Appendix 10

Caloma Eastern Cutback Geochemical Assessment

prepared by

RGS Environmental Consultants Pty Ltd

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TECHNICAL REPORT

Tomingley Gold Eastern Cutback Project Geochemical Assessment

Tomingley Gold Operations

Prepared for: **R. W. Corkery and Co. Pty Ltd on behalf of Alkane Resources Ltd**

RGS

MINE WASTE AND
WATER MANAGEMENT

TECHNICAL REPORT

Tomingley Gold Eastern Cutback Project Geochemical Assessment

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DOCUMENT CONTROL R002	
Document Number	R002
Project Number	2021054
File Location	Projects 2021/2021054(Tomingley)/Reporting/TGO ECB
Date	21.12.2021

DOCUMENT DISTRIBUTION			
Document Name	**Revision**	**Distributed to**	**Date distributed**
3BR002_2021054_Tomingley Gold Eastern Cutback Project Geochemical Assessment_ 21/12/2021	21/12/2021	R. W. Corkery and Co. Pty Ltd on behalf of Alkane Resources Ltd	21.12.2021

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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 acids.
ABA	Acid Base Account, an evaluation of the balance between acid generation and acid neutralisation processes. Generally, 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 of the acid neutralising capacity and maximum potential acidity of a sample. Used to assess the risk of a sample generating acid conditions.
Dispersive	Dispersive soil and rock materials are structurally unstable and disperse into basic particles such as sand, silt and clay in water. When a dispersive soil is wet, the basic structure has a tendency to collapse, whereas when it is dry it is prone to surface sealing and crusting.
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.
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.
NAG test	Net acid generation test. Hydrogen peroxide solution is used to oxidise sulfides in a sample, then any acid generated through oxidation may be consumed by neutralising components in the sample. Any remaining acidity is 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 (ie. less than or equal to 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.
Ore	Material that is been mined with sufficient value to warrant processing. Low-grade ore may be left as waste.
PAF	Potentially acid forming. Geochemical classification criterion for a sample that has the potential to generate acid conditions.
pH	Measure of the hydrogen ion (H+) activity in a sample solution, expressed in pH units.
Scr	Chromium reducible sulfur test measures the sulfide sulfur content of a sample material.

Sodic	Sodic soil and rock materials are characterized by a disproportionately high concentration of sodium (Na) in their cation exchange complex and are innately unstable, exhibiting poor physical and chemical properties, which impede water infiltration, water availability, and ultimately plant growth.
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.
Tailing	A form of process residue generated as a result of processing or ore.
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.
Waste Rock	Material that surrounds an ore body and must be removed to mine the ore.
WRE	Waste Rock Emplacement. A facility used to store waste rock.

1 Introduction

1.1 Background

RGS Environmental Consultants Pty Ltd (RGS) was commissioned by R.W. Corkery & Co. Pty. Limited (RWC) on behalf of Alkane Resources Ltd (Alkane) to complete a geochemical assessment of waste rock materials for the Tomingley Gold Operations Eastern Cutback Project ('the TGO ECB').

The TGO ECB is an approved cutback of the Caloma 1 Open Cut to extract ore from the eastern end of the current pit area.

The objectives of the geochemical assessment are as follows:

- Characterise representative waste rock samples and test for acid, metalliferous and saline drainage potential, metals/metalloids, and structural stability (dispersion potential).
- Determine if the geochemical characteristics of the waste rock materials will allow for potential beneficial use both on and off site.
- Provide a geochemical characterisation report for the Project (this report).

1.2 Project description

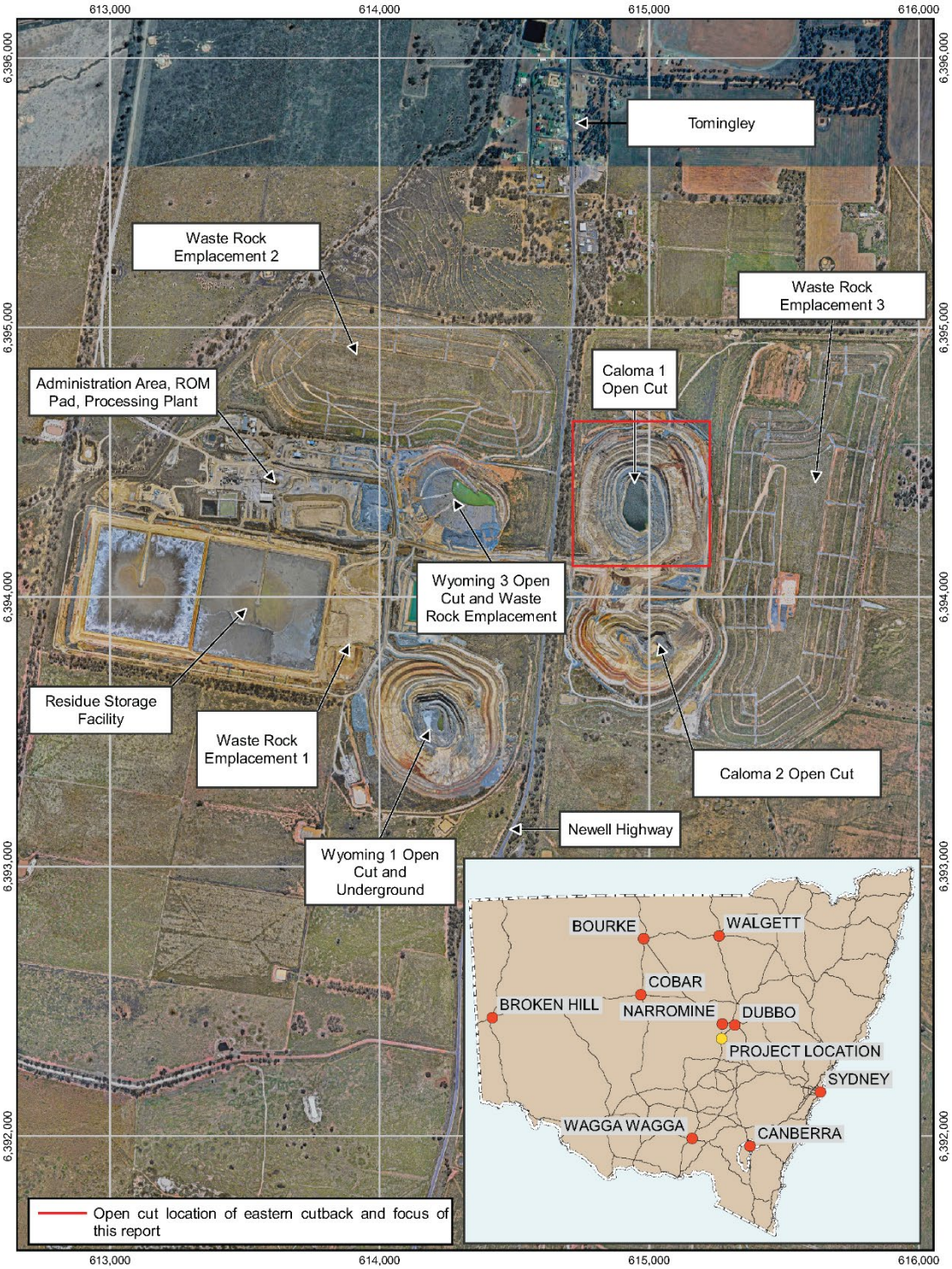
The existing Tomingley Gold Operation is operated by Tomingley Gold Operations Pty Ltd (TGO), a subsidiary of Alkane, and comprises both open cut and underground gold mining. TGO is located in the Great Western Plains of New South Wales (NSW) approximately 40 km south of Narromine and 50 km south-west of Dubbo (**Figure 1-1**).

The eastern Cutback at the Caloma 1 Open Cut has been estimated to generate 5.8 million tonnes of waste rock between 2021-2023 (Alkane, 2019). The total material mined as part of the cutback is estimated at 6.4 million tonnes. Fresh waste rock material from the cutback below 180 metres relative level (mRL) is proposed for beneficial re-use in road infrastructure. An aerial and cross-sectional view of the cutback is shown in **Attachment D**.

1.3 Project geology

The TGO deposits targeted by the Project are hosted within the Mingelo Volcanics and flanked by the Cotton Formation. The formations are orogenic gold systems, derived from the circulation of gold-enriched fluids associated with convergent plate margins and compressional to transgressional shear zones (Robb, 2005; RWC, 2021). The Mingelo Volcanics comprise Ordovician aged andesites, volcaniclastic breccias, and volcaniclastic sandstones and siltstones intruded by feldspar porphyries. The Cotton Formation on the western edge of the Mingelo Volcanics comprises siltstones and sandstones. Alluvial sequences of clays, sands, and gravel overlie the basement geologies ranging from 20 to 60 m in thickness.

A series of dolerite dikes intersect the Caloma 1 Open Cut (**Attachment D**). The dolerite and non-dolerite waste fractions are summarised in **Table 1-1**.



RGS	Scale 1:20,000 Datum: GDA94 / MGA zone 55	Tomingley Gold Extension Eastern Cutback Project Geochemical Assessment	250 0 250 500 m
	2021054_RWCC Tomingley Gold Extension_Spatial Data.qgz; TGOCB	**Project Location and ML1648 Site Layout**	Figure: 1-1 Job Number: 2021054 20/12/2021 N

Figure 1-1: Project location

Table 1-1: Summary of waste rock at the TGO ECB

Waste Category	Tonnes below 180 mRL
Dolerite waste	690,656
Waste outside dolerite	1,203,986
Waste outside dolerite broken into grade ranges (grams/tonne gold)	
0.3 - > 0.4	53,039
0.2 - > 0.3	78,263
0.1 - > 0.2	181,574
0.0 - > 0.1	891,110
Grand Total	1,203,986

1.4 Acid and metalliferous Drainage

In Australia, the term Acid and Metalliferous Drainage (AMD) is used and addresses all mine water issues that can include acid, neutral or alkaline pH, saline drainage, and metalliferous drainage. In North America, the terms Acid Rock Drainage and Metal Leaching (ARD & ML) are used. AMD is not just about acid.

Terms used to **classify mined materials** can include the following:

- **AF** (Acid Forming) – sample is producing acid (< pH 5), contains no available Acid Neutralising Capacity (ANC) and may have additional sulfide content that could oxidise and produce additional acidity.
- **PAF** (Potentially Acid Forming) –has sufficient reactive sulfide minerals to potentially produce acidity when all available ANC is consumed.
- **PAF-LC** (Potentially Acid Forming - Low Capacity) - has the potential to produce relatively minor acidity.
- **NAF-Barren** (Non-Acid Forming - Barren) - is geochemically inert in respect to total sulfur and will produce circum-neutral drainage generally in the range pH 6 to 9 with low sulfate concentrations.
- **NAF** (Non-Acid Forming) - will not produce acid but may leach salts and some metals/metalloids due to the presence of low concentrations of sulfide minerals.
- **AC** (Acid Consuming) - has significant available ANC that may contribute to ongoing acid neutralisation (e.g., calcite, dolomite).

Other terminology used to classify geological materials include the following:

- Saline - material may leach salts dominated by sodium chloride (NaCl) and/or calcium (Ca), magnesium (Mg) and sulfate (SO_4).
- Sodic – this material has a proportionally high concentration of exchangeable Na and has the potential to disperse and tunnel.

General industry terms that can be used to **describe water quality** at mines include the following;

- Acid Mine Drainage;
- Acid Rock Drainage and Metal Leaching;
- Acid and Metalliferous Drainage;
- Neutral and Metalliferous Drainage;
- Saline Drainage; and
- Mine Impacted Water.

Mine water that is in contact with mining materials can have the follow geochemical characteristics;

- acid, neutral, or alkaline pH;
- variable concentrations of major ions (salts e.g., Ca, Mg, potassium (K), Na, chloride (Cl), SO_4, boron (B), fluoride (F), phosphate (P)); and
- variable concentrations of metals (e.g., aluminium (Al), iron (Fe), manganese (Mn) and zinc (Zn)) or metalloids (e.g., arsenic (As), selenium (Se) and antimony (Sb)) with specific concentrations often linked to pH.

Potential sources of acidity in contact water at metalliferous mine sites can include;

- oxidation of sulfide minerals such as pyrite that produce sulfuric acid (INAP, 2021),
- rainfall and leaching of cations such as Ca, Mg, K, and Na that reduce soil acidification by atmospheric carbonic, nitric, or sulfuric acid,
- organic matter decay, and
- use of ammonium-based nitrogen fertilisers.

Potential sources of salts in contact water at mine sites can include;

- oxidation of sulfide minerals, the production of sulfuric acid and subsequent neutralisation reactions that mobilise major ions such as SO_4, Ca and Mg.
- chemical weathering of adjacent soil and rock by sulfuric acid that releases major ions such as Na, K, Mg and Cl, and
- the mobilisation of NaCl or sodium bicarbonate ($NaHCO_3$) that are present within geological units and groundwater which is then released in fluxes as mined materials are extracted (blasted), processed (crushed) and placed into mine landforms.

Potential sources of metal ions (e.g., Al^{3+}, Fe^{2+}, Fe^{3+}, Mn^{2+} and Zn^{2+}) and oxyanions (e.g., $[MoO_4]^{2-}$ in water at mine sites can include elements present:

- as ancillary minerals that weather very slowly within primary sulfide minerals,
- in a range of minerals in geological units with increasing environmental mobility that include immobile oxide minerals which are less mobile than carbonate minerals which are less mobile than exchangeable minerals which are less mobile than water soluble minerals; and
- in pore water.

1.5 Quality, standards, regulation, legislation, and guidelines

The purpose of this geochemical assessment is to characterise and assess waste rock materials likely to be generated by the Project in accordance with applicable legislation, regulation, guidelines, and standards. These may include:

- 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.
- Australian and New Zealand Water Quality Guidelines (ANZG, 2018) that supersede the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) (ANZECC & ARMCANZ).
- Global Acid Rock Drainage Guide (INAP, 2021).
- Commonwealth of Australia Leading Practice Sustainable Development Program (LPSDP) for the Mining Industry: Prevention of Acid and Metalliferous Drainage (2016a).
- Commonwealth of Australia Leading Practice Sustainable Development Program (LPSDP) for the Mining Industry: Rehabilitation (COA, 2016b).
- Commonwealth of Australia Leading Practice Sustainable Development Program (LPSDP) for the Mining Industry: Mine Closure (COA, 2016c).

1.6 Scope of work

RGS has completed a review existing information including existing laboratory test data on waste rock samples and has developed an appropriate laboratory test program for selected waste rock samples from the TGO ECB. Exploration and geological data as well as existing geochemical and monitoring data collected by Tomingley Gold was made available to RGS to help inform the laboratory test program.

RGS has tabulated and interpreted the available static geochemical characterisation test data and provided a technical report (this report) containing the geochemical characterisation data.

The key tasks completed for the scope of work included:

- Desktop review of existing Tomingley Gold geological database, and existing geochemical and monitoring data for the site to evaluate the geological and geochemical characteristics of the strata and lithologies to be generated as waste rock for the TGO ECB.
- Preparation of a second phase of geochemical testing on existing samples to facilitate completion of the geochemical characterisation program by RGS.
- Characterisation of representative waste rock samples for acid, metalliferous and saline drainage potential, metals/metalloids, and structural stability (dispersion potential).
- Determination of whether the geochemical characteristics of the waste rock materials will allow for potential beneficial use both on and off site.
- Provision of geochemical characterisation report (this report) for the TGO ECB.

2 Methodology

2.1 Sampling program

Samples representing waste rock materials were collected from the pit walls (grab samples) and at specific intervals of diamond drill core and reverse circulation drill chips sourced from exploration, shot and geotechnical drill holes. A shot hole is a drilled hole in which an explosive charge is placed before detonation. The waste rock samples were selected to be representative of major lithologies encountered during the Cutback.

The number, lithology and locations of the selected samples were informed by the following factors:

- Geological variability and complexity in material types;
- Information/experience from geologically comparable mine sites;
- Potential for significant environmental or health impacts;
- Size of the operation and volume of material type;
- Statistical requirements which ensure samples are representative;
- Level of confidence in predictive ability; and,
- Relative costs.

A total of 50 samples from seven major lithological waste rock types were collected (**Table 2-1**, **Figure 2-1**). The sampling frequency is deemed suitable for the assessment of acid and metalliferous drainage based on the estimated volume of waste rock to be generated (5.8 million tonnes) (INAP, 2021; and Price, 1997; 2009).

Samples were selected at semi-regular intervals along each drill hole and within the existing pit to ensure the samples were adequately representative of vertical variability in lithology in pit waste rock materials. The samples were collected by TGO personnel and shipped to ALS Environmental (ALS), a NATA accredited laboratory located in Stafford, Queensland. The ALS certificates of analysis are provided in **Attachment C**.

Table 2-1: Major lithologies sampled from the Project area

Lithology	Number of Samples	Lithology	Number of Samples
Dolerite	14	Volcaniclastic sandstone	5
Feldspar-phyric porphyry	15	Mudstone	4
Peperite/Feldspar-phyric porphyry	1	Mudstone/Volcaniclastic siltstone	9
Peperite	2	Total	50

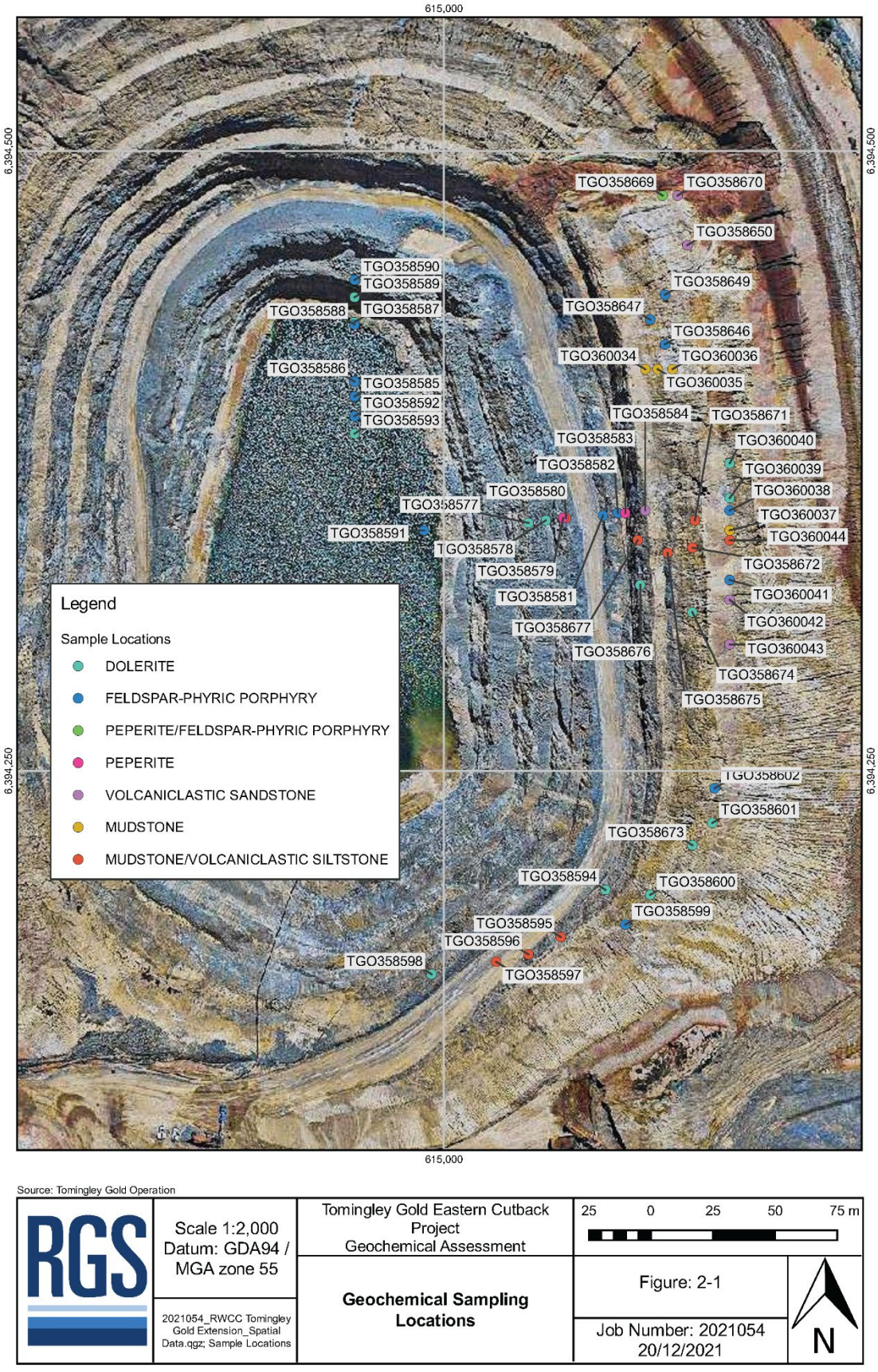


Figure 2-1: Geochemical sampling locations

3 Geochemical and physical characterisation

3.1 Analysis program

The 50 waste rock samples received by ALS were prepared for geochemical testing by drying at 85 °C, crushing to pass 20 mm (where necessary), sub-sampling and pulverising the sub-sample to ≤ 75 µm particle size. This standard laboratory procedure provides a more homogenous sample but also generates a larger sample surface area in contact with the resultant assay solution, thereby providing greater potential for dissolution and reaction, and represents an assumed initial 'worst case' scenario for these materials.

The geochemical analysis program had four main objectives:

1. Investigate the current pH and electrical conductivity (EC) value and existing acidity/alkalinity for sample materials.
2. Quantify the total sulfur/sulfide content and ANC, Net Acid Producing Potential and Net Acid Generation (NAG) capacity of the sample materials to assess any potential for the generation of AMD or NMD.
3. Quantify the metal/metalloid and major ion concentrations in the sample materials and potential solubility/mobility in contact water.
4. Determine the cation exchange capacity, particle size distribution and Emerson Aggregate class of waste rock samples to assess the potential for erosion and dispersion of these materials.

A summary of the parameters typically involved in completing a static geochemical characterisation of mine waste materials is provided in **Attachment A**. Static geochemical tests provide a 'snapshot' of the characteristics of a sample material at a single point in time. These tests were completed on individual rock samples prior to selected composite samples being prepared and subjected to additional static tests.

The 50 individual samples were initially screened using the static geochemical (Acid Base Account) analyses:

- pH (1:5 w:v, sample:deionised water) [Rayment and Lyons 4A1 and APHA 4500H+];
- EC (1:5 w:v, sample:deionised water) [Rayment and Lyons 3A1 and APHA 2510];
- Total Sulfur [Leco Analyser]; and
- ANC [AMIRA, 2002 method].

The 50 individual samples were also subjected to the following whole rock geochemical analyses:

- metals/metalloids in whole rock (Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, P, Pb, Sb, Se, Th, U, and Zn) [hydrofluoric [HF], nitric [HNO_3], perchloric [$HClO_4$] acid digestion and hydrochloric [HCl] acid leach followed by FIMS and/or ICP-AES/MS]; and
- major cations in whole rock (Ca, Mg, Na and K) [HF, HNO_3, $HClO_4$ acid digestion and HCl acid leach followed by FIMS and/or ICP-AES/MS].

A total of 29 samples with a total sulfur concentration of ≥ 0.15 % total sulfur were subjected to the chromium reducible sulfur (Scr) test to determine the sulfide sulfur content of the samples (Australian Standard AS 4969.7, 2008 method). The Scr test provides a more accurate representation of the Maximum Potential Acidity (MPA) that could be generated from a sample material, as acid generation primarily forms from the reactive sulfide content measured by this method. MPA values were calculated using total sulfur data or Scr data (where available) and these values were balanced against the ANC values to calculate the Net Acid Producing Potential (NAPP).

Based on static acid base account results, sample lithology and sample weathering, eight composite samples were prepared from the 50 individual samples as detailed in **Table B2** (**Attachment B**). The eight composite samples underwent a series of tests on the soluble fractions of 1:5 (w:v) water extracts for:

- pH and EC
- titratable acidity and alkalinity (automatic titrator measured as $CaCO_3$);

- soluble metals/metalloids (Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Sb, Se, Si, Th, U, V, and Zn) [ICP-AES/MS and FIMS (1:5 w:v water extracts)];
- major soluble cations (Ca, Mg, Na and K) [ICP-AES/MS (1:5 w:v water extracts)]; and
- major soluble anions (Cl, SO_4, F and reactive phosphorus) [ICP-AES/MS].

Four composite waste rock samples (deemed potentially suitable for reuse in rehabilitation based on static Acid Base Account and NAG test results) were also subjected to the following series of tests to provide an indication of their physical characteristics and potential for erosion and dispersion.

- Exchangeable cations;
- Emerson aggregate testing
- Particle sizing and particle size classification
- Particle density

3.2 Acid base account

The Acid Base Account test results for the 50 waste rock samples are provided in **Table B1** (**Attachment B**). An explanation of the methodology used in this section, including a description of the Acid Base Account screening method, is provided at **Section 3.1** and a glossary of terms and acronyms used is listed on **Page iv**. The Acid Base Account data trends discussed in this section are presented in **Figures 3-1** to **3-6**.

3.2.1 pH

The pH value for the 50 samples ranges from slightly alkaline to alkaline (pH 7.8 to 10.1) and has an alkaline median value of pH 9.6. The deionised water used in the analysis has a pH of 6.0. **Figure 3-1** illustrates that all rock samples increase the pH of the sample solution.

It is expected that initial leachate from the waste rock lithologies represented by the samples tested will have an alkaline pH value.

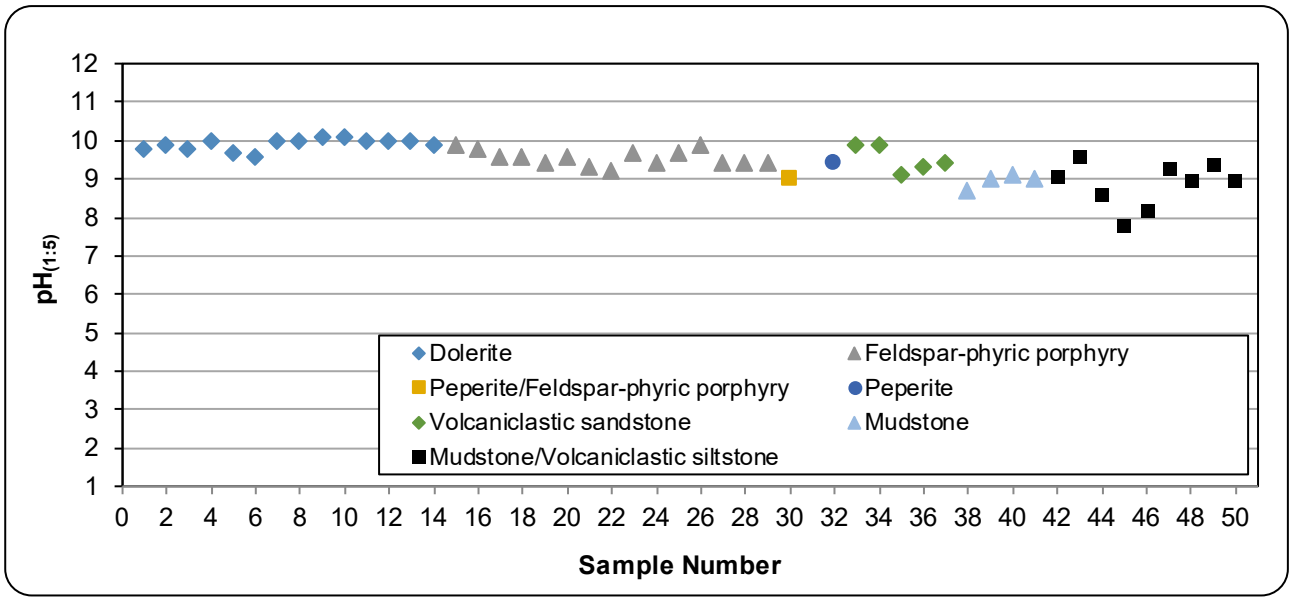


Figure 3-1: $pH_{(1:5)}$ results for rock samples from the TGO ECB

3.2.2 Electrical conductivity (EC)

The EC values for the 50 samples provide an indication of the potential salinity that may be initially generated by the rock materials. The EC results range from 93 to 800 micro-Siemens/cm (µS/cm) and have a median value of 173 µS/cm. **Figure 3-2** shows that the mudstone/volcaniclastic siltstone has higher EC values relative to most samples.

Overall, it is expected that initial salinity release from most bulk rock lithologies represented by the samples tested will be relatively low, although this could be expected to increase for some materials containing elevated total sulfur concentrations (if present as reactive sulfides) are allowed to freely oxidise over time.

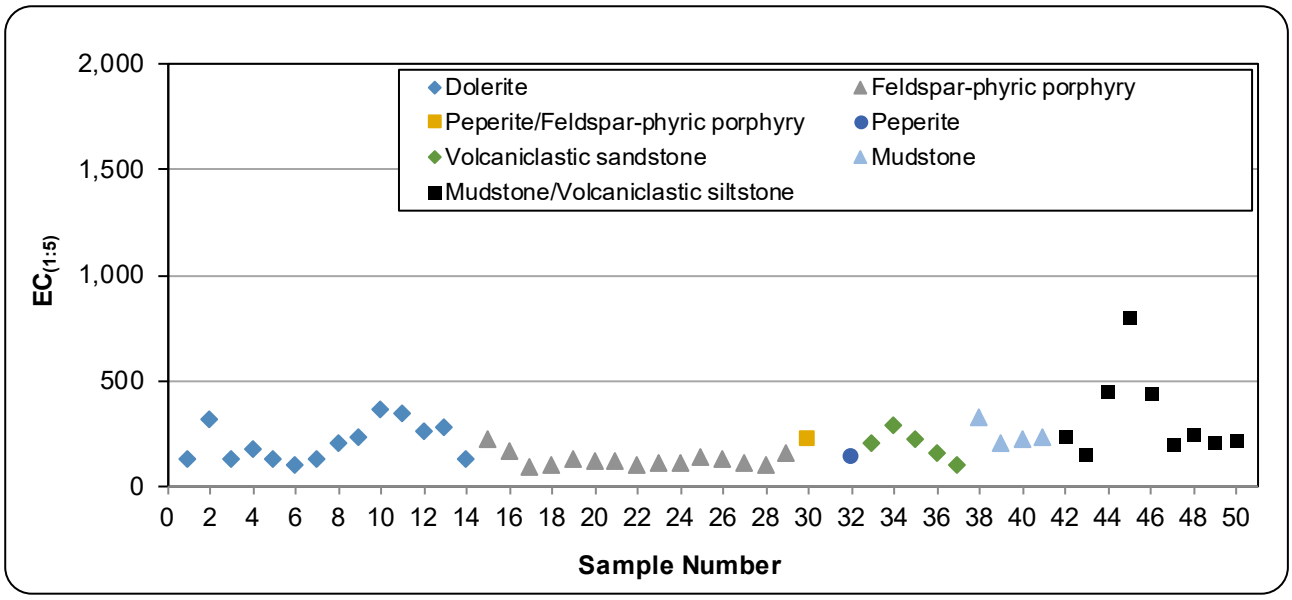


Figure 3-2: $EC_{(1:5)}$ results for rock samples from the TGO ECB

3.2.3 Total sulfur

The total sulfur concentrations of the 50 samples were screened to determine if any samples contained sufficient concentrations of sulfide sulfur to potentially generate acidity. Samples with a total sulfur concentration of less than 0.1 % are effectively barren of sulfide sulfur and so are unlikely to produce any significant acidity (CoA, 2016; INAP, 2021).

Figure 3-3 shows that the total sulfur content of the 50 samples ranges from 0.02 to 3.28 %S, and has a low median value of 0.2 %S. The lowest total sulfur values are associated with dolerite and feldspar-phyric porphyry, whilst the remaining lithologies can contain samples with elevated total sulfur content.

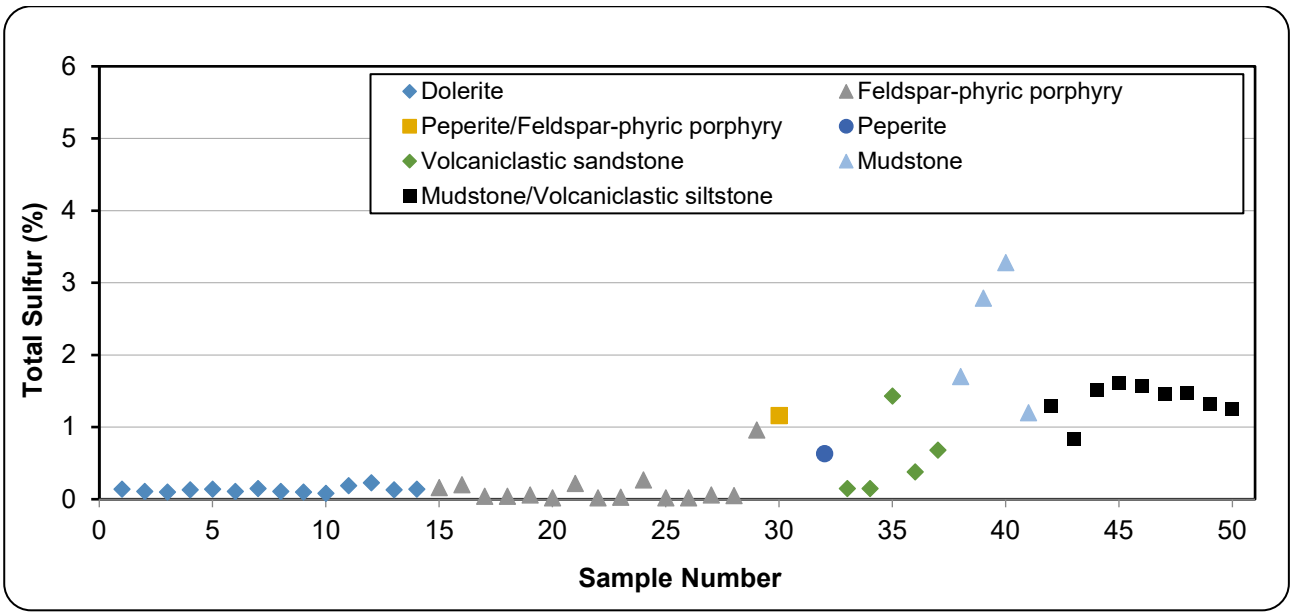


Figure 3-3: Total sulfur results for rock samples from the TGO ECB

3.2.4 Sulfide sulfur

Samples with a total sulfur concentration of ≥ 0.15 %S were further analysed to determine the Chromium Reducible Sulfur (Scr) concentration in the samples. The Scr analysis is used to determine the concentration of sulfur present in the samples as sulfide. Sulfide is the reduced form of sulfur (e.g., pyrite) which, depending on the mineralogy of the sample, may oxidise under oxidising conditions to generate acidity.

Of the 50 samples collected, 29 samples have a total sulfur concentration of ≥ 0.15 %S. In most samples, sulfide sulfur comprises approximately 80 % of the total sulfur present.

3.2.5 Maximum potential acidity (MPA)

The MPA of a sample is a calculated value describing the maximum amount of acidity that a sample could potentially produce over time if exposed to oxidising conditions. The total sulfur concentration (or sulfide sulfur concentration, if available) of a sample is multiplied by a stoichiometric factor (30.625) to determine the amount of sulfuric acid that a sample could potentially produce.

The MPA of the samples ranges from 0.6 to 78.7 kg H_2SO_4/t and has a low median value of 4.8 kg H_2SO_4/t.

3.2.6 Acid neutralising capacity (ANC)

The ANC of a sample is the maximum amount of acid a sample could potentially neutralise and assumes that the full neutralising capacity of a sample is available to neutralise acid.

The ANC of the samples range from 16.8 to 133 kg H_2SO_4/t and has a median value of 40.6 kg H_2SO_4/t. In simplistic terms, the median ANC value is almost an order of magnitude greater than the median MPA value.

3.2.7 Net acid production potential (NAPP)

The NAPP describes the balance of the MPA and ANC of a sample and is calculated by subtracting the ANC from the MPA of a sample.

The NAPP value of the samples ranges from -126 to 58.5 kg H_2SO_4/tonne and has a negative median value of -36.0 kg H_2SO_4/tonne.

Figure 3-4 illustrates that the NAPP values are largely negative, indicating that the majority of the waste rock samples tested are unlikely to generate acidic drainage under oxidising conditions. Positive NAPP values were reported for the mudstone and mudstone/volcaniclastic siltstone lithologies.

3.2.8 ANC:MPA ratio

The ANC:MPA ratio is an indicator of the potential for a sample material to produce or neutralise acidity. Samples with and ANC:MPA ratio of 2 to 3 or greater are considered to have an excess of ANC and are unlikely to generate acidic drainage. Samples with an ANC:MPA ratio of less than one may have the potential to generate acidic drainage, dependent on factors such as mineralogy and the occurrence of key minerals within the sample matrix.

Figure 3-5 shows a plot of ANC versus MPA for the 50 waste rock samples. Most of the samples have an ANC:MPA ratio greater than 2, indicating that most materials represented by these samples have an increased factor of safety and are unlikely to generate acidic drainage. Most of the mudstone and mudstone/volcaniclastic siltstone lithologies plot in the possible and increased risk domains and may have a reduced factor of safety and some potential to generate acidic drainage, if left exposed to oxidising conditions.

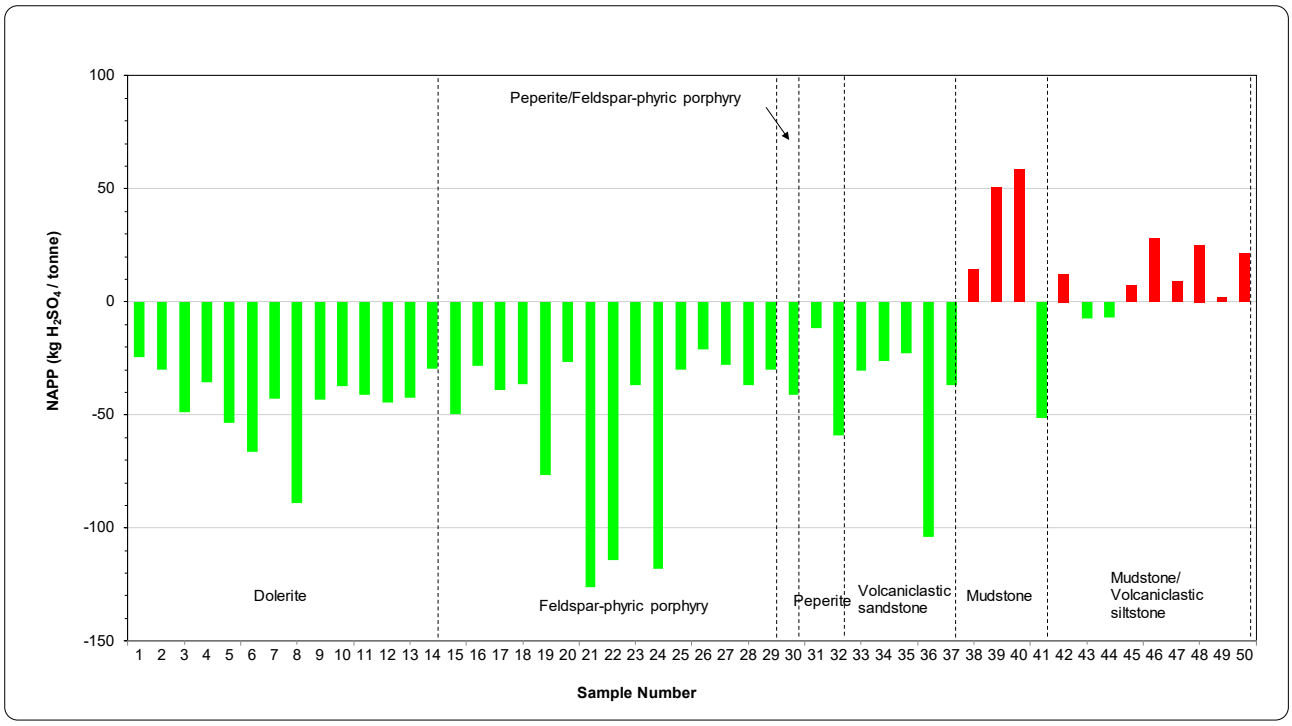


Figure 3-4: NAPP results for rock samples from the TGO ECB

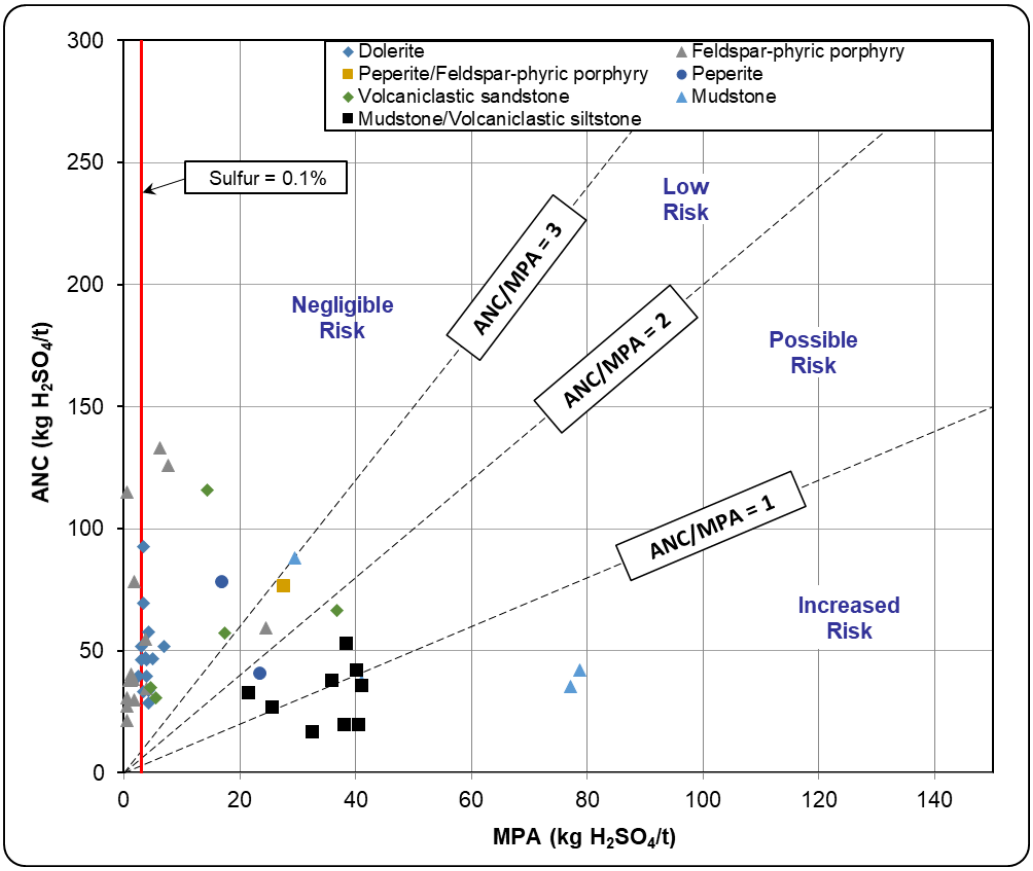


Figure 3-5: ANC vs MPA results for rock samples from the TGO ECB

3.2.9 Net Acid Generation (NAG)

The standard NAG test involves the oxidation of sulfides within a sample material and subsequent neutralisation by inherent neutralising minerals (e.g. calcite) using hydrogen peroxide (H_2O_2) oxidising solution buffered to pH 4.5 (AMIRA, 2002). The intent is to oxidise all inherent sulfides with the potential to contribute to the MPA of the sample and to consume all the available inherent ANC. The standard NAG test results can, however, produce erroneous final NAG_{pH} and NAG capacity when samples contain sulfur in concentrations exceeding 1 %S and relatively high amounts of available ANC. The catalytic breakdown of the peroxide by reaction with sulfide species may prevent all sulfides in the sample being oxidised as the peroxide is consumed (AMIRA, 2002). It is therefore important that standard NAG test results are considered within the context of existing Acid Base Account results.

All 50 waste rock samples were analysed for NAG_{pH} and NAG capacity titrated to both pH 4.5 and pH 7.0. The NAG_{pH} results for the waste rock samples range from pH 2.4 to 11.3. The relationship between NAG_{pH} and NAPP is plotted in **Figure 3-6**, which illustrates that nine rock samples within the mudstone and mudstone/volcaniclastic siltstone lithologies have a positive NAPP value (consistent with **Figure 3-4**) and plot in the Potentially Acid Forming (PAF) domain. One Mudstone/Volcaniclastic Siltstone sample with a NAG_{pH} greater than 4.5 has a slightly positive NAPP value but plots in the Uncertain domain (i.e. this sample has conflicting NAPP and NAG_{pH} test results and is classified as 'Uncertain'). The remaining 40 waste rock samples plot in the Non-Acid Forming (NAF) domain.

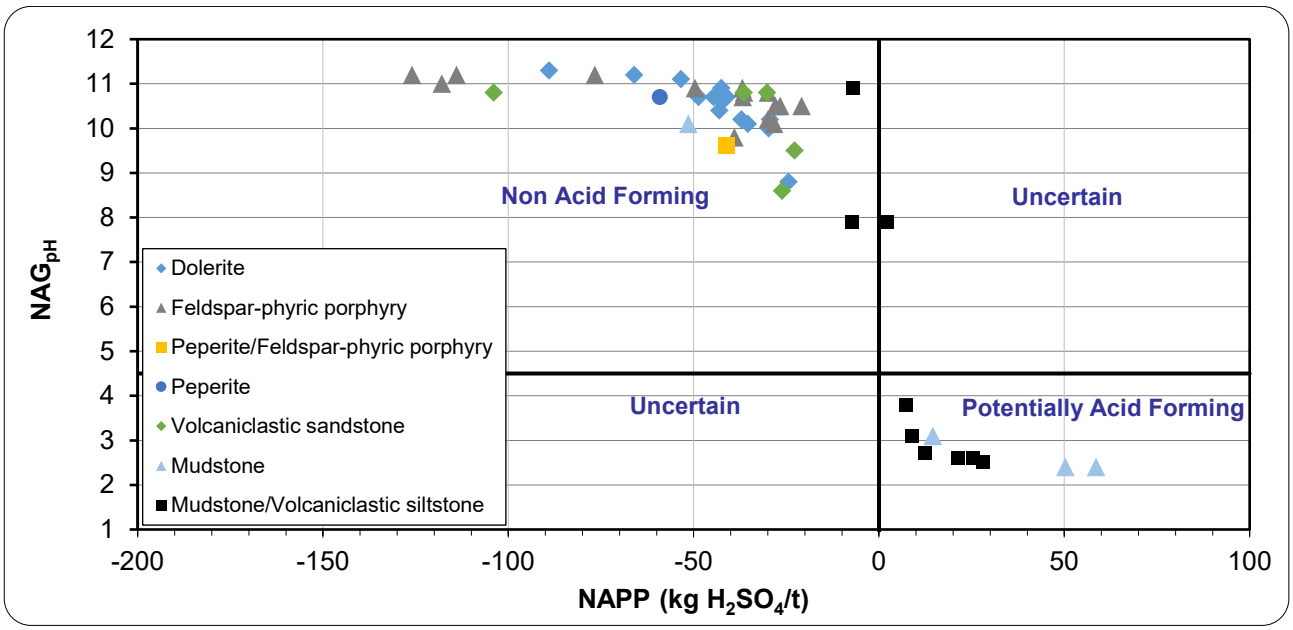


Figure 3-6: NAG_{pH} vs NAPP results for rock samples from the TGO ECB

3.2.10 Geochemical classification

Table 3-1 illustrates the sample classification methodology used by RGS to classify the acid forming nature of the 50 samples (based on AMIRA, 2002), with the number of samples in each specific classification category provided. The results demonstrate that of the 50 samples analysed, 40 (80 %) are classified as NAF and over half of these samples (21 samples) have a sufficiently low concentration of sulfur to be considered barren of sulfides and have a high factor of safety with respect to potential to generate acidic drainage. Nine of the remaining 10 samples are classified as PAF and one sample is classified as Uncertain and represent the Mudstone/Volcaniclastic Siltstone lithologies. Most of the samples representing Peperite and Volcaniclastic Sandstone have elevated sulfide content and could theoretically be a source of saline and/or metalliferous drainage if left exposed to oxidising conditions. In contrast, the samples representing the dolerite and Feldspar-phyric porphyry lithologies typically have low sulfide content and are unlikely to be a source of acidic, saline or metalliferous drainage.

Table 3-1: Geochemical classification of samples from the TGO ECB

Classification	Total Sulfur or Scr (%)	NAPP (kg H_2SO_4/t)	ANC:MPA ratio	Number of samples
Non-Acid Forming (Barren)	≤ 0.1	-	-	21
Non-Acid Forming	> 0.1	≤ -5	≥ 2	19
Uncertain	> 0.1	> -5 to ≤ +5	< 2	1
Potentially Acid Forming	> 0.1	> 5	< 2	9

Multi-element analyses was completed on the 50 waste rock samples to assess the concentration of metals/metalloids in waste rock represented by these samples. The results of the multi-element analyses are presented in **Sections** 3.3 to **3.5**.

3.3 Multi-elements in solids

Multi-element analysis was completed on all 50 waste rock samples. The results from multi-element testing (total metals/metalloids using a 4-acid digestion method) are presented in **Table B3 (Attachment B)**. To provide relevant context, RGS has compared the total metal/metalloid concentration in samples to National Environmental Protection Council (NEPC) Health-based Investigation Levels (HIL-C) for soils in public open spaces (NEPC, 2013).

Total major, minor and trace element concentrations are generally lower than NEPC HIL-C. The only exception is the total arsenic concentrations in one feldspar-phyric porphyry rock sample (609 mg/kg) which is greater than the HIL-C (300 mg/kg) for this metalloid. Arsenopyrite (FeAsS) mineralisation is known to be present in parts of this deposit and is likely the primary source of arsenic in this sample (Alkane, 2020a).

3.4 Assessment of element enrichment in solids

To provide additional context and in line with mining industry guidelines, the multi-element results described in **Section 3.3** were also compared to the typical background concentrations (median crustal abundance) of those elements (metal/metalloids) in un-mineralised soils (Bowen, 1979; COA, 2016a; and INAP, 2021).

The extent of enrichment is reported as the Geochemical Abundance Index (GAI), which relates the actual concentration in a sample with the median 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 (**Table 3-2**).

Table 3-2: GAI Values and Enrichment Factors

GAI	Enrichment Factor	GAI	Enrichment Factor
0	Less than 3-fold enrichment	4	24- to 48-fold enrichment
1	3- to 6-fold enrichment	5	48- to 96-fold enrichment
2	6- to 12-fold enrichment	6	Greater than 96-fold enrichment
3	12- to 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 As, Cr, Cd, Cu, Pb, Se and Zn, more so than with major rock-forming elements, such as Al, Ca, Fe, Mg and Na.

Elements identified as enriched using the GAI may not necessarily be a concern for revegetation, drainage water quality or public health and the following points should also be noted:

- The median crustal abundance varies between different literature sources, therefore affecting the calculated GAI values.
- If a sample is enriched relative to the median crustal abundance, there is no direct correlation that the 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 a deposit means the background levels of some elements 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 Al, Cu, Cd, Fe and Zn can increase significantly.

Table B3 (**Attachment B**) provides total metal/metalloid concentrations for the 50 waste rock samples. The relative enrichment of metals/metalloids in these samples compared to median crustal abundance (the GAI) is presented in **Table B4** (**Attachment B**).

Most major cations and most major, minor and trace elements have a GAI value of less than 3 and relative enrichment compared to unmineralised soils is limited and sporadic.

The GAI value is equal to 3 for magnesium and the sodium in six of the dolerite samples and a single mudstone sample, respectively, indicating some enrichment of these cations in a few samples.

Arsenic is enriched compared to unmineralised soils in two of the dolerite samples (GAI = 3) and three of the feldspar-phyric porphyry rock samples (GAI = 3-6), respectively.

Copper is enriched compared to unmineralised soils in one feldspar-phyric porphyry rock sample (GAI = 3).

Some relative enrichment in metals/metalloids is expected given the known mineralisation and geology of the ECB deposit area.

The potential mobility of arsenic, copper and other elements in water extracts from waste rock materials is discussed in **Section 3.5**.

3.5 Multi-elements in water extracts

The potential solubility and mobility of the metals/metalloids contained in the eight composite samples was investigated further through water extract tests as described in **Section 3.1**. The composition of the eight composite samples is presented in **Table B2** (**Attachment B**). Using sample pulps (ground to passing 75 µm) provides a very high surface area to solution ratio, which encourages mineral reaction and dissolution of the solid phase. As such, the results of the water extract solutions are assumed to represent a 'worst case' scenario for initial surface runoff and seepage from sample materials.

RGS has compared the multi-element test results for water extracts from the eight composite samples with applied ANZG (2018) water quality guideline values. 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 purposes of this study, guideline values are only provided for broad context and should not be interpreted as arbitrary 'maximum' values or 'trigger' values. Whilst arbitrary comparisons against guideline concentrations can be useful in some situations and help to provide relevant context, such comparisons cannot be directly extrapolated to the field situation.

The results from multi-element testing of water extracts (1:5 solid:water) from the eight composite waste rock samples are presented in **Table B5** (**Attachment B**).

The pH of the water extracts is alkaline (ranging from pH 8.6-9.8), with an alkaline median pH value of 9.4. Seven of the eight composite samples are marginally above the applied guideline values for pH in freshwater aquatic ecosystems (pH 6 to 9). A single mudstone/volcaniclastic siltstone sample (pH 8.6) was within the applied guideline range for pH.

The EC values for the water extracts are low relative to the applied guideline values. No composite samples exceeded the freshwater aquatic ecosystem guideline value (1,000 µS/cm) or livestock drinking water guideline value (3,580 µS/cm).

The water extracts from the eight composite samples have elevated total alkalinity values, with the acidity of all composites lower than the laboratory limit of reporting (1 mg $CaCO_3$/kg). These characteristics lead to a positive net alkalinity value being recorded in water extracts collected from all of the composite samples. The excess alkalinity was mainly present as bicarbonate with smaller concentrations of carbonate being recorded.

The concentration of soluble major ions in most of the water extracts from the composite samples are relatively low and generally dominated by sodium, chloride and sulfate. The highest sulfate concentration in the water extracts is from the PAF mudstone/volcaniclastic siltstone material although the sulfate concentration is currently an order of magnitude below the applied livestock drinking water guideline value (1,000 mg/L).

Soluble trace metal/metalloid concentrations water extracts from the eight composite waste rock samples are generally low with most of the results below the relevant laboratory limit of reporting. Some water extract samples have elevated concentrations of aluminium (eight samples) and arsenic (one sample) greater than the applied freshwater aquatic ecosystems guideline values. However, all trace metal/metalloid concentrations are well within the livestock drinking water guideline values. While the elevated concentration of aluminium in the water extracts may be at least partly due the amphoteric nature of this element, it may also be due to a breakthrough of fine colloidal particles through the 45 µm filter used in the water extract laboratory preparation stage.

Slightly elevated concentrations of some metals/metalloids in water extracts from rock samples, compared to receiving environment water quality guidelines, is common for mine waste materials. It should also be noted that during sample collection and laboratory preparation, the physical agitation and mixing of the samples can affect the physical stability of minerals and increase their solubility in a "first flush" leaching event, such as a static water extract test, which may not reflect the field situation where rocks of varying sizes will be dumped/stockpiled and rainfall/hydrological interaction with these materials is highly variable.

3.6 Cation exchange capacity and sodicity

The cation exchange capacity (CEC) results presented in **Table B6** (**Attachment B**) indicate that the CEC of the four selected composite NAF waste rock samples is very low (**Table 3-3**). The exchangeable sodium percentage (ESP) results are derived from the exchangeable sodium and CEC results and are also tabulated in **Table B6** (**Attachment B**). The ESP results for the composite waste rock samples ranges from non-sodic to strongly sodic (**Table 3-4**).

Table 3-3: Cation exchange capacity ratings

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

From Hazelton and Murphy (2007)

Table 3-4: Exchangeable sodium percentage ratings

Sodicity rating	ESP range for Australian soils
Non-sodic	0–6
Marginally sodic to sodic	6–14
Strongly sodic	>14

The CEC and ESP ratings of the four composite samples are shown in **Table 3-5**. The peperite, volcaniclastic sandstone and mudstone/volcaniclastic siltstone composite samples were not assessed for CEC and ESP as these materials can have elevated total sulfur content and some may be PAF and therefore will not be used for construction or rehabilitation.

Table 3-5: Sample composite CEC and ESP ratings

RGS Sample Number	Composite	CEC Rating	CEC (meq/100 g)	ESP Rating	ESP (%)
2021054_C012	Dolerite	Very Low	1.3	Strongly sodic	21.2
2021054_C013	Dolerite	Very Low	1.6	Strongly sodic	61.8
2021054_C014	Feldspar-phyric porphyry	Very Low	0.6	Non-sodic	<0.2
2021054_C015	Feldspar-phyric porphyry	Very Low	0.8	Strongly sodic	31.2

The results indicate that most composite samples derived from igneous lithologies are likely to have a low pH buffering ability, and low resistance to changes in available nutrients and calcium.

It is important to note that because the ESP describes exchangeable sodium as a proportion of CEC, composites with a very low to low CEC may have an elevated sodic rating despite relatively low levels of exchangeable sodium. The susceptibility of the composites to slaking and dispersion is further discussed in **Section 3.7**.

3.7 Sample physical properties

On the assumption that some NAF waste rock materials may be used on the external faces of waste rock emplacements (WRE's), or as construction or rehabilitation materials, selected physical properties of four composite samples were analysed. The results of these analyses are presented in **Table B7** (**Attachment B**).

Emerson Aggregate Test results for the four composite samples indicate that the dolerite and feldspar-phyric porphyry lithologies represented by the composite samples may, when exposed to long term weathering, be prone to slaking with some dispersion.

Particle size results for the four composite waste rock samples indicate that dolerite and feldspar-phyric porphyry material types are unlikely to break down to soil ped sizes (i.e., these samples yield only minor proportions of sand, silt and clay sized particles after crushing to sub-20 mm). Soil particle density was relatively consistent across the four composite samples.

4 Conclusions and recommendations

4.1 Conclusions

RGS has completed a geochemical assessment of waste rock materials for the Tomingley Gold ECB Project. The results of the geochemical assessment indicate that:

- The Diorite and Feldspar-Phyric-Porphyry waste rock materials represented by the samples tested are classified as NAF, with a low risk of acid generation and a high factor of safety with respect to AMD.
- Some of the igneous lithologies and mudstone have elevated sulfur content (as sulfide) and have the potential to oxidise over time and be a potential source of acidic, neutral and/or saline mine drainage.
- The only lithologies sampled that contain material classified as PAF are mudstone and mudstone/volcaniclastic siltstone.
- Initial water contact with the waste rock materials is likely to be slightly to moderately alkaline, and fresh. The main source of alkalinity is in the form of bicarbonate.
- Total metal concentrations in waste rock are generally not significantly enriched compared to applied guideline values and median crustal abundance in unmineralised soils. Minor sporadic enrichment of a few metals/metalloids compared to median crustal abundance in unmineralised soils is expected to be occasionally present in some waste rock materials.
- Apart from bicarbonate, the concentrations of major ions in initial water contact with NAF waste rock materials are likely to be relatively low and dominated by sodium, chloride and sulfate.
- The majority of metals/metalloids in material represented by the NAF waste rock samples are likely to be sparingly soluble with concentrations expected to remain within applied freshwater aquatic ecosystem and livestock drinking water quality guideline criteria under the alkaline pH conditions (ANZG, 2018).
- Some metal/metalloids may be marginally more soluble in initial contact water from waste rock compared to applied freshwater aquatic ecosystem guideline values. However, all trace metal/metalloid concentrations are well within the livestock drinking water guideline values.
- In the short-term soluble metal/metalloid concentrations are unlikely to impact upon the quality of surface and groundwater resources. In the longer-term metal/metalloid solubility from any PAF materials has the potential to increase, if these materials are not covered and are left exposed to oxidising conditions.
- Waste rock materials tested may have low exchangeable cation concentrations and may benefit from fertiliser, gypsum and organic matter addition if used for rehabilitation. The waste rock materials tested may also be susceptible to slaking and some dispersion after a period of weathering.

4.2 Recommendations

As a result of the findings of the geochemical assessment on waste rock materials at the Project, the following recommendations are made:

- Placement of any PAF waste rock materials or materials with elevated total sulfur content on the surface of final waste rock landform(s) should be avoided.
- Only low sulfur NAF waste rock materials should be used on external faces of WRE's, or as construction or rehabilitation materials.
- Monitoring of surface runoff and in seepage downstream of any WRE containing PAF materials and/or ore stockpile areas should be regularly monitored for pH and EC. Periodic monitoring of major ions and selected soluble metals/metalloids (e.g., Al, As, Cu, Cr, Cd, Cu, and Zn) should be included in the water quality monitoring program. Should the monitored pH drop below 6.0 and/or the EC increase by more than 100 %, a wider range of water quality parameters should be tested including acidity, alkalinity and the range of soluble metals described in **Table B5** (**Attachment B**) of this report.
- The geochemical and physical suitability of any waste rock materials for use in surface infrastructure and rehabilitation activities should be verified using monitored field trials during operations when bulk waste rock materials become available.

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ATTACHMENT A

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:

$$FeS_2 + 15/4\ O_2 + 7/2\ H_2O \text{ ---> } Fe(OH)_3 + 2\ H_2SO_4$$

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 endpoint 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 is recommended that this only be considered after site specific calibration work is carried out.

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.

ATTACHMENT B

Summary Tables for Static Geochemical and Physical Test Results

LIST OF TABLES

Table B1: Acid Base Account and NAG Test Results for the Tomingley Gold ECB Project

Table B2: List of Sample Composites for the Tomingley Gold ECB Project

Table B3: Multi-Element Test Results for the Tomingley Gold ECB Project

Table B4: Geochemical Abundance Index Results for the Tomingley Gold ECB Project

Table B5: Multi-Element Test Results for Water Extracts for the Tomingley Gold ECB Project

Table B6: Exchangeable Cation Results for Sample Composites from the Tomingley Gold ECB Project

Table B7: Physical Test Results for Composite Samples from the Tomingley Gold ECB Project

Table B1: Acid Base Account (ABA) Test Results for the Tomingley Gold Eastern Cutback Project

Sample No.	RGS Sample No.	Drill Hole/ Location	TGO ECB Sample ID	Sample Lithology	Sample Observation	From	To	Material	pH[1]	EC[1]	Total S	Scr[2]	MPA[2]	ANC[2]	NAPP[2]	ANC: MPA Ratio	NAG_{pH}	NAG Capacity (pH 4.5)	NAG Capacity (pH 7)	Total Carbon	Total Organic Carbon	Total Inorganic Carbon	Sample Classification[3]
						(m)				(µS/cm)	(%)		(kg H_2SO_4/t)					(kg H_2SO_4/t)		(%)			
1	2021054_091	215	TGO360039	Dolerite	-	-	-	Waste	9.8	129	0.14	-	4.3	28.8	-24.5	6.7	8.8	<0.1	<0.1	0.08	0.04	0.04	Non-Acid Forming (Barren)
2	2021054_092	215	TGO360040	Dolerite	Gabbro	-	-	Waste	9.9	318	0.11	-	3.4	33.2	-29.8	9.9	10.0	<0.1	<0.1	0.12	0.04	0.08	Non-Acid Forming (Barren)
3	2021054_098	PEGT001	TGO358578	Dolerite	-	140.0	-	Waste	9.8	134	0.10	-	3.1	51.8	-48.7	16.9	10.7	<0.1	<0.1	0.33	0.05	0.28	Non-Acid Forming (Barren)
4	2021054_097	PEGT001	TGO358577	Dolerite	-	150.5	-	Waste	10.0	179	0.13	-	4.0	39.4	-35.4	9.9	10.1	<0.1	<0.1	0.17	0.05	0.12	Non-Acid Forming (Barren)
5	2021054_109	PEGT004	TGO358589	Dolerite	Gabbro	138.2	-	Waste	9.7	127	0.14	-	4.3	57.8	-53.5	13.5	11.1	<0.1	<0.1	0.51	0.06	0.45	Non-Acid Forming (Barren)
6	2021054_107	PEGT004	TGO358587	Dolerite	-	153.3	-	Waste	9.6	102	0.11	-	3.4	69.5	-66.1	20.6	11.2	<0.1	<0.1	0.69	0.04	0.65	Non-Acid Forming (Barren)
7	2021054_113	PEGT004	TGO358593	Dolerite	-	220.3	-	Waste	10.0	128	0.15	0.124	3.7	47.2	-42.6	12.9	10.9	<0.1	<0.1	0.38	0.04	0.34	Non-Acid Forming
8	2021054_114	215 South pt1	TGO358594	Dolerite	-	-	-	Waste	10.0	202	0.11	-	3.4	92.5	-89.1	27.5	11.3	<0.1	<0.1	1.03	0.05	0.98	Non-Acid Forming (Barren)
9	2021054_118	215 South pt5	TGO358598	Dolerite	-	-	-	Waste	10.1	238	0.10	-	3.1	46.2	-43.1	15.1	10.4	<0.1	<0.1	0.21	0.04	0.17	Non-Acid Forming (Barren)
10	2021054_120	215 South pt7	TGO358600	Dolerite	-	-	-	Waste	10.1	364	0.08	-	2.5	39.7	-37.2	16.2	10.2	<0.1	<0.1	0.13	0.03	0.10	Non-Acid Forming (Barren)
11	2021054_121	215 South pt8	TGO358601	Dolerite	-	-	-	Waste	10.0	351	0.19	0.161	4.9	46.9	-41.1	9.5	10.7	<0.1	<0.1	0.30	0.04	0.26	Non-Acid Forming
12	2021054_131	702 Shot North	TGO358673	Dolerite	-	-	-	Waste	10.0	261	0.23	0.228	7.0	51.7	-44.7	7.4	10.7	<0.1	<0.1	0.41	0.05	0.36	Non-Acid Forming
13	2021054_132	702 Shot North	TGO358674	Dolerite	-	-	-	Waste	10.0	280	0.13	-	4.0	46.4	-42.4	11.7	10.6	<0.1	<0.1	0.29	0.03	0.26	Non-Acid Forming (Barren)
14	2021054_134	702 Shot Pit Edge	TGO358676	Dolerite	-	-	-	Waste	9.9	135	0.14	-	4.3	33.8	-29.5	7.9	10.2	<0.1	<0.1	0.14	0.04	0.10	Non-Acid Forming (Barren)
15	2021054_090	215	TGO360038	Feldspar-phyric porphyry	-	-	-	Waste	9.9	224	0.16	0.119	3.6	54.6	-49.7	15.0	10.9	<0.1	<0.1	0.48	0.06	0.42	Non-Acid Forming
16	2021054_093	215	TGO360041	Feldspar-phyric porphyry	-	-	-	Waste	9.8	166	0.20	0.126	3.9	34.5	-28.4	8.9	10.1	<0.1	<0.1	0.20	0.07	0.13	Non-Acid Forming
17	2021054_102	PEGT001	TGO358582	Feldspar-phyric porphyry	-	95.6	-	Waste	9.6	93	0.04	-	1.2	40.3	-39.1	32.9	9.8	<0.1	<0.1	0.08	0.04	0.04	Non-Acid Forming (Barren)
18	2021054_101	PEGT001	TGO358581	Feldspar-phyric porphyry	-	104.5	-	Waste	9.6	104	0.04	-	1.2	37.7	-36.5	30.8	10.8	<0.1	<0.1	0.22	0.05	0.17	Non-Acid Forming (Barren)
19	2021054_110	PEGT004	TGO358590	Feldspar-phyric porphyry	-	126.4	-	Waste	9.4	127	0.06	-	1.8	78.5	-76.7	42.7	11.2	<0.1	<0.1	0.92	0.05	0.87	Non-Acid Forming (Barren)
20	2021054_108	PEGT004	TGO358588	Feldspar-phyric porphyry	-	155.0	-	Waste	9.6	121	0.02	-	0.6	27.3	-26.7	44.6	10.5	<0.1	<0.1	0.15	0.05	0.10	Non-Acid Forming (Barren)
21	2021054_106	PEGT004	TGO358586	Feldspar-phyric porphyry	Andesite LG	188.5	-	Waste	9.3	125	0.22	0.203	6.2	133.0	-126.0	21.4	11.2	<0.1	<0.1	1.72	0.05	1.67	Non-Acid Forming
22	2021054_105	PEGT004	TGO358585	Feldspar-phyric porphyry	-	198.5	-	Waste	9.2	106	0.02	-	0.6	115.0	-114.0	187.8	11.2	<0.1	<0.1	1.37	0.06	1.31	Non-Acid Forming (Barren)
23	2021054_112	PEGT004	TGO358592	Feldspar-phyric porphyry	-	210.2	-	Waste	9.7	108	0.03	-	0.9	37.7	-36.8	41.0	10.7	<0.1	<0.1	0.17	0.04	0.13	Non-Acid Forming (Barren)
24	2021054_111	PEFT001	TGO358591	Feldspar-phyric porphyry	-	212.8	-	Waste	9.4	112	0.27	0.248	7.6	126.0	-118.0	16.6	11.0	<0.1	<0.1	1.46	0.06	1.40	Non-Acid Forming
25	2021054_119	215 South pt6	TGO358599	Feldspar-phyric porphyry	-	-	-	Waste	9.7	143	0.02	-	0.6	30.6	-30.0	50.0	10.8	<0.1	<0.1	0.24	0.04	0.20	Non-Acid Forming (Barren)
26	2021054_122	215 South pt9	TGO358602	Feldspar-phyric porphyry	-	-	-	Waste	9.9	135	0.02	-	0.6	21.5	-20.9	35.1	10.5	<0.1	<0.1	0.06	0.03	0.03	Non-Acid Forming (Barren)
27	2021054_123	TGC5424	TGO358646	Feldspar-phyric porphyry	-	28.0	30.0	Waste	9.4	108	0.06	-	1.8	29.8	-28.0	16.2	10.5	<0.1	<0.1	0.15	0.04	0.11	Non-Acid Forming (Barren)
28	2021054_124	TGC5426	TGO358647	Feldspar-phyric porphyry	-	18.0	20.0	Waste	9.4	103	0.05	-	1.5	38.4	-36.9	25.1	10.9	<0.1	<0.1	0.28	0.05	0.23	Non-Acid Forming (Barren)
29	2021054_125	TGC5429	TGO358649	Feldspar-phyric porphyry	-	31.0	33.0	Waste	9.4	163	0.96	0.799	24.5	59.4	-30.0	2.4	10.2	<0.1	<0.1	0.76	0.14	0.62	Non-Acid Forming
30	2021054_127	TGC5442	TGO358669	Peperite/Feldspar-phyric porphyry	-	17.0	19.0	Waste	9.0	228	1.16	0.899	27.5	76.6	-41.1	2.8	9.6	<0.1	<0.1	1.14	0.17	0.97	Non-Acid Forming
31	2021054_103	PEGT001	TGO358583	Peperite	Slightly Carbonaceous	91.8	-	Waste	9.6	126	0.96	0.766	23.5	40.8	-11.4	1.7	8.8	<0.1	<0.1	0.50	0.16	0.34	Non-Acid Forming
32	2021054_099	PEGT001	TGO358579	Peperite	Slightly Carbonaceous	129.1	-	Waste	9.4	141	0.63	0.549	16.8	78.5	-59.2	4.7	10.7	<0.1	<0.1	0.96	0.14	0.82	Non-Acid Forming
33	2021054_094	215	TGO360042	Volcaniclastic sandstone	-	-	-	Waste	9.9	206	0.15	0.151	4.6	34.9	-30.3	7.5	10.8	<0.1	<0.1	0.27	0.05	0.22	Non-Acid Forming
34	2021054_095	215	TGO360043	Volcaniclastic sandstone	-	-	-	Waste	9.9	294	0.15	0.179	5.5	30.8	-26.2	5.6	8.6	<0.1	<0.1	0.08	0.04	0.04	Non-Acid Forming
35	2021054_104	PEGT001	TGO358584	Volcaniclastic sandstone	-	78.5	-	Waste	9.1	228	1.43	1.200	36.8	66.6	-22.8	1.8	9.5	<0.1	<0.1	0.88	0.10	0.78	Non-Acid Forming
36	2021054_126	TGC5449	TGO358650	Volcaniclastic sandstone	-	15.0	18.0	Waste	9.3	160	0.38	0.470	14.4	116.0	-104.0	8.1	10.8	<0.1	<0.1	1.95	0.18	1.77	Non-Acid Forming
37	2021054_128	TGC5442	TGO358670	Volcaniclastic sandstone	-	28.0	30.0	Waste	9.4	100	0.68	0.568	17.4	57.4	-36.6	3.3	10.8	<0.1	<0.1	0.80	0.19	0.61	Non-Acid Forming
38	2021054_086	TGC5422	TGO360034	Mudstone	Slightly Carbonaceous	9.0	10.0	Waste	8.7	325	1.70	1.340	41.0	37.5	14.5	0.9	3.1	6.2	11.9	0.79	0.29	0.50	Potentially Acid Forming
39	2021054_087	TGC5422	TGO360035	Mudstone	Slightly Carbonaceous	10.0	20.0	Waste	9.0	208	2.79	2.520	77.2	35.2	50.2	0.5	2.4	31.8	38.3	0.77	0.31	0.46	Potentially Acid Forming
40	2021054_088	TGC5422	TGO360036	Mudstone	Slightly Carbonaceous	20.0	30.0	Waste	9.1	221	3.28	2.570	78.7	41.9	58.5	0.5	2.4	30.0	35.9	0.80	0.24	0.56	Potentially Acid Forming
41	2021054_089	215	TGO360037	Mudstone	-	-	-	Waste	9.0	236	1.20	0.964	29.5	88.2	-51.5	3.0	10.1	<0.1	<0.1	1.63	0.34	1.29	Non-Acid Forming
42	2021054_096	215	TGO360044	Mudstone/Volcaniclastic siltstone	Slightly Carbonaceous	-	-	Waste	9.1	241	1.29	0.831	25.4	27.0	12.5	1.1	2.7	13.2	19.5	0.30	0.26	0.04	Potentially Acid Forming
43	2021054_100	PEGT001	TGO358580	Mudstone/Volcaniclastic siltstone	Slightly Carbonaceous	130.0	-	Waste	9.6	154	0.83	0.699	21.4	32.9	-7.5	1.5	7.9	<0.1	<0.1	0.41	0.18	0.23	Non-Acid Forming
44	2021054_115	215 South pt2	TGO358595	Mudstone/Volcaniclastic siltstone	Slightly Carbonaceous	-	-	Waste	8.6	454	1.51	1.250	38.3	53.3	-7.1	1.4	10.9	<0.1	<0.1	0.98	0.30	0.68	Non-Acid Forming
45	2021054_116	215 South pt3	TGO358596	Mudstone/Volcaniclastic siltstone	Slightly Carbonaceous	-	-	Waste	7.8	800	1.61	1.310	40.1	42.2	7.1	1.1	3.8	2.3	7.0	1.01	0.23	0.78	Potentially Acid Forming
46	2021054_117	215 South pt4	TGO358597	Mudstone/Volcaniclastic siltstone	Slightly Carbonaceous	-	-	Waste	8.2	443	1.57	1.320	40.4	20.0	28.0	0.5	2.5	30.5	34.6	0.30	0.15	0.15	Potentially Acid Forming
47	2021054_129	702 Shot North	TGO358671	Mudstone/Volcaniclastic siltstone	-	-	-	Waste	9.3	199	1.46	1.340	41.0	35.9	8.8	0.9	3.1	5.8	10	0.59	0.16	0.43	Potentially Acid Forming
48	2021054_130	702 Shot North	TGO358672	Mudstone/Volcaniclastic siltstone	-	-	-	Waste	9.0	250	1.48	1.240	38.0	20.1	25.2	0.5	2.6	20.1	25.4	0.35	0.26	0.09	Potentially Acid Forming
49	2021054_133	702 Shot Mid	TGO358675	Mudstone/Volcaniclastic siltstone	-	-	-	Waste	9.4	207	1.32	1.170	35.8	38.2	2.2	1.1	7.9	<0.1	<0.1	0.64	0.15	0.49	Uncertain
50	2021054_135	702 Shot Pit Edge	TGO358677	Mudstone/Volcaniclastic siltstone	-	-	-	Waste	9.0	220	1.25	1.060	32.5	16.8	21.4	0.5	2.6	20	25.0	0.40	0.25	0.15	Potentially Acid Forming

1. Current pH, EC, Alkalinity and Acidity 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.

RC = Reverse circulation percussion drill hole; TGO = Tomingley Gold Operations; 215 = Grab sample collected at approximately 215 m RL.

Table B2: Sample Composites created for the Tomingley Gold Eastern Cutback Project

Sample No.	RGS Sample No.	Drill Hole/ Location	TGO ECB Sample ID	Sample Lithology	From (m)	To (m)	Sample Classification[3]	RGS Composite Sample No.
5	2021054_109	PEGT004	TGO358589	Dolerite	138.2	-	Non-Acid Forming (Barren)	2021054_C012
6	2021054_107	PEGT004	TGO358587	Dolerite	153.3	-	Non-Acid Forming (Barren)	
7	2021054_113	PEGT004	TGO358593	Dolerite	220.3	-	Non-Acid Forming	
1	2021054_091	215	TGO360039	Dolerite	-	-	Non-Acid Forming (Barren)	2021054_C013
2	2021054_092	215	TGO360040	Dolerite	-	-	Non-Acid Forming (Barren)	
3	2021054_098	PEGT001	TGO358578	Dolerite	140.0	-	Non-Acid Forming (Barren)	
4	2021054_097	PEGT001	TGO358577	Dolerite	150.5	-	Non-Acid Forming (Barren)	
8	2021054_114	215 South pt1	TGO358594	Dolerite	-	-	Non-Acid Forming (Barren)	
9	2021054_118	215 South pt5	TGO358598	Dolerite	-	-	Non-Acid Forming (Barren)	
10	2021054_120	215 South pt7	TGO358600	Dolerite	-	-	Non-Acid Forming (Barren)	
11	2021054_121	215 South pt8	TGO358601	Dolerite	-	-	Non-Acid Forming	
12	2021054_131	702 Shot North	TGO358673	Dolerite	-	-	Non-Acid Forming	
13	2021054_132	702 Shot North	TGO358674	Dolerite	-	-	Non-Acid Forming (Barren)	
14	2021054_134	702 Shot Pit Edge	TGO358676	Dolerite	-	-	Non-Acid Forming (Barren)	
19	2021054_110	PEGT004	TGO358590	Feldspar-phyric porphyry	126.4	-	Non-Acid Forming (Barren)	2021054_C014
20	2021054_108	PEGT004	TGO358588	Feldspar-phyric porphyry	155.0	-	Non-Acid Forming (Barren)	
21	2021054_106	PEGT004	TGO358586	Feldspar-phyric porphyry	188.5	-	Non-Acid Forming	
22	2021054_105	PEGT004	TGO358585	Feldspar-phyric porphyry	198.5	-	Non-Acid Forming (Barren)	
23	2021054_112	PEGT004	TGO358592	Feldspar-phyric porphyry	210.2	-	Non-Acid Forming (Barren)	
24	2021054_111	PEFT001	TGO358591	Feldspar-phyric porphyry	212.8	-	Non-Acid Forming	
15	2021054_090	215	TGO360038	Feldspar-phyric porphyry	-	-	Non-Acid Forming	2021054_C015
16	2021054_093	215	TGO360041	Feldspar-phyric porphyry	-	-	Non-Acid Forming	
17	2021054_102	PEGT001	TGO358582	Feldspar-phyric porphyry	95.6	-	Non-Acid Forming (Barren)	
18	2021054_101	PEGT001	TGO358581	Feldspar-phyric porphyry	104.5	-	Non-Acid Forming (Barren)	
25	2021054_119	215 South pt6	TGO358599	Feldspar-phyric porphyry	-	-	Non-Acid Forming (Barren)	
26	2021054_122	215 South pt9	TGO358602	Feldspar-phyric porphyry	-	-	Non-Acid Forming (Barren)	
27	2021054_123	TGC5424	TGO358646	Feldspar-phyric porphyry	28.0	30.0	Non-Acid Forming (Barren)	
28	2021054_124	TGC5426	TGO358647	Feldspar-phyric porphyry	18.0	20.0	Non-Acid Forming (Barren)	
29	2021054_125	TGC5429	TGO358649	Feldspar-phyric porphyry	31.0	33.0	Non-Acid Forming	
30	2021054_127	TGC5442	TGO358669	Peperite/Feldspar-phyric porphyry	17.0	19.0	Non-Acid Forming	2021054_C016
31	2021054_103	PEGT001	TGO358583	Peperite	91.8	-	Non-Acid Forming	
32	2021054_099	PEGT001	TGO358579	Peperite	129.1	-	Non-Acid Forming	
33	2021054_094	215	TGO360042	Volcaniclastic sandstone	-	-	Non-Acid Forming	2021054_C017
34	2021054_095	215	TGO360043	Volcaniclastic sandstone	-	-	Non-Acid Forming	
35	2021054_104	PEGT001	TGO358584	Volcaniclastic sandstone	78.5	-	Non-Acid Forming	
36	2021054_126	TGC5449	TGO358650	Volcaniclastic sandstone	15.0	18.0	Non-Acid Forming	
37	2021054_128	TGC5442	TGO358670	Volcaniclastic sandstone	28.0	30.0	Non-Acid Forming	
41	2021054_089	215	TGO360037	Mudstone	-	-	Non-Acid Forming	2021054_C018
42	2021054_096	215	TGO360044	Mudstone/Volcaniclastic siltstone	-	-	Non-Acid Forming	
43	2021054_100	PEGT001	TGO358580	Mudstone/Volcaniclastic siltstone	130.0	-	Non-Acid Forming	
49	2021054_133	702 Shot Mid	TGO358675	Mudstone/Volcaniclastic siltstone	-	-	Uncertain	
44	2021054_115	215 South pt2	TGO358595	Mudstone/Volcaniclastic siltstone	-	-	Non-Acid Forming	
38	2021054_086	TGC5422	TGO360034	Mudstone	9.0	10.0	Potentially Acid Forming	2021054_C019
39	2021054_087	TGC5422	TGO360035	Mudstone	10.0	20.0	Potentially Acid Forming	
40	2021054_088	TGC5422	TGO360036	Mudstone	20.0	30.0	Potentially Acid Forming	
45	2021054_116	215 South pt3	TGO358596	Mudstone/Volcaniclastic siltstone	-	-	Potentially Acid Forming	
46	2021054_117	215 South pt4	TGO358597	Mudstone/Volcaniclastic siltstone	-	-	Potentially Acid Forming	
47	2021054_129	702 Shot North	TGO358671	Mudstone/Volcaniclastic siltstone	-	-	Potentially Acid Forming	
48	2021054_130	702 Shot North	TGO358672	Mudstone/Volcaniclastic siltstone	-	-	Potentially Acid Forming	
50	2021054_135	702 Shot Pit Edge	TGO358677	Mudstone/Volcaniclastic siltstone	-	-	Potentially Acid Forming	

1. Current pH, EC, Alkalinity and Acidity 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.

RC = Reverse circulation percussion drill hole; TGO = Tomingley Gold Operations; 215 = Grab sample collected at approximately 215 m RL

Table B3: Multi-Element Test Results for Tomingley Gold Eastern Cutback Project

		TGO ECB Sample Number →	TGO360039	TGO360040	TGO358578	TGO358577	TGO358589	TGO358587	TGO358593	TGO358594	TGO358598	TGO358600
		ALS Laboratory ID →	BR21226530_06	BR21226530_07	BR21226530_13	BR21226530_12	BR21226530_24	BR21226530_22	BR21226530_28	BR21226530_29	BR21226530_33	BR21226530_35
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HIL C)	Dolerite									
Major Cations	All units mg/kg		All units mg/kg									
Calcium (Ca)	50	-	63500	54900	72200	66700	63200	62400	65500	64500	71000	71300
Magnesium (Mg)	50	-	37700	33300	46300	43100	34900	26200	37200	37700	43700	44600
Potassium (K)	50	-	2700	6500	3400	2900	5500	13700	4400	4400	5800	4800
Sodium (Na)	50	-	22200	17500	18000	17400	17400	20200	19800	20500	17500	20600
Major, Minor and Trace Elements	All units mg/kg		All units mg/kg									
Aluminium (Al)	50	-	72700	75100	81400	69800	80900	68700	71100	74400	79600	83200
Antimony (Sb)	0.05	-	0.22	0.35	0.77	0.67	0.83	2.57	0.26	0.66	0.54	0.24
Arsenic (As)	0.2	300	3.4	9	3.7	1.8	9.3	57	2.7	10.9	7.6	4.9
Barium (Ba)	10	-	100	140	90	100	190	510	110	120	120	60
Beryllium (Be)	0.05	90	0.98	0.65	0.57	0.57	0.69	1.92	0.92	0.88	0.72	0.88
Cadmium (Cd)	0.02	90	0.12	0.07	0.1	0.11	0.08	0.11	0.14	0.11	0.14	0.15
Chromium (Cr) - hexavalent	1	300 **	167	132	113	120	125	65	162	77	143	110
Cobalt (Co)	0.1	300	40	38	43	44	36	33	40	38	45	46
Copper (Cu)	0.2	17,000	55	48	55	56	49	54	57	49	58	62
Iron (Fe)	50	-	76300	55400	72900	69700	64200	85600	76400	67900	78600	76600
Lead (Pb)	0.5	600	3.1	1.9	1.1	1.1	2.2	4.1	2.7	2.6	1.5	1.4
Manganese (Mn)	5	19,000	1330	926	1200	1220	1120	1420	1330	1280	1320	1210
Mercury (Hg)	0.005	80	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel (Ni)	0.2	1,200	66.4	111	90.7	92.7	90.9	22.6	67.8	74.6	95.2	76.6
Reactive Phosphorus (P)	10	-	1150	800	770	750	1150	2510	1130	1130	1110	870
Selenium (Se)	1	700	<1	1	1	1	1	1	1	1	1	1
Thorium (Th)	0.01	-	1.09	0.37	0.42	0.37	0.62	3.88	1.06	1.31	0.62	0.76
Uranium (U)	0.1	-	0.4	0.2	0.1	0.2	0.3	1.2	0.4	0.4	0.2	0.3
Zinc (Zn)	2	30,000	93	65	79	80	83	120	90	80	91	84

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. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B3: Multi-Element Test Results for Tomingley Gold Eastern Cutback Project

		TGO ECB Sample Number →	TGO358601	TGO358673	TGO358674	TGO358676	TGO360038	TGO360041	TGO358582	TGO358581	TGO358590	TGO358588
		ALS Laboratory ID →	BR21226530_36	BR21226530_46	BR21226530_47	BR21226530_49	BR21226530_05	BR21226530_08	BR21226530_17	BR21226530_16	BR21226530_25	BR21226530_23
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HIL C)	Dolerite				Feldspar-phyric porphyry					
Major Cations	All units mg/kg		All units mg/kg									
Calcium (Ca)	50	-	68600	72400	67500	68500	70600	51100	51900	62200	51400	56000
Magnesium (Mg)	50	-	43100	47700	40800	41200	41600	22200	22400	20900	21200	21000
Potassium (K)	50	-	8500	3500	4700	5900	2700	6300	7200	4500	8900	11400
Sodium (Na)	50	-	17500	17800	18000	18100	19400	27100	23500	22100	31800	21000
Major, Minor and Trace Elements	All units mg/kg		All units mg/kg									
Aluminium (Al)	50	-	81400	81300	75000	68500	80600	77700	75700	82100	85000	70800
Antimony (Sb)	0.05	-	1.08	0.56	0.58	0.54	0.85	0.76	2.98	1.56	1.27	2.52
Arsenic (As)	0.2	300	61.2	1.6	11.8	10.7	65.7	4	1.2	7.7	4.6	19.7
Barium (Ba)	10	-	100	110	80	110	50	640	460	390	770	1370
Beryllium (Be)	0.05	90	0.86	0.57	0.68	0.74	0.7	1.26	1.16	1.31	1.24	1.32
Cadmium (Cd)	0.02	90	0.16	0.13	0.14	0.13	0.12	0.19	0.11	0.09	0.05	0.07
Chromium (Cr) - hexavalent	1	300 **	109	118	99	107	74	8	18	6	13	14
Cobalt (Co)	0.1	300	46	44	45	44	45	23	25	24	26	30
Copper (Cu)	0.2	17,000	58	59	60	58	66	236	250	217	212	174
Iron (Fe)	50	-	83500	70800	74400	72000	70400	59100	65000	64600	68200	74100
Lead (Pb)	0.5	600	2	3.5	1.2	1.5	1.2	7.1	4.5	4.7	3.7	7.3
Manganese (Mn)	5	19,000	1360	1210	1260	1280	1260	1240	1190	1320	1150	988
Mercury (Hg)	0.005	80	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel (Ni)	0.2	1,200	71.9	104	82.4	79.3	71.4	9.2	11.4	8.8	12.5	12.6
Reactive Phosphorus (P)	10	-	1150	740	740	700	610	1660	1590	1590	1620	1430
Selenium (Se)	1	700	1	1	1	1	1	<1	<1	<1	<1	<1
Thorium (Th)	0.01	-	0.5	0.48	0.46	0.61	0.57	2.31	1.94	2.53	2.00	1.31
Uranium (U)	0.1	-	0.2	0.2	0.2	0.2	0.2	1.6	1.2	1.2	1.1	0.9
Zinc (Zn)	2	30,000	99	78	81	79	77	104	105	100	107	111

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. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B3: Multi-Element Test Results for Tomingley Gold Eastern Cutback Project

		TGO ECB Sample Number →	TGO358586	TGO358585	TGO358592	TGO358591	TGO358599	TGO358602	TGO358646	TGO358647	TGO358649	TGO358669
		ALS Laboratory ID →	BR21226530_21	BR21226530_20	BR21226530_27	BR21226530_26	BR21226530_34	BR21226530_37	BR21226530_38	BR21226530_39	BR21226530_40	BR21226530_42
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HIL C)	Feldspar-phyric porphyry									Peperite/Feldspar-phyric porphyry
Major Cations	All units mg/kg		All units mg/kg									
Calcium (Ca)	50	-	53200	46900	50700	48700	50000	56800	60600	50200	26900	33100
Magnesium (Mg)	50	-	15800	17800	17700	16000	21300	17600	21300	25700	14600	13500
Potassium (K)	50	-	17100	8900	6600	17300	20200	14700	5200	1900	15500	22500
Sodium (Na)	50	-	26000	37500	32800	29100	20500	27700	23500	27100	25400	18200
Major, Minor and Trace Elements	All units mg/kg		All units mg/kg									
Aluminium (Al)	50	-	78300	77200	68700	82200	80800	77700	73100	74400	78300	82500
Antimony (Sb)	0.05	-	0.73	0.34	0.57	3.79	0.69	0.71	1.61	2.13	1.31	1.87
Arsenic (As)	0.2	300	609	32.3	12.6	229	12.9	7.8	6.2	7.6	12.2	28.8
Barium (Ba)	10	-	540	1170	370	370	930	520	400	170	940	970
Beryllium (Be)	0.05	90	1.1	0.94	1.03	1.18	1.11	1.36	1.32	1.32	1.1	1.06
Cadmium (Cd)	0.02	90	0.06	0.06	0.07	0.06	0.08	0.08	0.09	0.1	0.55	0.52
Chromium (Cr) - hexavalent	1	300 **	10	13	14	5	8	7	7	7	22	20
Cobalt (Co)	0.1	300	21	26	26	19	24	24	24	25	17	18
Copper (Cu)	0.2	17,000	181	170	211	212	260	221	226	126	167	141
Iron (Fe)	50	-	51600	63300	62400	52200	62800	61200	62800	67900	49500	50500
Lead (Pb)	0.5	600	5.5	3.1	4.1	5.1	5.8	5.7	5.4	3.8	6.4	7
Manganese (Mn)	5	19,000	850	886	1260	1260	1230	1450	1190	1010	673	861
Mercury (Hg)	0.005	80	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.012
Nickel (Ni)	0.2	1,200	9.4	12	11.7	7.5	15.5	9.5	10.4	9.4	16.6	17.2
Reactive Phosphorus (P)	10	-	1460	1560	1660	1680	1680	1770	1600	1590	1240	1190
Selenium (Se)	1	700	<1	<1	<1	<1	<1	<1	<1	<1	2	1
Thorium (Th)	0.01	-	1.95	1.68	1.36	2.36	2.11	2.15	1.75	1.85	2.55	2.56
Uranium (U)	0.1	-	0.9	0.9	1	1.2	1.2	1.3	1.1	1.2	2.3	2.6
Zinc (Zn)	2	30,000	82	93	100	92	98	98	100	91	124	123

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. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B3: Multi-Element Test Results for Tomingley Gold Eastern Cutback Project

		TGO ECB Sample Number →	TGO358583	TGO358579	TGO360042	TGO360043	TGO358584	TGO358650	TGO358670	TGO360034	TGO360035	TGO360036
		ALS Laboratory ID →	BR21226530_18	BR21226530_14	BR21226530_09	BR21226530_10	BR21226530_19	BR21226530_41	BR21226530_43	BR21226530_01	BR21226530_02	BR21226530_03
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HIL C)	Peperite		Volcaniclastic sandstone					Mudstone		
Major Cations	All units mg/kg		All units mg/kg									
Calcium (Ca)	50	-	43500	37700	57500	56500	35800	37700	31600	20500	21800	26200
Magnesium (Mg)	50	-	16000	15100	33500	33100	10800	14900	13600	8200	9000	6600
Potassium (K)	50	-	13800	19000	6500	7000	29100	13500	7200	29200	23800	10800
Sodium (Na)	50	-	20800	19800	25500	21800	10100	25900	30800	15600	25400	46600
Major, Minor and Trace Elements	All units mg/kg		All units mg/kg									
Aluminium (Al)	50	-	82300	78700	73700	67800	74200	72400	69500	81500	82200	83700
Antimony (Sb)	0.05	-	3.32	4.4	1.03	0.87	2.22	1.52	1.62	1.46	2.23	6.51
Arsenic (As)	0.2	300	17.9	18	5.8	18.3	8.1	41.4	13.5	12.2	8.1	23.6
Barium (Ba)	10	-	1540	1040	160	240	1500	540	500	1550	610	810
Beryllium (Be)	0.05	90	1.19	1.21	1.21	1.26	1.04	1.05	1.04	1.03	0.97	0.74
Cadmium (Cd)	0.02	90	0.23	0.28	0.12	0.17	0.13	0.42	0.7	0.32	0.74	0.55
Chromium (Cr) - hexavalent	1	300 **	22	21	106	88	27	13	17	28	31	31
Cobalt (Co)	0.1	300	16	13	37	44	13	18	17	14	17	17
Copper (Cu)	0.2	17,000	177	169	49	58	82	176	149	123	133	151
Iron (Fe)	50	-	53500	51500	76800	94900	41200	52900	45200	41600	49900	46600
Lead (Pb)	0.5	600	7.2	4.9	3.9	2.3	7.8	6.1	5.8	7.5	6.8	7.3
Manganese (Mn)	5	19,000	592	779	1280	1660	439	1160	704	324	533	597
Mercury (Hg)	0.005	80	0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.009	0.009	0.012	0.022
Nickel (Ni)	0.2	1,200	15.6	12.8	54.9	51.1	19.6	13	16.7	28.9	26.4	22.2
Reactive Phosphorus (P)	10	-	1310	1300	1290	1990	910	1440	1140	570	970	880
Selenium (Se)	1	700	1	1	1	1	1	1	1	2	2	2
Thorium (Th)	0.01	-	2.88	2.29	3.14	0.86	2.57	2.13	2.13	2.05	2.25	2.11
Uranium (U)	0.1	-	1.9	1.6	1.1	0.3	2.9	2.1	2.5	3	3.5	2.8
Zinc (Zn)	2	30,000	117	110	95	129	105	115	129	132	153	137

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. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B3: Multi-Element Test Results for Tomingley Gold Eastern Cutback Project

		TGO ECB Sample Number →	TGO360037	TGO360044	TGO358580	TGO358595	TGO358596	TGO358597	TGO358671	TGO358672	TGO358675	TGO358677
		ALS Laboratory ID →	BR21226530_04	BR21226530_11	BR21226530_15	BR21226530_30	BR21226530_31	BR21226530_32	BR21226530_44	BR21226530_45	BR21226530_48	BR21226530_50
Parameters	Limit of Reporting	NEPC[1] Health-Based Investigation Level (HIL C)	Mudstone	Mudstone/Volcaniclastic siltstone								
Major Cations	All units mg/kg		All units mg/kg									
Calcium (Ca)	50	-	38600	23600	12800	23100	17700	5000	22900	12300	24200	4400
Magnesium (Mg)	50	-	6300	9300	6700	8800	12600	13000	10900	10500	11900	12300
Potassium (K)	50	-	17500	16600	20700	28600	28400	34600	32900	40600	33800	38100
Sodium (Na)	50	-	24700	15400	12500	6600	7900	3700	10600	6800	6100	600
Major, Minor and Trace Elements	All units mg/kg		All units mg/kg									
Aluminium (Al)	50	-	66000	76000	57700	77100	81200	86700	78900	80400	79400	73000
Antimony (Sb)	0.05	-	1.15	1.05	4.65	3.96	1.43	2.21	1.22	1.11	1.05	0.67
Arsenic (As)	0.2	300	16.1	2.2	8.0	31.6	12.8	16.8	9.9	1.3	7.6	0.6
Barium (Ba)	10	-	1100	1340	820	890	1090	1010	1210	1470	1310	1540
Beryllium (Be)	0.05	90	0.91	1.34	0.68	0.95	0.99	0.92	0.96	1.34	1.12	1.18
Cadmium (Cd)	0.02	90	0.25	0.11	0.19	0.31	0.19	0.24	0.16	0.52	0.23	0.63
Chromium (Cr) - hexavalent	1	300 **	28	31	20	30	33	36	38	46	27	37
Cobalt (Co)	0.1	300	10	11	8	12	14	15	14	11	12	12
Copper (Cu)	0.2	17,000	89	163	85	81	87	84	83	101	78	107
Iron (Fe)	50	-	33200	37700	24800	39600	51500	44500	39000	38500	43100	41300
Lead (Pb)	0.5	600	6.7	8.2	6.4	5.9	5.4	7.6	5.9	7.4	6.5	4.8
Manganese (Mn)	5	19,000	465	376	182	338	415	265	494	325	397	437
Mercury (Hg)	0.005	80	0.006	0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel (Ni)	0.2	1,200	22.6	15.6	10.4	19.7	21.7	25.7	20.7	22.4	18.8	19.8
Reactive Phosphorus (P)	10	-	460	1110	630	760	780	920	830	800	760	830
Selenium (Se)	1	700	1	1	1	1	1	1	1	2	1	2
Thorium (Th)	0.01	-	1.78	3.05	2.65	2.36	2.52	2.78	2.55	2.29	2.51	2.06
Uranium (U)	0.1	-	2	1.9	1.4	3.3	2.6	3.1	3	2.5	2.5	2.1
Zinc (Zn)	2	30,000	117	90	66	119	131	94	105	93	110	117

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. Health-Based Investigation Level - HIL(C); public open spaces - recreational use.

Table B4: GAI Results for the Tomingley Gold Eastern Cutback Project

	TGO ECB Sample Number →		TGO360039	TGO360040	TGO358578	TGO358577	TGO358589	TGO358587	TGO358593	TGO358594	TGO358598	TGO358600
	ALS Laboratory ID →		BR21226530_06	BR21226530_07	BR21226530_13	BR21226530_12	BR21226530_24	BR21226530_22	BR21226530_28	BR21226530_29	BR21226530_33	BR21226530_35
Parameters	Limit of Reporting	Median Crustal Abundance[1,2]	Dolerite									
Major Cations	all units in mg/kg		Geochemical Abundance Index									
Calcium (Ca)	50	15000	1	1	2	2	1	1	2	2	2	2
Magnesium (Mg)	50	5,000	2	2	3	3	2	2	2	2	3	3
Potassium (K)	50	14,000	0	0	0	0	0	0	0	0	0	0
Sodium (Na)	50	5,000	2	1	1	1	1	1	1	1	1	1
Major, Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index									
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0	0	0
Antimony (Sb)	0.05	5	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	0.2	6	0	0	0	0	0	3	0	0	0	0
Barium (Ba)	10	500	0	0	0	0	0	0	0	0	0	0
Beryllium (Be)	0.05	6	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd)	0.02	0.35	0	0	0	0	0	0	0	0	0	0
Chromium (Cr) - hexavalent	1	70	1	0	0	0	0	0	1	0	0	0
Cobalt (Co)	0.1	8	2	2	2	2	2	1	2	2	2	2
Copper (Cu)	0.2	30	0	0	0	0	0	0	0	0	0	0
Iron (Fe)	50	40,000	0	0	0	0	0	1	0	0	0	0
Lead (Pb)	0.5	35	0	0	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1,000	0	0	0	0	0	0	0	0	0	0
Mercury (Hg)	0.005	0.06	0	0	0	0	0	0	0	0	0	0
Nickel (Ni)	0.1	50	0	1	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	10	800	0	0	0	0	0	1	0	0	0	0
Selenium (Se)	1	0.4	0	1	1	1	1	1	1	1	1	1
Thorium (Th)	0.01	9	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)	2	90	0	0	0	0	0	0	0	0	0	0

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

1. INAP (2021). 2. Bowen (1979).

Table B4: GAI Results for the Tomingley Gold Eastern Cutback Project

	TGO ECB Sample Number →		TGO358601	TGO358673	TGO358674	TGO358676	TGO360038	TGO360041	TGO358582	TGO358581	TGO358590	TGO358588
	ALS Laboratory ID →		BR21226530_36	BR21226530_46	BR21226530_47	BR21226530_49	BR21226530_05	BR21226530_08	BR21226530_17	BR21226530_16	BR21226530_25	BR21226530_23
Parameters	Limit of Reporting	Median Crustal Abundance[1,2]	Dolerite				Feldspar-phyric porphyry					
Major Cations	all units in mg/kg		Geochemical Abundance Index									
Calcium (Ca)	50	15000	2	2	2	2	2	1	1	1	1	1
Magnesium (Mg)	50	5,000	3	3	2	2	2	2	2	1	1	1
Potassium (K)	50	14,000	0	0	0	0	0	0	0	0	0	0
Sodium (Na)	50	5,000	1	1	1	1	1	2	2	2	2	1
Major, Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index									
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0	0	0
Antimony (Sb)	0.05	5	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	0.2	6	3	0	0	0	3	0	0	0	0	1
Barium (Ba)	10	500	0	0	0	0	0	0	0	0	0	1
Beryllium (Be)	0.05	6	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd)	0.02	0.35	0	0	0	0	0	0	0	0	0	0
Chromium (Cr) - hexavalent	1	70	0	0	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	2	2	2	2	2	1	1	1	1	1
Copper (Cu)	0.2	30	0	0	0	0	1	2	2	2	2	2
Iron (Fe)	50	40,000	0	0	0	0	0	0	0	0	0	0
Lead (Pb)	0.5	35	0	0	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1,000	0	0	0	0	0	0	0	0	0	0
Mercury (Hg)	0.005	0.06	0	0	0	0	0	0	0	0	0	0
Nickel (Ni)	0.1	50	0	0	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	10	800	0	0	0	0	0	0	0	0	0	0
Selenium (Se)	1	0.4	1	1	1	1	1	0	0	0	0	0
Thorium (Th)	0.01	9	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)	2	90	0	0	0	0	0	0	0	0	0	0

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

1. INAP (2021). 2. Bowen (1979).

Table B4: GAI Results for the Tomingley Gold Eastern Cutback Project

	TGO ECB Sample Number →		TGO358586	TGO358585	TGO358592	TGO358591	TGO358599	TGO358602	TGO358646	TGO358647	TGO358649	TGO358669
	ALS Laboratory ID →		BR21226530_21	BR21226530_20	BR21226530_27	BR21226530_26	BR21226530_34	BR21226530_37	BR21226530_38	BR21226530_39	BR21226530_40	BR21226530_42
Parameters	Limit of Reporting	Median Crustal Abundance[1,2]	Feldspar-phyric porphyry									Peperite/Feldspar-phyric porphyry
Major Cations	all units in mg/kg		Geochemical Abundance Index									
Calcium (Ca)	50	15000	1	1	1	1	1	1	1	1	0	1
Magnesium (Mg)	50	5,000	1	1	1	1	2	1	2	2	1	1
Potassium (K)	50	14,000	0	0	0	0	0	0	0	0	0	0
Sodium (Na)	50	5,000	2	2	2	2	1	2	2	2	2	1
Major, Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index									
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0	0	0
Antimony (Sb)	0.05	5	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	0.2	6	6	2	0	5	1	0	0	0	0	2
Barium (Ba)	10	500	0	1	0	0	0	0	0	0	0	0
Beryllium (Be)	0.05	6	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd)	0.02	0.35	0	0	0	0	0	0	0	0	0	0
Chromium (Cr) - hexavalent	1	70	0	0	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	1	1	1	1	1	1	1	1	1	1
Copper (Cu)	0.2	30	2	2	2	2	3	2	2	1	2	2
Iron (Fe)	50	40,000	0	0	0	0	0	0	0	0	0	0
Lead (Pb)	0.5	35	0	0	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1,000	0	0	0	0	0	0	0	0	0	0
Mercury (Hg)	0.005	0.06	0	0	0	0	0	0	0	0	0	0
Nickel (Ni)	0.1	50	0	0	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	10	800	0	0	0	0	0	1	0	0	0	0
Selenium (Se)	1	0.4	0	0	0	0	0	0	0	0	2	1
Thorium (Th)	0.01	9	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)	2	90	0	0	0	0	0	0	0	0	0	0

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

1. INAP (2021). 2. Bowen (1979).

Table B4: GAI Results for the Tomingley Gold Eastern Cutback Project

	TGO ECB Sample Number →		TGO358583	TGO358579	TGO360042	TGO360043	TGO358584	TGO358650	TGO358670	TGO360034	TGO360035	TGO360036
	ALS Laboratory ID →		BR21226530_18	BR21226530_14	BR21226530_09	BR21226530_10	BR21226530_19	BR21226530_41	BR21226530_43	BR21226530_01	BR21226530_02	BR21226530_03
Parameters	Limit of Reporting	Median Crustal Abundance[1,2]	Peperite		Volcaniclastic sandstone					Mudstone		
Major Cations	all units in mg/kg		Geochemical Abundance Index									
Calcium (Ca)	50	15000	1	1	1	1	1	1	0	0	0	0
Magnesium (Mg)	50	5,000	1	1	2	2	1	1	1	0	0	0
Potassium (K)	50	14,000	0	0	0	0	0	0	0	0	0	0
Sodium (Na)	50	5,000	1	1	2	2	0	2	2	1	2	3
Major, Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index									
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0	0	0
Antimony (Sb)	0.05	5	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	0.2	6	1	1	0	1	0	2	1	0	0	1
Barium (Ba)	10	500	1	0	0	0	1	0	0	1	0	0
Beryllium (Be)	0.05	6	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd)	0.02	0.35	0	0	0	0	0	0	0	0	0	0
Chromium (Cr) - hexavalent	1	70	0	0	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	0	2	2	0	1	0	0	0	1
Copper (Cu)	0.2	30	2	2	0	0	1	2	2	1	2	2
Iron (Fe)	50	40,000	0	0	0	1	0	0	0	0	0	0
Lead (Pb)	0.5	35	0	0	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1,000	0	0	0	0	0	0	0	0	0	0
Mercury (Hg)	0.005	0.06	0	0	0	0	0	0	0	0	0	0
Nickel (Ni)	0.1	50	0	0	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	10	800	0	0	0	0	0	0	0	0	0	0
Selenium (Se)	1	0.4	1	1	1	0	1	1	1	2	2	2
Thorium (Th)	0.01	9	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)	2	90	0	0	0	0	0	0	0	0	0	0

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

1. INAP (2021). 2. Bowen (1979).

Table B4: GAI Results for the Tomingley Gold Eastern Cutback Project

	TGO ECB Sample Number →		TGO360037	TGO360044	TGO358580	TGO358595	TGO358596	TGO358597	TGO358671	TGO358672	TGO358675	TGO358677
	ALS Laboratory ID →		BR21226530_04	BR21226530_11	BR21226530_15	BR21226530_30	BR21226530_31	BR21226530_32	BR21226530_44	BR21226530_45	BR21226530_48	BR21226530_50
Parameters	Limit of Reporting	Median Crustal Abundance[1,2]	Mudstone	Mudstone/Volcaniclastic siltstone								
Major Cations	all units in mg/kg		Geochemical Abundance Index									
Calcium (Ca)	50	15000	1	0	0	0	0	0	0	0	0	0
Magnesium (Mg)	50	5,000	0	0	0	0	1	1	1	0	1	1
Potassium (K)	50	14,000	0	0	0	0	0	1	1	1	1	1
Sodium (Na)	50	5,000	2	1	1	0	0	0	0	0	0	0
Major, Minor and Trace Elements	All units in mg/kg		Geochemical Abundance Index									
Aluminium (Al)	50	71,000	0	0	0	0	0	0	0	0	0	0
Antimony (Sb)	0.05	5	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	0.2	6	1	0	0	2	1	1	0	0	0	0
Barium (Ba)	10	500	1	1	0	0	1	0	1	1	1	1
Beryllium (Be)	0.05	6	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd)	0.02	0.35	0	0	0	0	0	0	0	0	0	0
Chromium (Cr) - hexavalent	1	70	0	0	0	0	0	0	0	0	0	0
Cobalt (Co)	0.1	8	0	0	0	0	0	0	0	0	0	0
Copper (Cu)	0.2	30	1	2	1	1	1	1	1	1	1	1
Iron (Fe)	50	40,000	0	0	0	0	0	0	0	0	0	0
Lead (Pb)	0.5	35	0	0	0	0	0	0	0	0	0	0
Manganese (Mn)	5	1,000	0	0	0	0	0	0	0	0	0	0
Mercury (Hg)	0.005	0.06	0	0	0	0	0	0	0	0	0	0
Nickel (Ni)	0.1	50	0	0	0	0	0	0	0	0	0	0
Reactive Phosphorus (P)	10	800	0	0	0	0	0	0	0	0	0	0
Selenium (Se)	1	0.4	1	0	1	1	1	1	1	2	1	2
Thorium (Th)	0.01	9	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)	2	90	0	0	0	0	0	0	0	0	0	0

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

1. INAP (2021). 2. Bowen (1979).

Table B5: Multi-Element Test Results for Water Extracts for the Tomingley Gold Eastern Cutback Project

		RGS Sample Number →	2021054_C012	2021054_C013	2021054_C014	2021054_C015	2021054_C016	2021054_C017	2021054_C018	2021054_C019
		ALS Laboratory ID →	EB2127839001	EB2127839002	EB2127839003	EB2127839004	EB2127839005	EB2127839006	EB2127839007	EB2127839008
		Water Quality Guidelines:								
Parameters	Limit of Reporting	Aquatic Ecosystems (freshwater)[1]	Livestock Drinking Water[2]	Dolerite	Dolerite	Feldspar-phyric porphyry	Feldspar-phyric porphyry	Peperite	Volcaniclastic sandstone	Mudstone/ Volcaniclastic Siltstone	Mudstone/ Volcaniclastic Siltstone
pH	0.01 pH unit	6 to 9	-	9.5	9.8	9.3	9.5	9.3	9.6	9.1	8.6
Electrical Conductivity	1 µS/cm	1,000#	3,580^	120	235	112	131	157	189	266	373
Carbonate Alkalinity (mg $CaCO_3$/kg)	1	-	-	92	66	79	40	26.4	39.6	40	<1
Bicarbonate Alkalinity (mg$CaCO_3$/kg)	1	-	-	5,340	7,760	9,220	3,000	4,560	3,720	4,240	2,080
Total Alkalinity (mg $CaCO_3$/kg)	1	-	-	5,420	7,840	9,300	3,040	4,580	3,760	4,280	2,080
Acidity (mg $CaCO_3$/kg)	1	-	-	<1	<1	<1	<1	<1	<1	<1	<1
Net Alkalinity (mg $CaCO_3$/kg)	1	-	-	5,419	7,839	9,299	3,039	4,579	3,759	4,279	2,079
Major Ions	All units mg/L										
Calcium (Ca)	2	-	1,000	2	<2	4	2	6	2	10	30
Magnesium (Mg)	2	-	-	<2	<2	<2	<2	<2	<2	<2	4
Potassium (K)	2	-	-	6	4	8	4	12	6	24	32
Sodium (Na)	2	-	-	22	52	16	28	22	38	32	26
Chloride (Cl)	2	-	-	252	8	8	12	18	6	80	2
Sulfate (SO_4)	2	-	1,000	2	16	4	6	26	24	70	122
Fluoride (F)	0.2	-	-	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4
Trace Metals/Metalloids	All units mg/L										
Aluminium (Al)	0.02	0.055	5	0.4	0.3	0.58	0.48	0.48	0.36	0.18	0.08
Antimony (Sb)	0.002	-	-	<0.002	0.002	0.008	0.002	0.024	0.004	0.028	0.006
Arsenic (As) - triavalent	0.002	0.024 **	0.5	0.006	0.046	0.014	0.01	0.002	0.006	0.008	<0.002
Barium (Ba)	0.002	-	-	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	0.006	0.016
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	0.008
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	<0.002	<0.002	<0.002	0.002	0.004	0.006	0.008	0.008
Nickel (Ni)	0.002	0.011	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Reactive Phosphorus (RP)	0.02	-	-	<0.02	0.04	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
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	-	-	3.4	7.6	1.8	3.4	2.2	4.0	3.2	2.8
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	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium (V)	0.02	-	-	<0.02	0.06	<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

* Cr (VI) = hexavalent. ** 0.013 mg/Lfor 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 laboratory limit of reporting. Shaded cells exceed applied guideline values.

1. ANZG (2018). Trigger values for freshwater aquatic ecosystems (95% species protection level)

2. ANZG (2018). Recommended guideline limits for Livestock Drinking Water.

Table B6: Exchangable Cation Results for Sample Composites from the Tomingley Gold Eastern Cutback Project

	RGS Sample Number →	2021054_C012	2021054_C013	2021054_C014	2021054_C015
	ALS Laboratory ID →	EB2127839001	EB2127839002	EB2127839003	EB2127839004
Parameters	Limit of Reporting	Dolerite	Dolerite	Feldspar-phyric porphyry	Feldspar-phyric porphyry
Exchangable Cations	All units meq/100g (except Exchangeable Sodium Percentage (%))				
Exchangeable Calcium	0.2	1	0.6	0.6	0.5
Exchangeable Magnesium	0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium	0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Sodium	0.2	0.3	1.0	<0.2	0.2
Cation Exchange Capacity	0.2	1.3	1.6	0.6	0.8
Exchangeable Sodium Percentage	0.2	21.2	61.8	<0.2	31.2

Notes: < indicates less than the laboratory limit of reporting.

Table B7: Physical Test Results for Composites Samples from the Tomingley Gold Eastern Cutback Project

RGS Sample Number →		2021054_C012	2021054_C013	2021054_C014	2021054_C015
ALS Laboratory ID →		EB2127839001	EB2127839002	EB2127839003	EB2127839004
Composite Sample Lithology -->		Dolerite	Dolerite	Feldspar-phyric porphyry	Feldspar-phyric porphyry
Colour (Munsell) -->		Very Dark Greenish Gray (10GY 3/1)	Very Dark Greenish Gray (10GY 3/1)	Very Dark Greenish Gray (10GY 3/1)	Very Dark Greenish Gray (10GY 3/1)
Texture -->		Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand
Emerson Class Number -->		2	2	2	2
Particle Sizing	Limit of Reporting	%			
+75µm	1%	98	97	98	92
+150µm	1%	97	97	97	89
+300µm	1%	97	97	96	86
+425µm	1%	96	96	96	85
+600µm	1%	96	96	95	83
+1180µm	1%	94	94	91	78
+2.36mm	1%	81	84	78	60
+4.75mm	1%	30	37	33	23
+9.5mm	1%	<1	<1	<1	<1
+19.0mm	1%	<1	<1	<1	<1
+37.5mm	1%	<1	<1	<1	<1
+75.0mm	1%	<1	<1	<1	<1
Soil Classification based on Particle Size		%			
Clay (<2 µm)	1%	2	3	2	4
Silt (2-60 µm)	1%	<1	<1	<1	3
Sand (0.06-2.00 mm)	1%	13	10	16	27
Gravel (>2 mm)	1%	85	87	82	66
Cobbles (>6 cm)	1%	<1	<1	<1	<1
Soil Particle Density		g/cm^3			
Soil Particle Density (Clay/Silt/Sand)	0.01 g/cm^3	3.09	3.06	2.71	2.86

ATTACHMENT C

ALS Laboratory Data

(Certificates of Analysis)

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 3/1 Burma Road Pooraka SA 5095 Ph: 08 8162 5130 E: adelaide@alsglobal.com
☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Gladstone QLD 4680 Ph: 07 4978 7944 E: ALSEnviro.Gladstone@alsglobal.com
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☐PERTH 26 Rigali Way Wangara WA 6065 Ph: 08 9406 1301 E: samples.perth@alsglobal.com

Environmental Division Brisbane
Work Order Reference
EB2123278

Telephone : + 61-7-3243 7222

CLIENT: Tomingley Gold Operations
OFFICE: Tomingley Gold Operations
PROJECT: CL1 **PROJECT NO.:**
ORDER NUMBER: **PURCHASE ORDER NO.:**
PROJECT MANAGER: Craig Pridmore **CONTACT PH:** 0457 300 325
SAMPLER: Terence Nhan **SAMPLER MOBILE:** 0403 008 199
COC Emailed to ALS? (YES / NO) **EDD FORMAT (or default):**
Email Reports to (will default to PM if no other addresses are listed): **cpridmore@alkane.com.au; tnhan@alkane.com.au**
Email Invoice to (will default to PM if no other addresses are listed): **cpridmore@alkane.com.au**

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)
☐ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:
COUNTRY OF ORIGIN: Australia

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6
OF: 1 2 3 4 5 6

RELINQUISHED BY:
DATE/TIME:

RECEIVED BY: [signature]
DATE/TIME: 1230

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Cod… Where Metals are required, specify Total (unfiltered bottle required) or…								
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Crush	Pulp	IN-4S (pH and EC)	ASS-1 (NAPP)	NAC	ME-MS61m (4 acid digest)	TOC		dilutions, or samples requiring specific QC analysis etc.
1	TGO360034	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
2	TGO360035	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
3	TGO360036	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
4	TGO360037	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
5	TGO360038	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
6	TGO360039	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
7	TGO360040	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
8	TGO360041	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
9	TGO360042	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
10	TGO360043	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
11	TGO360044	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
12	TGO358577	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
13	TGO358578	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
14	TGO358579	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
15	TGO358580	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
16	TGO358581	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
17	TGO358582	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
18	TGO358583	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
19	TGO358584	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
20	TGO358585	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
21	TGO358586	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
22	TGO358587	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
23	TGO358588	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
24	TGO358589	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
25	TGO358590	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
26	TGO358591	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
27	TGO358592	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
28	TGO358593	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
29	TGO358594	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
30	TGO358595	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
31	TGO358596	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
32	TGO358597	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
33	TGO358598	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
34	TGO358599	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
35	TGO358600	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
36	TGO358601	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
37	TGO358602	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
38	TGO358646	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
39	TGO358647	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
40	TGO358649	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
41	TGO358650	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
42	TGO358669	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
43	TGO358670	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
44	TGO3[illegible]8671	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
45	[illegible]GO3586[illegible]2	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
46	[illegible]	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
47	[illegible]	[illegible]/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
48	T[illegible]	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
49	TGO358676	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
50	TGO358677	11/08/2021 14:00:00 PM	S	B		Y	Y	Y	Y	Y	Y	Y		All analysis off pulp sample
				TOTAL		50	50	50	50	50	50	50		

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2123278**	Page	: 1 of 12
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: C PRIDMORE	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 02 6867 9780	Telephone	: +61-7-3243 7222
Project	: CL1	Date Samples Received	: 18-Aug-2021 19:47
Order number	: ----	Date Analysis Commenced	: 25-Aug-2021
C-O-C number	: ----	Issue Date	: 06-Sep-2021 16:25
Sampler	: TERENCE NHAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 50		
No. of samples analysed	: 50		

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*
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.

- Samples xxx have been crushed prior to preparation and analysis.
- 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)			Sample ID	TGO360034	TGO360035	TGO360036	TGO360037	TGO360038
			Sampling date / time	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00
Compound	CAS Number	LOR	Unit	EB2123278-001	EB2123278-002	EB2123278-003	EB2123278-004	EB2123278-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.7	9.0	9.1	9.0	9.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	14.5	50.2	58.5	-51.5	-49.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	325	208	221	236	224
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	3.1	2.4	2.4	10.1	10.9
NAG (pH 4.5)	----	0.1	kg H2SO4/t	6.2	31.8	30.0	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	11.9	38.3	35.9	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	37.5	35.2	41.9	88.2	54.6
ANC as CaCO3	----	0.1	% CaCO3	3.8	3.6	4.3	9.0	5.6
Fizz Rating	----	0	Fizz Unit	2	2	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	1.70	2.79	3.28	1.20	0.16
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.29	0.31	0.24	0.34	0.06
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	0.79	0.77	0.80	1.63	0.48

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO360039	TGO360040	TGO360041	TGO360042	TGO360043
			Sampling date / time	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00
Compound	CAS Number	LOR	Unit	EB2123278-006	EB2123278-007	EB2123278-008	EB2123278-009	EB2123278-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.8	9.9	9.8	9.9	9.9
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-24.5	-29.8	-28.4	-30.3	-26.2
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	129	318	166	206	294
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	8.8	10.0	10.1	10.8	8.6
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	28.8	33.2	34.5	34.9	30.8
ANC as CaCO3	----	0.1	% CaCO3	2.9	3.4	3.5	3.6	3.1
Fizz Rating	----	0	Fizz Unit	1	2	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.14	0.11	0.20	0.15	0.15
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.04	0.04	0.07	0.05	0.04
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	0.08	0.12	0.20	0.27	0.08

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO360044	TGO358577	TGO358578	TGO358579	TGO358580
			Sampling date / time	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00
Compound	CAS Number	LOR	Unit	EB2123278-011	EB2123278-012	EB2123278-013	EB2123278-014	EB2123278-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.1	10.0	9.8	9.4	9.6
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	12.5	-35.4	-48.7	-59.2	-7.5
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	241	179	134	141	154
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	2.7	10.1	10.7	10.7	7.9
NAG (pH 4.5)	----	0.1	kg H2SO4/t	13.2	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	19.5	<0.1	<0.1	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	27.0	39.4	51.8	78.5	32.9
ANC as CaCO3	----	0.1	% CaCO3	2.8	4.0	5.3	8.0	3.4
Fizz Rating	----	0	Fizz Unit	1	2	2	2	1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	1.29	0.13	0.10	0.63	0.83
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.26	0.05	0.05	0.14	0.18
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	0.30	0.17	0.33	0.96	0.41

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO358581	TGO358582	TGO358583	TGO358584	TGO358585
			Sampling date / time	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00
Compound	CAS Number	LOR	Unit	EB2123278-016	EB2123278-017	EB2123278-018	EB2123278-019	EB2123278-020
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.6	9.6	9.6	9.1	9.2
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-36.5	-39.1	-11.4	-22.8	-114
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	104	93	126	228	106
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	10.8	9.8	8.8	9.5	11.2
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	37.7	40.3	40.8	66.6	115
ANC as CaCO3	----	0.1	% CaCO3	3.8	4.1	4.2	6.8	11.7
Fizz Rating	----	0	Fizz Unit	2	2	2	2	3
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.04	0.04	0.96	1.43	0.02
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.05	0.04	0.16	0.10	0.06
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	0.22	0.08	0.50	0.88	1.37

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO358586	TGO358587	TGO358588	TGO358589	TGO358590
			Sampling date / time	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2123278-021	EB2123278-022	EB2123278-023	EB2123278-024	EB2123278-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.3	9.6	9.6	9.7	9.4
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-126	-66.1	-26.7	-53.5	-76.7
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	125	102	121	127	127
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	11.2	11.2	10.5	11.1	11.2
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	133	69.5	27.3	57.8	78.5
ANC as CaCO3	----	0.1	% CaCO3	13.5	7.1	2.8	5.9	8.0
Fizz Rating	----	0	Fizz Unit	3	2	1	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.22	0.11	0.02	0.14	0.06
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.05	0.04	0.05	0.06	0.05
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	1.72	0.69	0.15	0.51	0.92

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO358591	TGO358592	TGO358593	TGO358594	TGO358595
			Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00
Compound	CAS Number	LOR	Unit	EB2123278-026	EB2123278-027	EB2123278-028	EB2123278-029	EB2123278-030
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.4	9.7	10.0	10.0	8.6
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-118	-36.8	-42.6	-89.1	-7.1
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	112	108	128	202	454
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	11.0	10.7	10.9	11.3	10.9
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	126	37.7	47.2	92.5	53.3
ANC as CaCO3	----	0.1	% CaCO3	12.9	3.8	4.8	9.4	5.4
Fizz Rating	----	0	Fizz Unit	3	2	2	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.27	0.03	0.15	0.11	1.51
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.06	0.04	0.04	0.05	0.30
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	1.46	0.17	0.38	1.03	0.98

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO358596	TGO358597	TGO358598	TGO358599	TGO358600
			Sampling date / time	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00
Compound	CAS Number	LOR	Unit	EB2123278-031	EB2123278-032	EB2123278-033	EB2123278-034	EB2123278-035
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	7.8	8.2	10.1	9.7	10.1
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	7.1	28.0	-43.1	-30.0	-37.2
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	800	443	238	143	364
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	3.8	2.5	10.4	10.8	10.2
NAG (pH 4.5)	----	0.1	kg H2SO4/t	2.3	30.5	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	7.0	34.6	<0.1	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	42.2	20.0	46.2	30.6	39.7
ANC as CaCO3	----	0.1	% CaCO3	4.3	2.0	4.7	3.1	4.0
Fizz Rating	----	0	Fizz Unit	2	1	2	1	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	1.61	1.57	0.10	0.02	0.08
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.23	0.15	0.04	0.04	0.03
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	1.01	0.30	0.21	0.24	0.13

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO358601	TGO358602	TGO358646	TGO358647	TGO358649
			Sampling date / time	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 14:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2123278-036	EB2123278-037	EB2123278-038	EB2123278-039	EB2123278-040
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	10.0	9.9	9.4	9.4	9.4
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-41.1	-20.9	-28.0	-36.9	-30.0
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	351	135	108	103	163
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	10.7	10.5	10.5	10.9	10.2
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	<0.1
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	46.9	21.5	29.8	38.4	59.4
ANC as CaCO3	----	0.1	% CaCO3	4.8	2.2	3.0	3.9	6.1
Fizz Rating	----	0	Fizz Unit	2	1	1	2	2
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.19	0.02	0.06	0.05	0.96
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.04	0.03	0.04	0.05	0.14
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	0.30	0.06	0.15	0.28	0.76

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO358650	TGO358669	TGO358670	TGO358671	TGO358672
			Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2123278-041	EB2123278-042	EB2123278-043	EB2123278-044	EB2123278-045
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.3	9.0	9.4	9.3	9.0
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-104	-41.1	-36.6	8.8	25.2
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	160	228	100	199	250
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	10.8	9.6	10.8	3.1	2.6
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	5.8	20.1
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	10.0	25.4
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	116	76.6	57.4	35.9	20.1
ANC as CaCO3	----	0.1	% CaCO3	11.8	7.8	5.8	3.7	2.0
Fizz Rating	----	0	Fizz Unit	3	2	2	2	1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.38	1.16	0.68	1.46	1.48
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.18	0.17	0.19	0.16	0.26
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	1.95	1.14	0.80	0.59	0.35

Analytical Results

Sub-Matrix: ROCK (Matrix: SOIL)			Sample ID	TGO358673	TGO358674	TGO358675	TGO358676	TGO358677
			Sampling date / time	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00	11-Aug-2021 00:00
Compound	CAS Number	LOR	Unit	EB2123278-046	EB2123278-047	EB2123278-048	EB2123278-049	EB2123278-050
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	10.0	10.0	9.4	9.9	9.0
EA009: Net Acid Production Potential								
Net Acid Production Potential	----	0.5	kg H2SO4/t	-44.7	-42.4	2.2	-29.5	21.4
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	261	280	207	135	220
EA011: Net Acid Generation								
pH (OX)	----	0.1	pH Unit	10.7	10.6	7.9	10.2	2.6
NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	20.0
NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	<0.1	<0.1	25.0
EA013: Acid Neutralising Capacity								
ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	51.7	46.4	38.2	33.8	16.8
ANC as CaCO3	----	0.1	% CaCO3	5.3	4.7	3.9	3.4	1.7
Fizz Rating	----	0	Fizz Unit	2	2	2	2	1
ED042T: Total Sulfur by LECO								
Sulfur - Total as S (LECO)	----	0.01	%	0.23	0.13	1.32	0.14	1.25
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.05	0.03	0.15	0.04	0.25
EP003TC: Total Carbon (TC) in Soil								
Total Carbon	TC	0.02	%	0.41	0.29	0.64	0.14	0.40

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2123278**	Page	: 1 of 6
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: C PRIDMORE	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 02 6867 9780	Telephone	: +61-7-3243 7222
Project	: CL1	Date Samples Received	: 18-Aug-2021
Order number	: ----	Date Analysis Commenced	: 25-Aug-2021
C-O-C number	: ----	Issue Date	: 06-Sep-2021
Sampler	: TERENCE NHAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 50		
No. of samples analysed	: 50		

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 Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA002: pH 1:5 (Soils) (QC Lot: 3864659)									
EB2123278-001	TGO360034	EA002: pH Value	----	0.1	pH Unit	8.7	8.7	0.0	0% - 20%
EB2123278-011	TGO360044	EA002: pH Value	----	0.1	pH Unit	9.1	9.1	0.0	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 3864662)									
EB2123278-021	TGO358586	EA002: pH Value	----	0.1	pH Unit	9.3	9.3	0.0	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 3864668)									
EB2123278-031	TGO358596	EA002: pH Value	----	0.1	pH Unit	7.8	7.8	0.0	0% - 20%
EB2123278-041	TGO358650	EA002: pH Value	----	0.1	pH Unit	9.3	9.3	0.0	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 3864660)									
EB2123278-001	TGO360034	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	325	326	0.3	0% - 20%
EB2123278-011	TGO360044	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	241	242	0.5	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 3864661)									
EB2123278-021	TGO358586	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	125	126	1.0	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 3864667)									
EB2123278-031	TGO358596	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	800	816	2.0	0% - 20%
EB2123278-041	TGO358650	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	160	160	0.0	0% - 20%
EA011: Net Acid Generation (QC Lot: 3864892)									
EB2123278-001	TGO360034	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	6.2	6.4	3.2	0% - 20%
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	11.9	11.2	5.5	0% - 20%
		EA011: pH (OX)	----	0.1	pH Unit	3.1	3.1	0.0	0% - 20%
EB2123278-011	TGO360044	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	13.2	13.4	1.7	0% - 20%
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	19.5	19.4	0.0	0% - 20%
		EA011: pH (OX)	----	0.1	pH Unit	2.7	2.7	0.0	0% - 20%
EA011: Net Acid Generation (QC Lot: 3864894)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA011: Net Acid Generation (QC Lot: 3864894) - continued									
EB2123278-021	TGO358586	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit
		EA011: pH (OX)	----	0.1	pH Unit	11.2	11.1	0.9	0% - 20%
EB2123278-031	TGO358596	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	2.3	2.6	11.7	0% - 20%
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	7.0	7.2	4.3	0% - 20%
		EA011: pH (OX)	----	0.1	pH Unit	3.8	3.6	5.4	0% - 20%
EA011: Net Acid Generation (QC Lot: 3864896)									
EB2123278-041	TGO358650	EA011: NAG (pH 4.5)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit
		EA011: NAG (pH 7.0)	----	0.1	kg H2SO4/t	<0.1	<0.1	0.0	No Limit
		EA011: pH (OX)	----	0.1	pH Unit	10.8	10.7	0.9	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 3864893)									
EB2123278-001	TGO360034	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	37.5	37.9	1.0	0% - 20%
EB2123278-011	TGO360044	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	27.0	25.3	6.5	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 3864895)									
EB2123278-021	TGO358586	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	133	133	0.4	0% - 20%
EB2123278-031	TGO358596	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	42.2	42.2	0.0	0% - 20%
EA013: Acid Neutralising Capacity (QC Lot: 3864897)									
EB2123278-041	TGO358650	EA013: ANC as H2SO4	----	0.5	kg H2SO4 equiv./t	116	113	2.3	0% - 20%
ED042T: Total Sulfur by LECO (QC Lot: 3866600)									
EB2123278-001	TGO360034	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	1.70	1.62	4.9	0% - 20%
EB2123278-011	TGO360044	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	1.29	1.19	7.8	0% - 20%
ED042T: Total Sulfur by LECO (QC Lot: 3866603)									
EB2123278-021	TGO358586	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.22	0.20	10.8	0% - 20%
EB2123278-031	TGO358596	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	1.61	1.55	3.5	0% - 20%
ED042T: Total Sulfur by LECO (QC Lot: 3866606)									
EB2123278-041	TGO358650	ED042T: Sulfur - Total as S (LECO)	----	0.01	%	0.38	0.37	4.0	0% - 20%
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 3866599)									
EB2123278-001	TGO360034	EP003: Total Organic Carbon	----	0.02	%	0.29	0.29	0.0	0% - 50%
EB2123278-011	TGO360044	EP003: Total Organic Carbon	----	0.02	%	0.26	0.25	0.0	0% - 50%
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 3866602)									
EB2123278-021	TGO358586	EP003: Total Organic Carbon	----	0.02	%	0.05	0.07	24.2	No Limit
EB2123278-031	TGO358596	EP003: Total Organic Carbon	----	0.02	%	0.23	0.24	0.0	0% - 50%
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 3866605)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 3866605) - continued									
EB2123278-041	TGO358650	EP003: Total Organic Carbon	----	0.02	%	0.18	0.20	9.2	0% - 50%
EP003TC: Total Carbon (TC) in Soil (QC Lot: 3866601)									
EB2123278-001	TGO360034	EP003TC: Total Carbon	TC	0.02	%	0.79	0.82	4.4	0% - 20%
EB2123278-011	TGO360044	EP003TC: Total Carbon	TC	0.02	%	0.30	0.30	0.0	0% - 50%
EP003TC: Total Carbon (TC) in Soil (QC Lot: 3866604)									
EB2123278-021	TGO358586	EP003TC: Total Carbon	TC	0.02	%	1.72	1.73	0.6	0% - 20%
EB2123278-031	TGO358596	EP003TC: Total Carbon	TC	0.02	%	1.01	1.01	0.0	0% - 20%
EP003TC: Total Carbon (TC) in Soil (QC Lot: 3866607)									
EB2123278-041	TGO358650	EP003TC: Total Carbon	TC	0.02	%	1.95	2.00	2.6	0% - 20%

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA002: pH 1:5 (Soils) (QCLot: 3864659)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	98.8	98.0	102
				----	7 pH Unit	100	98.0	102
EA002: pH 1:5 (Soils) (QCLot: 3864662)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	98.8	98.0	102
				----	7 pH Unit	100	98.0	102
EA002: pH 1:5 (Soils) (QCLot: 3864668)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	99.0	98.0	102
				----	7 pH Unit	99.8	98.0	102
EA010: Conductivity (1:5) (QCLot: 3864660)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.8	97.0	103
EA010: Conductivity (1:5) (QCLot: 3864661)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.9	97.0	103
EA010: Conductivity (1:5) (QCLot: 3864667)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.4	97.0	103
EA011: Net Acid Generation (QCLot: 3864892)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.83 kg H2SO4/t	105	70.0	130
EA011: Net Acid Generation (QCLot: 3864894)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.83 kg H2SO4/t	104	70.0	130
EA011: Net Acid Generation (QCLot: 3864896)								
EA011: NAG (pH 7.0)	----	----	kg H2SO4/t	----	22.83 kg H2SO4/t	105	70.0	130
EA013: Acid Neutralising Capacity (QCLot: 3864893)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	49 kg H2SO4 equiv./t	95.9	82.0	120
EA013: Acid Neutralising Capacity (QCLot: 3864895)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	9.9 kg H2SO4 equiv./t	104	82.0	120
EA013: Acid Neutralising Capacity (QCLot: 3864897)								
EA013: ANC as H2SO4	----	----	kg H2SO4 equiv./t	----	49 kg H2SO4 equiv./t	95.9	82.0	120
ED042T: Total Sulfur by LECO (QCLot: 3866600)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	4.59 %	99.5	70.0	130
ED042T: Total Sulfur by LECO (QCLot: 3866603)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	0.16 %	101	70.0	130
ED042T: Total Sulfur by LECO (QCLot: 3866606)								
ED042T: Sulfur - Total as S (LECO)	----	0.01	%	<0.01	1.57 %	106	70.0	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 3866599)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	0.56 %	99.2	70.0	130
				<0.02	0.2 %	114	70.0	130
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 3866602)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	0.56 %	100	70.0	130
				<0.02	0.2 %	116	70.0	130
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 3866605)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	0.56 %	99.8	70.0	130
				<0.02	0.2 %	107	70.0	130
EP003TC: Total Carbon (TC) in Soil (QCLot: 3866601)								
EP003TC: Total Carbon	TC	0.02	%	<0.02	0.56 %	101	70.0	130
EP003TC: Total Carbon (TC) in Soil (QCLot: 3866604)								
EP003TC: Total Carbon	TC	0.02	%	<0.02	1.03 %	102	70.0	130
EP003TC: Total Carbon (TC) in Soil (QCLot: 3866607)								
EP003TC: Total Carbon	TC	0.02	%	<0.02	0.56 %	99.5	70.0	130

Matrix Spike (MS) Report

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

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2123278**	Page	: 1 of 12
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: C PRIDMORE	Telephone	: +61-7-3243 7222
Project	: CL1	Date Samples Received	: 18-Aug-2021
Site	: ----	Issue Date	: 06-Sep-2021
Sampler	: TERENCE NHAN	No. of samples received	: 50
Order number	: ----	No. of samples analysed	: 50

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002: pH 1:5 (Soils)						
Calico Bag						
TGO360034, TGO360035, TGO360036, TGO360037, TGO360038, TGO360039, TGO360040, TGO360041, TGO360042, TGO360043, TGO360044, TGO358577, TGO358578, TGO358579, TGO358580, TGO358581, TGO358582, TGO358583, TGO358584, TGO358585, TGO358586, TGO358587, TGO358588, TGO358589, TGO358590, TGO358591, TGO358592, TGO358593, TGO358594, TGO358595, TGO358596, TGO358597, TGO358598, TGO358599, TGO358600, TGO358601, TGO358602, TGO358646, TGO358647, TGO358649, TGO358650, TGO358669, TGO358670, TGO358671, TGO358672, TGO358673, TGO358674, TGO358675, TGO358676, TGO358677	31-Aug-2021	18-Aug-2021	**13**	----	----	----
EA010: Conductivity (1:5)						

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA010: Conductivity (1:5) - Analysis Holding Time Compliance							
Calico Bag							
TGO360034,	TGO360035,	31-Aug-2021	18-Aug-2021	**13**	----	----	----
TGO360036,	TGO360037,						
TGO360038,	TGO360039,						
TGO360040,	TGO360041,						
TGO360042,	TGO360043,						
TGO360044,	TGO358577,						
TGO358578,	TGO358579,						
TGO358580,	TGO358581,						
TGO358582,	TGO358583,						
TGO358584,	TGO358585,						
TGO358586,	TGO358587,						
TGO358588,	TGO358589,						
TGO358590,	TGO358591,						
TGO358592,	TGO358593,						
TGO358594,	TGO358595,						
TGO358596,	TGO358597,						
TGO358598,	TGO358599,						
TGO358600,	TGO358601,						
TGO358602,	TGO358646,						
TGO358647,	TGO358649,						
TGO358650,	TGO358669,						
TGO358670,	TGO358671,						
TGO358672,	TGO358673,						
TGO358674,	TGO358675,						
TGO358676,	TGO358677						

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002: pH 1:5 (Soils)							
Calico Bag (EA002)							
TGO360034, TGO360035, TGO360036, TGO360037, TGO360038, TGO360039, TGO360040, TGO360041, TGO360042, TGO360043, TGO360044, TGO358577, TGO358578, TGO358579, TGO358580, TGO358581, TGO358582, TGO358583, TGO358584, TGO358585, TGO358586, TGO358587, TGO358588, TGO358589, TGO358590, TGO358591, TGO358592, TGO358593, TGO358594, TGO358595, TGO358596, TGO358597, TGO358598, TGO358599, TGO358600, TGO358601, TGO358602, TGO358646, TGO358647, TGO358649, TGO358650, TGO358669, TGO358670, TGO358671, TGO358672, TGO358673, TGO358674, TGO358675, TGO358676, TGO358677	**11-Aug-2021**	**31-Aug-2021**	18-Aug-2021	×	**31-Aug-2021**	31-Aug-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity (1:5)								
Calico Bag (EA010)								
TGO360034,	TGO360035,	**11-Aug-2021**	**31-Aug-2021**	18-Aug-2021	×	**31-Aug-2021**	28-Sep-2021	✓
TGO360036,	TGO360037,							
TGO360038,	TGO360039,							
TGO360040,	TGO360041,							
TGO360042,	TGO360043,							
TGO360044,	TGO358577,							
TGO358578,	TGO358579,							
TGO358580,	TGO358581,							
TGO358582,	TGO358583,							
TGO358584,	TGO358585,							
TGO358586,	TGO358587,							
TGO358588,	TGO358589,							
TGO358590,	TGO358591,							
TGO358592,	TGO358593,							
TGO358594,	TGO358595,							
TGO358596,	TGO358597,							
TGO358598,	TGO358599,							
TGO358600,	TGO358601,							
TGO358602,	TGO358646,							
TGO358647,	TGO358649,							
TGO358650,	TGO358669,							
TGO358670,	TGO358671,							
TGO358672,	TGO358673,							
TGO358674,	TGO358675,							
TGO358676,	TGO358677							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA011: Net Acid Generation							
Snap Lock Bag (EA011)							
TGO360034, TGO360035, TGO360036, TGO360037, TGO360038, TGO360039, TGO360040, TGO360041, TGO360042, TGO360043, TGO360044, TGO358577, TGO358578, TGO358579, TGO358580, TGO358581, TGO358582, TGO358583, TGO358584, TGO358585, TGO358586, TGO358587, TGO358588, TGO358589, TGO358590, TGO358591, TGO358592, TGO358593, TGO358594, TGO358595, TGO358596, TGO358597, TGO358598, TGO358599, TGO358600, TGO358601, TGO358602, TGO358646, TGO358647, TGO358649, TGO358650, TGO358669, TGO358670, TGO358671, TGO358672, TGO358673, TGO358674, TGO358675, TGO358676, TGO358677	**25-Aug-2021**	**26-Aug-2021**	25-Aug-2022	✓	**31-Aug-2021**	22-Feb-2022	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA013: Acid Neutralising Capacity							
Snap Lock Bag (EA013)							
TGO360034, TGO360035, TGO360036, TGO360037, TGO360038, TGO360039, TGO360040, TGO360041, TGO360042, TGO360043, TGO360044, TGO358577, TGO358578, TGO358579, TGO358580, TGO358581, TGO358582, TGO358583, TGO358584, TGO358585, TGO358586, TGO358587, TGO358588, TGO358589, TGO358590, TGO358591, TGO358592, TGO358593, TGO358594, TGO358595, TGO358596, TGO358597, TGO358598, TGO358599, TGO358600, TGO358601, TGO358602, TGO358646, TGO358647, TGO358649, TGO358650, TGO358669, TGO358670, TGO358671, TGO358672, TGO358673, TGO358674, TGO358675, TGO358676, TGO358677	**25-Aug-2021**	**26-Aug-2021**	25-Aug-2022	✓	**26-Aug-2021**	22-Feb-2022	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED042T: Total Sulfur by LECO								
Pulp Bag (ED042T)								
TGO360034,	TGO360035,	**25-Aug-2021**	**26-Aug-2021**	21-Feb-2022	✓	**26-Aug-2021**	21-Feb-2022	✓
TGO360036,	TGO360037,							
TGO360038,	TGO360039,							
TGO360040,	TGO360041,							
TGO360042,	TGO360043,							
TGO360044,	TGO358577,							
TGO358578,	TGO358579,							
TGO358580,	TGO358581,							
TGO358582,	TGO358583,							
TGO358584,	TGO358585,							
TGO358586,	TGO358587,							
TGO358588,	TGO358589,							
TGO358590,	TGO358591,							
TGO358592,	TGO358593,							
TGO358594,	TGO358595,							
TGO358596,	TGO358597,							
TGO358598,	TGO358599,							
TGO358600,	TGO358601,							
TGO358602,	TGO358646,							
TGO358647,	TGO358649,							
TGO358650,	TGO358669,							
TGO358670,	TGO358671,							
TGO358672,	TGO358673,							
TGO358674,	TGO358675,							
TGO358676,	TGO358677							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag (EP003)							
TGO360034, TGO360035, TGO360036, TGO360037, TGO360038, TGO360039, TGO360040, TGO360041, TGO360042, TGO360043, TGO360044, TGO358577, TGO358578, TGO358579, TGO358580, TGO358581, TGO358582, TGO358583, TGO358584, TGO358585, TGO358586, TGO358587, TGO358588, TGO358589, TGO358590, TGO358591, TGO358592, TGO358593, TGO358594, TGO358595, TGO358596, TGO358597, TGO358598, TGO358599, TGO358600, TGO358601, TGO358602, TGO358646, TGO358647, TGO358649, TGO358650, TGO358669, TGO358670, TGO358671, TGO358672, TGO358673, TGO358674, TGO358675, TGO358676, TGO358677	**25-Aug-2021**	**26-Aug-2021**	22-Sep-2021	✓	**26-Aug-2021**	22-Sep-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP003TC: Total Carbon (TC) in Soil								
Pulp Bag (EP003TC)								
TGO360034,	TGO360035,	**25-Aug-2021**	**26-Aug-2021**	22-Sep-2021	✓	**26-Aug-2021**	22-Sep-2021	✓
TGO360036,	TGO360037,							
TGO360038,	TGO360039,							
TGO360040,	TGO360041,							
TGO360042,	TGO360043,							
TGO360044,	TGO358577,							
TGO358578,	TGO358579,							
TGO358580,	TGO358581,							
TGO358582,	TGO358583,							
TGO358584,	TGO358585,							
TGO358586,	TGO358587,							
TGO358588,	TGO358589,							
TGO358590,	TGO358591,							
TGO358592,	TGO358593,							
TGO358594,	TGO358595,							
TGO358596,	TGO358597,							
TGO358598,	TGO358599,							
TGO358600,	TGO358601,							
TGO358602,	TGO358646,							
TGO358647,	TGO358649,							
TGO358650,	TGO358669,							
TGO358670,	TGO358671,							
TGO358672,	TGO358673,							
TGO358674,	TGO358675,							
TGO358676,	TGO358677							

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Acid Neutralising Capacity (ANC)	EA013	5	50	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	5	50	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	5	50	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	5	50	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	5	50	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Carbon	EP003TC	5	50	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	5	50	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acid Neutralising Capacity (ANC)	EA013	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Net Acid Generation	EA011	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	6	50	**12.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Carbon	EP003TC	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	6	50	**12.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:5)	EA010	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfur - Total as S (LECO)	ED042T	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Carbon	EP003TC	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Net Acid Production Potential	EA009	SOIL	In house: Referenced to Coastech Research (Canada)(Mod.). NAPP = Acid Production Potential (APP or MAP-Maximum Acid Potential) minus Neutralising Capacity (ANC). NAPP may be +ve, zero or -ve.
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Net Acid Generation	EA011	SOIL	In house: Referenced to Miller (1998) Titremetric procedure determines net acidity in a soil following peroxide oxidation. Titrations to both pH 4.5 and pH 7 are reported.
Acid Neutralising Capacity (ANC)	EA013	SOIL	In house: Referenced to USEPA 600/2-78-054, I. Miller (2000). A fizz test is done to semiquanititatively estimate the likely reactivity. The soil is then reacted with an known excess quanitity of an appropriate acid. Titration determines the acid remaining, and the ANC can be calculated from comparison with a blank titration.
Sulfur - Total as S (LECO)	ED042T	SOIL	In house: Dried and pulverised sample is combusted in a high temperature furnace in the presence of strong oxidants / catalysts. The evolved S (as SO2) is measured by infra-red detector
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
Total Carbon	EP003TC	SOIL	In house C-IR07. Dried and pulverised sample is combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved Carbon (as CO2) is measured by infra-red detector

Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Dry and Crush	EN84	SOIL	In house
Dry and Pulverise (up to 100g)	GEO30	SOIL	#

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 6-SEP-2021
Account: ALSENV

CERTIFICATE BR21226530

Project: EB2123278
P.O. No.: ME-MS61m
This report is for 50 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 27-AUG-2021.
The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
LOG-22	Sample login - Rcd w/o BarCode
LEV-01	Waste Disposal Levy

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS61	48 element four acid ICP-MS	
Hg-MS42	Trace Hg by ICPMS	ICP-MS

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.
***** See Appendix Page for comments regarding this certificate *****

Signature:

Shaun Kenny, Brisbane Laboratory Manager

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga
	Units	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
	LOD	0.01	0.01	0.2	10	0.05	0.01	0.01	0.02	0.01	0.1	1	0.05	0.2	0.01	0.05
TGO360034		0.26	8.15	12.2	1550	1.03	0.08	2.05	0.32	28.8	14.3	28	0.63	122.5	4.16	17.00
TGO360035		0.38	8.22	8.1	610	0.97	0.08	2.18	0.74	31.9	16.6	31	0.59	133.0	4.99	16.80
TGO360036		0.43	8.37	23.6	810	0.74	0.07	2.62	0.55	31.4	17.1	31	0.26	150.5	4.66	14.25
TGO360037		0.19	6.60	16.1	1100	0.91	0.06	3.86	0.25	24.3	10.1	28	0.44	89.1	3.32	13.60
TGO360038		0.03	8.06	65.7	50	0.70	0.01	7.06	0.12	15.20	44.9	74	0.47	65.5	7.04	17.45
TGO360039		0.03	7.27	3.4	100	0.98	0.02	6.35	0.12	30.5	39.8	167	0.29	54.7	7.63	19.00
TGO360040		0.03	7.51	9.0	140	0.65	0.01	5.49	0.07	13.70	38.4	132	0.22	48.1	5.54	16.75
TGO360041		0.12	7.77	4.0	640	1.26	0.03	5.11	0.19	39.3	22.7	8	0.18	236	5.91	18.20
TGO360042		0.02	7.37	5.8	160	1.21	0.07	5.75	0.12	40.7	37.3	106	0.54	48.6	7.68	19.60
TGO360043		0.03	6.78	18.3	240	1.26	0.01	5.65	0.17	42.1	44.3	88	0.26	58.3	9.49	22.9
TGO360044		0.14	7.60	2.2	1340	1.34	0.11	2.36	0.11	36.5	10.7	31	0.58	163.0	3.77	17.15
TGO358577		0.03	6.98	1.8	100	0.57	0.01	6.67	0.11	14.90	43.9	120	1.11	56.1	6.97	16.90
TGO358578		0.03	8.14	3.7	90	0.57	0.01	7.22	0.10	17.20	43.3	113	0.93	54.8	7.29	17.40
TGO358579		0.18	7.87	18.0	1040	1.21	0.04	3.77	0.28	31.5	12.6	21	0.55	169.0	5.15	17.45
TGO358580		0.19	5.77	8.0	820	0.68	0.07	1.28	0.19	24.4	7.7	20	0.48	84.8	2.48	10.55
TGO358581		0.11	8.21	7.7	390	1.31	0.02	6.22	0.09	41.8	23.8	6	0.31	217	6.46	18.90
TGO358582		0.12	7.57	1.2	460	1.16	0.03	5.19	0.11	33.3	25.3	18	0.10	250	6.50	19.75
TGO358583		0.18	8.23	17.9	1540	1.19	0.07	4.35	0.23	41.8	16.4	22	0.42	176.5	5.35	18.15
TGO358584		0.18	7.42	8.1	1500	1.04	0.06	3.58	0.13	34.2	13.4	27	0.61	81.9	4.12	16.15
TGO358585		0.14	7.72	32.3	1170	0.94	0.01	4.69	0.06	29.1	26.4	13	0.23	170.0	6.33	18.35
TGO358586		0.14	7.83	609	540	1.10	0.02	5.32	0.06	36.4	21.0	10	0.45	181.0	5.16	16.45
TGO358587		0.03	6.87	57.0	510	1.92	0.04	6.24	0.11	72.3	33.0	65	0.55	54.2	8.56	22.0
TGO358588		0.07	7.08	19.7	1370	1.32	0.02	5.60	0.07	26.2	30.0	14	0.89	173.5	7.41	22.8
TGO358589		0.02	8.09	9.3	190	0.69	0.01	6.32	0.08	21.8	36.2	125	0.92	49.1	6.42	18.20
TGO358590		0.10	8.50	4.6	770	1.24	0.01	5.14	0.05	36.3	25.7	13	1.04	212	6.82	18.45
TGO358591		0.18	8.22	229	370	1.18	0.03	4.87	0.06	38.4	18.8	5	0.58	212	5.22	18.35
TGO358592		0.07	6.87	12.6	370	1.03	0.01	5.07	0.07	26.9	25.5	14	0.38	211	6.24	16.85
TGO358593		0.02	7.11	2.7	110	0.92	0.02	6.55	0.14	28.9	40.3	162	1.29	57.2	7.64	19.00
TGO358594		0.03	7.44	10.9	120	0.88	0.02	6.45	0.11	29.7	38.0	77	1.80	49.0	6.79	17.35
TGO358595		0.19	7.71	31.6	890	0.95	0.08	2.31	0.31	29.3	12.4	30	0.73	80.8	3.96	15.75
TGO358596		0.09	8.12	12.8	1090	0.99	0.07	1.77	0.19	30.2	13.9	33	0.78	87.2	5.15	16.40
TGO358597		0.14	8.67	16.8	1010	0.92	0.09	0.50	0.24	35.8	14.8	36	0.95	84.2	4.45	18.55
TGO358598		0.04	7.96	7.6	120	0.72	0.01	7.10	0.14	26.5	44.8	143	2.02	57.8	7.86	18.70
TGO358599		0.11	8.08	12.9	930	1.11	0.03	5.00	0.08	37.1	23.5	8	0.25	260	6.28	18.35
TGO358600		0.02	8.32	4.9	60	0.88	0.02	7.13	0.15	21.2	46.0	110	2.48	61.5	7.66	18.75
TGO358601		0.02	8.14	61.2	100	0.86	0.02	6.86	0.16	26.2	45.9	109	5.71	58.2	8.35	20.4
TGO358602		0.08	7.77	7.8	520	1.36	0.02	5.68	0.08	37.3	24.1	7	0.27	221	6.12	20.1
TGO358646		0.09	7.31	6.2	400	1.32	0.02	6.06	0.09	31.8	24.2	7	0.14	226	6.28	21.1
TGO358647		0.06	7.44	7.6	170	1.32	0.01	5.02	0.10	34.4	24.5	7	0.13	125.5	6.79	21.0
TGO358649		0.25	7.83	12.2	940	1.10	0.06	2.69	0.55	36.1	17.0	22	0.53	166.5	4.95	18.00

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	Hg-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm
	LOD	0.05	0.1	0.005	0.005	0.01	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5
TGO360034		0.14	2.4	0.009	0.067	2.92	13.8	12.5	0.82	324	1.94	1.56	5.1	28.9	570	7.5
TGO360035		0.13	2.5	0.012	0.068	2.38	15.5	12.5	0.90	533	3.93	2.54	5.7	26.4	970	6.8
TGO360036		0.13	2.5	0.022	0.068	1.08	14.9	11.3	0.66	597	3.33	4.66	5.6	22.2	880	7.3
TGO360037		0.11	2.1	0.006	0.050	1.75	11.7	9.0	0.63	465	1.24	2.47	4.4	22.6	460	6.7
TGO360038		0.15	2.5	<0.005	0.062	0.27	5.0	13.3	4.16	1260	0.37	1.94	4.1	71.4	610	1.2
TGO360039		0.16	3.5	<0.005	0.079	0.27	12.6	10.1	3.77	1330	0.63	2.22	7.6	66.4	1150	3.1
TGO360040		0.12	1.7	<0.005	0.052	0.65	4.9	21.3	3.33	926	0.42	1.75	5.2	111.0	800	1.9
TGO360041		0.13	2.9	<0.005	0.053	0.63	17.3	16.1	2.22	1240	0.71	2.71	5.5	9.2	1660	7.1
TGO360042		0.17	4.7	<0.005	0.091	0.65	17.2	12.4	3.35	1280	0.81	2.55	10.0	54.9	1290	3.9
TGO360043		0.18	4.3	<0.005	0.109	0.70	17.0	13.2	3.31	1660	0.95	2.18	13.1	51.1	1990	2.3
TGO360044		0.12	2.7	0.005	0.058	1.66	19.0	13.2	0.93	376	1.69	1.54	6.3	15.6	1110	8.2
TGO358577		0.19	2.4	<0.005	0.064	0.29	5.0	15.0	4.31	1220	0.34	1.74	4.4	92.7	750	1.1
TGO358578		0.11	2.5	<0.005	0.063	0.34	6.0	14.6	4.63	1200	0.32	1.80	4.5	90.7	770	1.1
TGO358579		0.12	3.0	<0.005	0.061	1.90	14.3	18.5	1.51	779	0.62	1.98	5.5	12.8	1300	4.9
TGO358580		0.10	2.3	<0.005	0.049	2.07	10.8	6.6	0.67	182	0.83	1.25	3.9	10.4	630	6.4
TGO358581		0.13	2.8	<0.005	0.051	0.45	18.9	8.2	2.09	1320	0.42	2.21	5.6	8.8	1590	4.7
TGO358582		0.12	2.9	<0.005	0.052	0.72	14.5	13.5	2.24	1190	0.69	2.35	5.6	11.4	1590	4.5
TGO358583		0.13	2.9	0.005	0.059	1.38	21.0	17.7	1.60	592	1.31	2.08	6.3	15.6	1310	7.2
TGO358584		0.14	2.6	<0.005	0.056	2.91	17.0	15.4	1.08	439	1.68	1.01	4.8	19.6	910	7.8
TGO358585		0.13	2.6	<0.005	0.042	0.89	12.2	17.6	1.78	886	0.66	3.75	5.4	12.0	1560	3.1
TGO358586		0.13	2.4	<0.005	0.041	1.71	16.1	16.1	1.58	850	0.30	2.60	3.9	9.4	1460	5.5
TGO358587		0.20	6.5	<0.005	0.110	1.37	30.3	13.1	2.62	1420	1.69	2.02	19.7	22.6	2510	4.1
TGO358588		0.13	2.2	<0.005	0.060	1.14	11.0	15.8	2.10	988	0.58	2.10	5.7	12.6	1430	7.3
TGO358589		0.13	2.6	<0.005	0.063	0.55	8.9	17.6	3.49	1120	0.55	1.74	7.7	90.9	1150	2.2
TGO358590		0.12	2.1	<0.005	0.051	0.89	15.4	16.4	2.12	1150	0.83	3.18	5.3	12.5	1620	3.7
TGO358591		0.14	2.9	<0.005	0.049	1.73	16.8	13.8	1.60	1260	0.31	2.91	5.5	7.5	1680	5.1
TGO358592		0.12	2.5	<0.005	0.053	0.66	11.6	8.9	1.77	1260	0.18	3.28	5.4	11.7	1660	4.1
TGO358593		0.14	3.7	<0.005	0.074	0.44	11.9	7.7	3.72	1330	0.65	1.98	7.7	67.8	1130	2.7
TGO358594		0.16	3.3	<0.005	0.064	0.44	12.2	10.0	3.77	1280	0.69	2.05	8.4	74.6	1130	2.6
TGO358595		0.13	2.5	<0.005	0.059	2.86	14.6	14.5	0.88	338	2.93	0.66	4.4	19.7	760	5.9
TGO358596		0.13	2.6	0.006	0.064	2.84	15.0	18.8	1.26	415	2.52	0.79	4.6	21.7	780	5.4
TGO358597		0.15	3.0	<0.005	0.068	3.46	17.5	15.8	1.30	265	3.46	0.37	5.2	25.7	920	7.6
TGO358598		0.16	3.1	<0.005	0.077	0.58	10.6	12.8	4.37	1320	0.52	1.75	7.2	95.2	1110	1.5
TGO358599		0.14	2.9	<0.005	0.056	2.02	15.6	19.9	2.13	1230	0.89	2.05	6.1	15.5	1680	5.8
TGO358600		0.16	3.2	<0.005	0.080	0.48	8.0	14.2	4.46	1210	0.48	2.06	5.5	76.6	870	1.4
TGO358601		0.15	3.2	0.005	0.087	0.85	10.2	13.7	4.31	1360	0.45	1.75	6.6	71.9	1150	2.0
TGO358602		0.14	3.2	<0.005	0.054	1.47	15.9	12.1	1.76	1450	0.37	2.77	5.9	9.5	1770	5.7
TGO358646		0.12	2.8	<0.005	0.057	0.52	14.0	18.8	2.13	1190	1.41	2.35	5.7	10.4	1600	5.4
TGO358647		0.14	2.6	<0.005	0.060	0.19	14.9	23.5	2.57	1010	1.10	2.71	5.6	9.4	1590	3.8
TGO358649		0.13	3.0	0.006	0.055	1.55	16.8	22.3	1.46	673	2.01	2.54	5.5	16.6	1240	6.4

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V
	Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	LOD	0.1	0.002	0.01	0.05	0.1	1	0.2	0.2	0.05	0.05	0.01	0.005	0.02	0.1	1
TGO360034		61.9	0.009	1.60	1.46	21.2	2	0.9	386	0.30	0.07	2.05	0.386	0.48	3.0	213
TGO360035		56.4	0.006	2.33	2.23	20.5	2	0.8	335	0.33	0.05	2.25	0.418	0.48	3.5	230
TGO360036		23.1	0.006	2.74	6.51	22.8	2	0.9	457	0.33	0.06	2.11	0.441	0.23	2.8	218
TGO360037		40.6	0.007	1.16	1.15	15.0	1	0.7	582	0.26	0.05	1.78	0.288	0.31	2.0	143
TGO360038		5.4	<0.002	0.13	0.85	32.2	1	1.0	240	0.27	<0.05	0.57	0.831	0.03	0.2	205
TGO360039		5.2	<0.002	0.10	0.22	34.3	<1	1.2	254	0.48	<0.05	1.09	1.125	0.04	0.4	244
TGO360040		6.1	<0.002	0.07	0.35	18.2	1	0.7	327	0.32	<0.05	0.37	0.660	0.08	0.2	174
TGO360041		6.3	<0.002	0.18	0.76	21.6	<1	0.9	945	0.31	<0.05	2.31	0.442	0.07	1.6	200
TGO360042		18.9	<0.002	0.15	1.03	35.1	1	1.7	276	0.63	<0.05	3.14	1.160	0.08	1.1	242
TGO360043		6.2	0.002	0.15	0.87	39.5	1	1.7	289	0.74	<0.05	0.86	1.585	0.04	0.3	335
TGO360044		41.1	0.002	1.09	1.05	22.1	1	0.9	393	0.34	0.07	3.05	0.402	0.35	1.9	139
TGO358577		5.1	<0.002	0.13	0.67	23.7	1	0.9	271	0.28	<0.05	0.37	0.790	0.08	0.2	202
TGO358578		10.2	<0.002	0.10	0.77	34.5	1	0.9	260	0.28	<0.05	0.42	0.835	0.08	0.1	200
TGO358579		34.7	0.003	0.54	4.40	21.4	1	0.9	807	0.30	<0.05	2.29	0.422	0.27	1.6	192
TGO358580		51.3	0.002	0.80	4.65	14.6	1	0.6	188.5	0.22	0.05	2.65	0.260	0.31	1.4	97
TGO358581		6.5	<0.002	0.03	1.56	22.1	<1	1.0	1495	0.30	<0.05	2.53	0.456	0.09	1.2	208
TGO358582		3.2	<0.002	0.03	2.98	19.3	<1	1.0	1275	0.30	<0.05	1.94	0.440	0.05	1.2	213
TGO358583		22.2	0.004	0.84	3.32	23.6	1	0.9	837	0.35	0.06	2.88	0.441	0.22	1.9	186
TGO358584		70.0	0.003	1.25	2.22	21.1	1	0.8	383	0.25	<0.05	2.57	0.355	0.48	2.9	140
TGO358585		7.5	<0.002	0.02	0.34	22.3	<1	0.8	605	0.28	<0.05	1.68	0.488	0.04	0.9	212
TGO358586		28.6	<0.002	0.25	0.73	21.4	<1	0.8	614	0.22	0.13	1.95	0.363	0.07	0.9	199
TGO358587		26.7	<0.002	0.11	2.57	38.5	1	2.2	368	1.13	0.10	3.88	1.440	0.08	1.2	266
TGO358588		9.1	<0.002	0.02	2.52	19.8	<1	0.9	1535	0.31	<0.05	1.31	0.529	0.14	0.9	276
TGO358589		5.7	<0.002	0.11	0.83	22.0	1	1.0	380	0.46	<0.05	0.62	0.870	0.04	0.3	195
TGO358590		10.7	<0.002	0.06	1.27	25.2	<1	0.9	777	0.29	<0.05	2.00	0.515	0.04	1.1	247
TGO358591		23.8	<0.002	0.23	3.79	21.7	<1	0.9	741	0.31	0.15	2.36	0.473	0.08	1.2	214
TGO358592		4.6	<0.002	0.02	0.57	18.8	<1	0.9	811	0.30	<0.05	1.36	0.507	0.03	1.0	248
TGO358593		11.4	<0.002	0.15	0.26	33.3	1	1.2	261	0.49	<0.05	1.06	1.115	0.06	0.4	246
TGO358594		12.5	<0.002	0.14	0.66	29.0	1	1.1	263	0.51	<0.05	1.31	0.949	0.07	0.4	201
TGO358595		71.3	0.007	1.40	3.96	22.4	1	0.8	162.0	0.24	0.08	2.36	0.344	0.47	3.3	186
TGO358596		75.3	0.004	1.56	1.43	23.8	1	0.8	240	0.25	<0.05	2.52	0.366	0.59	2.6	178
TGO358597		97.4	0.004	1.47	2.21	25.6	1	0.9	71.1	0.28	0.09	2.78	0.406	0.60	3.1	184
TGO358598		23.6	0.002	0.12	0.54	36.0	1	1.0	255	0.44	<0.05	0.62	1.075	0.19	0.2	228
TGO358599		17.3	<0.002	0.02	0.69	20.9	<1	1.0	1015	0.32	<0.05	2.11	0.492	0.08	1.2	218
TGO358600		21.1	0.002	0.11	0.24	39.5	1	1.1	276	0.35	<0.05	0.76	1.010	0.09	0.3	242
TGO358601		33.0	<0.002	0.20	1.08	42.7	1	1.2	259	0.41	<0.05	0.50	1.120	0.14	0.2	253
TGO358602		8.8	<0.002	0.01	0.71	21.8	<1	1.1	919	0.34	<0.05	2.15	0.503	0.04	1.3	229
TGO358646		1.7	<0.002	0.05	1.61	19.1	<1	1.0	1365	0.32	<0.05	1.75	0.480	0.06	1.1	225
TGO358647		0.9	<0.002	0.05	2.13	19.8	<1	1.0	1180	0.31	<0.05	1.85	0.476	0.02	1.2	213
TGO358649		32.2	0.006	0.85	1.31	21.5	2	0.9	604	0.31	<0.05	2.55	0.396	0.25	2.3	187

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32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method Analyte Units LOD	ME-MS61 W ppm 0.1	ME-MS61 Y ppm 0.1	ME-MS61 Zn ppm 2	ME-MS61 Zr ppm 0.5
TGO360034		0.9	19.7	132	93.4
TGO360035		2.1	19.9	153	103.0
TGO360036		4.8	20.8	137	97.4
TGO360037		0.4	12.9	117	75.1
TGO360038		0.1	26.1	77	111.5
TGO360039		0.2	30.7	93	161.5
TGO360040		0.2	13.9	65	72.0
TGO360041		0.4	20.0	104	114.5
TGO360042		0.6	38.4	95	201
TGO360043		0.5	42.4	129	201
TGO360044		0.4	19.7	90	114.0
TGO358577		0.1	23.8	80	103.0
TGO358578		0.1	26.9	79	102.0
TGO358579		0.6	19.0	110	119.0
TGO358580		0.3	13.1	66	91.5
TGO358581		0.4	20.2	100	118.0
TGO358582		0.3	17.8	105	116.5
TGO358583		0.5	22.2	117	117.5
TGO358584		0.3	17.8	105	108.0
TGO358585		4.6	14.6	93	107.0
TGO358586		4.2	13.7	82	96.3
TGO358587		0.9	53.8	120	337
TGO358588		0.3	15.3	111	78.7
TGO358589		0.2	20.7	83	117.5
TGO358590		0.4	19.0	107	81.3
TGO358591		4.2	16.6	92	118.5
TGO358592		0.3	15.5	100	100.5
TGO358593		0.2	28.9	90	167.0
TGO358594		0.2	25.6	80	163.0
TGO358595		0.4	10.9	119	99.4
TGO358596		0.7	16.7	131	106.5
TGO358597		1.1	15.2	94	120.0
TGO358598		0.1	31.8	91	149.0
TGO358599		0.4	18.9	98	116.0
TGO358600		0.2	30.3	84	139.5
TGO358601		0.2	33.6	99	144.0
TGO358602		0.3	18.5	98	123.0
TGO358646		0.8	16.5	100	107.5
TGO358647		0.8	17.0	91	102.5
TGO358649		1.3	17.8	124	118.0

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga
	Units	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm
	LOD	0.01	0.01	0.2	10	0.05	0.01	0.01	0.02	0.01	0.1	1	0.05	0.2	0.01	0.05
TGO358650		0.17	7.24	41.4	540	1.05	0.03	3.77	0.42	32.7	18.0	13	0.35	175.5	5.29	18.25
TGO358669		0.28	8.25	28.8	970	1.06	0.05	3.31	0.52	36.1	17.6	20	0.68	140.5	5.05	18.30
TGO358670		0.17	6.95	13.5	500	1.04	0.06	3.16	0.70	31.0	16.9	17	0.24	148.5	4.52	15.75
TGO358671		0.08	7.89	9.9	1210	0.96	0.08	2.29	0.16	32.3	13.6	38	1.05	82.9	3.90	16.20
TGO358672		0.21	8.04	1.3	1470	1.34	0.13	1.23	0.52	23.5	10.8	46	1.19	100.5	3.85	23.5
TGO358673		0.04	8.13	1.6	110	0.57	0.01	7.24	0.13	16.55	44.0	118	0.76	59.1	7.08	17.40
TGO358674		0.02	7.50	11.8	80	0.68	0.01	6.75	0.14	16.50	44.5	99	1.16	60.0	7.44	18.60
TGO358675		0.10	7.94	7.6	1310	1.12	0.07	2.42	0.23	31.4	12.4	27	1.02	78.2	4.31	17.05
TGO358676		0.02	6.85	10.7	110	0.74	0.02	6.85	0.13	16.00	43.9	107	0.73	58.2	7.20	18.05
TGO358677		0.18	7.30	0.6	1540	1.18	0.09	0.44	0.63	21.9	11.9	37	0.92	106.5	4.13	18.95

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	Hg-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm
	LOD	0.05	0.1	0.005	0.005	0.01	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5
TGO358650		0.14	2.9	0.005	0.050	1.35	15.0	23.0	1.49	1160	3.28	2.59	5.3	13.0	1440	6.1
TGO358669		0.14	3.0	0.012	0.052	2.25	17.5	21.9	1.35	861	5.06	1.82	5.4	17.2	1190	7.0
TGO358670		0.12	2.7	0.009	0.049	0.72	14.7	26.5	1.36	704	2.57	3.08	4.9	16.7	1140	5.8
TGO358671		0.16	2.7	<0.005	0.054	3.29	15.3	18.6	1.09	494	2.01	1.06	4.5	20.7	830	5.9
TGO358672		0.15	3.4	<0.005	0.073	4.06	11.1	16.2	1.05	325	1.70	0.68	7.2	22.4	800	7.4
TGO358673		0.16	2.5	<0.005	0.066	0.35	5.8	13.3	4.77	1210	0.36	1.78	4.4	104.0	740	3.5
TGO358674		0.16	2.7	<0.005	0.072	0.47	5.6	12.6	4.08	1260	0.40	1.80	4.6	82.4	740	1.2
TGO358675		0.14	2.8	<0.005	0.061	3.38	15.0	19.7	1.19	397	1.40	0.61	4.7	18.8	760	6.5
TGO358676		0.17	2.5	<0.005	0.072	0.59	5.4	17.7	4.12	1280	0.40	1.81	4.7	79.3	700	1.5
TGO358677		0.14	2.4	<0.005	0.066	3.81	10.4	17.5	1.23	437	1.21	0.06	5.2	19.8	830	4.8

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V
	Units	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
	LOD	0.1	0.002	0.01	0.05	0.1	1	0.2	0.2	0.05	0.05	0.01	0.005	0.02	0.1	1
TGO358650		20.2	0.002	0.42	1.52	19.5	1	0.9	660	0.30	<0.05	2.13	0.401	0.21	2.1	202
TGO358669		54.1	0.004	0.97	1.87	23.0	1	1.0	574	0.31	0.05	2.56	0.401	0.47	2.6	197
TGO358670		10.1	0.006	0.61	1.62	18.6	1	0.9	567	0.31	<0.05	2.13	0.362	0.12	2.5	190
TGO358671		90.0	0.003	1.38	1.22	23.1	1	0.8	357	0.25	0.05	2.55	0.357	0.67	3.0	162
TGO358672		74.5	0.009	1.43	1.11	17.8	2	1.1	199.5	0.52	0.11	2.29	0.343	0.64	2.5	145
TGO358673		10.5	0.002	0.19	0.56	32.3	1	0.9	423	0.27	<0.05	0.48	0.792	0.08	0.2	197
TGO358674		15.4	<0.002	0.12	0.58	31.3	1	1.1	300	0.32	<0.05	0.46	0.916	0.12	0.2	226
TGO358675		85.9	0.003	1.17	1.05	22.9	1	0.9	264	0.26	0.05	2.51	0.382	0.61	2.5	160
TGO358676		12.0	<0.002	0.10	0.54	28.6	1	1.1	252	0.31	<0.05	0.61	0.855	0.09	0.2	223
TGO358677		78.1	0.002	1.24	0.67	21.9	2	0.9	40.4	0.28	0.07	2.06	0.366	0.57	2.1	185

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm
	LOD	0.1	0.1	2	0.5
TGO358650		1.8	12.3	115	113.5
TGO358669		1.2	14.5	123	120.5
TGO358670		4.2	14.5	129	104.0
TGO358671		0.3	16.8	105	104.5
TGO358672		0.3	14.8	93	131.0
TGO358673		0.1	25.6	78	103.0
TGO358674		0.2	25.7	81	112.5
TGO358675		0.3	16.4	110	112.0
TGO358676		0.1	25.4	79	110.5
TGO358677		0.3	13.3	117	101.0

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 6-SEP-2021
Account: ALSENV

Project: EB2123278

CERTIFICATE OF ANALYSIS BR21226530

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

REEs may not be totally soluble in this method.
Applies to Method: ME-MS61

ACCREDITATION COMMENTS

NATA Accreditation covers the performance of this service but does not cover the performance of ALS Brisbane Sample Preparation. Corporate Accreditation No: 825, Corporate Site No: 818. The Technical Signatory is David Jones,ICPMS Supervising Chemist
Applies to Method: ME-MS61

LABORATORY ADDRESSES

Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia

Applies to Method:			
Hg-MS42	LEV-01	LOG-22	ME-MS61

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 6-SEP-2021
Account: ALSENV

QC CERTIFICATE BR21226530

Project: EB2123278

P.O. No.: ME-MS61m

This report is for 50 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 27-AUG-2021.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
LOG-22	Sample login - Rcd w/o BarCode
LEV-01	Waste Disposal Levy

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-MS61	48 element four acid ICP-MS	
Hg-MS42	Trace Hg by ICPMS	ICP-MS

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:

Shaun Kenny, Brisbane Laboratory Manager

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method Analyte Units LOD	ME-MS61 Ag ppm 0.01	ME-MS61 Al % 0.01	ME-MS61 As ppm 0.2	ME-MS61 Ba ppm 10	ME-MS61 Be ppm 0.05	ME-MS61 Bi ppm 0.01	ME-MS61 Ca % 0.01	ME-MS61 Cd ppm 0.02	ME-MS61 Ce ppm 0.01	ME-MS61 Co ppm 0.1	ME-MS61 Cr ppm 1	ME-MS61 Cs ppm 0.05	ME-MS61 Cu ppm 0.2	ME-MS61 Fe % 0.01	ME-MS61 Ga ppm 0.05
STANDARDS																
EMOG-17																
Target Range - Lower Bound																
Upper Bound																
EMOG-17		67.4	4.57	567	740	1.94	5.70	1.93	20.2	46.1	732	54	6.90	8210	4.82	11.80
Target Range - Lower Bound		60.9	4.18	522	310	1.60	5.31	1.72	18.15	42.9	686	49	6.56	7750	4.42	10.75
Upper Bound		74.5	5.13	638	440	2.06	6.51	2.12	22.2	52.5	838	62	8.12	8910	5.42	13.25
GBM908-10																
Target Range - Lower Bound																
Upper Bound																
GBM908-10		2.92	7.05	59.5	1080	1.51	1.06	3.85	1.80	110.5	25.5	140	3.77	3660	5.55	20.6
Target Range - Lower Bound		2.60	6.40	50.2	930	1.27	1.12	3.33	1.53	99.0	24.0	125	3.44	3350	4.98	18.65
Upper Bound		3.20	7.84	61.8	1280	1.66	1.39	4.10	1.91	121.0	29.6	155	4.32	3850	6.10	22.9
MRGeo08																
Target Range - Lower Bound																
Upper Bound																
MRGeo08		4.22	6.65	33.5	1010	3.24	0.65	2.61	2.19	60.4	18.3	89	11.65	611	3.75	18.20
Target Range - Lower Bound		3.93	6.64	29.5	920	2.98	0.58	2.35	2.00	66.2	17.7	81	11.20	587	3.55	17.50
Upper Bound		4.83	8.14	36.5	1270	3.76	0.73	2.90	2.48	81.0	21.9	102	13.80	675	4.37	21.5
OREAS 152a		0.67	7.52	33.9	80	0.57	0.15	1.55	0.23	9.31	10.9	18	0.61	3920	3.65	17.70
Target Range - Lower Bound		0.59	7.07	31.0	50	0.33	0.12	1.42	0.16	8.58	10.8	15	0.58	3610	3.37	16.45
Upper Bound		0.75	8.66	38.3	110	0.58	0.17	1.75	0.27	10.50	13.5	21	0.85	4150	4.14	20.2
OREAS 602																
Target Range - Lower Bound																
Upper Bound																
BLANKS																
BLANK																
BLANK																
Target Range - Lower Bound																
Upper Bound																
BLANK		<0.01	<0.01	<0.2	<10	<0.05	<0.01	<0.01	<0.02	<0.01	<0.1	1	<0.05	<0.2	<0.01	<0.05
BLANK		<0.01	<0.01	<0.2	<10	<0.05	<0.01	<0.01	<0.02	<0.01	<0.1	1	<0.05	<0.2	<0.01	<0.05
BLANK		<0.01	<0.01	<0.2	<10	<0.05	0.01	<0.01	<0.02	<0.01	<0.1	1	<0.05	0.2	<0.01	0.05
BLANK		<0.01	<0.01	<0.2	<10	<0.05	<0.01	<0.01	<0.02	<0.01	<0.1	<1	<0.05	0.8	<0.01	0.06
Target Range - Lower Bound		<0.01	<0.01	<0.2	<10	<0.05	<0.01	<0.01	<0.02	<0.01	<0.1	<1	<0.05	<0.2	<0.01	<0.05
Upper Bound		0.02	0.02	0.4	20	0.10	0.02	0.02	0.04	0.02	0.2	2	0.10	0.4	0.02	0.10

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method Analyte Units LOD	ME-MS61 Ge ppm 0.05	ME-MS61 Hf ppm 0.1	Hg-MS42 Hg ppm 0.005	ME-MS61 In ppm 0.005	ME-MS61 K % 0.01	ME-MS61 La ppm 0.5	ME-MS61 Li ppm 0.2	ME-MS61 Mg % 0.01	ME-MS61 Mn ppm 5	ME-MS61 Mo ppm 0.05	ME-MS61 Na % 0.01	ME-MS61 Nb ppm 0.1	ME-MS61 Ni ppm 0.2	ME-MS61 P ppm 10	ME-MS61 Pb ppm 0.5
STANDARDS																
EMOG-17				0.550												
Target Range - Lower Bound				0.490												
Upper Bound				0.610												
EMOG-17		0.19	1.8		0.929	1.65	23.0	26.5	0.93	728	1090	1.08	14.4	7450	770	7070
Target Range - Lower Bound		0.06	1.6		0.823	1.49	20.7	23.9	0.86	670	997	0.99	12.7	6820	700	6570
Upper Bound		0.30	2.2		1.015	1.85	26.4	29.7	1.08	830	1220	1.23	15.7	8330	880	8030
GBM908-10				0.011												
Target Range - Lower Bound				0.006												
Upper Bound				0.028												
GBM908-10		0.20	3.8		0.075	2.06	55.9	10.7	1.81	791	67.4	2.15	10.5	2250	950	2040
Target Range - Lower Bound		0.12	3.3		0.064	1.87	49.0	9.8	1.61	715	57.9	1.93	9.5	2020	880	1845
Upper Bound		0.36	4.3		0.092	2.31	61.0	12.4	1.99	885	70.9	2.38	11.9	2470	1100	2250
MRGeo08				0.062												
Target Range - Lower Bound				0.048												
Upper Bound				0.074												
MRGeo08		0.16	3.0		0.176	2.86	28.6	30.5	1.22	538	14.10	1.90	20.4	670	990	1010
Target Range - Lower Bound		<0.05	2.8		0.155	2.79	31.1	29.5	1.17	497	13.65	1.76	19.0	622	930	971
Upper Bound		0.28	3.6		0.201	3.43	39.1	36.5	1.45	619	16.75	2.18	23.4	760	1160	1185
OREAS 152a		0.10	0.1		0.026	1.41	3.1	7.1	2.06	290	75.1	2.27	0.9	11.0	610	5.6
Target Range - Lower Bound		<0.05	<0.1		0.018	1.31	2.7	5.5	1.89	258	72.2	2.06	0.7	10.3	550	5.0
Upper Bound		0.28	0.3		0.040	1.62	5.1	7.2	2.33	326	88.3	2.54	1.2	13.1	690	7.7
OREAS 602				0.760												
Target Range - Lower Bound				0.697												
Upper Bound				0.863												
BLANKS																
BLANK				<0.005												
BLANK				<0.005												
Target Range - Lower Bound				<0.005												
Upper Bound				0.010												
BLANK		<0.05	<0.1		<0.005	<0.01	<0.5	<0.2	<0.01	<5	<0.05	<0.01	<0.1	<0.2	<10	<0.5
BLANK		<0.05	<0.1		<0.005	<0.01	<0.5	<0.2	<0.01	<5	<0.05	<0.01	<0.1	0.8	<10	<0.5
BLANK		<0.05	<0.1		<0.005	<0.01	<0.5	<0.2	<0.01	<5	<0.05	<0.01	<0.1	<0.2	<10	<0.5
BLANK		<0.05	<0.1		<0.005	<0.01	<0.5	<0.2	<0.01	<5	<0.05	<0.01	<0.1	<0.2	<10	<0.5
Target Range - Lower Bound		<0.05	<0.1		<0.005	<0.01	<0.5	<0.2	<0.01	<5	<0.05	<0.01	<0.1	<0.2	<10	<0.5
Upper Bound		0.10	0.2		0.010	0.02	1.0	0.4	0.02	10	0.10	0.02	0.2	0.4	20	1.0

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 6-SEP-2021
Account: ALSENV

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description / Method / Analyte / Units / LOD	ME-MS61 Rb ppm 0.1	ME-MS61 Re ppm 0.002	ME-MS61 S % 0.01	ME-MS61 Sb ppm 0.05	ME-MS61 Sc ppm 0.1	ME-MS61 Se ppm 1	ME-MS61 Sn ppm 0.2	ME-MS61 Sr ppm 0.2	ME-MS61 Ta ppm 0.05	ME-MS61 Te ppm 0.05	ME-MS61 Th ppm 0.01	ME-MS61 Ti % 0.005	ME-MS61 Tl ppm 0.02	ME-MS61 U ppm 0.1	ME-MS61 V ppm 1
STANDARDS															
EMOG-17															
Target Range - Lower Bound															
Upper Bound															
EMOG-17	117.5	0.316	3.09	764	8.0	7	2.4	199.0	0.87	1.31	11.10	0.316	1.90	3.0	69
Target Range - Lower Bound	98.9	0.286	2.91	643	7.2	4	2.2	184.5	0.78	1.10	10.35	0.294	1.89	2.8	67
Upper Bound	121.0	0.354	3.57	869	9.0	9	3.2	226	1.08	1.46	12.65	0.370	2.61	3.7	84
GBM908-10															
Target Range - Lower Bound															
Upper Bound															
GBM908-10	186.0	<0.002	0.38	1.62	19.3	1	3.0	282	0.69	0.06	20.2	0.648	1.09	2.2	132
Target Range - Lower Bound	153.0	<0.002	0.33	1.40	17.0	<1	2.7	258	0.64	<0.05	16.55	0.591	1.00	2.0	123
Upper Bound	187.0	0.005	0.43	2.01	21.0	2	3.9	316	0.92	0.15	20.3	0.733	1.40	2.6	153
MRGeo08															
Target Range - Lower Bound															
Upper Bound															
MRGeo08	154.5	0.008	0.28	4.12	11.2	1	3.7	277	1.40	<0.05	17.95	0.475	0.90	5.1	101
Target Range - Lower Bound	173.5	0.004	0.27	3.89	11.1	<1	3.5	277	1.39	<0.05	17.90	0.443	0.86	4.9	97
Upper Bound	212	0.013	0.35	5.39	13.7	4	4.7	339	1.81	0.12	21.9	0.553	1.21	6.2	121
OREAS 152a	19.9	0.308	0.89	1.40	22.7	8	1.5	112.5	0.06	0.18	0.25	0.334	0.20	0.1	285
Target Range - Lower Bound	19.7	0.264	0.80	1.28	19.4	6	1.1	107.0	<0.05	0.07	0.24	0.278	0.15	<0.1	269
Upper Bound	24.2	0.327	1.00	1.85	23.9	10	2.1	131.0	0.17	0.28	0.32	0.351	0.28	0.3	331
OREAS 602															
Target Range - Lower Bound															
Upper Bound															
BLANKS															
BLANK															
BLANK															
Target Range - Lower Bound															
Upper Bound															
BLANK	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2	<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1
BLANK	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2	<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1
BLANK	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2	<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1
BLANK	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2	<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1
Target Range - Lower Bound	<0.1	<0.002	<0.01	<0.05	<0.1	<1	<0.2	<0.2	<0.05	<0.05	<0.01	<0.005	<0.02	<0.1	<1
Upper Bound	0.2	0.004	0.02	0.10	0.2	2	0.4	0.4	0.10	0.10	0.02	0.010	0.04	0.2	2

***** See Appendix Page for comments regarding this certificate *****

Australian Laboratory Services Pty. Ltd.
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ALS Brisbane is a NATA Accredited Testing Laboratory. Corporate Accreditation No: 825, Corporate Site No: 818.

To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm
	LOD	0.1	0.1	2	0.5
STANDARDS					
EMOG-17					
Target Range - Lower Bound					
Upper Bound					
EMOG-17		3.5	16.5	7240	64.8
Target Range - Lower Bound		3.3	14.3	6800	55.6
Upper Bound		4.7	17.7	8320	76.4
GBM908-10					
Target Range - Lower Bound					
Upper Bound					
GBM908-10		3.5	39.6	1070	155.5
Target Range - Lower Bound		2.9	35.2	961	117.5
Upper Bound		4.1	43.2	1180	160.5
MRGeo08					
Target Range - Lower Bound					
Upper Bound					
MRGeo08		4.6	24.2	777	109.0
Target Range - Lower Bound		4.1	23.8	722	92.2
Upper Bound		5.8	29.3	886	126.0
OREAS 152a		4.0	10.2	83	1.6
Target Range - Lower Bound		3.4	9.7	76	3.6
Upper Bound		4.8	12.1	98	6.6
OREAS 602					
Target Range - Lower Bound					
Upper Bound					
BLANKS					
BLANK					
BLANK					
Target Range - Lower Bound					
Upper Bound					
BLANK		<0.1	<0.1	<2	<0.5
BLANK		<0.1	<0.1	<2	<0.5
BLANK		<0.1	<0.1	<2	<0.5
BLANK		<0.1	<0.1	<2	<0.5
Target Range - Lower Bound		<0.1	<0.1	<2	<0.5
Upper Bound		0.2	0.2	4	1.0

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method / Analyte / Units / LOD	ME-MS61 Ag ppm 0.01	ME-MS61 Al % 0.01	ME-MS61 As ppm 0.2	ME-MS61 Ba ppm 10	ME-MS61 Be ppm 0.05	ME-MS61 Bi ppm 0.01	ME-MS61 Ca % 0.01	ME-MS61 Cd ppm 0.02	ME-MS61 Ce ppm 0.01	ME-MS61 Co ppm 0.1	ME-MS61 Cr ppm 1	ME-MS61 Cs ppm 0.05	ME-MS61 Cu ppm 0.2	ME-MS61 Fe % 0.01	ME-MS61 Ga ppm 0.05
DUPLICATES																
TGO360043		0.03	6.78	18.3	240	1.26	0.01	5.65	0.17	42.1	44.3	88	0.26	58.3	9.49	22.9
DUP		0.03	7.43	19.6	240	1.21	0.02	5.73	0.18	47.4	44.8	89	0.32	52.1	9.70	22.3
Target Range - Lower Bound		0.02	6.74	17.8	210	1.12	<0.01	5.40	0.15	42.5	42.2	88	0.29	53.1	9.11	21.4
Upper Bound		0.04	7.47	20.1	270	1.35	0.02	5.98	0.20	47.0	46.9	94	0.35	57.3	10.10	23.8
TGO358590		0.10	8.50	4.6	770	1.24	0.01	5.14	0.05	36.3	25.7	13	1.04	212	6.82	18.45
DUP		0.09	8.09	4.2	730	1.18	0.01	4.98	0.06	33.9	25.6	14	0.96	215	6.63	18.35
Target Range - Lower Bound		0.08	7.87	4.0	680	1.10	<0.01	4.80	0.03	33.3	24.3	12	0.90	206	6.38	17.45
Upper Bound		0.11	8.72	4.8	820	1.32	0.02	5.32	0.08	36.9	27.0	15	1.10	221	7.07	19.35
TGO358671		0.08	7.89	9.9	1210	0.96	0.08	2.29	0.16	32.3	13.6	38	1.05	82.9	3.90	16.20
DUP		0.10	7.87	9.1	1210	0.89	0.07	2.29	0.17	31.2	14.0	38	1.03	91.5	4.03	15.60
Target Range - Lower Bound		0.08	7.48	8.8	1110	0.83	0.06	2.17	0.14	30.2	13.0	35	0.94	83.9	3.76	15.05
Upper Bound		0.10	8.28	10.2	1310	1.02	0.09	2.41	0.19	33.3	14.6	41	1.14	90.5	4.17	16.75
TGO358672																
DUP																
Target Range - Lower Bound																
Upper Bound																

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	Hg-MS42	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	Ge	Hf	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	Pb
	Units	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm
	LOD	0.05	0.1	0.005	0.005	0.01	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5
DUPLICATES																
TGO360043		0.18	4.3	<0.005	0.109	0.70	17.0	13.2	3.31	1660	0.95	2.18	13.1	51.1	1990	2.3
DUP		0.17	4.8	<0.005	0.121	0.74	19.3	12.3	3.46	1660	0.95	2.19	13.0	48.6	2070	2.6
Target Range - Lower Bound		0.11	4.2	<0.005	0.104	0.67	16.7	11.9	3.21	1570	0.85	2.07	12.3	47.2	1920	1.8
Upper Bound		0.24	4.9	0.010	0.126	0.77	19.6	13.6	3.56	1750	1.05	2.30	13.8	52.5	2140	3.1
TGO358590		0.12	2.1	<0.005	0.051	0.89	15.4	16.4	2.12	1150	0.83	3.18	5.3	12.5	1620	3.7
DUP		0.14	2.2	<0.005	0.056	0.85	14.4	15.9	2.05	1140	0.82	3.08	5.3	11.8	1600	3.6
Target Range - Lower Bound		0.07	1.9	<0.005	0.046	0.82	13.7	15.1	1.97	1085	0.73	2.96	4.9	11.3	1520	3.0
Upper Bound		0.19	2.4	0.010	0.061	0.92	16.1	17.2	2.20	1205	0.92	3.30	5.7	13.0	1700	4.3
TGO358671		0.16	2.7		0.054	3.29	15.3	18.6	1.09	494	2.01	1.06	4.5	20.7	830	5.9
DUP		0.15	2.5		0.059	3.30	15.0	17.7	1.09	493	2.07	1.06	4.5	22.9	830	5.9
Target Range - Lower Bound		0.09	2.4		0.049	3.12	13.9	17.0	1.03	464	1.89	1.00	4.2	20.5	780	5.1
Upper Bound		0.22	2.8		0.064	3.47	16.4	19.3	1.15	523	2.19	1.12	4.8	23.1	880	6.7
TGO358672				<0.005												
DUP				0.006												
Target Range - Lower Bound				<0.005												
Upper Bound				0.010												

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method / Analyte / Units / LOD	ME-MS61 Rb ppm 0.1	ME-MS61 Re ppm 0.002	ME-MS61 S % 0.01	ME-MS61 Sb ppm 0.05	ME-MS61 Sc ppm 0.1	ME-MS61 Se ppm 1	ME-MS61 Sn ppm 0.2	ME-MS61 Sr ppm 0.2	ME-MS61 Ta ppm 0.05	ME-MS61 Te ppm 0.05	ME-MS61 Th ppm 0.01	ME-MS61 Ti % 0.005	ME-MS61 Tl ppm 0.02	ME-MS61 U ppm 0.1	ME-MS61 V ppm 1
							DUPLICATES									
TGO360043		6.2	0.002	0.15	0.87	39.5	1	1.7	289	0.74	<0.05	0.86	1.585	0.04	0.3	335
DUP		9.9	0.002	0.23	0.88	43.1	1	1.7	302	0.77	<0.05	1.08	1.605	0.05	0.3	334
	Target Range - Lower Bound	7.5	<0.002	0.17	0.76	39.1	<1	1.4	281	0.67	<0.05	0.91	1.510	<0.02	0.2	317
	Upper Bound	8.6	0.004	0.21	0.99	43.5	2	2.0	310	0.84	0.10	1.03	1.680	0.07	0.4	352
TGO358590		10.7	<0.002	0.06	1.27	25.2	<1	0.9	777	0.29	<0.05	2.00	0.515	0.04	1.1	247
DUP		10.1	<0.002	0.06	1.25	24.0	<1	0.9	753	0.28	<0.05	1.83	0.515	0.04	1.0	245
	Target Range - Lower Bound	9.8	<0.002	0.05	1.12	23.3	<1	0.7	727	0.22	<0.05	1.81	0.484	<0.02	0.9	233
	Upper Bound	11.0	0.004	0.07	1.40	25.9	2	1.1	803	0.35	0.10	2.02	0.546	0.06	1.2	259
TGO358671		90.0	0.003	1.38	1.22	23.1	1	0.8	357	0.25	0.05	2.55	0.357	0.67	3.0	162
DUP		90.6	0.004	1.54	1.19	22.4	2	0.8	359	0.25	0.05	2.47	0.358	0.64	2.9	161
	Target Range - Lower Bound	85.7	<0.002	1.38	1.06	21.5	<1	0.6	340	0.19	<0.05	2.37	0.335	0.59	2.7	152
	Upper Bound	94.9	0.004	1.54	1.35	24.0	2	1.0	376	0.31	0.10	2.65	0.380	0.72	3.2	171
TGO358672																
DUP																
	Target Range - Lower Bound															
	Upper Bound															

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

Sample Description	Method	ME-MS61	ME-MS61	ME-MS61	ME-MS61
	Analyte	W	Y	Zn	Zr
	Units	ppm	ppm	ppm	ppm
	LOD	0.1	0.1	2	0.5
DUPLICATES					
TGO360043		0.5	42.4	129	201
DUP		0.5	47.0	132	218
Target Range - Lower Bound		0.4	42.4	122	193.5
Upper Bound		0.6	47.0	139	226
TGO358590		0.4	19.0	107	81.3
DUP		0.4	18.3	105	82.6
Target Range - Lower Bound		0.3	17.6	99	75.3
Upper Bound		0.5	19.7	113	88.6
TGO358671		0.3	16.8	105	104.5
DUP		0.3	17.0	106	105.0
Target Range - Lower Bound		0.2	16.0	98	96.4
Upper Bound		0.4	17.8	113	113.0
TGO358672					
DUP					
Target Range - Lower Bound					
Upper Bound					

***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 6-SEP-2021
Account: ALSENV

Project: EB2123278

QC CERTIFICATE OF ANALYSIS BR21226530

CERTIFICATE COMMENTS

ANALYTICAL COMMENTS

REEs may not be totally soluble in this method.

Applies to Method: ME-MS61

ACCREDITATION COMMENTS

NATA Accreditation covers the performance of this service but does not cover the performance of ALS Brisbane Sample Preparation. Corporate Accreditation No: 825, Corporate Site No: 818. The Technical Signatory is David Jones,ICPMS Supervising Chemist

Applies to Method: ME-MS61

LABORATORY ADDRESSES

Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia

Applies to Method:				
	Hg-MS42	LEV-01	LOG-22	ME-MS61

CHAIN OF CUSTODY FORM

THIS COLUMN FOR LAB USE ONLY

Job Code: [redacted]2021054

Due Date: [redacted]

Custody seal intact? YES / NO

Sample cold? YES / NO

FROM: Alan Robertson
DATE: 16/09/2021

RGS Environmental Consultants Pty Ltd
3/30 Lensworth St, Coopers Plains QLD 4108
Ph: 07 3344 1222

Project No: 2021054
Project Name: Tomingley Gold Eastern Cutback Project
Project Manager: Alan Robertson
Contact Number: 431620623
Agreement No: Alkane Paying ALS

Released for RGS by: Ben Freidman
Date: Time:

[redacted]

TO: Australian Laboratory Services (Brisbane)
TO: Carsten Emrich
2 Byth Street (cnr Shand & Byth Street)
Stafford QLD 4053. T +61 7 3243 7222
D +61 7 3552 8616

Sampler(s):
Signature(s):
Checked:

Received for Laboratory by:
Date: Time:

Container Size, Type, Preservative and Analysis

Container Ident: 0.075mm Solid / Pulp

Environmental Division Brisbane
Work Order Reference
EB2126587

Telephone : +61-7-3243 7222

Analytes: EA026: Chromium Reducible Sulfur (Scr)

Return all samples to RGS following EA026 analysis

Lab identification	Date	Matrix	SCR			Total no	Tick required analytes									
1	16-Sep-21	Solid	TGO360034			1	✓						✓			
2	16-Sep-21	Solid	TGO360035			1	✓						✓			
3	16-Sep-21	Solid	TGO360036			1	✓						✓			
4	16-Sep-21	Solid	TGO360037			1	✓						✓			
5	16-Sep-21	Solid	TGO360038			1	✓						✓			
6	16-Sep-21	Solid	TGO360039										✓			
7	16-Sep-21	Solid	TGO360040										✓			
8	16-Sep-21	Solid	TGO360041			1	✓						✓			
9	16-Sep-21	Solid	TGO360042			1	✓						✓			
10	16-Sep-21	Solid	TGO360043			1	✓						✓			
11	16-Sep-21	Solid	TGO360044			1	✓						✓			
12	16-Sep-21	Solid	TGO358577										✓			
13	16-Sep-21	Solid	TGO358578										✓			
14	16-Sep-21	Solid	TGO358579			1	✓						✓			
15	16-Sep-21	Solid	TGO358580			1	✓						✓			
16	16-Sep-21	Solid	TGO358581										✓			
17	16-Sep-21	Solid	TGO358582										✓			
18	16-Sep-21	Solid	TGO358583			1	✓						✓			
19	16-Sep-21	Solid	TGO358584			1	✓						✓			
20	16-Sep-21	Solid	TGO358585										✓			
21	16-Sep-21	Solid	TGO358586			1	✓						✓			
22	16-Sep-21	Solid	TGO358587										✓			
23	16-Sep-21	Solid	TGO358588										✓			
24	16-Sep-21	Solid	TGO358589										✓			
25	16-Sep-21	Solid	TGO358590										✓			
26	16-Sep-21	Solid	TGO358591			1	✓						✓			

CHAIN OF CUSTODY FORM

THIS COLUMN FOR LAB USE ONLY

Job Code: [redacted] 2021 054

Due Date: [redacted] 2021

FROM:	Alan Robertson
DATE:	16/09/2021
	RGS Environmental Consultants Pty Ltd
	3/30 Lensworth St, Coopers Plains QLD 4108
	Ph: 07 3344 1222
Project No:	2021054
Project Name:	Tomingley Gold Eastern Cutback Project
Project Manager	Alan Robertson
Contact Number:	431620623
Agreement No:	Alkane Paying ALS
Released for RGS by:	Ben Freidman
Date:	Time:

Custody seal intact? YES / NO

Sample cold? YES / NO

TO:	Australian Laboratory Services (Brisbane)
TO:	Carsten Emrich
	2 Byth Street (cnr Shand & Byth Street)
	Stafford QLD 4053. T +61 7 3243 7222 D +61 7 3552 8616
Sampler(s):	
Signature(s):	
Checked:	
Received for Laboratory by:	
Date:	Time:

Lab identification	Date	Matrix	SCR			Total no	Container Size, Type, Preservative and Analysis									
						Analytes	Container Identification									
							0.075mm									
							Solid									
							Pulp									
							EA026: Chromium Reducible Sulfur (Scr)						Return all samples to RGS following EA026 analysis			
							Tick required analytes									
27	16-Sep-21	Solid	TGO358592										✓			
28	16-Sep-21	Solid	TGO358593			1	✓						✓			
29	16-Sep-21	Solid	TGO358594										✓			
30	16-Sep-21	Solid	TGO358595			1	✓						✓			
31	16-Sep-21	Solid	TGO358596			1	✓						✓			
32	16-Sep-21	Solid	TGO358597			1	✓						✓			
33	16-Sep-21	Solid	TGO358598										✓			
34	16-Sep-21	Solid	TGO358599										✓			
35	16-Sep-21	Solid	TGO358600										✓			
36	16-Sep-21	Solid	TGO358601			1	✓						✓			
37	16-Sep-21	Solid	TGO358602										✓			
38	16-Sep-21	Solid	TGO358646										✓			
39	16-Sep-21	Solid	TGO358647										✓			
40	16-Sep-21	Solid	TGO358649			1	✓						✓			
41	16-Sep-21	Solid	TGO358650			1	✓						✓			
42	16-Sep-21	Solid	TGO358669			1	✓						✓			
43	16-Sep-21	Solid	TGO358670			1	✓						✓			
44	16-Sep-21	Solid	TGO358671			1	✓						✓			
45	16-Sep-21	Solid	TGO358672			1	✓						✓			
46	16-Sep-21	Solid	TGO358673			1	✓						✓			

CHAIN OF CUSTODY FORM

THIS COLUMN FOR LAB USE ONLY

Job Code: 2021054

Due Date: 23-Sep-21

FROM:	Alan Robertson
DATE:	16/09/2021
	RGS Environmental Consultants Pty Ltd
	3/30 Lensworth St, Coopers Plains QLD 4108
	Ph: 07 3344 1222
Project No:	2021054
Project Name:	Tomingley Gold Eastern Cutback Project
Project Manager	Alan Robertson
Contact Number:	431620623
Agreement No:	Alkane Paying ALS
Released for RGS by:	Ben Freidman
Date:	Time:

TO: Australian Laboratory Services (Brisbane)
TO: Carsten Emrich
2 Byth Street (cnr Shand & Byth Street)
Stafford QLD 4053. T +61 7 3243 7222
D +61 7 3552 8616

Sampler(s):
Signature(s):
Checked:
Received for Laboratory by:
Date: Time:

Custody seal intact? YES / NO

Sample cold? YES / NO

Container Size, Type, Preservative and Analysis

Container Identification	0.075mm								
	Solid								
	Pulp								
Analytes	EA026: Chromium Reducible Sulfur (Scr)						Return all samples to RGS following EA026 analysis		
Total no	Tick required analytes								

Lab identification	Date	Matrix	SCR												
47	16-Sep-21	Solid	TGO358674									✓			
48	16-Sep-21	Solid	TGO358675			1	✓					✓			
49	16-Sep-21	Solid	TGO358676									✓			
50	16-Sep-21	Solid	TGO358677			1	✓					✓			
	Note:														
Remarks:					TOTAL	29	29	0	0	0	0	0	50	0	0

* Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinsed Jar; S = Solvent Washed Acid Rinsed Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; RF = Refrigerated

Courier Job No:

Specify Turnaround Time: 23-Sep-21

Email results to: ben@rgsenv.com alan@rgsenv.com laboratory@rgsenv.com CPridmore@alkane.com.au

Email invoice to: select PM email dkynaston@alkane.com.au

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2126587**

Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: C PRIDMORE	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: cpridmore@alkane.com.au	E-mail	: ALSEnviro.Brisbane@alsglobal.com
Telephone	: +61 02 6867 9780	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Page	: 1 of 4
Order number	: ----	Quote number	: EB2017ALKANE0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 20-Sep-2021 09:00	Issue Date	: 20-Sep-2021
Client Requested Due Date	: 28-Sep-2021	Scheduled Reporting Date	: **28-Sep-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: AMBIENT
Receipt Detail	: PALLET	No. of samples received / analysed	: 50 / 29

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **This work order has been crerated to re-batch samples from Brisbane work order EB2123278**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) SOIL No analysis requested	SOIL - EA026 Chromium Reducible Sulphur
EB2126587-001	16-Sep-2021 00:00	TGO360034		✓
EB2126587-002	16-Sep-2021 00:00	TGO360035		✓
EB2126587-003	16-Sep-2021 00:00	TGO360036		✓
EB2126587-004	16-Sep-2021 00:00	TGO360037		✓
EB2126587-005	16-Sep-2021 00:00	TGO360038		✓
EB2126587-006	16-Sep-2021 00:00	TGO360039	✓	
EB2126587-007	16-Sep-2021 00:00	TGO360040	✓	
EB2126587-008	16-Sep-2021 00:00	TGO360041		✓
EB2126587-009	16-Sep-2021 00:00	TGO360042		✓
EB2126587-010	16-Sep-2021 00:00	TGO360043		✓
EB2126587-011	16-Sep-2021 00:00	TGO360044		✓
EB2126587-012	16-Sep-2021 00:00	TGO358577	✓	
EB2126587-013	16-Sep-2021 00:00	TGO358578	✓	
EB2126587-014	16-Sep-2021 00:00	TGO358579		✓
EB2126587-015	16-Sep-2021 00:00	TGO358580		✓
EB2126587-016	16-Sep-2021 00:00	TGO358581	✓	
EB2126587-017	16-Sep-2021 00:00	TGO358582	✓	
EB2126587-018	16-Sep-2021 00:00	TGO358583		✓
EB2126587-019	16-Sep-2021 00:00	TGO358584		✓
EB2126587-020	16-Sep-2021 00:00	TGO358585	✓	
EB2126587-021	16-Sep-2021 00:00	TGO358586		✓
EB2126587-022	16-Sep-2021 00:00	TGO358587	✓	
EB2126587-023	16-Sep-2021 00:00	TGO358588	✓	
EB2126587-024	16-Sep-2021 00:00	TGO358589	✓	
EB2126587-025	16-Sep-2021 00:00	TGO358590	✓	
EB2126587-026	16-Sep-2021 00:00	TGO358591		✓
EB2126587-027	16-Sep-2021 00:00	TGO358592	✓	
EB2126587-028	16-Sep-2021 00:00	TGO358593		✓
EB2126587-029	16-Sep-2021 00:00	TGO358594	✓	
EB2126587-030	16-Sep-2021 00:00	TGO358595		✓
EB2126587-031	16-Sep-2021 00:00	TGO358596		✓
EB2126587-032	16-Sep-2021 00:00	TGO358597		✓
EB2126587-033	16-Sep-2021 00:00	TGO358598	✓	
EB2126587-034	16-Sep-2021 00:00	TGO358599	✓	
EB2126587-035	16-Sep-2021 00:00	TGO358600	✓	

			(On Hold) SOIL No analysis requested	SOIL - EA026 Chromium Reducible Sulphur
EB2126587-036	16-Sep-2021 00:00	TGO358601		✓
EB2126587-037	16-Sep-2021 00:00	TGO358602	✓	
EB2126587-038	16-Sep-2021 00:00	TGO358646	✓	
EB2126587-039	16-Sep-2021 00:00	TGO358647	✓	
EB2126587-040	16-Sep-2021 00:00	TGO358649		✓
EB2126587-041	16-Sep-2021 00:00	TGO358650		✓
EB2126587-042	16-Sep-2021 00:00	TGO358669		✓
EB2126587-043	16-Sep-2021 00:00	TGO358670		✓
EB2126587-044	16-Sep-2021 00:00	TGO358671		✓
EB2126587-045	16-Sep-2021 00:00	TGO358672		✓
EB2126587-046	16-Sep-2021 00:00	TGO358673		✓
EB2126587-047	16-Sep-2021 00:00	TGO358674	✓	
EB2126587-048	16-Sep-2021 00:00	TGO358675		✓
EB2126587-049	16-Sep-2021 00:00	TGO358676	✓	
EB2126587-050	16-Sep-2021 00:00	TGO358677		✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ACCOUNTS		
- A4 - AU Tax Invoice (INV)	Email	accounts@alkane.com.au
ALAN ROBERTSON		
- *AU Certificate of Analysis - NATA (COA)	Email	alan@rgsenv.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	alan@rgsenv.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	alan@rgsenv.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	alan@rgsenv.com
- Chain of Custody (CoC) (COC)	Email	alan@rgsenv.com
- EDI Format - ENMRG (ENMRG)	Email	alan@rgsenv.com
- EDI Format - ESDAT (ESDAT)	Email	alan@rgsenv.com
BEN		
- *AU Certificate of Analysis - NATA (COA)	Email	ben@rgsenv.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ben@rgsenv.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ben@rgsenv.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ben@rgsenv.com
- Chain of Custody (CoC) (COC)	Email	ben@rgsenv.com
- EDI Format - ENMRG (ENMRG)	Email	ben@rgsenv.com
- EDI Format - ESDAT (ESDAT)	Email	ben@rgsenv.com
C PRIDMORE		
- *AU Certificate of Analysis - NATA (COA)	Email	cpridmore@alkane.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	cpridmore@alkane.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	cpridmore@alkane.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	cpridmore@alkane.com.au
- Chain of Custody (CoC) (COC)	Email	cpridmore@alkane.com.au
- EDI Format - ENMRG (ENMRG)	Email	cpridmore@alkane.com.au
- EDI Format - ESDAT (ESDAT)	Email	cpridmore@alkane.com.au
DAVID KYNASTON		
- A4 - AU Tax Invoice (INV)	Email	dkynaston@alkane.com.au
RGS REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	laboratory@rgsenv.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	laboratory@rgsenv.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	laboratory@rgsenv.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	laboratory@rgsenv.com
- Chain of Custody (CoC) (COC)	Email	laboratory@rgsenv.com
- EDI Format - ENMRG (ENMRG)	Email	laboratory@rgsenv.com
- EDI Format - ESDAT (ESDAT)	Email	laboratory@rgsenv.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2126587**	Page	: 1 of 8
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: C PRIDMORE	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 02 6867 9780	Telephone	: +61-7-3243 7222
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Date Samples Received	: 20-Sep-2021 09:00
Order number	: ----	Date Analysis Commenced	: 24-Sep-2021
C-O-C number	: ----	Issue Date	: 24-Sep-2021 10:58
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 50		
No. of samples analysed	: 29		

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*
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: **PULP** (Matrix: **SOIL**)			Sample ID	TGO360034	TGO360035	TGO360036	TGO360037	TGO360038
			Sampling date / time	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2126587-001**	**EB2126587-002**	**EB2126587-003**	**EB2126587-004**	**EB2126587-005**
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**1.34**	**2.52**	**2.57**	**0.964**	**0.119**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	TGO360041	TGO360042	TGO360043	TGO360044	TGO358579
			Sampling date / time	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2126587-008**	**EB2126587-009**	**EB2126587-010**	**EB2126587-011**	**EB2126587-014**
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.126**	**0.151**	**0.179**	**0.831**	**0.549**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	TGO358580	TGO358583	TGO358584	TGO358586	TGO358591
			Sampling date / time	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2126587-015**	**EB2126587-018**	**EB2126587-019**	**EB2126587-021**	**EB2126587-026**
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.699**	**0.766**	**1.20**	**0.203**	**0.248**

Analytical Results

Sub-Matrix: PULP (Matrix: SOIL)			Sample ID	TGO358593	TGO358595	TGO358596	TGO358597	TGO358601
			Sampling date / time	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00
Compound	CAS Number	LOR	Unit	EB2126587-028	EB2126587-030	EB2126587-031	EB2126587-032	EB2126587-036
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.124**	**1.25**	**1.31**	**1.32**	**0.161**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	TGO358649	TGO358650	TGO358669	TGO358670	TGO358671
			Sampling date / time	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2126587-040**	**EB2126587-041**	**EB2126587-042**	**EB2126587-043**	**EB2126587-044**
				Result	Result	Result	Result	Result
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**0.799**	**0.470**	**0.899**	**0.568**	**1.34**

Analytical Results

Sub-Matrix: **PULP** (Matrix: **SOIL**)			Sample ID	**TGO358672**	**TGO358673**	**TGO358675**	**TGO358677**	**----**
			Sampling date / time	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	16-Sep-2021 00:00	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB2126587-045**	**EB2126587-046**	**EB2126587-048**	**EB2126587-050**	**--------**
				Result	Result	Result	Result	----
EA026 : Chromium Reducible Sulfur								
Chromium Reducible Sulphur	----	0.005	%	**1.24**	**0.228**	**1.17**	**1.06**	**----**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2126587**	Page	: 1 of 3
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: C PRIDMORE	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 02 6867 9780	Telephone	: +61-7-3243 7222
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Date Samples Received	: 20-Sep-2021
Order number	: ----	Date Analysis Commenced	: 24-Sep-2021
C-O-C number	: ----	Issue Date	: 24-Sep-2021
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 50		
No. of samples analysed	: 29		

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 Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA026 : Chromium Reducible Sulfur (QC Lot: 3918813)									
EB2126587-011	TGO360044	EA026: Chromium Reducible Sulphur	----	0.005	%	0.831	0.894	7.2	0% - 20%
EB2124233-001	Anonymous	EA026: Chromium Reducible Sulphur	----	0.005	%	1.21	1.23	1.1	0% - 20%
EA026 : Chromium Reducible Sulfur (QC Lot: 3918816)									
EB2126587-032	TGO358597	EA026: Chromium Reducible Sulphur	----	0.005	%	1.32	1.31	0.3	0% - 20%
EB2126587-050	TGO358677	EA026: Chromium Reducible Sulphur	----	0.005	%	1.06	1.10	4.0	0% - 20%

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA026 : Chromium Reducible Sulfur (QCLot: 3918813)								
EA026: Chromium Reducible Sulphur	----	0.005	%	<0.005	0.246 %	98.7	78.7	111
EA026 : Chromium Reducible Sulfur (QCLot: 3918816)								
EA026: Chromium Reducible Sulphur	----	0.005	%	<0.005	0.246 %	98.5	78.7	111

Matrix Spike (MS) Report

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

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2126587**	Page	: 1 of 4
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: C PRIDMORE	Telephone	: +61-7-3243 7222
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Date Samples Received	: 20-Sep-2021
Site	: ----	Issue Date	: 24-Sep-2021
Sampler	: ----	No. of samples received	: 50
Order number	: ----	No. of samples analysed	: 29

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA026 : Chromium Reducible Sulfur							
80* dried soil (EA026)							
TGO360034, TGO360035, TGO360036, TGO360037, TGO360038, TGO360041, TGO360042, TGO360043, TGO360044, TGO358579, TGO358580, TGO358583, TGO358584, TGO358586, TGO358591, TGO358593, TGO358595, TGO358596, TGO358597, TGO358601, TGO358649, TGO358650, TGO358669, TGO358670, TGO358671, TGO358672, TGO358673, TGO358675, TGO358677	**16-Sep-2021**	**24-Sep-2021**	11-Jun-2024	✓	**24-Sep-2021**	23-Dec-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Chromium Reducible Sulphur	EA026	4	34	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Reducible Sulphur	EA026	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Reducible Sulphur	EA026	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Chromium Reducible Sulphur	EA026	SOIL	In house: Referenced to Sullivan et al (1998) The CRS method converts reduced inorganic sulfur to H2S by CrCl2 solution ; the evolved H2S is trapped in a zinc acetate solution as ZnS which is quantified by iodometric titration.

Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house

CHAIN OF CUSTODY FORM

THIS COLUMN FOR LAB USE ONLY

Job Code:

Due Date:

FROM:	Ben Freidman	TO: Australian Laboratory Services (Brisbane)	
DATE:	30/09/2021	TO: Carsten Emrich	
RGS Environmental Consultants Pty Ltd 3/30 Lensworth St, Coopers Plains QLD 4108 Ph: 07 3344 1222		2 Byth Street (cnr Shand & Byth Street) Stafford QLD 4053. T +61 7 3243 7222 D +61 7 3552 8616	
Project No:	2021054	Sampler(s):	Ben Freidman
Project Name:	TGO ECB	Signature(s):	
Project Manager	Ben Freidman		
Contact Number:	0406480676	Checked:	
Agreement No:	Alkane Resources - D Kynaston		
Released for RGS by:	Ben Freidman	Received for Laboratory by:	
Date:	Time:	Date: 30/9/21	Time: 1635

Custody seal intact? YES NO

Sample cold? YES NO

							0.075mm	0.075mm	0.075mm	0.075mm	0.075mm	<20 mm		As received	As received
							Water	Water	Water	Water	Water	Water	Water	Solid	Solid
							Pulp	Pulp	Pulp	Pulp	Pulp	Crushed	Water	As recieved	As recieved
Lab identification	Date	Matrix		ME	CEC	Total no	IN-4S: pH and EC (at 1:5 w/v) (Includes EA002 and EA010)	RGS Suite 1: (1:5 Ca, Mg, Na, K) (Soil)	RGS Suite 2: (1:5 Cl, SO4, F, RP) (Soil)	RGS Suite 3: (1:5 Alkalinity/Acitity) (Soil)	RGS Suite 4 (1:5 Metals ICPMS/AES, FIMS)	ED007: Exchangeable Cations (Ca, Mg, Na, K) plus ECEC & ESP on Soils (pH < 7.3 and EC <300µm) NOTE: If pH < 6.0 ECEC includes ED005 - Exchange Acidity (Includes Exchangeable Aluminium)	EN/34: please report pH and EC of DI water used in test work	EA058: Emmerson Aggregate Test	EA0150-H: Particle Size Distribution
1	30-Sep-21	Solid		2021054_C012	2021054_C012		✓	✓	✓	✓	✓	✓	✓	✓	✓
2	30-Sep-21	Solid		2021054_C013	2021054_C013		✓	✓	✓	✓	✓	✓	✓	✓	✓
3	30-Sep-21	Solid		2021054_C014	2021054_C014		✓	✓	✓	✓	✓	✓	✓	✓	✓
4	30-Sep-21	Solid		2021054_C015	2021054_C015		✓	✓	✓	✓	✓	✓	✓	✓	✓
5	30-Sep-21	Solid		2021054_C016	2021054_C016		✓	✓	✓	✓	✓		✓		
6	30-Sep-21	Solid		2021054_C017	2021054_C017		✓	✓	✓	✓	✓		✓		
7	30-Sep-21	Solid		2021054_C018	2021054_C018		✓	✓	✓	✓	✓		✓		
8	30-Sep-21	Solid		2021054_C019	2021054_C019		✓	✓	✓	✓	✓		✓		
					TOTAL	0	8	8	8	8	8	4	8	4	4

Remarks:

* Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinsed Jar; S = Solvent Washed Acid Rinsed Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; RF = Refrigerated

Courier Job No:

Specify Turnaround Time: 5-Oct-21

Email results to: ben@rgsenv.com alan@rgsenv.com laboratory@rgsenv.com

Email invoice to: patti-anne@rgsenv.com alan@rgsenv.com dkynaston@alkane.com.au

Environmental Division
Brisbane
Work Order Reference
EB2127839

URGENT

Telephone : +61-7-3243 7222

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2127839**

Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID KYNASTON	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dkynaston@alkane.com.au	E-mail	: ALSEnviro.Brisbane@alsglobal.com
Telephone	: ----	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Page	: 1 of 4
Order number	: ----	Quote number	: EB2017ALKANE0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: BEN FREIDMAN		

Dates

Date Samples Received	: 30-Sep-2021 16:35	Issue Date	: 01-Oct-2021
Client Requested Due Date	: 12-Oct-2021	Scheduled Reporting Date	: **12-Oct-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 23.2°C
Receipt Detail	: BAG	No. of samples received / analysed	: 9 / 9

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

Method Sample ID	Sample Container Received	Preferred Sample Container for Analysis
Soluble Mercury by FIMS : EG035S		
2021054_C012	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C013	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C014	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C015	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C016	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C017	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C018	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C019	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
Soluble Metals by ICP-MS - Suite X : EG020X-S		
2021054_C012	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C013	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C014	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C015	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C016	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C017	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C018	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C019	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
Soluble Metals by ICP-MS - Suite Y : EG020Y-S		
2021054_C012	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C013	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C014	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C015	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C016	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C017	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C018	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
2021054_C019	- Snap Lock Bag	- Soil Glass Jar - Unpreserved

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EB2127839-009 : [30-Sep-2021] : pH and EC of DI water

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - ED037 Alkalinity in Soil	SOIL - ED038 Acidity in Soil	SOIL - IN-4S pH plus EC (1:5)	SOIL - RGS Suite 1 RGS Suite 1 (1:5 Ca, Mg, Na, K)	SOIL - RGS Suite 2 RGS Suite 2 (1:5 Cl, SO4, F, RP)	SOIL - RGS Suite 3 RGS Suite 3 (1:5 Alkalinity/Acidity)	SOIL - RGS Suite 4 RGS Suite 4 (1:5 Metals ICPMS/AES, FIMS)
EB2127839-001	30-Sep-2021 00:00	2021054_C012	✓	✓	✓	✓	✓	✓	✓
EB2127839-002	30-Sep-2021 00:00	2021054_C013	✓	✓	✓	✓	✓	✓	✓
EB2127839-003	30-Sep-2021 00:00	2021054_C014	✓	✓	✓	✓	✓	✓	✓
EB2127839-004	30-Sep-2021 00:00	2021054_C015	✓	✓	✓	✓	✓	✓	✓
EB2127839-005	30-Sep-2021 00:00	2021054_C016	✓	✓	✓	✓	✓	✓	✓
EB2127839-006	30-Sep-2021 00:00	2021054_C017	✓	✓	✓	✓	✓	✓	✓
EB2127839-007	30-Sep-2021 00:00	2021054_C018	✓	✓	✓	✓	✓	✓	✓
EB2127839-008	30-Sep-2021 00:00	2021054_C019	✓	✓	✓	✓	✓	✓	✓
EB2127839-009	30-Sep-2021 00:00	pH and EC of DI water			✓				

Matrix: **SOIL**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	SOIL - AG-1 EB Only Agricultural Soil Suite 1 EB Only	SOIL - EA058 Emerson Aggregate Test	SOIL - EA150H/EA152 Particle Sizing with Hydrometer + Soil Particle
EB2127839-001	30-Sep-2021 00:00	2021054_C012	✓	✓	✓
EB2127839-002	30-Sep-2021 00:00	2021054_C013	✓	✓	✓
EB2127839-003	30-Sep-2021 00:00	2021054_C014	✓	✓	✓
EB2127839-004	30-Sep-2021 00:00	2021054_C015	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ACCOUNTS

- A4 - AU Tax Invoice (INV)	Email	accounts@alkane.com.au

ALAN ROBERTSON

- *AU Certificate of Analysis - NATA (COA)	Email	alan@rgsenv.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	alan@rgsenv.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	alan@rgsenv.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	alan@rgsenv.com
- Attachment - Report (SUBCO)	Email	alan@rgsenv.com
- Chain of Custody (CoC) (COC)	Email	alan@rgsenv.com
- EDI Format - ENMRG (ENMRG)	Email	alan@rgsenv.com
- EDI Format - ESDAT (ESDAT)	Email	alan@rgsenv.com

BEN

- *AU Certificate of Analysis - NATA (COA)	Email	ben@rgsenv.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ben@rgsenv.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ben@rgsenv.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ben@rgsenv.com
- Attachment - Report (SUBCO)	Email	ben@rgsenv.com
- Chain of Custody (CoC) (COC)	Email	ben@rgsenv.com
- EDI Format - ENMRG (ENMRG)	Email	ben@rgsenv.com
- EDI Format - ESDAT (ESDAT)	Email	ben@rgsenv.com

DAVID KYNASTON

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

RGS REPORTS

- *AU Certificate of Analysis - NATA (COA)	Email	laboratory@rgsenv.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	laboratory@rgsenv.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	laboratory@rgsenv.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	laboratory@rgsenv.com
- Attachment - Report (SUBCO)	Email	laboratory@rgsenv.com
- Chain of Custody (CoC) (COC)	Email	laboratory@rgsenv.com
- EDI Format - ENMRG (ENMRG)	Email	laboratory@rgsenv.com
- EDI Format - ESDAT (ESDAT)	Email	laboratory@rgsenv.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2127839**	Page	: 1 of 7
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID KYNASTON	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Date Samples Received	: 30-Sep-2021 16:35
Order number	: ----	Date Analysis Commenced	: 01-Oct-2021
C-O-C number	: ----	Issue Date	: 12-Oct-2021 16:41
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 9		
No. of samples analysed	: 9		

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*
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
Satishkumar Trivedi	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.

- 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.
- ED006 (Exchangeable Cations on Alkaline Soils): Unable to calculate Calcium/Magnesium Ratio results as required Calcium & Magnesium results are less than the limit of reporting.
- ED006 (Exchangeable Cations on Alkaline Soils): Unable to calculate Magnesium/Potassium Ratio result as required Exchangeable Potassium results are less than the limit of reporting.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- 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)			Sample ID	2021054_C012	2021054_C013	2021054_C014	2021054_C015	2021054_C016
			Sampling date / time	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00
Compound	CAS Number	LOR	Unit	EB2127839-001	EB2127839-002	EB2127839-003	EB2127839-004	EB2127839-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	9.5	9.8	9.3	9.5	9.3
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	120	235	112	131	157
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Very Dark Greenish Gray (10GY 3/1)	Very Dark Greenish Gray (10GY 3/1)	Very Dark Greenish Gray (10GY 3/1)	Very Dark Greenish Gray (10GY 3/1)	----
Texture	----	-	-	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	----
Emerson Class Number	EC/TC	-	-	2	2	2	2	----
EA150: Particle Sizing								
+75µm	----	1	%	98	97	98	92	----
+150µm	----	1	%	97	97	97	89	----
+300µm	----	1	%	97	97	96	86	----
+425µm	----	1	%	96	96	96	85	----
+600µm	----	1	%	96	96	95	83	----
+1180µm	----	1	%	94	94	91	78	----
+2.36mm	----	1	%	81	84	78	60	----
+4.75mm	----	1	%	30	37	33	23	----
+9.5mm	----	1	%	<1	<1	<1	<1	----
+19.0mm	----	1	%	<1	<1	<1	<1	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	2	3	2	4	----
Silt (2-60 µm)	----	1	%	<1	<1	<1	3	----
Sand (0.06-2.00 mm)	----	1	%	13	10	16	27	----
Gravel (>2mm)	----	1	%	85	87	82	66	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	3.09	3.06	2.71	2.86	----
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	1.0	0.6	0.6	0.5	----
ø Exchangeable Magnesium	----	0.2	meq/100g	<0.2	<0.2	<0.2	<0.2	----
ø Exchangeable Potassium	----	0.2	meq/100g	<0.2	<0.2	<0.2	<0.2	----
ø Exchangeable Sodium	----	0.2	meq/100g	0.3	1.0	<0.2	0.2	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021054_C012	2021054_C013	2021054_C014	2021054_C015	2021054_C016
			Sampling date / time	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00
Compound	CAS Number	LOR	Unit	EB2127839-001	EB2127839-002	EB2127839-003	EB2127839-004	EB2127839-005
				Result	Result	Result	Result	Result
ED006: Exchangeable Cations on Alkaline Soils - Continued								
ø Cation Exchange Capacity	----	0.2	meq/100g	1.3	1.6	0.6	0.8	----
ø Exchangeable Sodium Percent	----	0.2	%	21.2	61.8	<0.2	31.2	----
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	27100	39200	46500	15200	22900
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	26700	38800	46100	15000	22800
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	461	329	395	198	132
ED038A: Acidity								
Acidity	----	1	mg/kg	<5	<5	<5	<5	<5
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	10	80	20	30	130
Silica	7631-86-9	1	mg/kg	17	38	9	17	11
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	<10	10	10	10	30
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	10	<10	20	10	30
Magnesium	7439-95-4	10	mg/kg	<10	<10	<10	<10	<10
Sodium	7440-23-5	10	mg/kg	110	260	80	140	110
Potassium	7440-09-7	10	mg/kg	30	20	40	20	60
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
EG020S: Soluble Metals by ICPMS								
Arsenic	7440-38-2	0.01	mg/kg	0.03	0.23	0.07	0.05	0.01
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	<0.01	<0.01	0.02
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	<0.01	<0.01	<0.01	0.01	0.02
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)			Sample ID	2021054_C012	2021054_C013	2021054_C014	2021054_C015	2021054_C016
			Sampling date / time	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00
Compound	CAS Number	LOR	Unit	EB2127839-001	EB2127839-002	EB2127839-003	EB2127839-004	EB2127839-005
				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**	**0.04**	**0.01**	**0.12**
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	**0.3**	<0.1	<0.1	<0.1
Aluminium	7429-90-5	0.1	mg/kg	**2.0**	**1.5**	**2.9**	**2.4**	**2.4**
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	**1**	**1**	**1**	**1**	**1**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.1	mg/kg	<0.1	**0.2**	<0.1	**0.1**	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021054_C017	2021054_C018	2021054_C019	pH and EC of DI water	----
			Sampling date / time	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	----
Compound	CAS Number	LOR	Unit	EB2127839-006	EB2127839-007	EB2127839-008	EB2127839-009	--------
				Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**9.6**	**9.1**	**8.6**	**5.9**	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**189**	**266**	**373**	<1	----
ED037: Alkalinity								
ø Total Alkalinity as CaCO3	----	1	mg/kg	**18800**	**21400**	**10400**	----	----
ø Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg	**18600**	**21200**	**10400**	----	----
ø Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg	**198**	**198**	<5	----	----
ED038A: Acidity								
Acidity	----	1	mg/kg	<5	<5	<5	----	----
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**120**	**350**	**610**	----	----
Silica	7631-86-9	1	mg/kg	**20**	**16**	**14**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	**30**	**80**	**90**	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	10	mg/kg	**10**	**50**	**150**	----	----
Magnesium	7439-95-4	10	mg/kg	<10	<10	**20**	----	----
Sodium	7440-23-5	10	mg/kg	**190**	**160**	**130**	----	----
Potassium	7440-09-7	10	mg/kg	**30**	**120**	**160**	----	----
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	----	----
EG020S: Soluble Metals by ICPMS								
Arsenic	7440-38-2	0.01	mg/kg	**0.03**	**0.04**	<0.01	----	----
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Barium	7440-39-3	0.01	mg/kg	<0.01	**0.03**	**0.08**	----	----
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	**0.04**	----	----
Molybdenum	7439-98-7	0.01	mg/kg	**0.03**	**0.04**	**0.04**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	2021054_C017	2021054_C018	2021054_C019	pH and EC of DI water	----
			Sampling date / time	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	30-Sep-2021 00:00	----
Compound	CAS Number	LOR	Unit	EB2127839-006	EB2127839-007	EB2127839-008	EB2127839-009	--------
				Result	Result	Result	Result	----
EG020S: Soluble Metals by ICPMS - Continued								
Nickel	7440-02-0	0.01	mg/kg	<0.01	<0.01	<0.01	----	----
Lead	7439-92-1	0.01	mg/kg	<0.01	<0.01	<0.01	----	----
Antimony	7440-36-0	0.01	mg/kg	**0.02**	**0.14**	**0.03**	----	----
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	**1.8**	**0.9**	**0.4**	----	----
EG035S: Soluble Mercury by FIMS								
Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	----	----
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	**1**	**2**	**2**	----	----
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	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2127839**	Page	: 1 of 6
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID KYNASTON	Contact	: Customer Services EB
Address	: 11 Johnson Street Dubbo NSW AUSTRALIA 2830	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Date Samples Received	: 30-Sep-2021
Order number	: ----	Date Analysis Commenced	: 01-Oct-2021
C-O-C number	: ----	Issue Date	: 12-Oct-2021
Sampler	: BEN FREIDMAN		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 9		
No. of samples analysed	: 9		

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 Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
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
Satishkumar Trivedi	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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)S : Soluble Metals by ICPAES (QC Lot: 3938505)									
EB2127839-001	2021054_C012	EG005S: Boron	7440-42-8	1	mg/kg	<1	<1	0.0	No Limit
		EG005S: Iron	7439-89-6	1	mg/kg	<1	<1	0.0	No Limit
EA002: pH 1:5 (Soils) (QC Lot: 3938511)									
EB2127839-001	2021054_C012	EA002: pH Value	----	0.1	pH Unit	9.5	9.5	0.0	0% - 20%
EB2127839-002	2021054_C013	EA002: pH Value	----	0.1	pH Unit	9.8	9.9	0.0	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 3938510)									
EB2127839-001	2021054_C012	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	120	120	0.0	0% - 20%
EB2127839-002	2021054_C013	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	235	238	1.1	0% - 20%
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 3944635)									
EB2126865-006	Anonymous	ED006: Exchangeable Calcium	----	0.2	meq/100g	0.6	0.7	15.9	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	0.6	0.7	0.0	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	<0.2	0.0	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	0.3	0.3	0.0	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	1.5	1.7	14.4	No Limit
ED037: Alkalinity (QC Lot: 3938509)									
EB2127839-001	2021054_C012	ED037: Carbonate Alkalinity as CaCO3	3812-32-6	5	mg/kg	461	527	13.3	0% - 20%
		ED037: Bicarbonate Alkalinity as CaCO3	71-52-3	5	mg/kg	26700	26600	0.2	0% - 20%
		ED037: Total Alkalinity as CaCO3	----	5	mg/kg	27100	27100	0.0	0% - 20%
ED038A: Acidity (QC Lot: 3938501)									
EB2127839-001	2021054_C012	ED038: Acidity	----	5	mg/kg	<5	<5	0.0	No Limit
ED040S: Soluble Major Anions (QC Lot: 3938503)									
EB2127839-001	2021054_C012	ED040S: Silica	7631-86-9	1	mg/kg	17	17	0.0	0% - 50%
		ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	10	10	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED040S: Soluble Major Anions (QC Lot: 3938503) - continued									
EB2127839-002	2021054_C013	ED040S: Silica	7631-86-9	1	mg/kg	38	39	3.8	0% - 20%
		ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	80	60	33.5	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3938502)									
EB2127839-003	2021054_C014	ED045G: Chloride	16887-00-6	10	mg/kg	10	10	0.0	No Limit
EB2127839-001	2021054_C012	ED045G: Chloride	16887-00-6	10	mg/kg	<10	<10	0.0	No Limit
ED093S: Soluble Major Cations (QC Lot: 3938507)									
EB2127839-001	2021054_C012	ED093S: Calcium	7440-70-2	10	mg/kg	10	10	0.0	No Limit
		ED093S: Magnesium	7439-95-4	10	mg/kg	<10	<10	0.0	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	110	110	0.0	0% - 50%
		ED093S: Potassium	7440-09-7	10	mg/kg	30	30	0.0	No Limit
EG020S: Soluble Metals by ICPMS (QC Lot: 3938499)									
EB2126439-039	Anonymous	EG020X-S: Antimony	7440-36-0	0.01	mg/kg	0.06	0.06	0.0	No Limit
		EG020X-S: Arsenic	7440-38-2	0.01	mg/kg	0.02	0.02	0.0	No Limit
		EG020X-S: Barium	7440-39-3	0.01	mg/kg	0.01	0.01	0.0	No Limit
		EG020X-S: Beryllium	7440-41-7	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Chromium	7440-47-3	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Cobalt	7440-48-4	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Copper	7440-50-8	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Lead	7439-92-1	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Manganese	7439-96-5	0.01	mg/kg	0.55	0.54	2.2	0% - 20%
		EG020X-S: Molybdenum	7439-98-7	0.01	mg/kg	0.05	0.06	0.0	No Limit
		EG020X-S: Nickel	7440-02-0	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Uranium	7440-61-1	0.01	mg/kg	0.01	0.01	0.0	No Limit
		EG020X-S: Zinc	7440-66-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EG020X-S: Aluminium	7429-90-5	0.1	mg/kg	0.2	0.2	0.0	No Limit
		EG020X-S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB2127839-007	2021054_C018	EG020X-S: Antimony	7440-36-0	0.01	mg/kg	0.14	0.13	9.3	0% - 50%
		EG020X-S: Arsenic	7440-38-2	0.01	mg/kg	0.04	0.04	0.0	No Limit
		EG020X-S: Barium	7440-39-3	0.01	mg/kg	0.03	0.03	0.0	No Limit
		EG020X-S: Beryllium	7440-41-7	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Chromium	7440-47-3	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Cobalt	7440-48-4	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Copper	7440-50-8	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Lead	7439-92-1	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Manganese	7439-96-5	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Molybdenum	7439-98-7	0.01	mg/kg	0.04	0.03	0.0	No Limit
		EG020X-S: Nickel	7440-02-0	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Uranium	7440-61-1	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020X-S: Zinc	7440-66-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EG020X-S: Aluminium	7429-90-5	0.1	mg/kg	0.9	1.3	33.3	0% - 50%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020S: Soluble Metals by ICPMS (QC Lot: 3938499) - continued									
EB2127839-007	2021054_C018	EG020X-S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG020S: Soluble Metals by ICPMS (QC Lot: 3938500)									
EB2126439-039	Anonymous	EG020Y-S: Cadmium	7440-43-9	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020Y-S: Thorium	7440-29-1	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020Y-S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB2127839-007	2021054_C018	EG020Y-S: Cadmium	7440-43-9	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020Y-S: Thorium	7440-29-1	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EG020Y-S: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035S: Soluble Mercury by FIMS (QC Lot: 3938506)									
EB2127839-001	2021054_C012	EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EK040S: Fluoride Soluble (QC Lot: 3938508)									
EB2127839-001	2021054_C012	EK040S: Fluoride	16984-48-8	1	mg/kg	1	1	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3938504)									
EB2127839-001	2021054_C012	EK071G: Reactive Phosphorus as P	14265-44-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)S : Soluble Metals by ICPAES (QCLot: 3938505)								
EG005S: Boron	7440-42-8	1	mg/kg	<1	2.5 mg/kg	97.0	70.0	130
EG005S: Iron	7439-89-6	1	mg/kg	<1	2.5 mg/kg	98.5	70.0	130
EA002: pH 1:5 (Soils) (QCLot: 3938511)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.0	102
				----	7 pH Unit	100	98.0	102
EA010: Conductivity (1:5) (QCLot: 3938510)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	101	97.0	103
EA152: Soil Particle Density (QCLot: 3934107)								
EA152: Soil Particle Density (Clay/Silt/Sand)	----	----	g/cm3	----	2.68 g/cm3	100	80.0	120
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 3944635)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	6.708 meq/100g	109	70.0	130
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	5.0353 meq/100g	92.6	70.0	130
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	1.0556 meq/100g	109	70.0	130
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	1.7599 meq/100g	102	70.0	130
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	14.5588 meq/100g	102	70.0	130
ED037: Alkalinity (QCLot: 3938509)								
ED037: Total Alkalinity as CaCO3	----	----	mg/kg	----	2500 mg/kg	94.8	90.0	110
ED038A: Acidity (QCLot: 3938501)								
ED038: Acidity	----	----	mg/kg	----	100 mg/kg	100	90.0	110
ED040S: Soluble Major Anions (QCLot: 3938503)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	750 mg/kg	99.4	90.0	114
ED040S: Silica	7631-86-9	1	mg/kg	<1	53.5 mg/kg	92.9	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3938502)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	97.2	83.0	119
				<10	5000 mg/kg	104	83.0	119
ED093S: Soluble Major Cations (QCLot: 3938507)								
ED093S: Calcium	7440-70-2	10	mg/kg	<10	250 mg/kg	99.8	80.0	120
ED093S: Magnesium	7439-95-4	10	mg/kg	<10	250 mg/kg	98.9	80.0	120
ED093S: Sodium	7440-23-5	10	mg/kg	<10	250 mg/kg	101	80.0	120
ED093S: Potassium	7440-09-7	10	mg/kg	<10	250 mg/kg	98.1	80.0	120
EG020S: Soluble Metals by ICPMS (QCLot: 3938499)								
EG020X-S: Aluminium	7429-90-5	0.1	mg/kg	<0.1	2.5 mg/kg	99.9	89.0	115
EG020X-S: Antimony	7440-36-0	0.01	mg/kg	<0.01	0.5 mg/kg	109	87.0	111

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020S: Soluble Metals by ICPMS (QCLot: 3938499) - continued								
EG020X-S: Arsenic	7440-38-2	0.01	mg/kg	<0.01	0.5 mg/kg	104	84.0	112
EG020X-S: Barium	7440-39-3	0.01	mg/kg	<0.01	0.5 mg/kg	103	70.0	130
EG020X-S: Beryllium	7440-41-7	0.01	mg/kg	<0.01	0.5 mg/kg	101	91.0	118
EG020X-S: Chromium	7440-47-3	0.01	mg/kg	<0.01	0.5 mg/kg	102	86.0	115
EG020X-S: Cobalt	7440-48-4	0.01	mg/kg	<0.01	0.5 mg/kg	100	88.0	110
EG020X-S: Copper	7440-50-8	0.01	mg/kg	<0.01	0.5 mg/kg	102	85.0	114
EG020X-S: Lead	7439-92-1	0.01	mg/kg	<0.01	0.5 mg/kg	106	91.0	106
EG020X-S: Manganese	7439-96-5	0.01	mg/kg	<0.01	0.5 mg/kg	102	87.0	113
EG020X-S: Molybdenum	7439-98-7	0.01	mg/kg	<0.01	0.5 mg/kg	106	87.0	111
EG020X-S: Nickel	7440-02-0	0.01	mg/kg	<0.01	0.5 mg/kg	97.4	85.0	117
EG020X-S: Uranium	7440-61-1	0.01	mg/kg	<0.01	0.5 mg/kg	112	70.0	130
EG020X-S: Vanadium	7440-62-2	0.1	mg/kg	<0.1	0.5 mg/kg	97.6	86.0	117
EG020X-S: Zinc	7440-66-6	0.05	mg/kg	<0.05	0.5 mg/kg	104	83.0	114
EG020S: Soluble Metals by ICPMS (QCLot: 3938500)								
EG020Y-S: Cadmium	7440-43-9	0.01	mg/kg	<0.01	0.5 mg/kg	100	79.0	111
EG020Y-S: Selenium	7782-49-2	0.1	mg/kg	<0.1	0.5 mg/kg	101	77.0	114
EG020Y-S: Thorium	7440-29-1	0.01	mg/kg	<0.01	0.5 mg/kg	110	70.0	130
EG035S: Soluble Mercury by FIMS (QCLot: 3938506)								
EG035S: Mercury	7439-97-6	0.0005	mg/kg	<0.0005	0.05 mg/kg	91.3	83.0	125
EK040S: Fluoride Soluble (QCLot: 3938508)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1	25 mg/kg	102	84.0	122
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3938504)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.1	mg/kg	<0.1	2.5 mg/kg	98.0	84.3	112

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG035S: Soluble Mercury by FIMS (QCLot: 3938506)							
EB2127839-002	2021054_C013	EG035S: Mercury	7439-97-6	0.05 mg/kg	92.4	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3938504)							
EB2127839-002	2021054_C013	EK071G: Reactive Phosphorus as P	14265-44-2	2 mg/kg	112	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2127839**	Page	: 1 of 8
Client	: **TOMINGLEY GOLD OPERATIONS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID KYNASTON	Telephone	: +61-7-3243 7222
Project	: 2021054 Tomingley Gold Eastern Cutback Project	Date Samples Received	: 30-Sep-2021
Site	: ----	Issue Date	: 12-Oct-2021
Sampler	: BEN FREIDMAN	No. of samples received	: 9
Order number	: ----	No. of samples analysed	: 9

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Soil Particle Density	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002: pH 1:5 (Soils)							
Snap Lock Bag (EA002)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	07-Oct-2021	✓	**07-Oct-2021**	07-Oct-2021	✓
Soil Glass Jar - Unpreserved (EA002)							
pH and EC of DI water	**30-Sep-2021**	**07-Oct-2021**	07-Oct-2021	✓	**07-Oct-2021**	07-Oct-2021	✓
EA010: Conductivity (1:5)							
Snap Lock Bag (EA010)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	07-Oct-2021	✓	**07-Oct-2021**	04-Nov-2021	✓
Soil Glass Jar - Unpreserved (EA010)							
pH and EC of DI water	**30-Sep-2021**	**07-Oct-2021**	07-Oct-2021	✓	**07-Oct-2021**	04-Nov-2021	✓
EA058: Emerson Aggregate Test							
Snap Lock Bag (EA058)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**----**	----	----	**01-Oct-2021**	29-Mar-2022	✓
EA150: Particle Sizing							
Snap Lock Bag (EA150H)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**----**	----	----	**12-Oct-2021**	29-Mar-2022	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Soil Classification based on Particle Size							
Snap Lock Bag (EA150H)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**----**	----	----	**12-Oct-2021**	29-Mar-2022	✓
EA152: Soil Particle Density							
Snap Lock Bag (EA152)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**----**	----	----	**12-Oct-2021**	29-Mar-2022	✓
ED005: Exchange Acidity							
Snap Lock Bag (ED005)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**08-Oct-2021**	28-Oct-2021	✓	**11-Oct-2021**	28-Oct-2021	✓
ED006: Exchangeable Cations on Alkaline Soils							
Snap Lock Bag (ED006)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**08-Oct-2021**	28-Oct-2021	✓	**11-Oct-2021**	28-Oct-2021	✓
ED007: Exchangeable Cations							
Snap Lock Bag (ED007)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**08-Oct-2021**	28-Oct-2021	✓	**11-Oct-2021**	28-Oct-2021	✓
ED008: Exchangeable Cations							
Snap Lock Bag (ED008)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015	**30-Sep-2021**	**08-Oct-2021**	28-Oct-2021	✓	**11-Oct-2021**	28-Oct-2021	✓
ED037: Alkalinity							
Snap Lock Bag (ED037)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	29-Mar-2022	✓	**08-Oct-2021**	29-Mar-2022	✓
ED038A: Acidity							
Snap Lock Bag (ED038)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	29-Mar-2022	✓	**08-Oct-2021**	29-Mar-2022	✓
ED040S : Soluble Sulfate by ICPAES							
Snap Lock Bag (ED040S)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	28-Oct-2021	✓	**11-Oct-2021**	04-Nov-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride by Discrete Analyser							
Snap Lock Bag (ED045G)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	28-Oct-2021	✓	**08-Oct-2021**	04-Nov-2021	✓
ED093S: Soluble Major Cations							
Snap Lock Bag (ED093S)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	29-Mar-2022	✓	**11-Oct-2021**	29-Mar-2022	✓
EG005(ED093)S : Soluble Metals by ICPAES							
Snap Lock Bag (EG005S)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	29-Mar-2022	✓	**11-Oct-2021**	29-Mar-2022	✓
EG020S: Soluble Metals by ICPMS							
Snap Lock Bag (EG020Y-S)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	29-Mar-2022	✓	**08-Oct-2021**	29-Mar-2022	✓
EG035S: Soluble Mercury by FIMS							
Snap Lock Bag (EG035S)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	28-Oct-2021	✓	**08-Oct-2021**	28-Oct-2021	✓
EK040S: Fluoride Soluble							
Snap Lock Bag (EK040S)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	07-Oct-2021	✓	**08-Oct-2021**	04-Nov-2021	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Snap Lock Bag (EK071G)							
2021054_C012, 2021054_C013, 2021054_C014, 2021054_C015, 2021054_C016, 2021054_C017, 2021054_C018, 2021054_C019	**30-Sep-2021**	**07-Oct-2021**	07-Oct-2021	✓	**08-Oct-2021**	09-Oct-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Acidity in Soil	ED038	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Alkalinity in Soil	ED037	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Cations - soluble by ICP-AES	ED093S	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride Soluble By Discrete Analyser	ED045G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride - Soluble	EK040S	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICP-MS - Suite X	EG020X-S	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICP-MS - Suite Y	EG020Y-S	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acidity in Soil	ED038	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Alkalinity in Soil	ED037	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Cations - soluble by ICP-AES	ED093S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride Soluble By Discrete Analyser	ED045G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride - Soluble	EK040S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICP-MS - Suite X	EG020X-S	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICP-MS - Suite Y	EG020Y-S	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Cations - soluble by ICP-AES	ED093S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride Soluble By Discrete Analyser	ED045G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Electrical Conductivity (1:5)	EA010	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Fluoride - Soluble	EK040S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Soluble	ED040S	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICPAES	EG005S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICP-MS - Suite X	EG020X-S	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Metals by ICP-MS - Suite Y	EG020Y-S	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Soluble Mercury by FIMS	EG035S	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Emerson Aggregate Test	EA058	SOIL	In house: Referenced to AS1289.3.8.1. Testing is performed only on soils with suitable aggregates; sands and gravels are usually unsuitable for this test. The test classifies the behaviour of soil aggregates, when immersed, on their coherence in water.
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1: Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Exchange Acidity by 1M Potassium Chloride	* ED005	SOIL	In house: referenced to Rayment and Lyons, method 15G1. This method is unsuitable for near neutral and alkaline soils. NATA accreditation does not cover performance of this service.
Exchangeable Cations on Alkaline Soils	* ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM Schedule B(3).
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Lyons Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM Schedule B(3).
Alkalinity in Soil	* ED037	SOIL	In house: Referenced to APHA 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Acidity in Soil	ED038	SOIL	In house: Referenced to APHA 2310B
Major Anions - Soluble	ED040S	SOIL	In house: Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.
Cations - soluble by ICP-AES	ED093S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3).
Soluble Metals by ICPAES	EG005S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Soluble metals are determined following an appropriate soil / water extraction of the soil. The ICPAES technique ionises samples in a plasma, emitting characteristic spectrums based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards.

Analytical Methods	Method	Matrix	Method Descriptions
Soluble Metals by ICP-MS - Suite X	EG020X-S	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Soluble Metals by ICP-MS - Suite Y	EG020Y-S	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Soluble Mercury by FIMS	EG035S	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the extract. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve.
Fluoride - Soluble	EK040S	SOIL	In house: Referenced to APHA 4500 F--C Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	SOIL	In house: Referenced to APHA 4500 P-F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3).

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Lyons method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Certificate of Analysis

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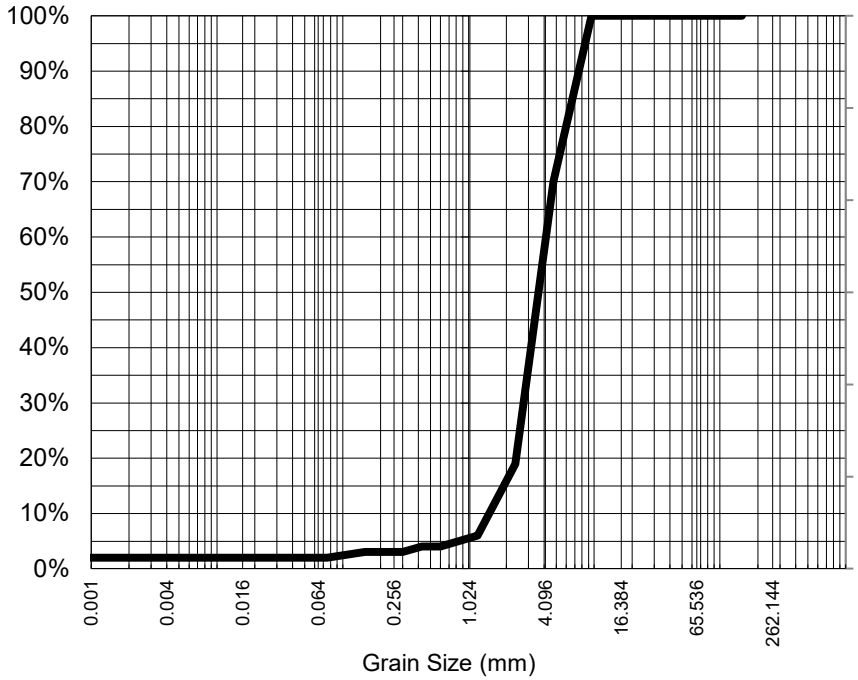
ALS Environmental

Brisbane QLD

CLIENT:	DAVID KYNASTON	**DATE REPORTED:**	12-Oct-2021
COMPANY:	TOMINGLEY GOLD OPERATIONS P/L	**DATE RECEIVED:**	30-Sep-2021
ADDRESS:	11 Johnson Street Dubbo Nsw Australia	**REPORT NO:**	EB2127839-001 / PSD
PROJECT:	2021054 Tomingley Gold Eastern Cutback Project	**SAMPLE ID:**	2021054_C012

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	70%
2.36	19%
1.18	6%
0.600	4%
0.425	4%
0.300	3%
0.150	3%
0.075	2%
Particle Size (microns)	
54	2%
38	2%
27	2%
19	2%
14	2%
10	2%
7	2%
5	2%
1	2%

Median Particle Size (mm)*	3.813

Analysis Notes

Samples analysed as received.

** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:	AS1289.3.6.3 states that hydrometer analysis is not applicable for samples containing <10% fines (<75um). Results should be assessed accordingly	**Analysed:**	5-Oct-21
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:		**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3		
Soil Particle Density (<2.36mm)	3.09 (2.85)*		

NATA Accreditation: 825 Site: Brisbane
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WORLD RECOGNISED ACCREDITATION

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Authorised Signatory

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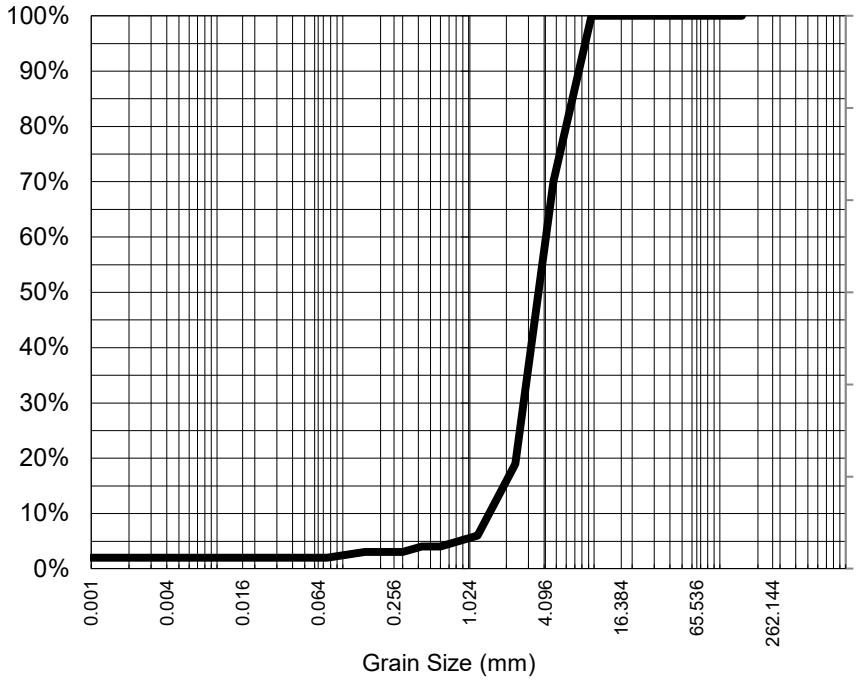
CLIENT:	DAVID KYNASTON	**DATE REPORTED:**	12-Oct-2021
COMPANY:	TOMINGLEY GOLD OPERATIONS P/L	**DATE RECEIVED:**	30-Sep-2021
ADDRESS:	11 Johnson Street Dubbo Nsw Australia	**REPORT NO:**	EB2127839-001DUP / PSD
PROJECT:	2021054 Tomingley Gold Eastern Cutback Project	**SAMPLE ID:**	2021054_C012

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	70%
2.36	19%
1.18	6%
0.600	4%
0.425	4%
0.300	3%
0.150	3%
0.075	2%
Particle Size (microns)	
54	2%
38	2%
27	2%
19	2%
14	2%
10	2%
7	2%
5	2%
1	2%

Median Particle Size (mm)*	3.813

Analysis Notes

Samples analysed as received.

** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:	AS1289.3.6.3 states that hydrometer analysis is not applicable for samples containing <10% fines (<75um). Results should be assessed accordingly	**Analysed:**	5-Oct-21
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:		**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3		
Soil Particle Density (<2.36mm)	3.09 (2.85)*		

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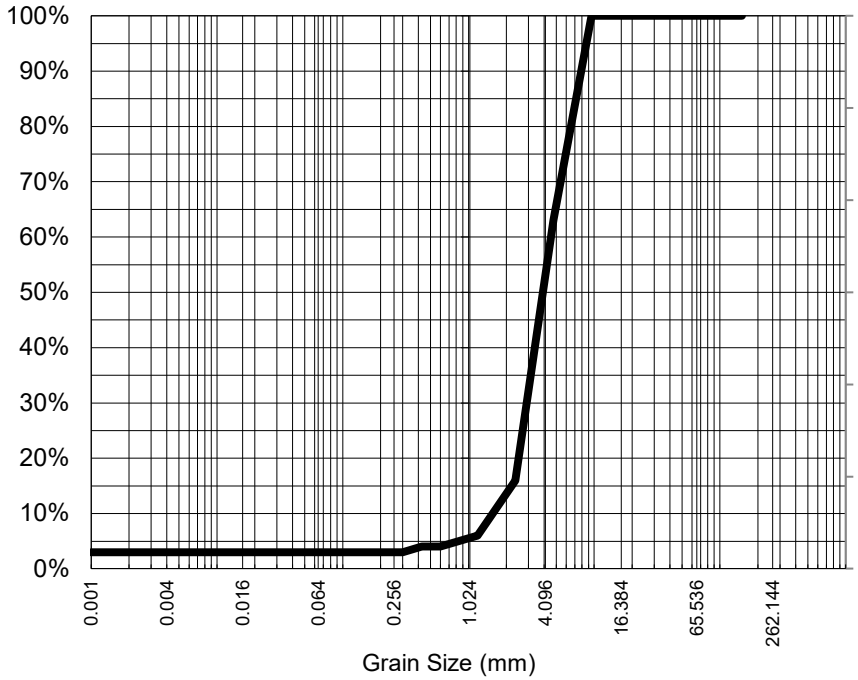
CLIENT:	DAVID KYNASTON	**DATE REPORTED:**	12-Oct-2021
COMPANY:	TOMINGLEY GOLD OPERATIONS P/L	**DATE RECEIVED:**	30-Sep-2021
ADDRESS:	11 Johnson Street Dubbo Nsw Australia	**REPORT NO:**	EB2127839-002 / PSD
PROJECT:	2021054 Tomingley Gold Eastern Cutback Project	**SAMPLE ID:**	2021054_C013

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	63%
2.36	16%
1.18	6%
0.600	4%
0.425	4%
0.300	3%
0.150	3%
0.075	3%
Particle Size (microns)	
54	3%
38	3%
27	3%
19	3%
14	3%
10	3%
7	3%
5	3%
1	3%

Analysis Notes

Samples analysed as received.

** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size (mm)*	4.089

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:	AS1289.3.6.3 states that hydrometer analysis is not applicable for samples containing <10% fines (<75um). Results should be assessed accordingly	**Analysed:**	5-Oct-21
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:		**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3		
Soil Particle Density (<2.36mm)	3.06 (2.85)*		

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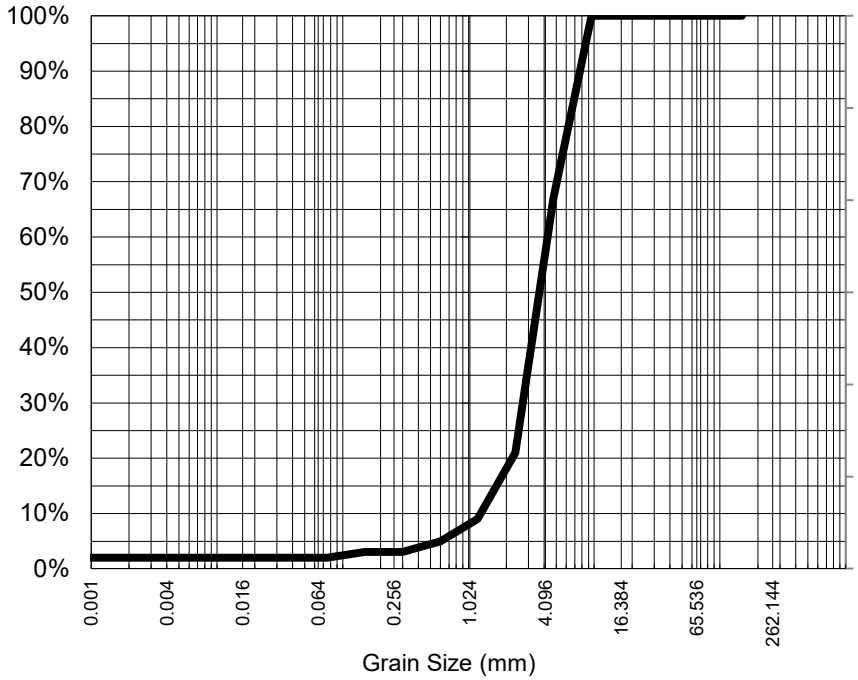
CLIENT:	DAVID KYNASTON	**DATE REPORTED:**	12-Oct-2021
COMPANY:	TOMINGLEY GOLD OPERATIONS P/L	**DATE RECEIVED:**	30-Sep-2021
ADDRESS:	11 Johnson Street Dubbo Nsw Australia	**REPORT NO:**	EB2127839-003 / PSD
PROJECT:	2021054 Tomingley Gold Eastern Cutback Project	**SAMPLE ID:**	2021054_C014

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	67%
2.36	21%
1.18	9%
0.600	5%
0.425	4%
0.300	3%
0.150	3%
0.075	2%
Particle Size (microns)	
56	2%
40	2%
28	2%
20	2%
15	2%
10	2%
7	2%
5	2%
1	2%

Median Particle Size (mm)*	3.867

Analysis Notes

Samples analysed as received.

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:	AS1289.3.6.3 states that hydrometer analysis is not applicable for samples containing <10% fines (<75um). Results should be assessed accordingly	**Analysed:**	5-Oct-21
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:		**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3		
Soil Particle Density (<2.36mm)	2.71		

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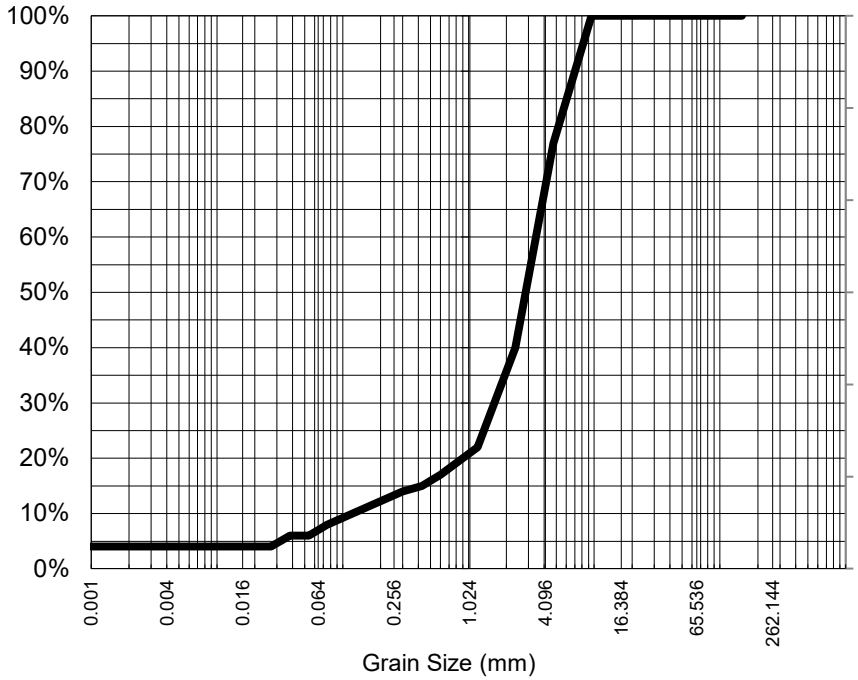
CLIENT:	DAVID KYNASTON	**DATE REPORTED:**	12-Oct-2021
COMPANY:	TOMINGLEY GOLD OPERATIONS P/L	**DATE RECEIVED:**	30-Sep-2021
ADDRESS:	11 Johnson Street Dubbo Nsw Australia	**REPORT NO:**	EB2127839-004 / PSD
PROJECT:	2021054 Tomingley Gold Eastern Cutback Project	**SAMPLE ID:**	2021054_C015

Particle Size Distribution



Particle Size (mm)	% Passing
9.50	100%
4.75	77%
2.36	40%
1.18	22%
0.600	17%
0.425	15%
0.300	14%
0.150	11%
0.075	8%
Particle Size (microns)	
54	6%
38	6%
27	4%
19	4%
14	4%
10	4%
7	4%
5	4%
1	4%

Median Particle Size (mm)*	3.006

Analysis Notes

Samples analysed as received.

** Soil Particle Density results fell outside the scope of AS 1289.3.6.3. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results*

Median Particle Size is not covered under the current scope of ALS's NATA accreditation.

Sample Comments:	AS1289.3.6.3 states that hydrometer analysis is not applicable for samples containing <10% fines (<75um). Results should be assessed accordingly	**Analysed:**	5-Oct-21
Loss on Pretreatment	NA	**Limit of Reporting:**	1%
Sample Description:		**Dispersion Method**	Shaker
Test Method:	AS1289.3.6.2/AS1289.3.6.3		
Soil Particle Density (<2.36mm)	2.86 (2.85)*		

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ATTACHMENT D

Supplementary Project Figures

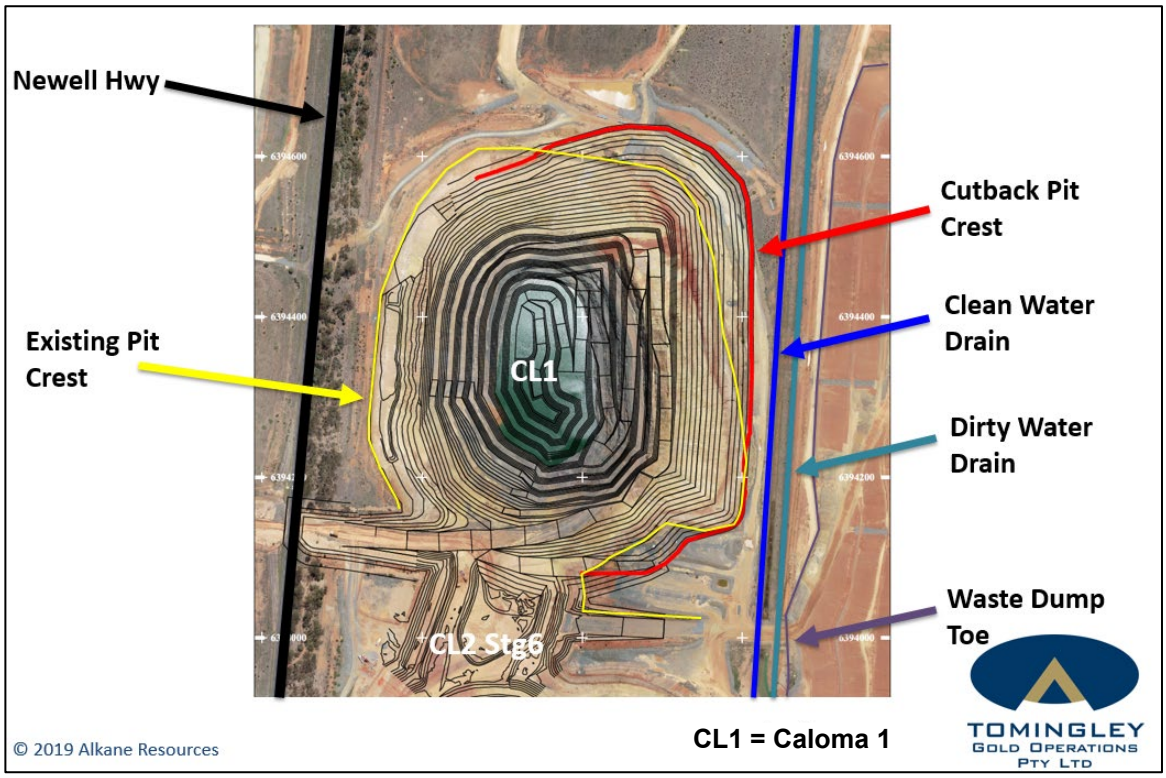

Figure D1: Aerial Image showing the topography and surrounding infrastructure at the Caloma 1 Open Cut. Information provided by Alkane.

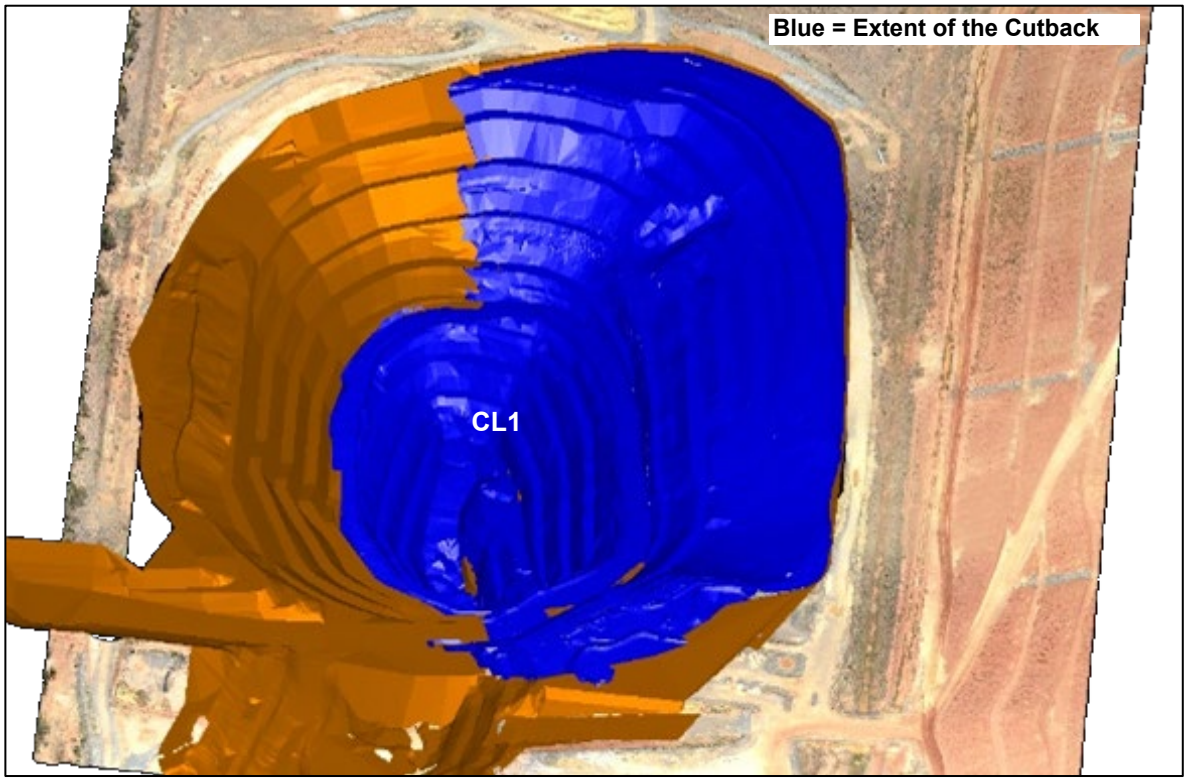

Figure D2: Aerial image showing the extent of the Cutback at the Caloma 1 Open Cut. Information provided by Alkane.

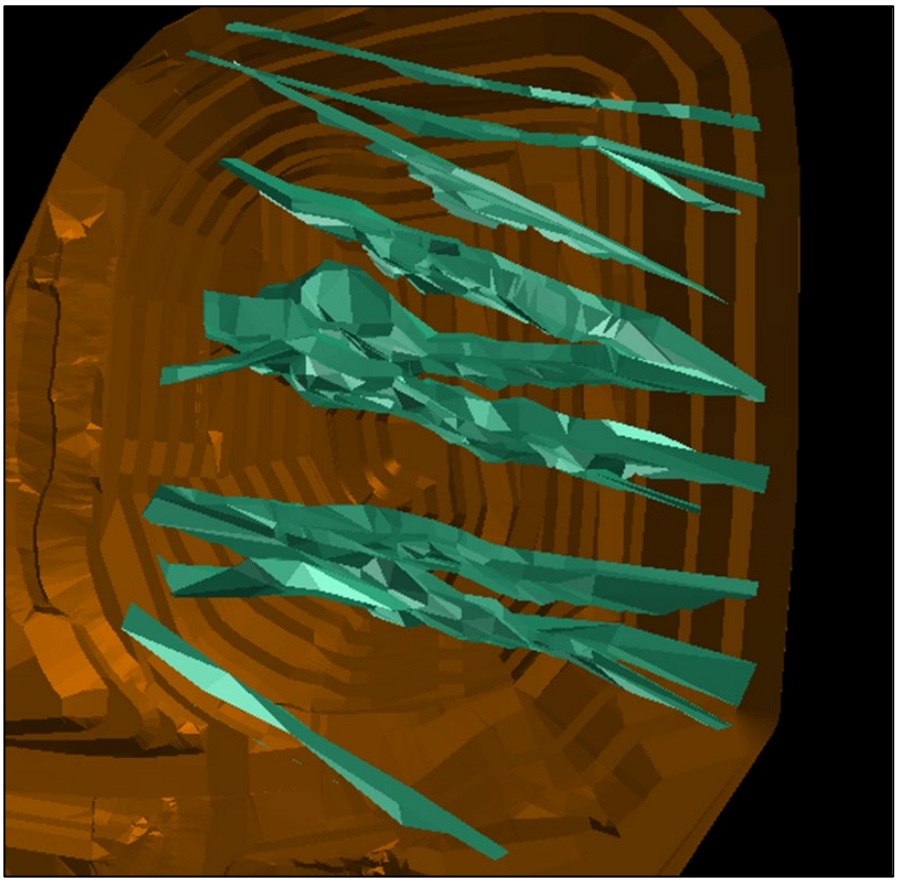

Figure D3: Aerial image showing the dolerite dikes at the Caloma 1 Open Cut. Information provided by Alkane.

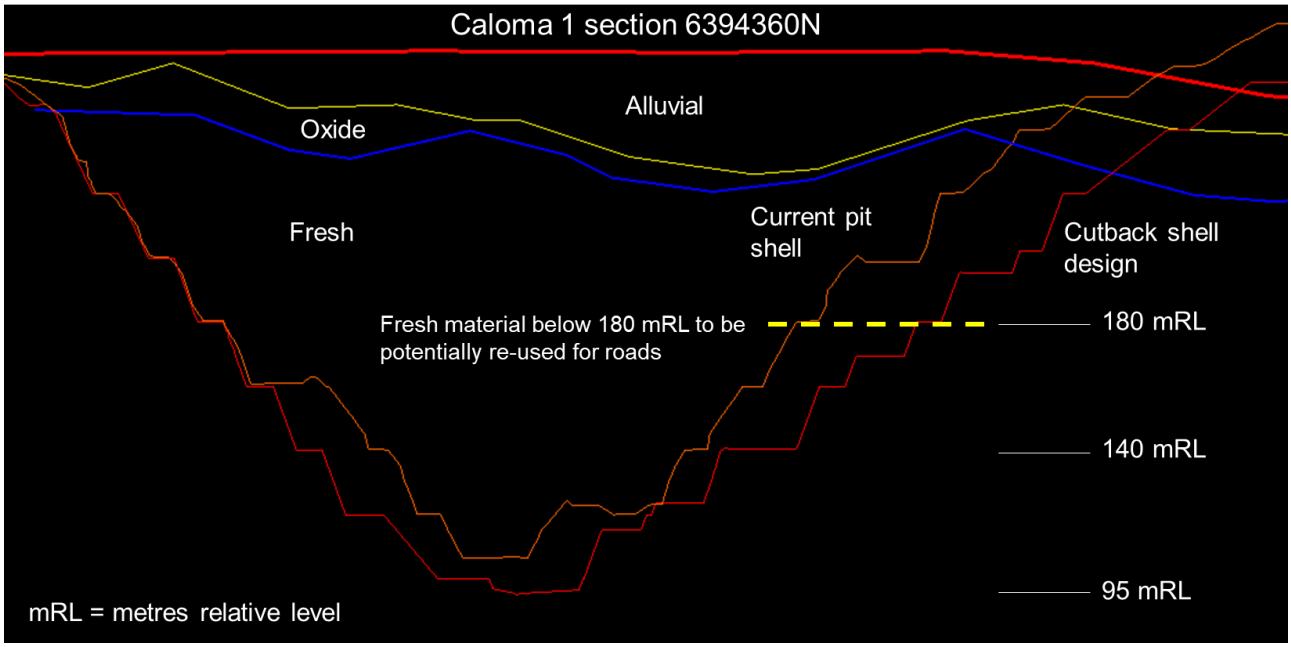

Figure D4: Cross-section of the Cutback at the Caloma 1 Open Cut. Information provided by Alkane.

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MINE WASTE AND
WATER MANAGEMENT