------**	**--------**	**--------**
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**5.3**	**----**	**----**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2018662**	Page	: 1 of 8
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook	Date Samples Received	: 15-Jul-2020 17:21
Order number	: ----	Date Analysis Commenced	: 17-Jul-2020
C-O-C number	: ----	Issue Date	: 24-Jul-2020 11:18
Sampler	: DAVE WINTERBOTHAM, JOSH MURRAY, KEN O'REILLY		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 15		
No. of samples analysed	: 8		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ED037 (Alkalinity): NATA accreditation does not cover the performance of this service.
- ED038 (Acidity): NATA accreditation does not cover the performance of this service.
- EG020T (Total Metals by ICP-MS): The Manganese method blank is above the limit of reporting but is not considered significant compared to analyte levels in the samples.
- EG020-T (Total Metals by ICP-MS): Sample Composite 15 (EB2018662-013) shows poor matrix spike recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-S (Soluble Metals by ICP-MS) for sample Composite 14 (EB2018662-012). However, the difference is within experimental variation of the methods.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2716C10 LV2716C	2716C11 LV2716C	2716C12 LV2716C	2718C08 LV2718C	Composite 14
			Client sampling date / time	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	15-Jul-2020 00:00
Compound	CAS Number	LOR	Unit	EB2018662-004	EB2018662-009	EB2018662-010	EB2018662-011	EB2018662-012
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	9.6
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	----	----	487
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	0.088	0.022	0.192	0.176	----
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	----	----	----	----	6460
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	----	----	----	----	5460
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	----	----	----	----	1000
ED038A: Acidity								
Acidity	----	1	mg/kg	----	----	----	----	<5
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	----	----	----	----	100
Silica	7631-86-9	1	mg/kg	----	----	----	----	32
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	----	----	----	----	110
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	----	----	----	----	<10
Magnesium	7439-95-4	10	mg/kg	----	----	----	----	<10
Sodium	7440-23-5	10	mg/kg	----	----	----	----	520
Potassium	7440-09-7	10	mg/kg	----	----	----	----	20
ED093T: Total Major Cations								
Sodium	7440-23-5	50	mg/kg	----	----	----	----	1850
Potassium	7440-09-7	50	mg/kg	----	----	----	----	1370
Calcium	7440-70-2	50	mg/kg	----	----	----	----	8030
Magnesium	7439-95-4	50	mg/kg	----	----	----	----	5010
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	----	----	----	----	<1
Iron	7439-89-6	1	mg/kg	----	----	----	----	<1
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	----	----	----	10400
Boron	7440-42-8	50	mg/kg	----	----	----	----	<50
Iron	7439-89-6	50	mg/kg	----	----	----	----	50100

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID	2716C10 LV2716C	2716C11 LV2716C	2716C12 LV2716C	2718C08 LV2718C	Composite 14
				Client sampling date / time	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	15-Jul-2020 00:00
					EB2018662-004	EB2018662-009	EB2018662-010	EB2018662-011	EB2018662-012
					Result	Result	Result	Result	Result
EG020S: Soluble Metals by ICPMS									
Arsenic	7440-38-2	0.01	mg/kg		----	----	----	----	**2.22**
Selenium	7782-49-2	0.1	mg/kg		----	----	----	----	<0.1
Barium	7440-39-3	0.01	mg/kg		----	----	----	----	**0.10**
Beryllium	7440-41-7	0.01	mg/kg		----	----	----	----	<0.01
Cadmium	7440-43-9	0.01	mg/kg		----	----	----	----	<0.01
Cobalt	7440-48-4	0.01	mg/kg		----	----	----	----	<0.01
Chromium	7440-47-3	0.01	mg/kg		----	----	----	----	<0.01
Thorium	7440-29-1	0.01	mg/kg		----	----	----	----	<0.01
Copper	7440-50-8	0.01	mg/kg		----	----	----	----	<0.01
Manganese	7439-96-5	0.01	mg/kg		----	----	----	----	<0.01
Molybdenum	7439-98-7	0.01	mg/kg		----	----	----	----	**0.23**
Nickel	7440-02-0	0.01	mg/kg		----	----	----	----	<0.01
Lead	7439-92-1	0.01	mg/kg		----	----	----	----	<0.01
Antimony	7440-36-0	0.01	mg/kg		----	----	----	----	**0.11**
Uranium	7440-61-1	0.01	mg/kg		----	----	----	----	<0.01
Zinc	7440-66-6	0.05	mg/kg		----	----	----	----	<0.05
Vanadium	7440-62-2	0.1	mg/kg		----	----	----	----	**0.2**
Aluminium	7429-90-5	0.1	mg/kg		----	----	----	----	**2.2**
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.1	mg/kg		----	----	----	----	**12.0**
Selenium	7782-49-2	1	mg/kg		----	----	----	----	<1
Silver	7440-22-4	0.1	mg/kg		----	----	----	----	**0.1**
Barium	7440-39-3	0.1	mg/kg		----	----	----	----	**136**
Beryllium	7440-41-7	0.1	mg/kg		----	----	----	----	**0.9**
Cadmium	7440-43-9	0.1	mg/kg		----	----	----	----	**0.1**
Cobalt	7440-48-4	0.1	mg/kg		----	----	----	----	**11.9**
Chromium	7440-47-3	0.1	mg/kg		----	----	----	----	**9.1**
Copper	7440-50-8	0.1	mg/kg		----	----	----	----	**47.4**
Thorium	7440-29-1	0.1	mg/kg		----	----	----	----	**1.8**
Manganese	7439-96-5	0.1	mg/kg		----	----	----	----	**1570**
Molybdenum	7439-98-7	0.1	mg/kg		----	----	----	----	**0.7**
Nickel	7440-02-0	0.1	mg/kg		----	----	----	----	**19.1**
Lead	7439-92-1	0.1	mg/kg		----	----	----	----	**15.9**
Antimony	7440-36-0	0.1	mg/kg		----	----	----	----	**0.1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2716C10 LV2716C	2716C11 LV2716C	2716C12 LV2716C	2718C08 LV2718C	Composite 14
				Client sampling date / time	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	30-Jun-2020 00:00	15-Jul-2020 00:00
Compound	CAS Number	LOR	Unit		EB2018662-004	EB2018662-009	EB2018662-010	EB2018662-011	EB2018662-012
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Uranium	7440-61-1	0.1	mg/kg		----	----	----	----	**0.3**
Zinc	7440-66-6	0.5	mg/kg		----	----	----	----	**90.7**
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		----	----	----	----	<0.0005
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	----	----	----	<0.1
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		----	----	----	----	**1**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		----	----	----	----	**1.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	Composite 15	Composite 16	pH and EC of DI water	----	----
			Client sampling date / time	15-Jul-2020 00:00	15-Jul-2020 00:00	15-Jul-2020 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2018662-013	EB2018662-014	EB2018662-015	--------	--------
				Result	Result	Result	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.7**	**9.8**	**5.9**	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**309**	**309**	<1	----	----
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	**3250**	**1420**	----	----	----
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	**2170**	**1000**	----	----	----
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	**1080**	**417**	----	----	----
ED038A: Acidity								
Acidity	----	1	mg/kg	<5	<5	----	----	----
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**170**	**90**	----	----	----
Silica	7631-86-9	1	mg/kg	**38**	**29**	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	**60**	**30**	----	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	<10	<10	----	----	----
Magnesium	7439-95-4	10	mg/kg	<10	<10	----	----	----
Sodium	7440-23-5	10	mg/kg	**360**	**370**	----	----	----
Potassium	7440-09-7	10	mg/kg	<10	<10	----	----	----
ED093T: Total Major Cations								
Sodium	7440-23-5	50	mg/kg	**2050**	**1140**	----	----	----
Potassium	7440-09-7	50	mg/kg	**1210**	**650**	----	----	----
Calcium	7440-70-2	50	mg/kg	**5630**	**13400**	----	----	----
Magnesium	7439-95-4	50	mg/kg	**3790**	**1570**	----	----	----
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	<1	<1	----	----	----
Iron	7439-89-6	1	mg/kg	<1	<1	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**7140**	**3100**	----	----	----
Boron	7440-42-8	50	mg/kg	<50	<50	----	----	----
Iron	7439-89-6	50	mg/kg	**51600**	**44700**	----	----	----
EG020S: Soluble Metals by ICPMS								
Arsenic	7440-38-2	0.01	mg/kg	**1.65**	**0.15**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 15	Composite 16	pH and EC of DI water	----	----
				Client sampling date / time	15-Jul-2020 00:00	15-Jul-2020 00:00	15-Jul-2020 00:00	----	----
Compound	CAS Number	LOR	Unit		EB2018662-013	EB2018662-014	EB2018662-015	--------	--------
					Result	Result	Result	----	----
EG020S: Soluble Metals by ICPMS - Continued									
Selenium	7782-49-2	0.1	mg/kg		**0.1**	<0.1	----	----	----
Barium	7440-39-3	0.01	mg/kg		**0.02**	**0.08**	----	----	----
Beryllium	7440-41-7	0.01	mg/kg		<0.01	<0.01	----	----	----
Cadmium	7440-43-9	0.01	mg/kg		<0.01	<0.01	----	----	----
Cobalt	7440-48-4	0.01	mg/kg		<0.01	<0.01	----	----	----
Chromium	7440-47-3	0.01	mg/kg		<0.01	<0.01	----	----	----
Thorium	7440-29-1	0.01	mg/kg		<0.01	<0.01	----	----	----
Copper	7440-50-8	0.01	mg/kg		<0.01	<0.01	----	----	----
Manganese	7439-96-5	0.01	mg/kg		<0.01	<0.01	----	----	----
Molybdenum	7439-98-7	0.01	mg/kg		**1.30**	**0.06**	----	----	----
Nickel	7440-02-0	0.01	mg/kg		<0.01	<0.01	----	----	----
Lead	7439-92-1	0.01	mg/kg		<0.01	<0.01	----	----	----
Antimony	7440-36-0	0.01	mg/kg		**0.12**	**0.04**	----	----	----
Uranium	7440-61-1	0.01	mg/kg		<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.05	mg/kg		<0.05	<0.05	----	----	----
Vanadium	7440-62-2	0.1	mg/kg		**0.3**	**0.2**	----	----	----
Aluminium	7429-90-5	0.1	mg/kg		**2.3**	**0.8**	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.1	mg/kg		**8.4**	**48.6**	----	----	----
Selenium	7782-49-2	1	mg/kg		<1	<1	----	----	----
Silver	7440-22-4	0.1	mg/kg		**0.2**	<0.1	----	----	----
Barium	7440-39-3	0.1	mg/kg		**135**	**110**	----	----	----
Beryllium	7440-41-7	0.1	mg/kg		**0.8**	**0.5**	----	----	----
Cadmium	7440-43-9	0.1	mg/kg		**0.1**	**0.2**	----	----	----
Cobalt	7440-48-4	0.1	mg/kg		**20.9**	**7.3**	----	----	----
Chromium	7440-47-3	0.1	mg/kg		**6.5**	**2.1**	----	----	----
Copper	7440-50-8	0.1	mg/kg		**47.2**	**31.3**	----	----	----
Thorium	7440-29-1	0.1	mg/kg		**3.8**	**4.0**	----	----	----
Manganese	7439-96-5	0.1	mg/kg		**2160**	**2590**	----	----	----
Molybdenum	7439-98-7	0.1	mg/kg		**2.2**	**0.5**	----	----	----
Nickel	7440-02-0	0.1	mg/kg		**24.8**	**8.1**	----	----	----
Lead	7439-92-1	0.1	mg/kg		**19.3**	**12.5**	----	----	----
Antimony	7440-36-0	0.1	mg/kg		**0.2**	**0.8**	----	----	----
Uranium	7440-61-1	0.1	mg/kg		**0.6**	**0.9**	----	----	----
Zinc	7440-66-6	0.5	mg/kg		**76.3**	**53.4**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Composite 15	Composite 16	pH and EC of DI water	----	----
				Client sampling date / time	15-Jul-2020 00:00	15-Jul-2020 00:00	15-Jul-2020 00:00	----	----
Compound	CAS Number	LOR	Unit		EB2018662-013	EB2018662-014	EB2018662-015	--------	--------
					Result	Result	Result	----	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	**0.2**	----	----	----
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		<1	**4**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		**1.0**	<0.1	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2021757**	Page	: 1 of 7
Amendment	: **1**		
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook	Date Samples Received	: 18-Aug-2020 10:21
Order number	: ----	Date Analysis Commenced	: 20-Aug-2020
C-O-C number	: ----	Issue Date	: 09-Sep-2020 17:24
Sampler	: VERONICA CANALES		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 20		
No. of samples analysed	: 14		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ED037 (Alkalinity): NATA accreditation does not cover the performance of this service.
- ED038 (Acidity): NATA accreditation does not cover the performance of this service.
- Amendment (09/09/2020): This report has been amended and re-released to allow the reporting of additional analytical data, specifically Total Cations for samples "Composite 17" & "Composite 18".
- EG020-T (Total Metals by ICP-MS): Sample EB2021551-003 shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG020-S (Soluble Metals by ICP-MS): Sample Composite 17 (EB2021757-018) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2731M02	2730S02	2730S03	2730S04	2730S05
				Client sampling date / time	16-Jul-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00
Compound	CAS Number	LOR	Unit		EB2021757-001	EB2021757-002	EB2021757-003	EB2021757-004	EB2021757-005
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.016**	**0.016**	**0.013**	**0.012**	**0.019**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2730S06	2730S07	2730S08	2730S09	2730S10
			Client sampling date / time	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00
Compound	CAS Number	LOR	Unit	EB2021757-006	EB2021757-007	EB2021757-008	EB2021757-009	EB2021757-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.013**	**0.012**	**0.012**	**0.010**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2730S11	Composite 17	Composite 18	pH and EC of Deionised Water	----
			Client sampling date / time	06-Aug-2020 00:00	16-Jul-2020 00:00	06-Aug-2020 00:00	19-Aug-2020 00:00	----
Compound	CAS Number	LOR	Unit	EB2021757-011	EB2021757-018	EB2021757-019	EB2021757-020	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	----	9.8	9.7	5.9	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	493	107	<1	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	0.011	----	----	----	----
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	----	33100	5040	----	----
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	----	31100	3960	----	----
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	----	2000	1080	----	----
ED038A: Acidity								
Acidity	----	1	mg/kg	----	<5	<5	----	----
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	----	20	<10	----	----
Silica	7631-86-9	1	mg/kg	----	50	19	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	----	60	30	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	----	<10	<10	----	----
Magnesium	7439-95-4	10	mg/kg	----	<10	<10	----	----
Sodium	7440-23-5	10	mg/kg	----	520	210	----	----
Potassium	7440-09-7	10	mg/kg	----	20	<10	----	----
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	----	<1	<1	----	----
Iron	7439-89-6	1	mg/kg	----	<1	<1	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	4560	2610	----	----
Boron	7440-42-8	50	mg/kg	----	<50	<50	----	----
Iron	7439-89-6	50	mg/kg	----	16600	13600	----	----
Calcium	7440-70-2	50	mg/kg	----	10300	6460	----	----
Magnesium	7439-95-4	50	mg/kg	----	2970	1460	----	----
Sodium	7440-23-5	50	mg/kg	----	1980	420	----	----
Potassium	7440-09-7	50	mg/kg	----	1250	290	----	----
EG020S: Soluble Metals by ICPMS								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2730S11	Composite 17	Composite 18	pH and EC of Deionised Water	----
				Client sampling date / time	06-Aug-2020 00:00	16-Jul-2020 00:00	06-Aug-2020 00:00	19-Aug-2020 00:00	----
Compound	CAS Number	LOR	Unit		EB2021757-011	EB2021757-018	EB2021757-019	EB2021757-020	--------
					Result	Result	Result	Result	----
EG020S: Soluble Metals by ICPMS - Continued									
Arsenic	7440-38-2	0.01	mg/kg		----	**0.69**	**0.03**	----	----
Selenium	7782-49-2	0.1	mg/kg		----	<0.1	<0.1	----	----
Barium	7440-39-3	0.01	mg/kg		----	**0.08**	**0.05**	----	----
Beryllium	7440-41-7	0.01	mg/kg		----	<0.01	<0.01	----	----
Cadmium	7440-43-9	0.01	mg/kg		----	<0.01	<0.01	----	----
Cobalt	7440-48-4	0.01	mg/kg		----	<0.01	<0.01	----	----
Chromium	7440-47-3	0.01	mg/kg		----	<0.01	<0.01	----	----
Thorium	7440-29-1	0.01	mg/kg		----	<0.01	<0.01	----	----
Copper	7440-50-8	0.01	mg/kg		----	<0.01	<0.01	----	----
Manganese	7439-96-5	0.01	mg/kg		----	<0.01	<0.01	----	----
Molybdenum	7439-98-7	0.01	mg/kg		----	**0.14**	**0.01**	----	----
Nickel	7440-02-0	0.01	mg/kg		----	<0.01	<0.01	----	----
Lead	7439-92-1	0.01	mg/kg		----	<0.01	<0.01	----	----
Antimony	7440-36-0	0.01	mg/kg		----	**0.02**	<0.01	----	----
Uranium	7440-61-1	0.01	mg/kg		----	<0.01	<0.01	----	----
Zinc	7440-66-6	0.05	mg/kg		----	<0.05	<0.05	----	----
Vanadium	7440-62-2	0.1	mg/kg		----	**0.3**	<0.1	----	----
Aluminium	7429-90-5	0.1	mg/kg		----	**3.0**	**2.6**	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.1	mg/kg		----	**2.3**	**0.4**	----	----
Selenium	7782-49-2	1	mg/kg		----	<1	<1	----	----
Silver	7440-22-4	0.1	mg/kg		----	<0.1	<0.1	----	----
Barium	7440-39-3	0.1	mg/kg		----	**214**	**38.6**	----	----
Beryllium	7440-41-7	0.1	mg/kg		----	**1.0**	**0.3**	----	----
Cadmium	7440-43-9	0.1	mg/kg		----	**0.1**	<0.1	----	----
Cobalt	7440-48-4	0.1	mg/kg		----	**5.2**	**1.2**	----	----
Chromium	7440-47-3	0.1	mg/kg		----	**3.6**	**2.4**	----	----
Copper	7440-50-8	0.1	mg/kg		----	**61.3**	**20.3**	----	----
Thorium	7440-29-1	0.1	mg/kg		----	**1.6**	**1.0**	----	----
Manganese	7439-96-5	0.1	mg/kg		----	**313**	**286**	----	----
Molybdenum	7439-98-7	0.1	mg/kg		----	**0.9**	**0.2**	----	----
Nickel	7440-02-0	0.1	mg/kg		----	**9.2**	**1.6**	----	----
Lead	7439-92-1	0.1	mg/kg		----	**15.3**	**5.4**	----	----
Antimony	7440-36-0	0.1	mg/kg		----	<0.1	<0.1	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2730S11	Composite 17	Composite 18	pH and EC of Deionised Water	----
				Client sampling date / time	06-Aug-2020 00:00	16-Jul-2020 00:00	06-Aug-2020 00:00	19-Aug-2020 00:00	----
Compound	CAS Number	LOR	Unit		EB2021757-011	EB2021757-018	EB2021757-019	EB2021757-020	--------
					Result	Result	Result	Result	----
EG020T: Total Metals by ICP-MS - Continued									
Uranium	7440-61-1	0.1	mg/kg		----	**0.2**	**0.3**	----	----
Zinc	7440-66-6	0.5	mg/kg		----	**42.3**	**17.3**	----	----
EG035S: Soluble Mercury by FIMS									
Mercury	7439-97-6	0.0005	mg/kg		----	<0.0005	<0.0005	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	<0.1	<0.1	----	----
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		----	**2**	**2**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		----	**0.3**	<0.1	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2021757**	Page	: 1 of 7
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038 Meadowbrook	Date Samples Received	: 18-Aug-2020 10:21
Order number	: ----	Date Analysis Commenced	: 20-Aug-2020
C-O-C number	: ----	Issue Date	: 28-Aug-2020 15:01
Sampler	: VERONICA CANALES		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 20		
No. of samples analysed	: 14		

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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ED037 (Alkalinity): NATA accreditation does not cover the performance of this service.
- ED038 (Acidity): NATA accreditation does not cover the performance of this service.
- EG020-T (Total Metals by ICP-MS): Sample EB2021551-003 shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- EG020-S (Soluble Metals by ICP-MS): Sample Composite 17 (EB2021757-018) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2731M02	2730S02	2730S03	2730S04	2730S05
				Client sampling date / time	16-Jul-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00
Compound	CAS Number	LOR	Unit		EB2021757-001	EB2021757-002	EB2021757-003	EB2021757-004	EB2021757-005
					Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur									
Chromium Reducible Sulphur	----	0.005	%		**0.016**	**0.016**	**0.013**	**0.012**	**0.019**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2730S06	2730S07	2730S08	2730S09	2730S10
			Client sampling date / time	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00	06-Aug-2020 00:00
Compound	CAS Number	LOR	Unit	EB2021757-006	EB2021757-007	EB2021757-008	EB2021757-009	EB2021757-010
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.013**	**0.013**	**0.012**	**0.012**	**0.010**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2730S11	Composite 17	Composite 18	pH and EC of Deionised Water	----
			Client sampling date / time	06-Aug-2020 00:00	16-Jul-2020 00:00	06-Aug-2020 00:00	19-Aug-2020 00:00	----
Compound	CAS Number	LOR	Unit	EB2021757-011	EB2021757-018	EB2021757-019	EB2021757-020	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	----	9.8	9.7	5.9	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	493	107	<1	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	0.011	----	----	----	----
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	----	33100	5040	----	----
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	----	31100	3960	----	----
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	----	2000	1080	----	----
ED038A: Acidity								
Acidity	----	1	mg/kg	----	<5	<5	----	----
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	----	20	<10	----	----
Silica	7631-86-9	1	mg/kg	----	50	19	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	----	60	30	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	----	<10	<10	----	----
Magnesium	7439-95-4	10	mg/kg	----	<10	<10	----	----
Sodium	7440-23-5	10	mg/kg	----	520	210	----	----
Potassium	7440-09-7	10	mg/kg	----	20	<10	----	----
EG005(ED093)S : Soluble Metals by ICPAES								
Boron	7440-42-8	1	mg/kg	----	<1	<1	----	----
Iron	7439-89-6	1	mg/kg	----	<1	<1	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	4560	2610	----	----
Boron	7440-42-8	50	mg/kg	----	<50	<50	----	----
Iron	7439-89-6	50	mg/kg	----	16600	13600	----	----
EG020S: Soluble Metals by ICPMS								
Arsenic	7440-38-2	0.01	mg/kg	----	0.69	0.03	----	----
Selenium	7782-49-2	0.1	mg/kg	----	<0.1	<0.1	----	----
Barium	7440-39-3	0.01	mg/kg	----	0.08	0.05	----	----
Beryllium	7440-41-7	0.01	mg/kg	----	<0.01	<0.01	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	2730S11	Composite 17	Composite 18	pH and EC of Deionised Water	----
			Client sampling date / time	06-Aug-2020 00:00	16-Jul-2020 00:00	06-Aug-2020 00:00	19-Aug-2020 00:00	----
Compound	CAS Number	LOR	Unit	EB2021757-011	EB2021757-018	EB2021757-019	EB2021757-020	--------
				Result	Result	Result	Result	----
EG020S: Soluble Metals by ICPMS - Continued								
Cadmium	7440-43-9	0.01	mg/kg	----	<0.01	<0.01	----	----
Cobalt	7440-48-4	0.01	mg/kg	----	<0.01	<0.01	----	----
Chromium	7440-47-3	0.01	mg/kg	----	<0.01	<0.01	----	----
Thorium	7440-29-1	0.01	mg/kg	----	<0.01	<0.01	----	----
Copper	7440-50-8	0.01	mg/kg	----	<0.01	<0.01	----	----
Manganese	7439-96-5	0.01	mg/kg	----	<0.01	<0.01	----	----
Molybdenum	7439-98-7	0.01	mg/kg	----	**0.14**	**0.01**	----	----
Nickel	7440-02-0	0.01	mg/kg	----	<0.01	<0.01	----	----
Lead	7439-92-1	0.01	mg/kg	----	<0.01	<0.01	----	----
Antimony	7440-36-0	0.01	mg/kg	----	**0.02**	<0.01	----	----
Uranium	7440-61-1	0.01	mg/kg	----	<0.01	<0.01	----	----
Zinc	7440-66-6	0.05	mg/kg	----	<0.05	<0.05	----	----
Vanadium	7440-62-2	0.1	mg/kg	----	**0.3**	<0.1	----	----
Aluminium	7429-90-5	0.1	mg/kg	----	**3.0**	**2.6**	----	----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.1	mg/kg	----	**2.3**	**0.4**	----	----
Selenium	7782-49-2	1	mg/kg	----	<1	<1	----	----
Silver	7440-22-4	0.1	mg/kg	----	<0.1	<0.1	----	----
Barium	7440-39-3	0.1	mg/kg	----	**214**	**38.6**	----	----
Beryllium	7440-41-7	0.1	mg/kg	----	**1.0**	**0.3**	----	----
Cadmium	7440-43-9	0.1	mg/kg	----	**0.1**	<0.1	----	----
Cobalt	7440-48-4	0.1	mg/kg	----	**5.2**	**1.2**	----	----
Chromium	7440-47-3	0.1	mg/kg	----	**3.6**	**2.4**	----	----
Copper	7440-50-8	0.1	mg/kg	----	**61.3**	**20.3**	----	----
Thorium	7440-29-1	0.1	mg/kg	----	**1.6**	**1.0**	----	----
Manganese	7439-96-5	0.1	mg/kg	----	**313**	**286**	----	----
Molybdenum	7439-98-7	0.1	mg/kg	----	**0.9**	**0.2**	----	----
Nickel	7440-02-0	0.1	mg/kg	----	**9.2**	**1.6**	----	----
Lead	7439-92-1	0.1	mg/kg	----	**15.3**	**5.4**	----	----
Antimony	7440-36-0	0.1	mg/kg	----	<0.1	<0.1	----	----
Uranium	7440-61-1	0.1	mg/kg	----	**0.2**	**0.3**	----	----
Zinc	7440-66-6	0.5	mg/kg	----	**42.3**	**17.3**	----	----
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	----	<0.0005	<0.0005	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	2730S11	Composite 17	Composite 18	pH and EC of Deionised Water	----
				Client sampling date / time	06-Aug-2020 00:00	16-Jul-2020 00:00	06-Aug-2020 00:00	19-Aug-2020 00:00	----
Compound	CAS Number	LOR	Unit		EB2021757-011	EB2021757-018	EB2021757-019	EB2021757-020	--------
					Result	Result	Result	Result	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		**----**	<0.1	<0.1	**----**	**----**
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		**----**	**2**	**2**	**----**	**----**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg		**----**	**0.3**	<0.1	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2012596**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: RGS LABORATORY	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 12-May-2020 15:40
Order number	:	Date Analysis Commenced	: 13-May-2020
C-O-C number	: 10992	Issue Date	: 18-May-2020 17:01
Sampler	: RGS LABORATORY		
Site	: 2019038_Meadowbrook_L1		
Quote number	: BN/1234/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

ilac-MRA NATA
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*
Dave Gitsham	Metals Instrument Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Senior Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
			Client sampling date / time	12-May-2020 10:53	12-May-2020 10:53	12-May-2020 10:54	12-May-2020 10:53	----
Compound	CAS Number	LOR	Unit	EB2012596-001	EB2012596-002	EB2012596-003	EB2012596-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.76**	**7.55**	**9.06**	**9.35**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**576**	**508**	**641**	**371**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	**14**	**13**	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**21**	**17**	**32**	**24**	----
Total Alkalinity as CaCO3	----	1	mg/L	**21**	**17**	**46**	**37**	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	**5**	**3**	<1	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**24**	**15**	**26**	**24**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**152**	**139**	**164**	**77**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**5**	**6**	**4**	**2**	----
Magnesium	7439-95-4	1	mg/L	**5**	**4**	**2**	**1**	----
Sodium	7440-23-5	1	mg/L	**102**	**90**	**122**	**72**	----
Potassium	7440-09-7	1	mg/L	**1**	<1	**1**	<1	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.09**	**0.06**	**0.35**	**0.48**	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	**0.001**	**0.002**	----
Arsenic	7440-38-2	0.001	mg/L	**0.009**	**0.005**	**0.060**	**0.038**	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	**0.001**	<0.001	**0.002**	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L	**0.014**	**0.010**	**0.009**	**0.002**	----
Molybdenum	7439-98-7	0.001	mg/L	**0.010**	**0.012**	**0.012**	**0.072**	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	**0.01**	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	12-May-2020 10:53	12-May-2020 10:53	12-May-2020 10:54	12-May-2020 10:53	----
Compound	CAS Number	LOR	Unit		EB2012596-001	EB2012596-002	EB2012596-003	EB2012596-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	**0.06**	**0.07**	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	<0.1	**0.1**	<0.1	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**5.21**	**4.57**	**6.09**	**3.41**	----
ø **Total Cations**	----	0.01	meq/L		**5.12**	**4.54**	**5.70**	**3.31**	----
ø **Ionic Balance**	----	0.01	%		**0.81**	**0.32**	**3.31**	**1.44**	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2015275**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 09-Jun-2020 17:30
Order number	: -	Date Analysis Commenced	: 10-Jun-2020
C-O-C number	: 11694	Issue Date	: 15-Jun-2020 13:06
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook_L2		
Quote number	: BN/1234/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
			Client sampling date / time	09-Jun-2020 12:23	09-Jun-2020 12:23	09-Jun-2020 12:24	09-Jun-2020 12:24	----
Compound	CAS Number	LOR	Unit	EB2015275-001	EB2015275-002	EB2015275-003	EB2015275-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**9.35**	**8.99**	**9.11**	**9.37**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**399**	**530**	**542**	**257**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**19**	**17**	**17**	**20**	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**19**	**30**	**29**	**17**	----
Total Alkalinity as CaCO3	----	1	mg/L	**38**	**47**	**46**	**37**	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	<1	<1	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**22**	**27**	**33**	**33**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**86**	**125**	**128**	**34**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**3**	**3**	**2**	----
Magnesium	7439-95-4	1	mg/L	**1**	**2**	**1**	<1	----
Sodium	7440-23-5	1	mg/L	**74**	**97**	**102**	**47**	----
Potassium	7440-09-7	1	mg/L	**1**	**1**	**1**	<1	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.72**	**0.31**	**0.47**	**0.94**	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	**0.001**	----
Arsenic	7440-38-2	0.001	mg/L	**0.016**	**0.016**	**0.043**	**0.024**	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L	**0.001**	**0.002**	**0.003**	**0.001**	----
Molybdenum	7439-98-7	0.001	mg/L	**0.004**	**0.007**	**0.009**	**0.048**	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	09-Jun-2020 12:23	09-Jun-2020 12:23	09-Jun-2020 12:24	09-Jun-2020 12:24	----
Compound	CAS Number	LOR	Unit		EB2015275-001	EB2015275-002	EB2015275-003	EB2015275-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L		**0.13**	<0.05	<0.05	**0.11**	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	**0.2**	**0.1**	<0.1	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**3.64**	**5.03**	**5.22**	**2.38**	----
ø **Total Cations**	----	0.01	meq/L		----	----	**4.75**	**2.25**	----
ø **Total Cations**	----	0.01	meq/L		**3.43**	**4.56**	----	----	----
ø **Ionic Balance**	----	0.01	%		----	----	**4.72**	**2.86**	----
ø **Ionic Balance**	----	0.01	%		**3.07**	**4.88**	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2017832**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 07-Jul-2020 16:09
Order number	: -	Date Analysis Commenced	: 08-Jul-2020
C-O-C number	: 12395	Issue Date	: 13-Jul-2020 11:12
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook_L3		
Quote number	: BN/1234/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Dave Gitsham	Metals Instrument Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
			Client sampling date / time	07-Jul-2020 12:09	07-Jul-2020 12:09	07-Jul-2020 12:10	07-Jul-2020 12:11	----
Compound	CAS Number	LOR	Unit	EB2017832-001	EB2017832-002	EB2017832-003	EB2017832-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**9.10**	**9.39**	**9.09**	**8.98**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**259**	**230**	**398**	**170**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**21**	**23**	**21**	**19**	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**28**	**8**	**23**	**10**	----
Total Alkalinity as CaCO3	----	1	mg/L	**49**	**31**	**44**	**30**	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	<1	<1	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**21**	**20**	**33**	**30**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**49**	**41**	**80**	**16**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**4**	**3**	**2**	----
Magnesium	7439-95-4	1	mg/L	**1**	**1**	<1	<1	----
Sodium	7440-23-5	1	mg/L	**52**	**42**	**84**	**35**	----
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.49**	**0.52**	**0.68**	**0.59**	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	0.001	mg/L	**0.008**	**0.008**	**0.027**	**0.012**	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	**0.0004**	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	**0.001**	<0.001	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L	**0.002**	**0.001**	**0.004**	**0.002**	----
Molybdenum	7439-98-7	0.001	mg/L	**0.005**	**0.005**	**0.010**	**0.031**	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	07-Jul-2020 12:09	07-Jul-2020 12:09	07-Jul-2020 12:10	07-Jul-2020 12:11	----
Compound	CAS Number	LOR	Unit		EB2017832-001	EB2017832-002	EB2017832-003	EB2017832-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L		**0.11**	**0.06**	**0.08**	**0.08**	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	**0.1**	**0.2**	<0.1	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.80**	**2.19**	**3.82**	**1.68**	----
ø **Total Cations**	----	0.01	meq/L		**2.51**	**----**	**----**	**----**	----
ø **Total Cations**	----	0.01	meq/L		**----**	**2.11**	**3.80**	**1.62**	----
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**0.25**	**----**	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2020420**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 04-Aug-2020 17:23
Order number	:	Date Analysis Commenced	: 04-Aug-2020
C-O-C number	: 12768	Issue Date	: 11-Aug-2020 13:38
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook_L-4		
Quote number	: BN/1234/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
			Client sampling date / time	23-Jul-2020 08:21	04-Aug-2020 14:08	04-Aug-2020 14:09	04-Aug-2020 14:10	----
Compound	CAS Number	LOR	Unit	EB2020420-001	EB2020420-002	EB2020420-003	EB2020420-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**9.15**	**9.13**	**9.30**	**8.71**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**325**	**282**	**464**	**206**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**13**	**13**	**16**	**7**	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**16**	**25**	**24**	**17**	----
Total Alkalinity as CaCO3	----	1	mg/L	**29**	**38**	**40**	**24**	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	<1	<1	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**27**	**21**	**41**	**37**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**62**	**52**	**83**	**19**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**6**	**2**	**2**	----
Magnesium	7439-95-4	1	mg/L	**1**	**2**	<1	<1	----
Sodium	7440-23-5	1	mg/L	**63**	**50**	**81**	**34**	----
Potassium	7440-09-7	1	mg/L	<1	<1	**1**	<1	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.47**	**0.30**	**0.90**	**1.05**	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	0.001	mg/L	**0.004**	**0.004**	**0.023**	**0.010**	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	**0.0001**	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	**0.002**	<0.001	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L	**0.001**	<0.001	**0.002**	**0.002**	----
Molybdenum	7439-98-7	0.001	mg/L	**0.006**	**0.005**	**0.014**	**0.025**	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	23-Jul-2020 08:21	04-Aug-2020 14:08	04-Aug-2020 14:09	04-Aug-2020 14:10	----
Compound	CAS Number	LOR	Unit		EB2020420-001	EB2020420-002	EB2020420-003	EB2020420-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L		**0.12**	<0.05	**0.10**	**0.13**	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	<0.1	**0.2**	<0.1	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.89**	**2.66**	**3.99**	**1.78**	----
ø **Total Cations**	----	0.01	meq/L		**2.92**	**2.64**	**3.65**	**1.58**	----
ø **Ionic Balance**	----	0.01	%		**----**	**----**	**4.52**	**----**	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2021853**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 20-Aug-2020 15:17
Order number	:	Date Analysis Commenced	: 24-Aug-2020
C-O-C number	: 13449	Issue Date	: 28-Aug-2020 15:17
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook L1		
Quote number	: BN/1234/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
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*
Dave Gitsham	Metals Instrument Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-5	----	----	----	----
			Client sampling date / time	20-Aug-2020 13:07	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2021853-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.63**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**34**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**6**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**6**	----	----	----	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	**1**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**6**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	**6**	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.04**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.007**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.001**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-5	----	----	----	----
				Client sampling date / time	20-Aug-2020 13:07	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2021853-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**0.29**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**0.26**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2022978**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 01-Sep-2020 17:19
Order number	:	Date Analysis Commenced	: 04-Sep-2020
C-O-C number	: 13681	Issue Date	: 10-Sep-2020 09:40
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook_L-5		
Quote number	: BN/1234/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
			Client sampling date / time	01-Sep-2020 13:45	01-Sep-2020 13:45	01-Sep-2020 13:46	01-Sep-2020 13:46	----
Compound	CAS Number	LOR	Unit	EB2022978-001	EB2022978-002	EB2022978-003	EB2022978-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**8.62**	**7.99**	**9.19**	**8.95**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**352**	**335**	**319**	**241**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**4**	<1	**11**	**5**	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**29**	**30**	**42**	**24**	----
Total Alkalinity as CaCO3	----	1	mg/L	**33**	**30**	**53**	**29**	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	<1	<1	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**28**	**31**	**33**	**43**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**69**	**61**	**42**	**21**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**3**	**2**	**2**	----
Magnesium	7439-95-4	1	mg/L	**2**	**2**	<1	<1	----
Sodium	7440-23-5	1	mg/L	**70**	**61**	**64**	**46**	----
Potassium	7440-09-7	1	mg/L	**1**	<1	**1**	**1**	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.63**	**0.30**	**1.20**	**0.74**	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	0.001	mg/L	**0.006**	**0.005**	**0.024**	**0.012**	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	**0.001**	<0.001	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L	**0.002**	<0.001	**0.002**	**0.001**	----
Molybdenum	7439-98-7	0.001	mg/L	**0.006**	**0.008**	**0.012**	**0.029**	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	01-Sep-2020 13:45	01-Sep-2020 13:45	01-Sep-2020 13:46	01-Sep-2020 13:46	----
Compound	CAS Number	LOR	Unit		EB2022978-001	EB2022978-002	EB2022978-003	EB2022978-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L		**0.14**	<0.05	**0.10**	**0.08**	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	**0.2**	**0.2**	**0.1**	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**3.19**	**2.96**	**2.93**	**2.07**	----
ø **Total Cations**	----	0.01	meq/L		**3.33**	**2.97**	**2.91**	**2.13**	----
ø **Ionic Balance**	----	0.01	%		**2.24**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2024510**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 17-Sep-2020 16:30
Order number	:	Date Analysis Commenced	: 18-Sep-2020
C-O-C number	: 14097	Issue Date	: 23-Sep-2020 13:06
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook_L-2		
Quote number	: BN/1234/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-5	----	----	----	----
			Client sampling date / time	17-Sep-2020 10:20	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2024510-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.63**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**92**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**25**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**25**	----	----	----	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	**2**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**4**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**11**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	**18**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**3**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.07**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.029**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.008**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-5	----	----	----	----
				Client sampling date / time	17-Sep-2020 10:20	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2024510-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**0.89**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**0.86**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2025596**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 29-Sep-2020 16:50
Order number	:	Date Analysis Commenced	: 01-Oct-2020
C-O-C number	: 14381	Issue Date	: 07-Oct-2020 14:28
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook_L6		
Quote number	: BN/1234/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Ionic Balance out of acceptable limits for some samples due to analytes not quantified in this report.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	29-Sep-2020 13:11	29-Sep-2020 13:12	29-Sep-2020 13:12	29-Sep-2020 13:12	----
Compound	CAS Number	LOR	Unit		EB2025596-001	EB2025596-002	EB2025596-003	EB2025596-004	--------
					Result	Result	Result	Result	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.65	7.43	8.25	7.72	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		282	323	279	206	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		30	19	38	46	----
Total Alkalinity as CaCO3	----	1	mg/L		30	19	38	46	----
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		2	2	<1	2	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		28	28	41	43	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		52	67	30	17	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		2	3	2	2	----
Magnesium	7439-95-4	1	mg/L		1	2	<1	<1	----
Sodium	7440-23-5	1	mg/L		54	59	56	40	----
Potassium	7440-09-7	1	mg/L		<1	<1	<1	<1	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.20	0.10	0.27	0.18	----
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	0.001	mg/L		0.002	0.002	0.009	0.006	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		0.001	0.001	<0.001	<0.001	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L		0.003	0.002	0.003	0.002	----
Molybdenum	7439-98-7	0.001	mg/L		0.006	0.007	0.013	0.032	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	29-Sep-2020 13:11	29-Sep-2020 13:12	29-Sep-2020 13:12	29-Sep-2020 13:12	----
Compound	CAS Number	LOR	Unit		EB2025596-001	EB2025596-002	EB2025596-003	EB2025596-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L		**0.06**	<0.05	<0.05	<0.05	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	**0.1**	**0.2**	<0.1	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.65**	**2.85**	**2.46**	**2.29**	----
ø **Total Cations**	----	0.01	meq/L		**2.53**	**2.88**	**2.54**	**1.84**	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2027003**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 15-Oct-2020 16:15
Order number	:	Date Analysis Commenced	: 17-Oct-2020
C-O-C number	: 14938	Issue Date	: 22-Oct-2020 13:42
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook L3		
Quote number	: BN/1234/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-5	----	----	----	----
			Client sampling date / time	15-Oct-2020 14:28	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2027003-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.89**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**114**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**33**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**33**	----	----	----	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**3**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**12**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	**25**	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.09**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.008**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)				Client sample ID	**KLC-5**	----	----	----	----
				Client sampling date / time	15-Oct-2020 14:28	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EB2027003-001**	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.2	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2028067**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 27-Oct-2020 18:02
Order number	:	Date Analysis Commenced	: 28-Oct-2020
C-O-C number	: 15263	Issue Date	: 03-Nov-2020 15:05
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook_L7		
Quote number	: BN/1234/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
			Client sampling date / time	27-Oct-2020 13:24	27-Oct-2020 13:25	27-Oct-2020 13:26	27-Oct-2020 13:26	----
Compound	CAS Number	LOR	Unit	EB2028067-001	EB2028067-002	EB2028067-003	EB2028067-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.10**	**7.07**	**7.88**	**7.39**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**248**	**326**	**258**	**171**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**20**	**16**	**38**	**18**	----
Total Alkalinity as CaCO3	----	1	mg/L	**20**	**16**	**38**	**18**	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	<1	<1	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**34**	**27**	**43**	**39**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**39**	**72**	**23**	**11**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	**3**	**1**	**2**	----
Magnesium	7439-95-4	1	mg/L	**1**	**2**	<1	<1	----
Sodium	7440-23-5	1	mg/L	**45**	**59**	**52**	**32**	----
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.16**	**0.12**	**0.28**	**0.16**	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	0.001	mg/L	**0.002**	**0.002**	**0.008**	**0.004**	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	**0.003**	**0.001**	**0.001**	<0.001	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L	**0.003**	**0.002**	**0.003**	**0.003**	----
Molybdenum	7439-98-7	0.001	mg/L	**0.005**	**0.006**	**0.013**	**0.021**	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-1	KLC-2	KLC-3	KLC-4	----
				Client sampling date / time	27-Oct-2020 13:24	27-Oct-2020 13:25	27-Oct-2020 13:26	27-Oct-2020 13:26	----
Compound	CAS Number	LOR	Unit		EB2028067-001	EB2028067-002	EB2028067-003	EB2028067-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
Iron	7439-89-6	0.05	mg/L		**0.06**	<0.05	<0.05	<0.05	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.1**	**0.1**	**0.2**	<0.1	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.21**	**2.91**	**2.30**	**1.48**	----
ø **Total Cations**	----	0.01	meq/L		**2.14**	**2.88**	**2.31**	**1.49**	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2029751**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 12-Nov-2020 16:00
Order number	:	Date Analysis Commenced	: 13-Nov-2020
C-O-C number	: 15868	Issue Date	: 19-Nov-2020 15:45
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook L4		
Quote number	: BN/1234/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-5	----	----	----	----
				Client sampling date / time	12-Nov-2020 12:18	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2029751-001	--------	--------	--------	--------
					Result	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**7.92**	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**160**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**49**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**49**	----	----	----	----
ED038: Acidity									
Acidity as CaCO3	----	1	mg/L		<1	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**4**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**14**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L		<1	----	----	----	----
Sodium	7440-23-5	1	mg/L		**34**	----	----	----	----
Potassium	7440-09-7	1	mg/L		<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.08**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L		<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.001**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.001**	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L		**0.009**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	KLC-5	----	----	----	----
				Client sampling date / time	12-Nov-2020 12:18	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2029751-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**1.46**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**1.48**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2032749**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 11-Dec-2020 12:00
Order number	: -	Date Analysis Commenced	: 13-Dec-2020
C-O-C number	: 16976	Issue Date	: 21-Dec-2020 11:39
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook L5		
Quote number	: BN/1234/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	KLC-5	----	----	----	----
			Sampling date / time	10-Dec-2020 12:35	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2032749-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.72**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**184**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**60**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**60**	----	----	----	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**5**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**15**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	**42**	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.10**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.002**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.010**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	**0.01**	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	KLC-5	----	----	----	----
				Sampling date / time	10-Dec-2020 12:35	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2032749-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**1.73**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**1.83**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2100364**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 08-Jan-2021 15:11
Order number	:	Date Analysis Commenced	: 11-Jan-2021
C-O-C number	: 17608	Issue Date	: 14-Jan-2021 09:39
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook L		
Quote number	: BN/1234/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	KLC-5	----	----	----	----
			Sampling date / time	08-Jan-2021 09:25	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2100364-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**8.83**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**210**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**13**	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**60**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**74**	----	----	----	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**6**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**14**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	**50**	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.09**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.002**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.010**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	**0.01**	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)				Sample ID	**KLC-5**	**----**	**----**	**----**	**----**
				Sampling date / time	08-Jan-2021 09:25	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EB2100364-001**	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	**----**	**----**	**----**	**----**
Iron	7439-89-6	0.05	mg/L		<0.05	**----**	**----**	**----**	**----**
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.3**	**----**	**----**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2103026**	Page	: 1 of 4
Client	: **RGS ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALAN ROBERTSON	Contact	: Carsten Emrich
Address	: PO BOX 3091 SUNNYBANK SOUTH QLD, AUSTRALIA 4109	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3344 1222	Telephone	: +61 7 3552 8616
Project	: 2019038_Meadowbrook	Date Samples Received	: 04-Feb-2021 16:53
Order number	:	Date Analysis Commenced	: 06-Feb-2021
C-O-C number	: 18606	Issue Date	: 09-Feb-2021 16:30
Sampler	: ALAN ROBERTSON		
Site	: 2019038_Meadowbrook L		
Quote number	: BN/1234/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
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, unless the sampling was conducted by ALS. 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*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	KLC-5	----	----	----	----
			Sampling date / time	04-Feb-2021 12:26	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2103026-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**8.54**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**249**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	**6**	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**85**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**91**	----	----	----	----
ED038: Acidity								
Acidity as CaCO3	----	1	mg/L	<1	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**7**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**17**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**1**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**54**	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.06**	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.003**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	**0.012**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	**0.01**	----	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	KLC-5	----	----	----	----
				Sampling date / time	04-Feb-2021 12:26	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2103026-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Boron	7440-42-8	0.05	mg/L		<0.05	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.3**	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**2.44**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**2.53**	----	----	----	----


RGS
MINE WASTE AND
WATER MANAGEMENT