AUCTUS RESOURCES PTY LTD

King Vol Project

Site Regulated Dams

Operations and Management Plan

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JILL K ALBEE
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Introduction

This Operations and Management Plan (OMP) has been prepared as the basis for operation and ongoing management and monitoring of the following listed water storage structures at the King Vol Project (including those nominated as Regulated Structures in the current EA (EHP, 2017) [1], as noted below):

- Clean Water Dam (CWD) - not a Regulated Structure
- Mine Water Dam (MWD) - Regulated Structure
- Sediment Pond (SP) - Regulated Structure.

The OMP has been developed with reference to the following design and construction documentation for each of these water storage structures:

- Design documentation:
  - CWD design (ATCW, 2016A, 2016B, 2016C, 2016D) [2][3][4][5]
  - MWD and SP design (ATCW 2016E) [6]
- Construction documentation:
  - CWD construction (ATCW, 2017A) [7]
  - MWD construction (ATCW, 2017B) [8]
  - SP construction (ATCW, 2017C) [9]

Purpose of Document

This document describes the obligations of the operator with respect to acceptable standards for operation of each listed water storage structure, as a means of maintaining the long term integrity of each facility. In addition, the OMP is intended to assist with training of staff in matters related to management of the water storage structures (including incident response) and maintenance of appropriate operating records.

Specifically, the purpose of the OMP is as follows:

- To provide relevant background to the water storage structures, and in particular those that are nominated as Regulated Structures, relating to specific regulatory requirements and performance expectations of Auctus.
- To identify the principal components of the water storage structures and describe the contribution of these components to the effective operation of each structure.
- To describe general guidelines for water storage and associated water management/recovery practices, with the scope of these guidelines being to facilitate effective and efficient storage utilisation and to achieve a competent final embankment surface for rehabilitation.
- To outline minimum inspection and monitoring requirements for the water storage structures.

Reviews and Updates

The OMP is a working document, with operating, management and monitoring practices, as outlined, subject to periodic review and update to reflect modifications to the conditions on which the document is based. The timing for such updates includes, but is not necessarily limited, to the following for each water storage structure:
(i) Alteration (either increase or decrease) of the capacity of the water storage structure by changing footprint or storage height; or alteration of the Consequence Category of the water storage structure.

(ii) A significant incident with respect to the operation and/or performance of the water storage structure is experienced.

(iii) A significant change to the Environmental Authority (EA) for the King Vol Project, or conditions contained therein, is made, which would materially impact on the operating and management conditions of the facility.

Notwithstanding these conditions, review and updating of the OMP should be completed every three years, as a minimum, should the life of the Regulated Structure extend beyond this timeframe.

Document Structure

The OMP is structured as follows:

| Section 1 | Provides a brief description of the King Vol Mine site |
| Section 2 | Environmental Authority Requirements |
| Section 3 | Describes the layout and development of the water storage structures. |
| Section 4 | Outlines the operating principles and objectives related to the water storage structures with respect to regulatory constraints/approvals conditions, as well as overviewsing key design criteria applying to the facility. |
| Sections 5 - 7 | Presents operating procedures for each water storage structure. |
| Section 8 | Outlines inspection and monitoring requirements to be implemented in conjunction with operation of the water storage structures. |
| Section 9 | Provides Emergency Response Plans for the water storage structures. |
| Section 10 | Outlines documentation requirements related to the water storage structures operation and auditing. |

Drawing 301 shows the layout of the water storage structures.
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DRAWINGS

Drawing 301  King Vol Site Layout

APPENDICES

Appendix A  Environmental Authority EMPL00562913
Appendix B  Regulated Structure Inspection Form
1 PROJECT DESCRIPTION AND SETTING

1.1 Background

The King Vol Project, owned by Auctus Resources Pty Ltd (Auctus), is located approximately 40 km northwest of Chillagoe in north Queensland. The project is currently under development and will be operated as a poly-metallic mining site. Key project infrastructure comprises an underground portal, clean water dam (CWD), mine water dam (MWD) and sediment pond (SP) as well as clean water diversion works as shown on Drawing 301.

In 2016, ATC Williams was engaged to design the CWD (ATCW, 2016A, 2016B, 2016C, 2016D) [2][3][4][5], MWD (ATCW, 2016E) [6] and SP (ATCW, 2016E) [6]. Construction was started that same year and all work was completed in early 2017.

The development and operation of the King Vol Mine Site is subject to Environmental Authority (EA) Permit Number EPML00562913 (effective 24 August 2017). This permit was issued by the Department of Environment and Heritage Protection (EHP) and is presented in Appendix A. Subject to the EA and with reference to the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EHP, 2016A), the following storages at the King Vol Mine site are regarded as “regulated structures”:

- Mine Water Dam (MWD)
- Sediment Pond (SP)

Also included in this OMP but not referred to as a Regulated Structure under the EA, is the King Vol Clean Water Dam (CWD).

A minimum requirement for regulated dams is to have an Operations Plan in place for these structures. Under the commission of Auctus, ATCW has prepared an Operation Plans for the Regulated Structures listed above and the CWD.

1.2 Rainfall and Evaporation

Regionally, King Vol site is located in north Queensland, approximately 250 km west of Cairns. This region is described as having a ‘tropical continental’ climate, associated with highly variable rainfall conditions from year to year. A distinctive seasonal pattern with lower rainfall conditions associated with the winter months. The wet season occurs from December to March, with approximately 85% of the annual rainfall occurring during these months.
Figure 1
Mean Monthly Rainfall and Evaporation Data

<table>
<thead>
<tr>
<th>Month</th>
<th>Rainfall (mm)</th>
<th>Evap (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>229.1</td>
<td>183.6</td>
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<tr>
<td>Feb</td>
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<td>Mar</td>
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<td>8.2</td>
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<td>Jul</td>
<td>3.3</td>
<td>166.0</td>
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<tr>
<td>Aug</td>
<td>3.3</td>
<td>207.6</td>
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<tr>
<td>Sep</td>
<td>3.5</td>
<td>246.6</td>
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<tr>
<td>Oct</td>
<td>12.4</td>
<td>234.4</td>
</tr>
<tr>
<td>Nov</td>
<td>55.3</td>
<td>217.9</td>
</tr>
<tr>
<td>Dec</td>
<td>136.2</td>
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</tr>
</tbody>
</table>

Source: SILO Data Drill generated for the Site Location

1.3 Topography and Drainage

The King Vol development is located within the westerly flowing Walsh River catchment, a major tributary of the Mitchell River Basin which ultimately discharges into the Gulf of Carpentaria. Bowler Creek is a tributary of the Walsh River into which it discharges some 2 km downstream of the King Vol development.

The topography at the King Vol site consists of hills and low ridgelines with elevation of approximately 280 - 300 mAHDT, and gently sloping valleys with elevation of approximately 250 mAHDT. An RLA (2008) report [10] discusses the geomorphology of the site in relation to local lithology, viz.

“The arkose forms hills and low ridges of moderate relief. The limestone units and ISH between the south western and north eastern arkose forms a reasonably gently sloping U-shaped valley. Minor scree has formed on the sides of the valley as a result of weathering and erosion of the deeply weathered arkose that caps the ridges.

Outcrops of limestone are sporadic within the valley. Where outcrops do occur they are of massive, domal form often with solution channels from the surface.

There is no significant stream incision within the valley that contains the prime aquifer. Nevertheless rainfall runoff within the valley is directed to relatively small steep gullies that originate on the arkose ridges and traverse the valley. It is likely that these smaller drainage features are structurally controlled and conform to joints across the strike of the Chillagoe Formation rocks.”
1.4 Regional Geologic Setting

The Chillagoe area is characterised by two distinct geological regions divided by the Palmerville Fault. The Palmerville Fault is regional structure extending hundreds of kilometres from the north west to the south east. To the north east of the Palmerville Fault lies the Middle Palaeozoic Hodgkinson Province and the south west of the fault lies the Middle Proterozoic Dargalong Metamorphics.

The Chillagoe Formation (Early Silurian-Early Devonian in age) comprises the most western margin of the Hodgkinson Province and is mapped in a 150 km long strip that is up to 10 km wide. The King Vol deposit lies within the Chillagoe Formation which has been described by Bultitude et al. (1995) as limestone, chert, metabasalt, arenite, mudstone and minor siltstone, conglomerate arenite and the Dargalong Metamorphics as predominantly biotite gneiss.

The RLA (2008) report summarised the geology of the King Vol deposit in both a regional and local context. Whilst there has been further resource drilling undertaken since 2008, it is understood that the geological interpretation reported in RLA report is still current and valid to this study.

Pertinent aspects of the local geology relevant to this study are reproduced below from an RLA (2011) report.

“The Chillagoe Formation generally consists of highly faulted, folded and steeply dipping, west-north-west to east-south-east striking lithic sandstone, chert, conglomerate, breccia, limestone, andesite and skarns.

At King Vol a sedimentary sequence of five informally named units has been identified by Mungana Pty Ltd. These strike north west to south east and dip steeply to the north east. They are named as follows:

- The western limestone comprising mostly limestone with abundant intercalated basic volcanic units;
- The intermediate shale formation (often referred to as the ISH), a clastic sequence of interbedded sandstones, siltstones and shales, typically unmineralised;
- The eastern limestone, mostly a marbleized limestone and host to most of the massive sulphide lode zones and displaying variable amounts of ‘skarning’ associated with the mineralisation;
- The arkose, an arkosic to greywacke sandstone unit; and
- The chert, a siliceous unit on the eastern side of the sequence, typically unmineralised.”

1.5 Subsurface Conditions within Each Water Storage Structure Area

For all three structures, the area is underlain by topsoils and silty SAND and sandy GRAVEL layers extending to thicknesses up to approximately 1.0 m, overlying highly weathered sandstone/siltstone bedrock. Site specific geotechnical data is provided in relevant design documentation for each water storage structure.

1.6 Hydrogeological Setting

RLA (2008) also undertook a hydrogeological assessment of the King Vol site. A network of monitoring bores was installed as part of this assessment, and regular baseline monitoring of groundwater levels and groundwater quality has been carried out from 2008 to date.
RLA provided interpretation of the hydrogeology at the King Vol site, based on a review of historical assessments and data captured at that time. This hydrogeology interpretation is summarised as follows:

- “Regional and local groundwater flow is structurally related.
- The primary aquifer is the limestone lithology which is a fractured rock aquifer. The limestone sequence may be hydraulically connected along strike of the ore bodies.
- Secondary permeability and porosity of the limestone sequence has been increased due to the development of solution channels at shallow depth.
- There is a progressive reduction in aquifer permeability with increasing depth. Porosity imparted by solution channeling diminishes with increasing depth below the water table. Exploration drilling has not identified any major fracture zones below 100 m.”

In addition to this, the characteristics of the limestone at depths greater than 100 m below ground level was able to be observed at a nearby underground mine (Mungana). The limestone at Mungana was observed to be massive in nature with groundwater inflow limited to structural features such as faults, dissolution channels (varying in sizes up to approximately 1 m diameter), recent drill holes and minor seepage on fresh development faces.”

2 ENVIRONMENTAL AUTHORITY REQUIREMENTS

2.1 General

The EA document (refer Appendix A) stipulates the responsibilities of Auctus in regards to the use and management of the King Vol Project site. Table 1 below highlights selected relevant sections of the EA which relate to Regulated Structures for various design and construction aspects (note that this is not provided as an exhaustive list of relevant EA sections).
### Table 1
**EHP Criteria with EA References**

<table>
<thead>
<tr>
<th>EHP Criteria</th>
<th>Schedule D - Regulated Structures in EA (refer Appendix A)</th>
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<td>EA Conditions</td>
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<td>Assessment of Consequence Category</td>
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<td>Design and Construction of a Regulated Structure</td>
<td>D4-D10</td>
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<tr>
<td>Operation of a Regulated Structure</td>
<td>D11-D13</td>
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<td>Hydraulic Performance Criteria for Regulated Structures</td>
<td>D8, D14-D22</td>
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<td>Regulated Dams Annual Inspections</td>
<td>D23-D26</td>
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<tr>
<td>Transfer Arrangements</td>
<td>D27</td>
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<tr>
<td>Decommissioning and Rehabilitation</td>
<td>D28-D29</td>
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<td>Register of Regulated Structures</td>
<td>D30-D35</td>
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#### King Vol Site Based Monitoring and Reporting

<table>
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<th>EHP Criteria</th>
<th>Regulated Structures in EA (refer Appendix A)</th>
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<td>EA Conditions</td>
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<td>Site Based Reporting and Notification</td>
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<td>Waste Management</td>
<td>E2-E9, E16-E19</td>
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<tr>
<td>Site Based Monitoring</td>
<td>G1-G10</td>
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<tr>
<td>Rehabilitation</td>
<td>C1-C2, C13, C17-C19</td>
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</table>

### 2.2 List of Regulated Structures

Containment and freeboard conditions for Regulated Structures is defined under current EA (Schedule D, Table D1 and D2). The conditions adopted for design and operational purposes is provided in **Table 2**.
Table 2
Containment and Freeboard Requirements for Regulated Dams

<table>
<thead>
<tr>
<th>Name of Regulated Dam</th>
<th>Consequence Category*</th>
<th>Design Storage Allowance Critical Wet Period</th>
<th>Spillway Capacity Critical Design Storm</th>
<th>Mandatory Reporting Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>King Vol Clean Water Dam (CWD)***</td>
<td>Low (i.e. not a Regulated Dam)</td>
<td>N/A</td>
<td>1:1000 AEP^7 rainfall plus 1:10 AEP wave allowance</td>
<td>N/A</td>
</tr>
<tr>
<td>King Vol Mine Water Dam (MWD)</td>
<td>Significant</td>
<td>1:20 ARI, 2 month wet season</td>
<td>1:1000 ARI, 1 hr duration plus 1:10 AEP wave allowance</td>
<td>1:10 year ARI, 72 hour event**</td>
</tr>
<tr>
<td>King Vol Sediment Pond (SP)</td>
<td>Significant</td>
<td>1:20 ARI, 2 month wet season</td>
<td>1:1000 ARI, 1 hr duration plus 1:10 AEP wave allowance</td>
<td>1:10 year ARI, 72 hour event**</td>
</tr>
</tbody>
</table>

*Consequence Category as referenced in 2016 EHP manual [13], which was previously defined as the Hazard Category
**The level below the spillway crest, required to contain either the AEP (design risk) 72hr storm or the AEP (design risk) wave allowance, whichever is lower
***The CWD has been assessed to have a Low Consequence Category and is therefore not nominated as a Regulated Dam but is included in this Table for completeness.
^Annual Exceedance Probability

3 DESCRIPTION OF REGULATED STRUCTURES

3.1 Clean Water Dam

The Clean Water Dam is located at the western boundary of the King Vol Satellite. This structure is used for groundwater dewatering around the new underground mine.

The dam is formed by a single embankment consisting of earthfill, rock armour and select rock fill materials. The spillway is located on the right abutment, excavated into natural sequences.

The current configuration of the Clean Water Dam is as follows:

- Embankment Crest Level: RL 259.6 m
- Spillway Crest/Full Supply Level: RL 258.6 m
- Spillway Width: 9.4 m
- Spillway Depth: 1.0 m
- Maximum Embankment Height: 13.3 m
- Storage Surface Area: 4.95 Ha
- Storage Capacity: 197.8 ML
- Spillway Catchment Area: 18.93 Ha

3.2 Mine Water Dam

The MWD is located at the western boundary of the King Vol Satellite just north of the CWD. This structure is used to store excess water from underground dewatering, plus water from mining activities.

The dam is formed by a single embankment consisting of earthfill, rock armour and select rock fill materials. The emergency spillway is located on the left abutment, excavated into natural sequences.
The current configuration of the MWD is as follows:

- Embankment Crest Level: RL 259.8 m
- Emergency Spillway Crest/Full Supply Level: RL 258.8 m
- Emergency Spillway Width: 11.0 m
- Emergency Spillway Depth: 1.0 m
- Maximum Embankment Height: 10.8 m
- Storage Surface Area: 4.9 Ha
- Storage Capacity: 118.3 ML
- Spillway Catchment Area: 25.9 Ha
- DSA Catchment Area: 11.75 Ha

Two clean water diversion drains were constructed around the MWD to divert upstream catchments. The drains extend to the north and south of the MWD where surface runoff reports to the downstream drainage lines.

### 3.3 Sediment Pond

The Sediment Pond is located east of the ROM pad and the waste rock dump. The dam captures surface runoff and traps coarse sediment particles from the waste stockpile and the ROM pad. The structure also is a transfer facility for the extracted underground mine water to the Mine Water Dam.

The dam is formed by a single embankment consisting of earthfill, rock armour and select rock fill materials. An emergency spillway is located on the right abutment of the embankment.

The current configuration of the Sediment Pond is as follows:

- Embankment Crest Level: RL 239.6 m
- Emergency Spillway Crest/Full Supply Level: RL 238.6 m
- Emergency Spillway Width: 4.4 m
- Emergency Spillway Depth: 1.0 m
- Maximum Embankment Height: 10.6 m
- Storage Surface Area: 2.4 Ha
- Storage Capacity: 74 ML
- Spillway Catchment Area: 10.1 Ha
- DSA Catchment Area: 8.3 Ha

A clean water diversion has been constructed to divert clean water runoff from the upstream catchment to the south of the ROM pad. The drain discharges to the downstream drainage path located north of the ROM pad.

### 4 BASIS FOR SYSTEM DEVELOPMENT AND OPERATION

#### 4.1 Operational Principles and Objectives

The philosophy or commitment of Auctus in relation to the operation of the King Vol Regulated Structures is as stated below:
• The system will achieve appropriate environmental performance standards, given the setting and design constraints of the facilities. Specifically, these standards relate to protection of receiving environments, with emphasis on maintaining environmental values of surface water, groundwater and air quality.
• A system of operating, monitoring and reporting in relation to associated activities will be maintained to ensure that all statutory requirements are met.

4.1.1 Clean Water Dam Objective

Specific objectives of the CWD operation, reflecting the above philosophies/commitments, are as follows:

• The CWD will provide effective containment for clean water, in accordance with conditions of the relevant approvals/authorities.
• The operation of the facility will be focussed on reducing the overall quantity of water “stored” in the CWD to an operational level.
• Rehabilitation of the facility will be carried out in compliance with approvals requirements, with emphasis on developing a geotechnically competent and sustainable landform to support appropriate end land use(s).

To achieve, or significantly contribute to the above objectives, water use at the site would need to be evaluated within the first 12 to 24 months as the mine commences operations. Following on from that, it is recommended that water use in the long term should be planned in advance and rostered to ensure it meets design requirements whilst meeting the site’s water needs as the case may be.

4.1.2 Mine Water Dam

Specific objectives of the MWD operation, reflecting the above philosophies/commitments, are as follows:

• The MWD will provide effective containment for potentially contaminated water, in accordance with conditions of the relevant approvals/authorities.
• The operation of the facility will be focussed on reducing the overall quantity of water “stored” in the MWD to an operational level.
  o A key element of this is the requirement to achieve the DSA (Design Storage Allowance) on 1 Nov of each year. For the MWD, the as-constructed storage capacity is 118.3 ML. If the MWD is empty on 1 Nov each year, this provides sufficient storage capacity to meet the DSA (based on current estimates – to be reviewed annually), including provision for some 6.4 days of continuous process inputs (due to underground dewatering at a rate of 25 l/second) over the two month wet season period.
  o A second key element of this is the ongoing requirement associated with the MRL (Mandatory Reporting Level).
• Rehabilitation of the facility will be carried out in compliance with approvals requirements, with emphasis on developing a geotechnically competent and sustainable landform to support appropriate end land use(s).
4.1.3 Sediment Pond

Specific objectives of the SP operation, reflecting the above philosophies/commitments, are as follows:

- The SP will provide effective containment for potentially contaminated water, in accordance with conditions of the relevant approvals/authorities.
- The operation of the facility will be focussed on reducing the overall quantity of sediment and water “stored” in SP to an operational level.
  - A key element of this is the requirement to achieve the DSA (Design Storage Allowance) on 1 Nov of each year. For the SP, the as-constructed storage capacity is 74 ML. If the SP is empty on 1 Nov each year, this provides sufficient storage capacity to meet the DSA of 73.6 ML (based on current estimates - to be reviewed annually), with no provision for process inputs over the two month wet season period.
  - A second key element of this is the ongoing requirement associated with the MRL (Mandatory Reporting Level).
- Rehabilitation of the facility will be carried out in compliance with approvals requirements, with emphasis on developing a geotechnically competent and sustainable landform to support appropriate end land use(s).

4.2 Regulatory Compliance Requirements

Development and operation of the King Vol Project is subject to the current EA (Environmental Authority EPML00562913). Conditions relevant to the operation and monitoring of the Regulated Structures are outlined under Schedule D, as reproduced in Appendix A.

4.3 Minimum Design and Operating Standards

4.3.1 Key Design References

In addition to the EA, other design benchmarks for Regulated Structures are as follows:

- EHP (2016B): Guideline, Structures which are dams or levees constructed as part of environmentally relevant activities[14]
- EHP (2016C): Eligibility criteria and standard conditions for mining lease activities[15]

Other related references include ANCOLD and ICOLD publications addressing design guidelines for risk assessment and earthquake design.
4.3.2 Consequence Category

Dams and related land-based containment structures associated with environmentally relevant activities (ERA’s) and referred to as regulated structures are subject to an assessment of consequence category, based on ‘The Manual’ (EHP, 2016A) [13]. This document requires consideration of three failure scenarios as follows:

- ‘Failure to contain - seepage’ (i.e. spills or releases due to sub-surface seepage)
- ‘Failure to contain - overtopping’ (i.e. spills or releases due to surface flow, e.g. spillway flow)
- ‘Dam break’ (i.e. collapse of the structure).

Table 2 in Section 2.2 contains the current consequence category for the Regulated Structures.

4.3.3 Design Basis

Based on the key references as outlined in Section 4.3.1, the principal aspects of design for the Regulated Structures (which have been adopted for all three water storage structures), are as follows:

(i) construction materials
(ii) structural stability
(iii) seepage
(iv) hydraulic performance.

4.3.4 Construction Materials

Target properties of the materials used in the CWD, MWD and SP construction, based on past experience and performance assessment are as follows:

(i) Earth Fill (for use as low permeability zone)

- Clay dominant material (clay/silt fraction greater than 20% and Liquid Limits greater than 25% and Plasticity Index greater than >15%).
- Achievable compacted permeability of less than $1 \times 10^{-8}$ m/s.
- Able to be engineered to limit potential for ‘piping’ (sub-surface erosion).

The key to the above suite of properties is to create a fill layer that possesses high strength, compacts well, is stable (i.e. not subject to significant vertical settlement under load or volume instability due to variation in moisture content) and importantly, provides an appropriately low level of permeability.

(ii) Rock Fill (for use as embankment fill)

The purpose of rock fill within an embankment would be to provide stability and erosion protection to external portions of the embankment, where required. General requirements for rock fill would be as follows:

- High compacted strength.
- Stable and durable (with respect to potential settlement, volume instability, erosion potential and weathering).
- High permeability relative to adjacent embankment or subgrade zones.
- Suitable grading to reduce migration of fines from adjacent zones.
• Geochemically stable (i.e. non-acid producing).

4.3.5 Structural Stability

On the basis of limit equilibrium conditions, Table 3 shows typical minimum factors of safety for embankment stability would apply:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Minimum Factor of Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Term/Steady State Seepage (at maximum storage level)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Seismic Conditions

- Pseudo static (OBE)  
  Minimum Factor of Safety = 1.2
- Maximum Design Earthquake (MDE)  
  Minimum Factor of Safety = 1.0

Post-Seismic (liquefied shear strengths adopted if applicable)  
Minimum Factor of Safety = 1.0

* OBE: Operating Base Earthquake, producing a level of ground motion which will cause only minor and repairable damage to the structure.

MDE: Maximum Design Earthquake (MDE), with the design requirement being that the dam may be badly damaged but the facility should maintain its integrity and cannot allow the release of impounded water.

4.3.6 Seepage Management

For the purpose of embankment design and stability, the following criteria are inferred with respect to seepage management, based on ‘The Manual’.

(i) Excessive surface expression of seepage discharge downstream from the embankment should not occur.
(ii) A significant impact on the environmental status of receiving waters should not result.
(iii) The potential beneficial uses of surface and groundwater down gradient from the site should not be compromised.

Under worst case conditions assuming limited seepage mitigation measures are implemented and/or proposed seepage systems are not operated over the long term, seepage from the storage during the operation of the structures and into the post closure phase would occur by development of a seepage plume, initially migrating slowly downwards into the foundation sequences. A local groundwater mound would form beneath the storage, either directly connected with the underlying groundwater system, or perched above a horizon of lower permeability. This mound will eventually move hydraulically down gradient, likely towards the west, south to south east, or to the south to south west for the CWD, MWD and SP, respectively. The time taken for such seepage to migrate would depend on the hydraulic capacity of the seepage pathways that exist, either through the basement or beneath the cut-off key.

Based on the above conceptual conditions, it is likely that the fate of seepage from the storage would either report to the seepage collection system of the MWD or manifest itself downstream of the CWD, MWD or SP. Evidence of seepage would likely be observed as follows:

- Expression of seepage at ground surface directly downstream from the embankment.
- Depending on the continuity of surface soils, some seepage springs may appear in depressions/hollows or intersecting drainages further downstream.
A series of nominal seepage control measures were incorporated into the embankment configuration of each water storage structure, including:

- **General sub-excavation** within the embankment footprint to remove topsoil and any weak or loose soils.
- **A foundation cut-off trench** along the embankment footprint, excavated to a nominal depth of 1.0 m.
- **The primary mechanism for containment of water** was a low permeability homogenous earthfill embankment for each structure.
- **A seepage collection pit and manhole** was constructed immediately downstream of the toe of the MWD. The seepage water in the manhole is pumped back to the storage.

In addition to the proposed seepage control measures, monitoring and if necessary, subsequent implementation of additional seepage controls is a fundamental component of the ongoing site Regulated Dams development. Groundwater monitoring within the environmental monitoring bores should be maintained, particularly downgradient from each Regulated Structure. An observational approach should be implemented and remedial measures taken, if required.

### 4.3.7 Hydraulic Performance

Key hydraulic performance aspects relevant to development and operation of the Regulated Structures, based on EHP (2016) are as follows:

- Design Storage Allowance (DSA)
- Mandatory Reporting Level (MRL)
- Emergency Spillway

As the CWD is not a Regulated Structure, the DSA and MRL requirements do not apply to this dam.

#### 4.3.7.1 Design Storage Allowance (DSA)

For Regulated Structures, a minimum available storage capacity, referred to as *Design Storage Allowance (DSA)* is required on 1 November of each year. This capacity is therefore a constraint applying to the operating phase of each Regulated Structure. Note that the DSA is to be reviewed annually and may change with time. Details of the assessed DSA values at the time of preparation of this OMP are presented in Table 4, below.
Table 4
Assessed DSA for Regulated Structures (July 2017)

<table>
<thead>
<tr>
<th>Site Storage</th>
<th>MWD</th>
<th>SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequence Category</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>DSA Criteria</td>
<td>1 in 20 year AEP, 2 month wet season (design critical wet period), plus process inputs</td>
<td>1 in 20 year AEP, 2 month wet season (design critical wet period), plus process inputs</td>
</tr>
<tr>
<td>Design Critical Wet Period</td>
<td>2 months</td>
<td>2 months</td>
</tr>
<tr>
<td>Runoff Over Design Critical Wet Period</td>
<td>2 months</td>
<td>2 months</td>
</tr>
<tr>
<td>- Rainfall Total</td>
<td>890 mm*</td>
<td>890 mm*</td>
</tr>
<tr>
<td>- DSA/MRL Catchment Area</td>
<td>11.75 Ha**</td>
<td>8.27 Ha**</td>
</tr>
<tr>
<td>- Runoff Coefficient</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>- Calculated Runoff</td>
<td>104.6 ML</td>
<td>73.6 ML</td>
</tr>
<tr>
<td>Process Inputs Over Design Critical Wet Period</td>
<td>13.7 ML</td>
<td>0 ML</td>
</tr>
<tr>
<td>- i.e. provision for 6.4 days of continuous pumping at 25 litres per second</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>DSA Volume</td>
<td>118.3 ML</td>
<td>73.6 ML</td>
</tr>
<tr>
<td>As-Built Storage Capacity (to Full Supply Level)</td>
<td>118.3 ML</td>
<td>74.0 ML</td>
</tr>
<tr>
<td>- i.e. dam needs to be empty on 1 Nov. to achieve DSA</td>
<td>-</td>
<td>i.e. dam needs to be essentially empty on 1 Nov. to achieve DSA</td>
</tr>
</tbody>
</table>

*Assessed based on the SILO Data Drill data for the King Vol site.
**DSA/MRL catchment areas are based on clean water diversions in place and operational

4.3.7.2 Mandatory Reporting Level (MRL)

In accordance with the EA conditions as outlined in Section 2.1, the MRL is the level in any Regulated Structure at which reporting to the administering authority is required, with an action plan to be implemented to recover sufficient capacity to minimise the risk of release from the storage. The MRL for the site Regulated Dams is based on containment of a 1 in 10 year AEP storm event. Note that the MRL is to be reviewed annually and may change with time. Details of the assessed MRL values at the time of preparation of this OMP are presented in Table 5, below.

Table 5
Assessed MRL for Regulated Structures (July 2017)

<table>
<thead>
<tr>
<th>Site Storage</th>
<th>MWD</th>
<th>SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequence Category</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>MRL Criteria</td>
<td>1 in 10 year AEP, 72 hour event</td>
<td>1 in 10 year AEP, 72 hour event</td>
</tr>
<tr>
<td>Rainfall Depth</td>
<td>226.8 mm</td>
<td>226.8 mm</td>
</tr>
<tr>
<td>DSA/MRL Catchment Area</td>
<td>11.75 Ha**</td>
<td>8.27 Ha**</td>
</tr>
<tr>
<td>Extreme Storm Storage (ESS)</td>
<td>26.6 ML</td>
<td>18.8 ML</td>
</tr>
<tr>
<td>Depth Below Full Supply Level to Achieve ESS</td>
<td>0.6 m</td>
<td>1.0 m</td>
</tr>
<tr>
<td>Depth Below Full Supply Level to Achieve 1 in 10 Year AEP Wave Allowance</td>
<td>0.4 m</td>
<td>0.4 m</td>
</tr>
<tr>
<td>Full Supply Level (AHD datum)</td>
<td>RL 258.8 m</td>
<td>RL 238.6 m</td>
</tr>
<tr>
<td>Mandatory Reporting Level (MRL) (AHD datum)</td>
<td>RL 258.2 m</td>
<td>RL 237.6 m</td>
</tr>
</tbody>
</table>

**DSA/MRL catchment areas are based on clean water diversions in place and operational
4.3.7.3 Emergency Spillway Requirement

An emergency spillway for the site water storage structures (including those that are Regulated Structures) is a mandatory requirement, with the design of the spillways for each of the based on the 0.001 AEP event (equivalent to a 1 in 1000 year event) critical duration event, as outlined in Section 2.2.

Spillway/emergency spillway details for the site water storages are presented in Sections 3.1, 3.2 and 3.3 with locations of the spillways shown on Drawing 301.

5 CLEAN WATER DAM OPERATING PROCEDURES

5.1 Objectives

The philosophy and objectives of Auctus in relation to operation of the CWD can be found in Section 4.1.1. To achieve, or significantly contribute to these objectives, the water stored within the CWD will need to be appropriately managed using a combination of irrigation and cannon evaporation, with water being pumped to either adjacent landholder or the receiving environment as per Schedule G of the EA.

Auctus has prescribed the storage capacity for each of the water storage structures (including the CWD), with the intent that operational water storage levels are managed to meet both site water use and EA requirements.

Sediment accumulated within the CWD would need to be monitored and if necessary cleaned out as part of general maintenance and to ensure the required storage volume is maintained. Furthermore, water levels within the CWD would need to be reduced as necessary to allow sediments to dry out prior to these works. This work would require planned and coordinated sediment removal and water discharge and recharge management.

To assist in managing the CWD, it is intended that a daily record (inspection log book) be maintained which includes daily records of stored water level, volumes of water pumped (into the storage, out of the storage for use on site, and out of the storage to the receiving environment) and any works undertaken.

5.2 Operating Procedures

Five key operating aspects are relevant to the CWD. These aspects are as follows:

- operation of CWD impoundment
- operation of seepage management
- rectification of faults/leakage in pipelines
- environmental reporting
- maintenance of system infrastructure.

These aspects contribute to protection of environmental values surrounding the Project site, including:

- surface water
- groundwater
- air quality.
5.2.1 Operation of CWD Impoundment

5.2.1.1 System Description

Water which is obtained from the production bores used to reduce the groundwater level surrounding the underground mining is transferred to the CWD. The CWD has a maximum storage capacity of 197.8 ML (as-constructed).

The CWD is designed to spill over into the drainage lines located to the west of the structure during extreme storm events only. The intent is that water released under this scenario would only consist of clean overland flows which have mixed with groundwater from the production bores.

5.2.2 Operating Guideline for Water Routing

The CWD is to be used in conjunction with other water storage structures to meet site operational water needs. Additionally, water within the CWD is to be discharged to the receiving environment in accordance with Schedule G of the EA.

5.2.3 Operation of Seepage Management

Potential seepage from the CWD is to be managed in the first instance as part of inspections and monitoring, as outlined in Section 8, below. In the event that additional seepage controls are required, design, construction and operational requirements of such controls would need to be documented and implemented.

5.2.4 Rectification of Faults/Leakage in Pipelines

The principle pipelines associated with the CWD comprise transfer routes from the dewatering bores to all dams, between dams, transfers to adjacent landholder and associated evaporation/irrigation systems. A general procedure for repair of faults or small leaks within pipelines is described as follows:

- Maintain an inspection program to check for faults or leaks (refer Section 8.2).
- Where a leak is detected, this area shall be marked to assist maintenance personnel to locate the fault.
- As a temporary measure, Linatex bandages, fiberglass tape or insertion of timber plugs may be used to repair leaks. Permanent repairs currently on site include pipes needing mending cut and welded or a bandit-clamp used. Regardless of whether temporary measures are successful or not, prompt action by the maintenance crew will be required to undertake permanent repairs of leaks or faults.
- In the event that a significant fault or leak is encountered (i.e. cannot be managed by temporary measures), the maintenance crew shall be contacted immediately (Site Radio: Workshop channel). Such an event may constitute an incident, with incident reporting to be carried out in accordance with Auctus’ incident response process.

As a means of limiting the occurrence of faults or leakage or at least with prompt identification of faults within pipeline systems around the CWD, management measures are of importance and should include daily visual checks included as part of the dam inspection (refer Section 8.2.1).

5.2.5 Environmental Reporting

Any significant changes to pond levels, high pond levels, spills or leaks that are detected during regular inspections and operation will be reported to the environmental department immediately.
For pumped discharges of water to the receiving environment, adequate records shall be maintained to confirm compliance with EA conditions G45 to G53.

5.2.6 Maintenance of System Infrastructure

A maintenance program must be implemented to maintain the integrity and long term serviceability aspects of the following key infrastructure items:

- storage embankments
- spillway
- seepage management systems
- storage area
- auxiliary pump(s), equipment and water pipeline(s).

Specific maintenance procedures and a maintenance schedule, developed with consideration of the monthly and surveillance requirements and any issues highlighted during or as part of the Annual Dam Safety Inspection, shall be prepared and implemented by Auctus.

6 MINE WATER DAM OPERATING PROCEDURES

6.1 Objectives

The philosophy and objectives of Auctus in relation to operation of the MWD can be found in Section 4.1.2.

Auctus has prescribed the storage capacity for each of the water storage structures (including the MWD), with the intent that operational water storage levels are managed to meet both site water use and EA requirements. Water levels within the MWD would need to be maintained: (1) to comply with MRL requirements at all times; and (2) such that the DSA is met at 1 November each year (refer Section 4.3.7, above).

Sediment accumulated within the MWD would need to be monitored and if necessary cleaned out as part of general maintenance and to ensure the required storage volume is maintained. Furthermore, water levels within the MWD would need to be reduced as necessary to allow sediments to dry out prior to these works. This work would require planned and coordinated sediment removal and water discharge and recharge management.

To assist in managing the MWD, it is intended that a daily record (inspection log book) be maintained which includes daily records of stored water level, volumes of water pumped into and out of the storage, and any works undertaken.
6.2 Operating Procedures

Five key operating aspects are relevant to the MWD. These aspects are as follows:

- operation of MWD impoundment
- operation of seepage management
- rectification of faults/leakage in pipelines
- environmental reporting
- maintenance of system infrastructure.

These aspects contribute to protection of environmental values surrounding the Project site, including:

- surface water
- groundwater
- air quality.

6.2.1 Operation of MWD Impoundment

6.2.1.1 System Description

The MWD is a Regulated Structure intended for containment of: (1) excess water from dewatering of the King Vol underground mine; (2) surface run-off that reports directly to the MWD plus (3) water from mining activities. The MWD has a maximum storage capacity of 118.3 ML (as-constructed).

To maintain dam safety requirements, any water which overflows through the MWD emergency spillway due to continued rain and overland flows is to continue without interruption as environmental flows.

6.2.1.2 Operating Guideline for Water Routing

Water from the underground mining is initially directed to the SP and then transferred to the MWD.

The MWD standing water level is to be maintained: (1) to comply with MRL requirements at all times; and (2) such that the DSA is met at 1 November each year; (refer Section 4.3.7, above) to meet licence requirements.

Note: The DSA assessment presented above includes provision for process inputs due to underground dewatering only, i.e. it is assumed that net process inputs due to water from mining activities would be zero.

6.2.2 Operation of Seepage Management

The seepage management system is comprised of a seepage outfall drainage area and manhole that exists at the toe of the downstream batter. Seepage collected via this system is to be pumped from the manhole back into the MWD impoundment.

6.2.3 Rectification of Faults/Leakage in Pipelines

The principle pipelines associated with the MWD comprise of one water delivery line to the receiving environment and one water pipeline from the SP facility. A general procedure for repair of faults or small leaks within pipelines is described as follows.
Maintain an inspection program to check for faults or leaks (refer Section 8.2).

Where a leak is detected, this area shall be marked to assist maintenance personnel to locate the fault.

As a temporary measure, Linatex bandages, fibreglass tape or insertion of timber plugs may be used to repair leaks. Permanent repairs currently on site include pipes needing mending cut and welded or a bandit-clamp used. Regardless of whether temporary measures are successful or not, prompt action by the maintenance crew will be required to undertake permanent repairs of leaks or faults.

In the event that a significant fault or leak is encountered (i.e. cannot be managed by temporary measures), the maintenance crew shall be contacted immediately (Site Radio: Workshop channel). Such an event may constitute an incident, with incident reporting to be carried out in accordance with Auctus’ incident response process.

As a means of limiting the occurrence of faults or leakage or at least with prompt identification of faults within pipeline systems around the MWD, management measures are of importance and should include daily visual checks included as part of the dam inspection (refer Section 8.2.1).

6.2.4 Environmental reporting

Any significant changes to pond levels, high pond levels (e.g. in relation to the MRL), spills or leaks that are detected during regular inspections and operation will be reported to the environmental department immediately.

6.2.5 Maintenance of System Infrastructure

A maintenance program must be implemented to maintain the integrity and long term serviceability aspects of the following key infrastructure items:

- storage embankments
- emergency spillway
- seepage management systems
- storage area
- clean water diversions
- auxiliary pump(s), equipment and water pipeline(s).

Specific maintenance procedures and a maintenance schedule, developed with consideration of the monthly surveillance requirements and any issues highlighted during or as part of the Annual Dam Safety Inspection, shall be prepared and implemented by Auctus.

7 SEDIMENT POND OPERATING PROCEDURES

7.1 Objectives

The philosophy and objectives of Auctus in relation to operation of the SP can be found in Section 4.1.3.

Auctus has prescribed the storage capacity for each of the water storage structures (including the SP), with the intent that operational water storage levels are managed to meet both site water use and EA requirements. Water levels within the SP would need to be maintained: (1) to comply with MRL requirements at all times; and (2) such that the DSA is met at 1 November each year (refer Section 4.3.7, above).
Sediment accumulated within the SP would need to be monitored and if necessary cleaned out as part of general maintenance and to ensure the required storage volume is maintained. Furthermore, water levels within the SP would need to be reduced as necessary to allow sediments to dry out prior to these works. This work would require planned and coordinated sediment removal and water discharge and recharge management.

Further, it is important that the extent of the proposed waste dump and ROM pad does not increase beyond the design extents provided by Auctus to ATCW, as shown on the SP as-constructed drawings (ATCW, 2017C) [9], otherwise the required SP storage capacity could be compromised.

To assist in managing the SP, it is intended that a daily record (inspection log book) be maintained which includes daily records of stored water level, volumes of water pumped into and out of the storage, and any works undertaken.

7.2 Operating Procedures

Five key operating aspects are relevant to the SP. These aspects are as follows:

- operation of SP impoundment
- operation of seepage management
- rectification of faults/leakage in pipelines
- environmental reporting
- maintenance of system infrastructure.

These aspects contribute to protection of environmental values surrounding the Project site, including:

- surface water
- groundwater
- air quality

Operating aspects are outlined in the following sections.

7.2.1 Operation of SP Impoundment

7.2.1.1 System Description

The SP is a Regulated Dam intended for containment of potentially turbid surface run-off that reports directly to the SP. The intent is that by allowing turbid overland flows to be collected within the SP impoundment, particulates will settle out of the water column into the pond as sediment. Additionally, the SP is to be utilised as a temporary transfer storage of excess water from dewatering of the King Vol underground mine to the MWD. The SP has a maximum storage capacity of 74 ML (as-constructed, with allowance for the proposed waste dump and ROM pad).

To maintain dam safety requirements, any water which overflows through the SP emergency spillway due to continued rain and overland flows is to continue without interruption as environmental flows.
7.2.1.2 Operating Guideline for Water Routing

Water which is obtained from the underground dewatering system is transferred to the SP. Water is then pumped from the SP to the MWD.

The SP standing water level is to be maintained: (1) to comply with MRL requirements at all times; and (2) such that the DSA is met at 1 November each year; (refer Section 4.3.7, above) to meet licence requirements.

7.2.2 Operation of Seepage Management

Potential seepage from the SP is to be managed in the first instance as part of inspections and monitoring, as outlined in Section 8, below. In the event that additional seepage controls are required, design, construction and operational requirements of such controls would need to be documented and implemented.

7.2.3 Rectification of Faults/Leakage in Pipelines

The principle pipelines associated with the SP comprise of one water delivery from the underground mine to the SP and one water pipeline from the SP to the MWD. A general procedure for repair of faults or small leaks within pipelines is described as follows.

- Maintain an inspection program to check for faults or leaks (refer Section 8.2).
- Where a leak is detected, this area shall be marked to assist maintenance personnel to locate the fault.
- As a temporary measure, Linatex bandages, fibreglass tape or insertion of timber plugs may be used to repair leaks. Permanent repairs currently on site include pipes needing mending cut and welded or a bandit-clamp used. Regardless of whether temporary measures are successful or not, prompt action by the maintenance crew will be required to undertake permanent repairs of leaks or faults.
- In the event that a significant fault or leak is encountered (i.e. cannot be managed by temporary measures), the maintenance crew shall be contacted immediately (Site Radio: Workshop channel). Such an event may constitute an incident, with incident reporting to be carried out in accordance with Auctus’ incident response process.

As a means of limiting the occurrence of faults or leakage or at least with prompt identification of faults within pipeline systems around the SP, management measures are of importance and should include daily visual checks included as part of the dam inspection (refer Section 8.2.1).

7.2.4 Environmental Reporting

Any significant changes to pond levels, high pond levels (e.g. in relation to the MRL), spills or leaks that are detected during regular inspections and operation will be reported to the environmental department immediately.

7.2.5 Maintenance of System Infrastructure

A maintenance program must be implemented to maintain the integrity and long term serviceability aspects of the following key infrastructure items:

- storage embankments
- emergency spillway
- seepage management systems
• storage area
• clean water diversions
• auxiliary pump(s), equipment and water pipeline(s).

Specific maintenance procedures and a maintenance schedule, developed with consideration of the monthly surveillance requirements and any issues highlighted during or as part of the Annual Dam Safety Inspection, shall be prepared and implemented by Auctus.

8 \hspace{1cm} \textbf{INSPECTIONS AND MONITORING}

The key inspection and monitoring aspects related to the Regulated Structure is:

• Inspections to ensure the ongoing safety and serviceability.
• Monitoring of key infrastructure including embankments, emergency spillway, pumps and pipeline systems.
• Monitoring of seepage recovery systems.

These aspects are discussed below along with roles and responsibilities.

8.1 \hspace{1cm} \textbf{Operational Structure}

Key personnel and associated roles with respect to management of the CWD, MWD and SP and associated systems are as follows:

• Project Manager Mining will act as the water storage structures manager and is responsible for the overall management of the system.
• Process Manager is responsible for providing operational/logistical support for the maintenance and operation of the facilities including on ground support.
• Mining personnel, working under the Project Manager Mining or Underground Mine Manager, will conduct the general daily duties/activities associated with the functioning of the water storage structures and associated water transfer systems in respect to the operation of the site.
• Environmental Advisor is the nominated compliance officer for the water storage structures and is responsible for monitoring the functioning of the system and for environmental compliance against EPML00562913.
• Mining Manager is responsible for providing operational/logistical support to the water storage structures management team through the provision of specific machinery, survey and geotechnical inspections/surveys.
• Mine Surveyor will conduct survey and technical monitoring functions.
• Off-site specialist or consultants will be utilised as required under the EA or for technical assistance and specific monitoring/audit functions.

8.2 \hspace{1cm} \textbf{Inspections}

Visual inspections of the water storage structures are required as outlined in \textbf{Table 6}. 
### Table 6
Visual Inspection Types for the Regulated Structures

<table>
<thead>
<tr>
<th>Inspection Type</th>
<th>Frequency</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Inspection</td>
<td>1 inspection per shift (minimum)</td>
<td>Delegate of Project Manager Mining</td>
</tr>
<tr>
<td>Monthly Inspection</td>
<td>Once per month</td>
<td>Environmental Advisor</td>
</tr>
<tr>
<td>Annual/Engineering Inspection</td>
<td>Once per year</td>
<td>Registered Professional Engineer of Queensland (RPEQ), suitably qualified in dam engineering</td>
</tr>
<tr>
<td>Post Rain Event</td>
<td>Following &gt;10 mm rainfall event</td>
<td>Environmental Advisor</td>
</tr>
</tbody>
</table>

Inspections for the Regulated Structures would focus on the key components of the system, with action required in relation to but not necessarily limited to, the following:

(i) Any significant changes within impoundment areas or to pond levels, high pond levels (e.g. in relation to the MRL), or spills.
(ii) Any excessive settlement, cracking or other deformation observed/recorded within any significant earthworks structure (i.e. perimeter embankments).
(iii) Any excessive, concentrated or sediment-laden seepage from embankment surfaces or surrounds.
(iv) Scouring or visible erosion on any formed or natural surface, most notably on the batters of any embankment.
(v) Any obstruction to the emergency spillway.
(vi) Inoperability or failure of any pumping system.
(vii) Ponding of water on embankment surfaces.
(viii) Tree growth on embankment surfaces.
(ix) Loss of integrity of clean water diversions.

The scope of inspection as outlined above is described as follows:

8.2.1 Daily Inspections

The standard procedure for daily inspections should include a drive-around inspection of the entire system, incorporating the CWD, MWD, and SP (storage area, emergency spillway/spillway, MRL markers, seepage recovery systems, embankment crests and batters, downstream toe area of embankments, embankment abutments and water transfer infrastructure) as a minimum requirement.

Daily inspections undertaken immediately following any rainfall event of greater than 10 mm in any one day shall include each of the above elements, with any reporting and notification implemented in a timely manner as required.

The results of any observations made during the daily inspection shall be recorded in the daily log book. The daily inspection will focus on the following:

- Serviceability of pipelines (water delivery and return water lines).
- General integrity of all embankments (e.g. observable deformation or settlement, etc.).
- Indication of any seeps or expression of water downstream of any embankment.
- Location and current status of water in the CWD, MWD and SP.
- Operability of return water systems (the abstraction tower and the seepage recovery system).
• Serviceability of bunding and spillway/emergency spillway.
• Any other aspect that may impact on embankment integrity.

The daily log book exists as a “chain-of-command” for reporting issues and variances in operation or performance. One entry per inspection is to be completed and maintained as a permanent record of the inspection, and as justification for work orders to be raised for appropriate maintenance works.

8.2.2 Monthly Inspections

Monthly inspections of the regulated structures shall be carried out by the Environmental Advisor (refer Appendix B). The monthly inspection would focus on the key areas as identified by the daily inspections, taking particular note of any previously identified issue or incident and the condition of any action undertaken. In addition to the daily inspection issues, the monthly inspections would include inspections of all the embankments to confirm integrity, and in particular to assess the downstream toe area of embankments for indication of seeps/expression of water. The results of the monthly inspections are to be compiled within a formal checklist, with work orders raised for completion of any works required.

Where required or deemed necessary, independent review or inspection of any condition considered to represent a potential dam safety or environmental hazard is to be undertaken. Such a review should be undertaken in addition to the Annual/Engineering Inspection as outlined in Section 8.2.3.

Completed event or incident documentation are to be returned to the Environment Department in preparation for the Annual Regulated Dam Safety Inspection.

8.2.3 Annual/Engineering Inspections

Annual engineering inspections shall take the form of a regulated dam safety inspection and operational audit by a suitably qualified independent third party person/s. The requirement for such a review of the regulated structures (including the CWD, for completeness) is in accordance with the The Manual (EHP, 2016A) [13] and the EA EPML00562913. The scope of such a review is as follows:

• To identify any elements of the system that are of concern or are deficient from a dam safety perspective, with emphasis on storage embankments and hydraulic controls.
• To assess available inspection/monitoring data, against design expectations or predictions.
• Where applicable, to evaluate available storage capacities over the next 12 month period, to satisfy relevant containment requirements/conditions.

The annual inspection report is to be prepared for submission to the administering authority. Included in the report will be a list of any remedial or repair works that have been identified.

Completed reports are to be delivered to the Environment Department for submission to the Administering Authority as required under EA condition D26.
8.3 Monitoring

8.3.1 Embankment Integrity

The key monitoring aspect for assessment on embankment integrity of the CWD, MWD, and SP is survey (of embankment crest displacement).

Survey shall be undertaken in relation to a series of permanent benchmarks located around the CWD, MWD and SP. Survey monuments need to be established within the crest of the embankment, with at least one site in the centre of each embankment section. Additional settlement monitoring sites need to be established where any monitored or observed settlement of displacement occurs.

Survey monitoring shall be carried out on a quarterly basis. The results of survey from each site would need to be plotted, with a broad assessment of the rate of settlement to be undertaken. Any significant increase to this rate, or in the event of total settlement exceeding 50 mm over a quarter, the settlement data shall be reviewed by a suitably qualified dam engineer (unless otherwise covered by the Annual Dam Safety Inspection). All dam settlement shall be assessed regardless as part of the annual dam safety inspection/operational audit.

Completed surveys are to be sent to the Environment Department for inclusion into the Annual Dam Safety Inspection.

8.3.2 Operability of Spillway/Emergency Spillway

A principle operating objective with respect to the three structures is to allow spill from the storage via the Spillway/Emergency Spillway only in the event of preventing a catastrophic failure of the embankment as a last resort under extreme rainfall conditions and under expert recommendation and licencing notification procedures.

It is emphasised that the Spillway/Emergency Spillway is provided for such response to extreme conditions exclusively. Notwithstanding this, there is an expectation that any uncontrolled release/spill will not be viewed favourably by the administering authority under any circumstances.

8.3.3 Maintenance of MRL

As required by the EA condition D16-D17, a Mandatory Reporting Level (MRL) exists for the MWD and SP, with this level triggering a need for external notification with the administering authority under EA Conditions A13 and D16. The SSE (holder of this environmental authority) must sign off on all external notifications before they are lodged.

The MRL level for the MWD, with background provided in Section 3.2, is RL 258.2 m. The MRL level for the SP, with background provided in Section 3.3, is RL 237.6 m.

Operating standards applying to the Regulated Structures storage relevant to the MRL are as follows:

- Elevation markers must be installed within the MWD and SP storages to indicate the MRL levels along with the spillway invert levels.
- It will not be acceptable that a spill occurs following an acceptable period after cessation of any rainfall event, even if this event contributes to the DSA. This implies that a “Sunny Day” spill is not permitted under any circumstances.
- An inspection and maintenance program is to be initiated to ensure the operability of the emergency spillway (as described in Section 8.2). Of significance is that any blockages or
Constrictions will require removal, with approaches also to be maintained and stabilised as required. The emergency spillway discharge area should also be effectively maintained.

In the event the MRL is found to be exceeded within the MWD and SP, the following actions shall be implemented:

(i) Report to the Project Manager Mining and Environmental Advisor that the MRL has been exceeded.
(ii) The Environmental Advisor shall inform EHP by telephone. This communication shall take place as soon as practicable of the MRL being reached.
(iii) An action plan shall be prepared and submitted to EHP within 24 hours of the MRL being reached, with this action plan outlining measures and timing proposed to be undertaken to reduce or otherwise manage the water level within the storage such that the risk of release is minimized.

8.3.4 Water Balance Assessment

In accordance with EA requirements, an annual water balance review in relation to the King Vol Project is to be completed. The purpose of this review will be to confirm compliance with containment criteria as outlined in Section 2.2, or otherwise to identify the works required achieve compliance within the defined timeframe. Key inputs to water balance modelling will comprise:

(i) Survey of the water storage structures (as at the base date for the model) to assess the air-space capacity that has been consumed by sediments, as the case may be.
(ii) Water levels occurring within the Regulated Structures as at the model base date.
(iii) Water usage data for the 12 month period prior to the model base date, related to water usage around the site.

This data will be utilised for the purpose of model calibration, as well as to establish boundary conditions for predictive modelling as a basis for a 12 month outlook.

8.4 Inspection and Monitoring Summary

A schedule for inspections and monitoring for the Regulated Structures is provided in Table 7. This schedule is based on the inspection and monitoring requirements as outlined in Sections 8.2 and 8.3.

Environmental monitoring is to be completed in line with EA conditions G12-G14 inclusive to collect receiving waters samples following rainfall events which trigger flow events and sediment samples prior to and post wet season from all locations outlined in EA Table G6 (as relevant to the King Vol site). If any results from these analysis show an exceedance of Contaminant Limits as outlined in EA Table G7 notification to the administering authority must occur within 24 hours (EA condition A13).

The Environmental Advisor is responsible for implementing all environmental monitoring and reporting programs at Mungana under EPML00562913.

The Project Manager Mining is responsible for ensuring the management and operation of equipment used during the operation of the Regulated Structures are maintained in compliance with EA condition A4.
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Condition</th>
<th>Method</th>
<th>Frequency</th>
<th>Application/Assessment</th>
<th>Responsible Person</th>
</tr>
</thead>
</table>
| Inspection & Monitoring        | Overall Condition | Visual            | Once per shift           | • Water pumping practices  
• Freeboard availability / MRL  
• Integrity of infrastructure, including embankments, emergency spillway, leak detection standpipe and pumps and pipes | Delegate of Project Manager Mining                      |
|                                | Overall Condition | Visual            | Monthly                  | • Overall condition and status of the ECP  
• Identification of need for action based on issues raised through daily inspections | Environmental Advisor                                    |
|                                | Seepage Recovery System | Visual         | Weekly /Monthly          | • Overall condition and status of Seepage Return System, containment embankments and pumping systems | Project Manager Mining or Delegate/ Environmental Advisor |
|                                | Overall Condition | Visual/Analysis   | Annual                   | • Overall condition against industry standards and EA  
• Elements of concern  
• Qualitatively assess available data against design expectations  
• Assess available storage and qualitatively assess upgrade requirements | Suitably qualified geotechnical/ engineering specialist (RPEQ) |
| Measurement of Operational/ Performance Parameters | Reservoir Surface | Marker board (showing MRL and Emergency Spillway levels) | Monthly                   | • Assess storage level against MRL                                                                 | Environmental Advisor                                    |
|                                | Annual Performance | Aerial Survey for Storage area Flow Meters for Transfer Rates | Annual                   | • Review of effectiveness of water management practices  
• Water balance review (calibration and 12-month predictive outlook)  
• Qualitatively assess need for future storage upgrading | Environmental Advisor / Third party Auditor              |
9 EMERGENCY RESPONSE PLAN

9.1 Purpose

The Emergency Action Plan (EAP) for the water storage structures defines response procedures designed to:

- Identify emergency conditions that could endanger the integrity of either the storage or the surround environment and that would require immediate preventative or containing action.
- Prescribe procedures that should be followed by operating personnel in the event of an emergency.
- Provide timely warning to appropriate emergency management agencies for implementation of community protection measures, if deemed necessary.

9.2 Emergency Events and Actions

9.2.1 Incident (Storage Failure) Identification

Table 8 lists potential conditions that are considered most likely to initiate a failure of the water storage structure.

<table>
<thead>
<tr>
<th>Incident</th>
<th>Incident Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overtopping Event</td>
<td>Rainfall or wind event causing encroachment by erosion of any portion of embankment crest surface, or by general overtopping</td>
</tr>
<tr>
<td>Seepage</td>
<td>Evidence of concentrated discharge of seepage from any embankment surface, with or without presence of colour or loss of clarity due to suspended soil particles. Water surface disturbances such as whirlpools (vortices) in reservoir (probably associated with significant downstream leakage, soft spots or boggy areas)</td>
</tr>
<tr>
<td>Structure Failure</td>
<td>Defects observed in embankments or immediate surrounds (e.g. cracking, slumping, settlement, or faults in transfer system) or emergency spillway</td>
</tr>
</tbody>
</table>

Indicators that identify the onset of these incidents are covered in the daily inspection requirements (refer Section 8.2.1).

9.2.2 Emergency Response Procedure

Timely implementation of the emergency response procedure (ERP) is a crucial element in the effectiveness of the OMP, with appropriate warning systems imperative to reduce the risk of loss of life and property damage downstream from the storage. Generic ERPs are presented as Figure 2 to Figure 5 which have been prepared to apply to the King Vol Project in a flow chart style, and provide the steps to identify and manage some, but not necessarily all, of the events that can lead to failure of key elements of either system. The fundamental requirement of the procedure is to
identify and evaluate the emergency procedure, and to classify its urgency so that appropriate action can be taken.

Section D, Clause 10 of the EA (EPML00562913) stipulates that any third party located downstream of the water storage structures must be provided with a copy of the emergency action plan in place for each facility. As part of the design works, a consequence category assessment (ATCW, 2016A and ATCW, 2016E) [2][6] was performed for all the structures. The outcome of the assessment determined that there are no downstream dwellings or workplaces identified within the likely flow path of the CWD, MWD and the SP. In the event of an uncontrolled release from or breach of the SP, it is anticipated that the Burke Development Road (gravel road) would be affected. This would necessitate closure of the road and notification of local authorities (police and Mareeba Shire Council), along with notification of Tartana Mine (as closure of the road would impact access to Tatana Mine).
Figure 2
Emergency Response Procedure

OBSERVER/ REPORT ➔ Incident Indicator Triggered (Refer Table 8)

FAILURE INITIATED

☑️ YES ➔ Evaluate Storage Elements

☑️ YES ➔ Initiate Emergency Notification Procedure

☑️ YES ➔ Overtopping Event Refer Figure 3

☑️ YES ➔ Seepage Refer Figure 4

☑️ YES ➔ Structural Failure Refer Figure 5

☑️ NO ➔ Record all relevant observations including time/date and weather conditions

Is Failure Imminent?

☑️ YES ➔ Maintain heightened attention by close inspections/monitoring (Monitoring period to be notified)

☑️ NO ➔ Have Conditions Worsened?

☑️ YES ➔ Conduct debrief and terminate notification procedures

☑️ NO ➔ Evaluate Event

☑️ NO ➔ Review Emergency Notification and Emergency Response Procedures

☑️ NO ➔ Report to Administration

☑️ NO ➔ Incident Closed
Figure 3
Emergency Response Procedure - Overtopping Event

Is water level at or above MRL?

NO → No action

YES →

Immediately commence drawdown of water level if possible

Record all relevant observations and measurements. Notify EHP and Dam Design Engineer (Refer to Note 1)

Note 1: An SP event may impact Burke Development Road. If so: (1) close the road; (2) notify local authorities (police and Mareeba Shire Council); and (3) notify Tartana Mine (as closure of the road would impact access to Tatana Mine).

Figure 4
Emergency Response Procedure - Uncontrolled Seepage (Seepage from Embankment of Earthworks Surface)

Is seepage significant and/or increasing or is seepage turbid?

NO → Notify Dam Design Engineer

YES →

Immediately commence drawdown of water level if possible

Record all relevant observations and measurements. Notify EHP and Dam Design Engineer (Refer to Note 1)

Notify Dam Design Engineer

NO → Is seepage rate reducing with reduction in water level?

YES → Continue drawdown of water level

Note 1: An SP event may impact Burke Development Road. If so: (1) close the road; (2) notify local authorities (police and Mareeba Shire Council); and (3) notify Tartana Mine (as closure of the road would impact access to Tatana Mine).
10 DOCUMENTATION

All data and information collected on site shall be compiled using the appropriate on site document control process. Information such as reference documents/reports, permits and approvals, log books, photographs, video of site conditions, inspection documents/reports, weather reports, remedial work records, response measures, etc. must be collated, recorded and retained. Any records required by the site’s EA will be kept for a minimum of seven years.

Standard forms shall be used to compile data and to report the information to appropriate personnel.

All site inspections, instrumentation data and water quality readings are to be reported to Auctus’ Environmental Superintendent as the information becomes available. Any readings or unusual occurrences (e.g. design storm) should be reported immediately by Auctus.

The following documentation should be kept in the Project Manager Mining or Environmental Advisor’s office on site:

1. A copy of this Operation Management Plan.
2. A copy of each annual inspection report (refer Section 8.2.3).
3. Quality control records and statistical summaries.
4. Instrument records and daily diary entries.
5. Communications and activities records.
6. All incident reports.
7. Details of any emergency actions.
8. Photographic records of progress and incidents.

Note 1: An SP event may impact Burke Development Road. If so: (1) close the road; (2) notify local authorities (police and Mareeba Shire Council); and (3) notify Tartana Mine (as closure of the road would impact access to Tartana Mine).
REFERENCES


Department of Environment and Heritage Protection

Permit

Environmental Protection Act 1994

Environmental authority EPML00562913

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Permit number: EPML00562913

Environmental authority takes effect on 24 August 2017

The anniversary date of this environmental authority is 10th February. An annual renewal and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

<table>
<thead>
<tr>
<th>Name</th>
<th>Registered address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auctus Resources Pty Ltd</td>
<td>Suite 15/68 Kishorn Street,</td>
</tr>
<tr>
<td></td>
<td>MOUNT PEASANT WA 6153</td>
</tr>
</tbody>
</table>

Environmentally relevant activity and location details

<table>
<thead>
<tr>
<th>Environmentally relevant activities</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-Fuel burning &gt;500kg hr</td>
<td>ML4910</td>
</tr>
<tr>
<td>15-(2c) Extractive &gt;1000000t</td>
<td>ML4911</td>
</tr>
<tr>
<td>19-(3c) Screening &gt;1000000t yr</td>
<td>ML4921</td>
</tr>
<tr>
<td>31-(2b) Mineral processing &gt;100000t yr RESOURCE</td>
<td>ML4928</td>
</tr>
<tr>
<td>60-(2a) Waste disposal &gt;50t but &lt;2000t yr (1)(b)</td>
<td>ML4977</td>
</tr>
<tr>
<td>63-(1b)(i) Sewage treatment &gt;100 to 1500EP - IT or IR</td>
<td>ML5176</td>
</tr>
<tr>
<td>8-(2) Chemical storage &gt;50t class 6</td>
<td>ML5319</td>
</tr>
<tr>
<td>Mining - ML copper cre - 17, Site Specific</td>
<td>ML20640</td>
</tr>
<tr>
<td>Mining - ML gold cre - 16, Site Specific</td>
<td>ML20658</td>
</tr>
<tr>
<td>Mining - ML lead, silver or zinc - 18, Site Specific</td>
<td></td>
</tr>
<tr>
<td>Mining - ML drilling, coastaing, pitting or carrying out geological surveys causing significant disturbance - 9, Site Specific</td>
<td></td>
</tr>
</tbody>
</table>

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1 Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation.
Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental authority as to the scale, intensity or manner of carrying out an ERA, then the conditions prevail to the extent of the inconsistency.

An environmental authority authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the authority specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the Environmental Protection Act 1994 (EP Act).

Contaminated land

It is a requirement of the EP Act that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3 and Schedule 4) is being carried out on the land, or that the land has been, or is being, contaminated by a hazardous contaminant, the owner or occupier must, within 22 business days after becoming so aware, give written notice to the chief executive.

Enquiries:
Department of Environment and Heritage Protection
CAIRNS QLD 4870
Phone: (07) 4222 5334
Fax: (07) 4222 5070

Jacob Tee
Delegate of the administering authority
Environmental Protection Act 1994

Signature
Date 24/10/2017
Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Conditions of environmental authority

**SCHEDULE OF CONDITIONS**

This environmental authority consists of the following schedules of conditions:

<table>
<thead>
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<th>Schedule</th>
<th>Issue</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>Schedule A</td>
<td>General</td>
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</tr>
<tr>
<td>Schedule B</td>
<td>Air</td>
<td>11</td>
</tr>
<tr>
<td>Schedule C</td>
<td>Land and Rehabilitation</td>
<td>15</td>
</tr>
<tr>
<td>Schedule D</td>
<td>Regulated Dams</td>
<td>25</td>
</tr>
<tr>
<td>Schedule E</td>
<td>Waste Management</td>
<td>31</td>
</tr>
<tr>
<td>Schedule F</td>
<td>Noise</td>
<td>36</td>
</tr>
<tr>
<td>Schedule G</td>
<td>Water</td>
<td>39</td>
</tr>
<tr>
<td>Schedule H</td>
<td>Sewage Treatment</td>
<td>67</td>
</tr>
<tr>
<td>Schedule I</td>
<td>Definitions</td>
<td>68</td>
</tr>
<tr>
<td>Schedule J</td>
<td>Plans/Maps</td>
<td>78</td>
</tr>
</tbody>
</table>
### SCHEDULE A - GENERAL

**Activity**

(A1) This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.

(A2) In carrying out the mining activity authorised by this environmental authority, the holder of this environmental authority must comply with Table A1 (Authorised Mining Activities) as depicted in Schedule J – Figures 2a (Red Dome/Mungana - Domain Map) and 2b (King Vol - Domain Map).

### Table A1 (Authorised Mining Activities)

<table>
<thead>
<tr>
<th>Mine Domain</th>
<th>Mine Feature Name</th>
<th>Tenure Type and Number</th>
<th>Controid Coordinate (GDA94, zone 55k)</th>
<th>Maximum disturbance area (ha)</th>
<th>Purpose of Mine Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dams</td>
<td>Red Dome Tailings Storage Facility</td>
<td>ML5178</td>
<td>224837E; 8103645N</td>
<td>47.8</td>
<td>Storage of tailings from historic Red Dome mine</td>
</tr>
<tr>
<td></td>
<td>Mungana Tailings Storage Facility</td>
<td>ML5176</td>
<td>221907E; 8014623N</td>
<td>147.9</td>
<td>Storage of tailings from polymetallic minerals processing at Mungana</td>
</tr>
<tr>
<td></td>
<td>Red Dome Sediment Dam</td>
<td>ML5179</td>
<td>223514E; 8104531N</td>
<td>4.0</td>
<td>Containment of sediment from Red Dome impoundment system</td>
</tr>
<tr>
<td></td>
<td>Plant Site Sediment Dam</td>
<td>ML5176</td>
<td>221483E; 8108232N</td>
<td>5.0</td>
<td>Collect runoff from admin and processing areas</td>
</tr>
<tr>
<td></td>
<td>Mungana Process Pond</td>
<td>ML5176</td>
<td>221684E; 8108448N</td>
<td>0.5</td>
<td>Supply process water from underground mine</td>
</tr>
<tr>
<td></td>
<td>Mungana Mine Water Dam</td>
<td>ML5176; ML4928</td>
<td>222014E; 8106104N</td>
<td>5.0</td>
<td>Storage of water from underground mine</td>
</tr>
<tr>
<td></td>
<td>Raw Water Dam</td>
<td>ML5176</td>
<td>221808E; 8105768N</td>
<td>42.9</td>
<td>Storage and supply of clean runoff from around the operations</td>
</tr>
<tr>
<td>Mine Domain</td>
<td>Mine Feature Name</td>
<td>Tenure Type and Number</td>
<td>Centroid Coordinate (GDA94, zone 55k)</td>
<td>Maximum disturbance area (ha)</td>
<td>Purpose of Mine Feature</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------------</td>
<td>------------------------</td>
<td>---------------------------------------</td>
<td>-------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>King Vol Clean Water Dam</td>
<td>ML20658</td>
<td>TBA1</td>
<td>5.7</td>
<td>Clean water storage</td>
<td></td>
</tr>
<tr>
<td>King Vol Mine Water Dam</td>
<td>ML20658</td>
<td>TBA1</td>
<td>6.5</td>
<td>Mine water storage</td>
<td></td>
</tr>
<tr>
<td>King Vol Sediment Dam</td>
<td>ML20658</td>
<td>TBA1</td>
<td>2.7</td>
<td>Sediment control</td>
<td></td>
</tr>
<tr>
<td>Surface Infrastructure Sediment Trap</td>
<td>ML20658</td>
<td>TBA1</td>
<td>0.1</td>
<td>Sediment control</td>
<td></td>
</tr>
<tr>
<td>Waste</td>
<td>Red Dome Western Waste Dump</td>
<td>ML5176, ML4923, ML4977</td>
<td>223100E, 8105113N</td>
<td>40.5</td>
<td>Rehabetiated waste rock emplacement from historic Red Dome mine</td>
</tr>
<tr>
<td></td>
<td>Red Dome Southern Waste Dump</td>
<td>ML5176</td>
<td>223000E, 8104543N</td>
<td>71.7</td>
<td>Rehabetiated waste rock emplacement from historic Red Dome mine</td>
</tr>
<tr>
<td></td>
<td>Red Dome North Western Waste Dump</td>
<td>ML4928</td>
<td>223046E, 8105827N</td>
<td>26.6</td>
<td>Rehabetiated waste rock emplacement from historic Red Dome mine</td>
</tr>
<tr>
<td></td>
<td>MGOPD Waste Rock Dump</td>
<td>ML5176, ML20640</td>
<td>220872E, 810609N</td>
<td>122.7</td>
<td>Not in current plan</td>
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<tr>
<td>Waste Rock Dump</td>
<td>ML20658</td>
<td>TBA1</td>
<td>3.0</td>
<td>Store mineral waste</td>
<td></td>
</tr>
<tr>
<td>Topsoil stockpiles</td>
<td>ML20658</td>
<td>TBA1</td>
<td>1.0</td>
<td>Store topsoil for rehabilitation</td>
<td></td>
</tr>
<tr>
<td>Mungana ROM pad</td>
<td>ML5176, ML4923</td>
<td>222144E, 8106255N</td>
<td>8.8</td>
<td>Stockpile polymetallic ore ahead of processing</td>
<td></td>
</tr>
<tr>
<td>Mine Domain</td>
<td>Mine Feature Name</td>
<td>Tenure Type and Number</td>
<td>Centroid Coordinate (GDA94, zone 55k)</td>
<td>Maximum disturbance area (ha)</td>
<td>Purpose of Mine Feature</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------</td>
<td>------------------------</td>
<td>--------------------------------------</td>
<td>-----------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Run of Mine (ROM)</td>
<td>ROM</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>2.0</td>
<td>Temporarily store ore material</td>
</tr>
<tr>
<td>Processin g area</td>
<td>Mungana Processing</td>
<td>ML5167</td>
<td>221678E; 8106399N</td>
<td>25.3</td>
<td>Infrastructure for treatment of polymetallic area</td>
</tr>
<tr>
<td>Extraction</td>
<td>King Vol box cut</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>0.5</td>
<td>Access to the King Vol underground mine</td>
</tr>
<tr>
<td>Ancillary Infrastructure</td>
<td>Mungana Workshop and Portal</td>
<td>ML5176</td>
<td>221961E; 8106480N</td>
<td>2.0</td>
<td>Repair and maintenance of mine plant and equipment</td>
</tr>
<tr>
<td></td>
<td>STP Administration and STP Mining</td>
<td>ML5176</td>
<td>221697E; 8106278N and 221600E; 8106764N</td>
<td>0.2</td>
<td>Sewage treatment, Offices, Washrooms, Warehouse, etc.</td>
</tr>
<tr>
<td></td>
<td>Historic Mungana Administration</td>
<td>ML6175</td>
<td>221505E; 8106861N</td>
<td>13.3</td>
<td>Offices, Washrooms, warehouse etc.</td>
</tr>
<tr>
<td></td>
<td>The Gap (Access track)</td>
<td>ML5178, ML4928</td>
<td>2233831E; 8104797N</td>
<td>9.9</td>
<td>Traffic</td>
</tr>
<tr>
<td></td>
<td>Waste Disposal (incineration of explosive packaging)</td>
<td>ML5176</td>
<td>222112E; 8106383N</td>
<td>TBA¹</td>
<td>Incineration</td>
</tr>
<tr>
<td></td>
<td>Fuel storage</td>
<td>ML5176</td>
<td>221574E; 8106804N</td>
<td>0.1</td>
<td>Storing diesel and lubricants</td>
</tr>
<tr>
<td></td>
<td>Lower Opera Creek to Raw Water Dam</td>
<td>ML5176</td>
<td>2222783E; 8105090N</td>
<td>34.7</td>
<td>No purpose, under rehabilitation, historic mining disturbance</td>
</tr>
<tr>
<td></td>
<td>Explosives Storage Yard</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>0.3</td>
<td>Store explosives</td>
</tr>
<tr>
<td></td>
<td>Mine Infrastructure area</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>1.0</td>
<td>Storage, buildings and parking</td>
</tr>
<tr>
<td></td>
<td>Fuel storage and power generation</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>0.05</td>
<td>Storage, reftueling and power supply</td>
</tr>
<tr>
<td></td>
<td>Roads and tracks</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>3.0</td>
<td>Access</td>
</tr>
<tr>
<td></td>
<td>Infrastructure area above box cut</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>0.15</td>
<td>Mine infrastructure above box cut</td>
</tr>
<tr>
<td>Mine Domain</td>
<td>Mine Feature Name</td>
<td>Tenure Type and Number</td>
<td>Centroid Coordinate (GDA94, zone 55k)</td>
<td>Maximum disturbance area (ha)</td>
<td>Purpose of Mine Feature</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------</td>
<td>------------------------</td>
<td>--------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Water pipeline</td>
<td>ML20858</td>
<td>TBA¹</td>
<td>0.4</td>
<td>Pipeline corridor</td>
<td></td>
</tr>
<tr>
<td>Voids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Dome Open Pit</td>
<td>ML5176, ML4928, ML4977</td>
<td>223860E, 8105457N</td>
<td>38.9</td>
<td>Historic mining void</td>
<td></td>
</tr>
<tr>
<td>MGCPD Open Pit</td>
<td>ML5176, ML5319, ML20640</td>
<td>221424E, 8107355N</td>
<td>53.9</td>
<td>Not in current plan</td>
<td></td>
</tr>
<tr>
<td>Exploration</td>
<td>Access Tracks, and Exploration</td>
<td>ML4910, ML4911, ML4921, ML4928, ML4977, ML5176, ML5319, ML20640</td>
<td>222559E, 8105182N²</td>
<td>45.0</td>
<td>Enable mineral exploration</td>
</tr>
<tr>
<td></td>
<td>Access Tracks, and Exploration</td>
<td>ML20658</td>
<td>TBA¹</td>
<td>3.0</td>
<td>Exploration of resource</td>
</tr>
<tr>
<td>Conservation</td>
<td>Fauna Conservation Zones</td>
<td>ML5319, ML5176, ML4977</td>
<td>221370E, 8107741N, 221832E, 8107482N, 2224556E, 8106710N, 224612E, 8104950N</td>
<td>0.1</td>
<td>Fauna conservation</td>
</tr>
<tr>
<td></td>
<td>Historic Sites (Non-Indigenous)</td>
<td>ML4928</td>
<td>222559E, 8105182N²</td>
<td>0.2</td>
<td>Non-Indigenous heritage Conservation</td>
</tr>
<tr>
<td>Red Dome Historic Disturbance</td>
<td>Red Dome Fixed Plant</td>
<td>ML5176, ML4977</td>
<td>224221E, 81050474N</td>
<td>12.4</td>
<td>Rehabilitated historic processing area</td>
</tr>
<tr>
<td></td>
<td>Red Dome accommodation and offices</td>
<td>ML5176, ML4977</td>
<td>224448E, 8105251N</td>
<td>9.4</td>
<td>Rehabilitated historic offices area</td>
</tr>
<tr>
<td></td>
<td>Red Dome Roche Workshop</td>
<td>ML5176, ML4977</td>
<td>224105E, 8104512N</td>
<td>4.6</td>
<td>Rehabilitated historic workshop area</td>
</tr>
<tr>
<td></td>
<td>Red Dome Heap Leach Pads</td>
<td>ML5176, ML4977</td>
<td>224099E, 8104326N</td>
<td>23.8</td>
<td>Rehabilitated heap leach pads. Potential gold ore reserve</td>
</tr>
<tr>
<td></td>
<td>Red Dome Heap Leach Impoundment System</td>
<td>ML5176</td>
<td>223575E, 8104433N</td>
<td>9.1</td>
<td>Collect and store runoff from around heap leach pads (includes RD sediment dam)</td>
</tr>
<tr>
<td></td>
<td>Red Dome Process Ponds</td>
<td>ML5176</td>
<td>224384E, 8104835N</td>
<td>2.2</td>
<td>Rehabilitated historic process water ponds</td>
</tr>
</tbody>
</table>

¹ Detail to be provided to the administering authority prior to construction.
² Centroid coordinates for the access tracks, exploration and non-indigenous cultural heritage areas are taken from the centre of the mining leases at Red Dome/Mulgana.
(A3) Access to the licensed place via land authorised for that purpose by the Mineral Resources Act 1989 is subject to the conditions of this environmental authority.

Maintenance of Measures, Plant and Equipment

(A4) The holder of this environmental authority must;

a) install measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;

b) maintain such measures, plant and equipment in a proper condition; and

c) operate such measures, plant and equipment in a proper manner.

Monitoring and Reporting

(A5) Any management or monitoring plans, systems, programs or reports required to be developed and implemented by a condition of this environmental authority must be reviewed for effectiveness in minimising the likelihood of environmental harm on an annual basis and amended immediately if required.

(A6) Monitoring records or reports required under this environmental authority must be maintained and be readily accessible at the licensed place for a period of not less than five (5) years.

(A7) The holder of this environmental authority must upon request from the administering authority, supply monitoring records, plans and reports in the form and by the means requested by the administering authority within five (5) business days, or a timeframe as otherwise agreed to by the administering authority.

(A8) All monitoring referred to in this environmental authority must be undertaken by an appropriately qualified and experienced person using monitoring equipment that is accurately calibrated and maintained in accordance with manufacturer’s specifications.

(A9) All analysis and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analysis and tests, except as otherwise authorised by the administering authority.

Financial Assurance

(A10) Financial assurance must be lodged with the administering authority in the amount, the form and within the time required by the administering authority.

Risk Management

(A11) The holder of this environmental authority must develop and implement a risk management system for the mining activity which mirrors the content requirements of the Standard for Risk Management (ISO31000:2009) or the latest edition of an Australian Standard for Risk Management by 31 December 2017.

Emergency Response/Contingency

(A12) Prior to the commencement of mining or processing the holder of this environmental authority must develop and implement an emergency response/contingency plan to respond to emergency events and incidents. The emergency response/contingency plan must address the following matters at a minimum:

(a) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from emergency events and incidents;

(b) response procedures to minimise the extent and duration of environmental harm caused by emergency events and incidents;

(c) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;

(d) the resources to be used in response to an emergency event or incident;
(e) procedures to investigate the cause of any emergency events and incidents, including releases, and remedial actions to reduce the likelihood of a recurrence of similar events;

(f) the provision and availability of documented procedures to staff attending any emergency event or incident to enable them to effectively respond;

(g) training of staff that will be called upon to respond to emergency events and incidents to enable them to effectively respond;

(h) timely and accurate reporting of the circumstance and nature of emergency events and incidents to the administering authority in accordance with conditions of this environmental authority;

(i) procedures for accessing monitoring points during emergency events or incidents; and

(j) procedures to notify any potentially impacted stakeholder who may be affected by emergency events or incidents.

Notification of Emergencies, Incidents and Exceptions

(A13) The holder of this environmental authority must notify the administering authority by written notification within twenty-four (24) hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to not be in accordance with the conditions of this environmental authority.

(A14) The holder of this environmental authority must notify the occupiers or registered owners of affected land and any other potentially impacted stakeholder as soon as reasonably practicable after becoming aware of any incident, exceedance or release that has the potential to impact on environmental values or breaches any condition of this environmental authority concerning releases of contaminants to the environment.

(A15) Within ten (10) business days following the initial notification of an emergency or incident further written advice must be provided to the administering authority, including the following:
   a) results and interpretation of any samples taken and analysed; and
   b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and
   c) proposed actions to prevent a recurrence of the emergency or incident.

Transition to New Standards

(A16) Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issues of this environmental authority the holder of this environmental authority must:
   a) comply with the amended or changed standard, policy or guideline within two years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, or where the amendment or change relates specifically to regulated structures referred to in condition D1, the time specified in that condition,
   b) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.

Complaints

(A17) Records must be kept of all environmental complaints received about the mining activity including the following details:
(a) name, address and contact number of the complainant;
(b) time and date of complaint;
(c) reasons for the complaint;
(d) investigations undertaken;
(e) conclusions formed;
(f) actions taken to resolve the complaint;
(g) any abatement measures implemented; and
(h) person responsible for resolving the complaint.

(A18) The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within 10 business days of completion of the investigation, or no later than 10 business days after the end of the timeframe nominated by the administering authority to undertake the investigation.

Third Party Auditing

(A19) The holder of this environmental authority must:
   a) By 31 December 2017, obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority;
   b) Obtain further such reports at regular intervals, not exceeding three yearly intervals, from the completion of the report referred to above; and
   c) Provide each report to the administering authority within 30 days of its completion.

Exploration

(A20) All exploration activities carried out at the licensed place must comply with each of the Standard Environmental Conditions contained in the most recent version of the Eligibility criteria and standard conditions for exploration and mineral development projects (ESR/2016/1995).

(A21) Notwithstanding condition 13 of the Eligibility criteria and standard conditions for exploration and mineral development projects (ESR/2016/1995), the holder of this environmental authority is permitted to conduct exploration activities within 1 kilometre but not within 100 metres of the Chillagoe – Mungana Caves National Park (Category A Environmentally Sensitive Area).

(A22) The holder of this environmental authority is permitted to carry out monitoring, environmental investigation and environmental management works within 100m of the Chillagoe – Mungana Caves National Park (Category A Environmentally Sensitive Area).

Matter of State Environmental Significance

(A23) Significant residual impacts to prescribed environmental matters are not authorised under this environmental authority or the Environmental Offsets Act 2014.

King Voi Underground Extraction

(A24) Extraction of ore or decline development in the King Voi underground mine on ML20659 must not occur at a depth greater than 150 metres below ground level (Australian Height Datum).

END OF CONDITIONS FOR SCHEDULE A
SCHEDULE B – AIR

General

(B1) Unless authorised by this environmental authority, the release of noxious or offensive odour, dust or any other airborne contaminant resulting from the mining activity must not cause environmental harm.

Transportation

(B2) The holder of this environmental authority must ensure that vehicles (including trains) used for transporting bulk materials on or from the licensed place have appropriate load preparation to prevent the spillage and/or loss of particulate matter and/or windblown dust during transport.

Point Source Releases to Air

(B3) Point source emissions to air must only be released to the atmosphere from the release points specified in Table B1 (Release Points).

Table B1 (Release Points)

<table>
<thead>
<tr>
<th>Release Point</th>
<th>Minimum Release Height above ground (m)</th>
<th>Minimum exit velocity (m/s)</th>
<th>Contaminant Parameter</th>
<th>Contaminant Limit</th>
<th>Frequency of Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrubber Stack serving the smelter plant</td>
<td>15</td>
<td>6</td>
<td>Total Solid Particulates (TSP)</td>
<td>50 mg/Nm³ dry</td>
<td>Once within three months of commencing smelting; and, as requested by the administering authority thereafter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Oxides of Sulphur (sulphur dioxide and sulphur trioxide as SO₂ equivalent)</td>
<td>300 mg/Nm³ (dry)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Heavy Metals¹ (Note 1)</td>
<td>1 mg/Nm³ (dry)</td>
<td></td>
</tr>
</tbody>
</table>

¹ Total heavy metals includes the elements antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, selenium, tin, vanadium, or any compound containing one or more of those elements.

(B4) The release of contaminants to the atmosphere must not exceed the contaminant limit for any parameter specified in the Table B1 (Release Points) and must be:

(a) directed vertically upwards with no impedence; and
(b) be released in accordance with the velocity and minimum release height specified in Table B1 (Release Points).

(B5) Emissions from the 'Scrubber Stack serving the smelter plant' must be monitored in accordance with the frequency of monitoring and for all contaminant parameters specified in Table B1 (Release Points).

(B6) Monitoring undertaken for condition B5 must:

(a) Be in accordance with:

i. The current edition of the administering authority’s Air Quality Sampling Manual. If monitoring requirements are not described in the EHP’s Air Quality Sampling Manual, monitoring protocols must be in accordance with a method as approved by New South Wales EPA, Victorian EPA or United States EPA;

(b) Include, but not be limited to the following tests:
   i. Gas velocity, volume and mass flow rate;
   ii. Temperature and pressure; and
   iii. Water vapour concentration.

(c) Include recording of details pertaining to:
   i. Plant throughput rate at time of sampling;
   ii. Fuel type and consumption rate;
   iii. Any factors that may influence odour and particulate emissions;
   iv. The gaseous and/or particulate treatment system operating status; and
   v. Reference to the actual test methods and accuracy.

(B7) By 28 July 2017, the holder of this environmental authority must develop, implement and keep records of, a Stock Emission Monitoring Program (SEMP) to monitor and record the release of contaminants in accordance with condition B5. A copy of the SEMP must be provided to the administering authority on request.

Ambient Air Quality and Dust Deposition Monitoring

(B8) Contaminant concentrations must not exceed any of the following limits when measured at any sensitive or commercial place:

a) Dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter—Gravimetric method.

b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, when monitored in accordance with the most recent version of either:

   1. Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM₁₀ high volume sampler with size-selective inlet—Gravimetric method; or
   2. Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM₁₀ low volume sampler—Gravimetric method; or
   3. Or an alternative method as agreed to in writing by the administering authority.

c) A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method.

(B9) The holder of this environmental authority must develop and implement a dust deposition monitoring program at the monitoring locations specified in Table B2 (Dust Deposition Monitoring Sites) and shown in Schedule J – Figure 3 (Air Quality Monitoring Sites) at the monitoring frequency and for the contaminants specified in Table B3 (Dust Deposition Trigger Values and Limits).
Table B2 (Dust Deposition Monitoring Sites)

<table>
<thead>
<tr>
<th>Site</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
<th>Monitoring Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eclipse Cave (CH21)</td>
<td>221835</td>
<td>8107425</td>
<td>South-west side of Eclipse Tower. The cave entrance is adjacent to the access track and at the base of the karst. The entrance is 'A' shaped and approximately 4.5m tall.</td>
</tr>
<tr>
<td>Piano cave (CH17)</td>
<td>223403</td>
<td>8106129</td>
<td>Southern side of Piano Tower. The cave entrance is the base of the tower.</td>
</tr>
<tr>
<td>Mungana 2 Cave</td>
<td>221429</td>
<td>8107708</td>
<td>Near the top of the Mungana 2 karst, at the southern end. Access is gained via the eastern talus slope of the karst. The entrance faces east and is at the base of the upper limestone outcrop.</td>
</tr>
<tr>
<td>Red Dome 5 Cave</td>
<td>224518</td>
<td>8104917</td>
<td>The western face of Red Dome 5 karst, approximately 20m up the moderately sloped face with a large recessed opening. Another entrance is approximately 30m southeast of this entrance.</td>
</tr>
</tbody>
</table>

Reference Monitoring Site

| Reference site 1      | 224587                          | 8103560                         | 100m south of Red Dome Tailings Storage Facility                                    |

1 CH number indicates Chilalgue Cave Club cave designation. Entrance to these caves are marked by a small red metal marker containing a 'CH' number.

(B10) The mining activity must not cause the exceedance of any dust deposition limit specified in Table B3 (Dust Deposition Trigger Values and Limits) at any:

a) Sensitive or commercial place; or
b) Compliance monitoring site specified in Table B2 (Dust Deposition Monitoring Sites)

Table B3 (Dust Deposition Trigger Values and Limits)

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Limit Type/Measurement Period</th>
<th>Trigger Level</th>
<th>Air Quality Limit</th>
<th>Frequency of Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust Deposition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic and its compounds as arsenic1</td>
<td>Annual average</td>
<td>45 µg/m²/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium and its compounds as cadmium1</td>
<td>Annual average</td>
<td>25 µg/m²/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper and its compounds as copper6</td>
<td>Annual average</td>
<td>330 µg/m²/day</td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>Lead and its compounds as lead1</td>
<td>Annual average</td>
<td>100 µg/m²/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust deposition6 (total insoluble matter)</td>
<td>Monthly average</td>
<td></td>
<td>12000 mg/m²/day</td>
<td></td>
</tr>
</tbody>
</table>

1 Metal analysis must be carried out in accordance with a methodology sufficient to produce representative results capable of comparison against the respective limits & trigger values.

6 Trigger levels based on First General Administrative Regulation Pertaining to the Federal Emission Control Act (Technical Instructions on Air Quality Control — TA Luft) (Table 6 page 25).
In the event of any monitoring showing exceedance of dust deposition trigger values or limits specified in Table B3 (Dust Deposition Trigger Values and Limits), the holder of this environmental authority must:

(a) complete an investigation to identify the potential cause of the exceedance and the potential for environmental harm being caused or likely to be caused by the exceedance; and

(b) provide a written report to the administering authority within three (3) months of the date of the original exceedance, outlining:

(i) details of the investigation carried out; and

(ii) actions taken to prevent environmental harm.

B12 Meteorological Monitoring

The holder of this environmental authority must establish a permanent automatic meteorological station to continuously measure and record wind speed and direction, temperature and rainfall data.

B13 Abrasive Blasting and Metal Surface Coating

Abrasive blasting activities must be carried out using measures that prevent or minimise contaminants, including abrasive blasting media, solvents and paint, being released to the receiving environment.

B14 Only abrasive blasting waste consisting of garnet and surface coating wastes consisting of dried mastic paint flakes may be disposed of at the licensed place within the Mungana Tailings Storage Facility or at a facility licensed to take this material.

END OF CONDITIONS FOR SCHEDULE B
**SCHEDULE C - LAND & REHABILITATION**

**General**

(C1) Other than as authorised under this environmental authority, contaminants must not be released to land in a manner which constitutes environmental harm.

**Rehabilitation Objectives**

(C2) Land disturbed by mining must be rehabilitated in accordance with Table C1 (Rehabilitation Requirements).

**Table C1 (Rehabilitation Requirements)**

<table>
<thead>
<tr>
<th>Mine Domain &amp; Feature ID (refer Schedule J - Figure 2)</th>
<th>Surface area (ha) of domain</th>
<th>Total disturbance of surface area (ha) of domain, for the life of the mine (±10%)</th>
<th>Post-mine land description</th>
<th>Post mine land capability</th>
<th>Rehabilitation Goals</th>
<th>Land Use Acceptance Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Dome/Mungana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Red Dome: Open Pit</td>
<td>38.5</td>
<td>38.5 Water Storage</td>
<td>VI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Red Dome: Western Waste Dump</td>
<td>40.5</td>
<td>40.5 L.I.G. and Bushland</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII,</td>
<td></td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>3 Red Dome: Southern Waste Dump</td>
<td>71.7</td>
<td>71.7 L.I.G. and Bushland Airstrip</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII,</td>
<td></td>
<td>As per Condition C3, Use as an airstrip</td>
<td></td>
</tr>
<tr>
<td>4 The Gap: (access track)</td>
<td>8.9</td>
<td>9.9 L.I.G. and Bushland</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII,</td>
<td></td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>5 Red Dome: Flood Plant</td>
<td>12.4</td>
<td>12.4 L.I.G. and Bushland</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII,</td>
<td></td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>6 Red Dome: Process Water Ponds</td>
<td>2.2</td>
<td>2.2 L.I.G. and Bushland</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII,</td>
<td></td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>Mine Domain &amp; Feature ID (refer Schedule J - Figure 2)</td>
<td>Surface area (ha) of domain</td>
<td>Total disturbance of surface area (ha) of domain, for the life of the mine (±10%)</td>
<td>Post-mine land description</td>
<td>Post mine land capability¹</td>
<td>Rehabilitation Goals</td>
<td>Land Use Acceptance Criteria</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td>7 Lower Open Cut to Raw Water Dam</td>
<td>34.7</td>
<td>34.7</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>8 Red Dome Accommodation and Offices</td>
<td>9.4</td>
<td>9.4</td>
<td>L.I.G.²</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>9 Red Dome TSF</td>
<td>47.8</td>
<td>47.8</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td>With the exception of criteria for tree and shrub density, and diversity on the TSF cap.</td>
</tr>
<tr>
<td>10 Red Dome Roche Workshop</td>
<td>4.8</td>
<td>4.8</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>11 Red Dome Heap Leach Pad</td>
<td>23.8</td>
<td>23.8</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>12 Red Dome Heap Leach Impoundment System</td>
<td>9.1</td>
<td>9.1</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>13 Raw Water Dam</td>
<td>42.9</td>
<td>42.9</td>
<td>Water Storage VI</td>
<td></td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>14 Red Dome North Western Waste Dump</td>
<td>26.6</td>
<td>26.6</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>Mine Domain &amp; Feature ID (refer Schedule J - Figure 2)</td>
<td>Surface area (ha) of domain</td>
<td>Total disturbance of surface area (ha) of domain, for the life of the mine (≥10%)</td>
<td>Post-mine land description</td>
<td>Post mine land capability¹</td>
<td>Rehabilitation Goals¹</td>
<td>Land Use Acceptance Criteria</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
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</tr>
<tr>
<td>15 Access Tracks and Exploration</td>
<td>942.5</td>
<td>45.0</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>16 Mungana Open Pit</td>
<td>53.9</td>
<td>53.9</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>17 Fauna Conservation Zones</td>
<td>32.6</td>
<td>0.1</td>
<td>L.I.G.² and Bushland³</td>
<td>No change in land capability.</td>
<td>As per Condition C3 for the disturbed area. For the area undisturbed by the mining activity undisturbed area (32.5) the integrity attribute is the only success criteria to be satisfied for sections of the Domain.</td>
<td></td>
</tr>
<tr>
<td>18 Historical Sites (Non Indigenous)</td>
<td>10.3</td>
<td>0.2</td>
<td>L.I.G.², Bushland³, Historical site</td>
<td>No change in land capability.</td>
<td>As per Condition C3 for the disturbed area. For the area undisturbed by the mining activity undisturbed area (10.1) the integrity attribute is the only success criteria to be satisfied for sections of the Domain.</td>
<td></td>
</tr>
<tr>
<td>19 Mungana Workshop and Portal</td>
<td>2.0</td>
<td>2.0</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>20 Mungana ROM Pad and stockpiles</td>
<td>17.9</td>
<td>0.0</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>Mine Domain &amp; Feature ID (refer Schedule J - Figure 2)</td>
<td>Surface area (ha) of domain</td>
<td>Total disturbance of surface area (ha) of domain, for the life of the mine (±10%)</td>
<td>Post-mine land description</td>
<td>Post-mine land capability</td>
<td>Rehabilitation Goals</td>
<td>Land Use Acceptance Criteria</td>
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</tr>
<tr>
<td>21 MGOPO Waste Rock Dump</td>
<td>122.7</td>
<td>122.7</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>22 Mungana Processing</td>
<td>31.6</td>
<td>25.3</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>23 Mungana TSF</td>
<td>147.0</td>
<td>147.0</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
<tr>
<td>24 Mungana Administration and Access</td>
<td>14</td>
<td>14</td>
<td>L.I.G.² and Bushland³</td>
<td>Greater than 20% of all disturbed land will be class VI or better; No more than 30% of all disturbed land is capability VIII.</td>
<td>As per Condition C3</td>
<td></td>
</tr>
</tbody>
</table>

**King Vol**

<table>
<thead>
<tr>
<th>King Vol Box Cut (including area above box cut)</th>
<th>TBA²</th>
<th>TBA²</th>
<th>TBA²</th>
<th>TBA²</th>
<th>Safe, non-polluting, stable and self-sustaining</th>
<th>As per the requirements of condition C12</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>0.65</td>
<td>TBA²</td>
<td>TBA²</td>
<td>TBA²</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>26 Waste Rock Dump</td>
<td>3.0</td>
<td>TBA²</td>
<td>TBA²</td>
<td>TBA²</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>27 Topooli Stockpile</td>
<td>0.5</td>
<td>TBA²</td>
<td>TBA²</td>
<td>TBA²</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>28 ROM</td>
<td>2.0</td>
<td>TBA²</td>
<td>TBA²</td>
<td>TBA²</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>29 Clean Water Dam</td>
<td>5.7</td>
<td>TBA²</td>
<td>TBA²</td>
<td>TBA²</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>30 Mina Water Dam</td>
<td>6.6</td>
<td>TBA²</td>
<td>TBA²</td>
<td>TBA²</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>Mine Domain &amp; Feature ID (Refer Schedule 1 - Figure 2)</td>
<td>Surface area (ha) of domain</td>
<td>Total disturbance of surface area (ha) of domain, for the life of the mine (±10%)</td>
<td>Post-mine land description</td>
<td>Post mine land capability</td>
<td>Rehabilitation Goals</td>
<td>Land Use Acceptance Criteria</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td>31 Sediment dam</td>
<td>0.2</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>32 Surface infrastructure, sediment trap</td>
<td>0.1</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>33 Explosives storage yard</td>
<td>0.3</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>34 Mine infrastructure area</td>
<td>1.0</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>35 Fuel storage and power generation</td>
<td>0.05</td>
<td>TBA$^7$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>36 Roads and tracks</td>
<td>3.0</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>37 Infrastructure area above bench cut</td>
<td>0.15</td>
<td>TBA$^7$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>38 Water pipeline</td>
<td>0.4</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
<tr>
<td>50 Access tracks and exploration</td>
<td>5.0</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>TBA$^4$</td>
<td>Safe, non-polluting, stable and self-sustaining</td>
<td>As per the requirements of condition C13</td>
</tr>
</tbody>
</table>

2. L.I.G. (Low Intensity Grazing) defined by criteria listed in Land Use Acceptance Criteria.  
3. Bushland defined by criteria listed in Land Use Acceptance Criteria.  
4. Detail to be provided to the administering authority by 31 December 2017.

**Grazing and Bushland Rehabilitation Outcome**

(C3) Areas which are to be rehabilitated to Low Intensity Grazing and Bushland must generate a self sustaining vegetation with productive cover, species composition and species distribution as defined by the criteria in Table C2 (Rehabilitation Success Criteria).
### Table C2 (Rehabilitation Success Criteria)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Criteria</th>
<th>Monitoring Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>Groundcover biomass and tree density is equal to, or greater than, 50% of that of the corresponding measure in analogue sites of equivalent capability.</td>
<td>Vegetation Community (Biomass, Composition and Structure)</td>
</tr>
<tr>
<td>Diversity</td>
<td>Species richness is to be equal to, or greater than, 50% of that of analogue sites of equivalent capability. Minimum requirement is: (i) Minimum of 3 groundcover species and 3 tree and shrub species; (j) 70% or more of tree and shrub species will be native; (ii) the remaining 30% or less of tree and shrub species must comprise of recognised pasture species and agreed upon in the Post Mine Land Use Plan</td>
<td>Vegetation Community (Biomass, Composition and Structure)</td>
</tr>
<tr>
<td>Integrity</td>
<td>70% or more of tree and shrub species will be native and weeds are controlled as required under the Land Protection (Fire and Stock Route Management) Act, 2002.</td>
<td>Vegetation Community (Biomass, Composition and Structure)</td>
</tr>
<tr>
<td></td>
<td>The remaining 30% or less of tree and shrub species must comprise of recognised pasture species and agreed upon in the Post Mine Land Use Plan.</td>
<td></td>
</tr>
<tr>
<td>Productivity</td>
<td>Groundcover biomass is equal to, or greater than, 50% of that of analogue sites of equivalent capability.</td>
<td>Vegetation Community (Biomass)</td>
</tr>
<tr>
<td>Landform stability</td>
<td>(i) erosion will not prevent the reinstatement of the nominated land capability and land use.</td>
<td>Erosion Gully monitoring</td>
</tr>
<tr>
<td></td>
<td>(ii) minimising the extent of till erosion to depth less than 300mm. Gullies will be accepted such that they do not prevent achievement of desired land capability and do not exceed 2m in depth, are as wide as deep; and</td>
<td>Vegetation Community (Surface Cover)</td>
</tr>
<tr>
<td></td>
<td>(iii) gullies would not be accepted in areas covered by less than 3 metres of cover/ capping material eg tailings dam and other areas where potentially harmful material has been buried; and</td>
<td>Land Capability</td>
</tr>
<tr>
<td></td>
<td>(iv) grazing and or bushland is possible on final landform; (v) void slopes are not to exceed 65 degrees in consolidated material.</td>
<td></td>
</tr>
<tr>
<td>Self sustaining</td>
<td>(i) groundcover biomass and tree density is equal to, or greater than, 50% of that of the corresponding measure in analogue sites of equivalent capability for 3 consecutive years; (ii) greater than 5 individuals of either shrub, grass or tree species will be volunteers or 2nd generation volunteers and not weeds.</td>
<td>Vegetation Community (include flowering fruiting and seedlings in collection of community composition and structure data)</td>
</tr>
<tr>
<td>PMLU</td>
<td>(i) grazing and or bushland is possible on the final landform. (ii) voids and Raw Water Dam containing water suitable for stock. (iii) land capability proportions (as defined in Schedule - C Table 1) for each domain achieved. (iv) potential grazing intensity exceeds 1 beast/40 Ha.</td>
<td>Land Capability</td>
</tr>
</tbody>
</table>


(C4) The holder of this environmental authority must mine in accordance with the Conservation Zones and defined in Figures 3a of the Mungana Gold Open Pit Project Environmental Management Plan (September 2011).

(C5) Rehabilitation must commence progressively in accordance with the plan of operations.
Disturbance to Land

(C6) When carrying out the mining activity, the holder of this environmental authority must:
(a) avoid, minimise or mitigate (in order of preference) any impacts on areas of sensitive vegetation or other areas of ecological value;
(b) minimise the risk of injury, harm, or entrapment to wildlife and stock;
(c) minimise disturbance to land that may otherwise result in land degradation;
(d) prior to carrying out any disturbance activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any Category A, B or C Environmentally Sensitive Area (ESA) and the relevant requirements of this environmental authority;
(e) if significant disturbance to land is unavoidable, the holder of this environmental authority must clear vegetation in a way which minimises fragmentation; and
(f) manage cleared vegetation so that it is stockpiled in a manner that facilitates salvage, re-spreading or burning and does not impede vehicle, stock or wildlife movements.

Topsoil

(C7) Topsoil and subsoils must be stripped and stockpiled ahead of mining to a depth determined from soil surveys to ensure that useable soil resources are preserved for rehabilitation.

(C8) Topsoil and subsoil stockpiles must be managed to ensure stability and to minimise the release of contaminants. Measures must include:
(a) vegetating stockpiles;
(b) minimising the height of stockpiles; and
(c) re-using stockpiles as soon as possible.

(C9) A topsoil inventory which identifies the topsoil requirements for the mining project and availability of suitable topsoil on-site must be detailed in the Plan of Operations.

Chemicals and Flammable or Combustible Liquids

(C10) All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, flammable or combustible liquids and dangerous goods must be stored and handled in accordance with the current, relevant Australian Standard where such is applicable.

(C11) Where no relevant Australian Standard exists, store such materials within an effective on-site containment system.

(C12) Minimise the potential for contamination of land and waters by diverting stormwater around contaminated areas and facilities used for the storage of chemicals and flammable or combustible liquids.

Post Mine Land Use Plan

(C13) By 31 December 2017, the current Post Mine Land-use Plan (PMLUP) that describes how the rehabilitation objectives in condition C2 will be achieved must be updated, documented and implemented for all stages of the mining activities. The PMLUP must at minimum include:
a) Schematic representation of the proposed final land form inclusive of site drainage features;
b) Details of proposed slope design and erosion and sediment controls;
c) Proposed cover designs for encapsulation of waste material, including performance criteria;
d) Proposed revegetation methods inclusive of plant species selection, propagation methods and establishment of suitable plant growth medium (i.e. top soil).
a) Materials balance for all rehabilitation requirements including available top soil and material suitable for encapsulating waste in accordance with the proposed encapsulation methodology;

f) Geotechnical, geochemical and hydrological studies necessary to demonstrate likely success of proposed rehabilitation methodology to achieve the required rehabilitation outcomes;

g) An investigation of proposed residual voids inducing potential for generation/mobilisation of contaminants, potential pathways for release of contaminants to waters (including groundwater) and a long-term void water balance model; and

h) A rehabilitation monitoring program sufficient to identify if required rehabilitation outcomes have been achieved.

Residual Void Studies

(C14) The holder of this environmental authority must:

a) Submit a revised residual void model within 12 months of commencing mining of Mungana Gold Open Pit Development, giving due regard to comments made by the administering authority;

b) The model in a) must be subject to review each subsequent five years;

c) Any amendment to the approved residual void model that may arise from the reviews in a) or b) must be based on any significant changes to groundwater characteristics or other data considered relevant by the administering authority that becomes available from the groundwater monitoring program; and

d) Notwithstanding obligations under a), b) or c) the holder of the environmental authority must undertake residual void water balance modelling during mine closure planning, in consultation with the administering authority, to ensure assumptions regarding surface water runoff and groundwater ingress are reviewed.

(C15) Complete an investigation into residual voids and submit a report to the administering authority within 12 months of commencing mining of Mungana Gold Open Pit Development proposing acceptance criteria to meet the outcomes in condition C16 and landform design criteria for review and comment by the administering authority.

The investigation must at a minimum include the following:

(a) a study of options available for minimising final void area and volume;

(b) develop design criteria for rehabilitation of final voids;

(c) a void hydrology study, addressing the long-term water balance in the voids, connections to groundwater resources and water quality parameters in the long term;

(d) a study of the measures to protect the residual voids, un-compacted overburden and workings from the “probable maximum flood” level based on the Bureau of Meteorology’s “probable maximum precipitation” forecast for the locality;

(e) a pit wall stability study, considering the effects of long-term erosion and weathering of the pit wall and the effects of significant hydrological events;

(f) a study of void capability to support native flora and fauna; and

(g) a proposal for end of mine void rehabilitation success criteria and final void areas and volumes.

Note. These studies must be undertaken during the life of the mine, and will include detailed research and modelling.

Residual Void Outcome

(C16) Residual voids must not cause any environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself, and subject to any other condition within this environmental authority.
Rehabilitation Monitoring Program

(C17) A rehabilitation monitoring program must be implemented by an appropriately qualified person upon commencement of rehabilitation identified in Table C1 (Rehabilitation Requirements).

(C18) The holder of this environmental authority must conduct rehabilitation monitoring in accordance with the program developed in condition C17 including sufficient spatial and temporal replication to enable scientifically justifiable conclusions to be made, as established in the rehabilitation monitoring program.

(C19) Verification of rehabilitation success is to be carried out for each domain. Monitoring must be carried out for each domain at a minimum sampling intensity of 1: 15,000 and must include sufficient replication to enable statistical analysis of results at an acceptable power as established in the rehabilitation monitoring program.

Infrastructure

(C20) All buildings, structures, mining equipment and plant erected and/or used for the mining activity must be removed from the site prior to surrender, except as agreed in writing by the landowner.

Contaminated Land

(C21) Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.

Contaminated Water Release to Land

(C22) Contaminated water released to land must be monitored in accordance with Table C3 (Contaminant release limits to land) and must not exceed the release limits in Table C3 (Contaminant release limits to land).

Table C3 (Contaminant release limits to land)

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Unit</th>
<th>Release Limit</th>
<th>Limit Type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>pH units</td>
<td>6.0 - 9.0</td>
<td>Range</td>
<td>Monthly</td>
</tr>
<tr>
<td>EC</td>
<td>µS/cm</td>
<td>1,000</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Metals and Metalloids²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Arsenic</td>
<td>mg/L</td>
<td>2.0</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Total Cadmium</td>
<td>mg/L</td>
<td>0.06</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Total Cobalt</td>
<td>mg/L</td>
<td>0.1</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Total Copper</td>
<td>mg/L</td>
<td>5.0</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Total Lead</td>
<td>mg/L</td>
<td>6.0</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Total Molybdenum</td>
<td>mg/L</td>
<td>0.05</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Total Selenium</td>
<td>mg/L</td>
<td>0.05</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
<tr>
<td>Total Zinc</td>
<td>mg/L</td>
<td>5.0</td>
<td>Maximum</td>
<td>Monthly</td>
</tr>
</tbody>
</table>

2. Default trigger values – from ANZECC/ARMCANZ (2000), agricultural irrigation water short-term trigger values (up to 20 years) triggers for heavy metals and metalloids, Table 4.2.10.

(C23) Contaminants may only be released to land in accordance with the conditions of this approval at the following locations:

a) Within the nominated areas identified in Schedule J – Figure 6 (Water Management Layout Drawing) and only within the boundaries of ML20658; and

b) Other land within the boundaries of ML20658 for the purpose of dust suppression and/or fire fighting.
(C24) The irrigation of contaminants to land must be carried out in a manner such that:
   a) Drainage to groundwater and subsurface flows of contaminants to surface waters are prevented;
   b) Surface pondage and run-off of contaminants is prevented;
   c) Degradation of soil structure is minimised; and
   d) Soil sodicity and the build-up of heavy metals and metalloids in the soil and subsoil is minimised.

(C25) All contaminants released to land must be monitored at the frequency and for the parameters specified in Table C3 (Contaminant release limits to land).

(C26) The daily volume of contaminants released to land must be measured and records kept of the volumes of contaminants released.

END OF CONDITIONS FOR SCHEDULE C
SCHEDULE D - REGULATED STRUCTURES (including structures containing mineral waste)

Assessment of consequence category

(D1) The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ERS/2016/1993) at the following times:
   a) prior to the design and construction of the structure, if it is not an existing structure; or
   b) prior to any change in its purpose or the nature of its stored contents.

(D2) A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

(D3) Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ERS/2016/1993).

Design and Construction of a Regulated Structure

(D4) Conditions D5 to D9 inclusive do not apply to existing structures.

(D5) All regulated structures must be designed by and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ERS/2016/1993).

(D6) Construction of a regulated structure is prohibited unless:
   a) the holder has submitted a consequence category assessment report and certification to the administering authority; and
   b) certification for the design, design plan and the associated operating procedures has been certified by a suitably qualified and experienced person in compliance with the relevant condition of this authority.

(D7) Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan, in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ERS/2016/1993), and must be recorded in the Register of Regulated structures.

(D8) Regulated structures must:
   a) be designed and constructed in compliance with the Manual for assessing consequence categories and hydraulic performance of structures (ERS/2016/1993);
   b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
      i. flood waters from entering the regulated darr from any watercourse or drainage line; and
      ii. wall failure due to erosion by flood waters arising from any watercourse or drainage line.
   c) must meet the hydraulic performance criteria stated in Table D1 - Hydraulic Performance Criteria for Regulated Structures

1 Certification of design and construction may be undertaken by different persons.
Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
(a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; and
(b) construction of the regulated structure is in accordance with the design plan.

Table D1 (Hydraulic Performance Criteria for Regulated Structures)

<table>
<thead>
<tr>
<th>Name of Regulated Dam</th>
<th>Spillway Capacity AEP</th>
<th>Design Storage Allowance AEP</th>
<th>Mandatory Reporting Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Dome Tailings Storage Facility</td>
<td>1-in-10,000 year ARI</td>
<td>Nil (Surface has been rehabilitated)</td>
<td>N/A</td>
</tr>
<tr>
<td>Mungana Tailings Storage Facility (Cell 1 to Cell 4)</td>
<td>Probable Maximum Flood (PMF)</td>
<td>1-in-100 year ARI, 2 month wet season</td>
<td>1-in-100 year ARI, 72 hour event</td>
</tr>
<tr>
<td>King Vol Mine Water Dam</td>
<td>1-in 1000 year ARI, 1 hr duration</td>
<td>1-in 20 year ARI, 2 month wet season</td>
<td>1-in 10 year ARI, 72 hr event</td>
</tr>
<tr>
<td>King Vol Sediment Dam</td>
<td>1-in 1000 year ARI, 1 hr duration</td>
<td>1-in 20 year ARI, 2 month wet season</td>
<td>1-in 10 year ARI, 72 hr event</td>
</tr>
</tbody>
</table>

1 Refers to the level below the spillway crest, required to contain either the AEP (design risk) 72hr storm or the AEP (design risk) wave allowance, whichever is lower.

All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure:

a) for existing structures that are regulated structures, within 10 business days of this condition taking effect;
b) prior to the operation of the new regulated structure; and
c) if the emergency action plan is amended, within 5 business days of it being amended.

Operation of a regulated structure

Operation of a regulated structure, except for an existing structure, is prohibited unless the holder has submitted to the administering authority in respect of regulated structure, all of the following:

a) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition D8;
b) a set of 'as constructed' drawings and specifications;
c) certification of the 'as constructed drawings and specifications' in accordance with condition D9;
d) where the regulated structure is to be managed as part of an integrated containment system for the purpose of storing the Design Storage Allowance (DSA) volume across the system, a copy of the certified system design plan;
e) the requirements of this authority relating to the construction of the regulated structure have been met;
f) the holder has entered the details required under this authority, into a register of regulated structures; and

g) there is a current operational plan for the regulated structure.
(D12) For existing structures that are regulated structures:
   a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified system design plan including that structure; and
   b) there must be a current operational plan for the existing structures.

(D13) Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory Reporting Level

(D14) Conditions D15 to D18 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain - overtopping'.

(D15) The mandatory reporting level (MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.

(D16) The holder of this environmental authority must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.

(D17) The holder of this environmental authority must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.

(D18) The holder must record any changes to the MRL in the Register of Regulated Structures.

Design Storage Allowance

(D19) The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

(D20) By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the DSA volume for the dam (or network of linked containment systems).

(D21) The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

(D22) The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual Inspection Report

(D23) Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

(D24) At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.

(D25) The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933).
The holder must, within 20 business days of receipt of the annual inspection report, provide to the administering authority:

a) The recommendations section of the annual inspection report; and

b) If applicable, any actions being taken in response to those recommendations; and c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Decommissioning and Rehabilitation

Regulated structures must not be abandoned but be either:

a) decommissioned and rehabilitated to achieve compliance with Schedule C of this environmental authority; or

b) be left in-situ for a use by the landholder provided that:
   i) it no longer contains contaminants that will migrate into the environment; and
   ii) it contains water of a quality that is demonstrated to be suitable for its intended use(s); and
   iii) the holder of the environmental authority and the landholder agree in writing that the
   • dam will be used by the landholder following the cessation of the environmentally relevant activity(ies); and
   • landholder is responsible for the dam, on and from an agreed date.

Each regulated structure named in column 1 of Table D2 (Basic Details of Regulated Structures), must be consistent with the details noted in columns 2 through to and including column 7 of Table D2 (Basic Details of Regulated Structures).

<table>
<thead>
<tr>
<th>Regulated Structure</th>
<th>Hazard Category</th>
<th>Maximum surface area at the spillway (Ha)</th>
<th>Maximum volume (m³)</th>
<th>Maximum depth (m)</th>
<th>Spillway Level (m AHD)</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Dome Tailings Storage Facility</td>
<td>High</td>
<td>30</td>
<td>7,000,000</td>
<td>29</td>
<td>360.0</td>
<td>Storage of Cyanide tailings</td>
</tr>
<tr>
<td>Mungana Tailings Storage Facility (Cell 1)</td>
<td>High</td>
<td>28.1</td>
<td>2,605,000</td>
<td>21.9</td>
<td>321.4</td>
<td>Storage of tailings containing cyanide</td>
</tr>
<tr>
<td>Mungana Tailings Storage Facility (Cell 2 to Cell 4)</td>
<td>High</td>
<td>TBA¹</td>
<td>TBA¹</td>
<td>TBA¹</td>
<td>TBA¹</td>
<td>Storage of tailings containing cyanide</td>
</tr>
<tr>
<td>King Vol Mine Water Dam</td>
<td>Significant</td>
<td>25.9</td>
<td>118,500</td>
<td>10.8</td>
<td>258.8</td>
<td>Mine water storage</td>
</tr>
<tr>
<td>King Vol Sediment Dam</td>
<td>Significant</td>
<td>10.1</td>
<td>71,000</td>
<td>10.6</td>
<td>238.8</td>
<td>Sediment control</td>
</tr>
</tbody>
</table>

¹ Detail to be provided to the administering authority prior to commencement of construction.

Register of Regulated Structures

A Register of Regulated Structures must be established and maintained by the environmental authority holder for each regulated structure.
(D31) The environmental authority holder must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated structure is submitted to the administering authority.

(D32) The environmental authority holder must make a final entry of the required information in the Register of Regulated Structures once compliance with condition D11 has been achieved.

(D33) The environmental authority holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.

(D34) All entries in the Register of Regulated Structures must be approved by the chief executive officer for the environmental authority holder, or their delegate, as being accurate and correct.

(D35) The environmental authority holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.

**Red Dome Tailings Storage Facility Management**

(D36) The holder of this environmental authority must implement a procedure that prescribes maintenance, management and monitoring of seepage from the Red Dome TSF.

(D37) The holder of this environmental authority must monitor the rate of seepage from the Red Dome tailings storage facility and rainfall at the site on a daily basis.

(D38) The holder of the Environmental Authority must take all reasonable and practical measures to ensure that discharges from the Red Dome Tailings Storage Facility leachate pipe does not form precipitates on the pit wall.

(D39) The holder of the Environmental Authority shall maintain and operate seepage collection works for the Red Dome Tailings Storage Facility, seepage waters collected in the process circuit.

(D40) The holder of this Environmental Authority shall maintain and operate seepage collection works for the Red Dome Tailings Storage Facility to ensure that all leachate escaping from the Red Dome Tailings Storage Facility is ultimately directed to the Red Dome Pit. No release of contaminants to land is authorised.

(D41) Upon commissioning of a gold cyanidation extraction plant as part of minerals processing at Red Dome/Mungana, free standing liquor within the Mungana TSF outside of the decant pond must be monitored weekly when there is liquor present, and it must not exceed 10mg/L Weak Acid Dissociable (WAD) cyanide for 3 out of 5 consecutive samples.

(D42) The decant pond within the Mungana TSF is authorised to contain liquor at a maximum of 20mg/L WAD cyanide while mortality rates are acceptable with respect to condition D43 in the opinion of the administering authority.

(D43) Upon disposal of tailings into the tailings storage facility, the holder of this environmental authority must inspect the tailings storage facility weekly to identify and register any fauna mortalities. This information will be made available to the administering authority upon request and within forty eight (48) hours of the discovery of any fauna mortalities. Details of mortalities will include but not be limited to:

a) animal species of the discovery of any fauna mortality;
b) number of animals;
c) location; and,
d) likely cause of death.

(D44) If in the opinion of the administering authority, the mortality rate referred to in condition D43 is unacceptable, the holder of this environmental authority will be required to develop and implement an action plan to reduce the mortality rate and provide the action plan to the administering authority within one (1) month of the plan being required.
The decent pond on the Mungana TSF must be developed and maintained to limit access by birds and other native fauna.

END OF CONDITIONS FOR SCHEDULE D.
SCHEDULE E - GENERAL AND REGULATED WASTE MANAGEMENT

Non Mineral Waste Management Program

(E1) A waste management program must be developed and implemented prior to the commencement of mining or processing and maintained for all mining activity at the licensed place. The waste management program must be submitted to the administering authority upon request. The program must include:

(a) a description of the mining activity that may generate waste;
(b) waste management control strategies including;
   i) recording of the types and amounts of wastes generated by the mining activity;
   ii) segregation of the wastes;
   iii) storage of the wastes;
   iv) transport of the wastes; and
   v) monitoring and reporting matters concerning the waste;
(c) the hazard characteristics of the wastes generated including disposal procedures for hazardous wastes;
(d) a program for reusing, recycling or disposing of all wastes;
(e) how the waste will be dealt with in accordance with the waste management hierarchy, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices in the waste management hierarchy (i.e. avoidance, reuse, recycling, energy recovery, disposal);
(f) procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources and improve the waste management practices employed;
(g) procedures for dealing with accidents, spills, and other incidents that may impact on waste management;
(h) details of any accredited management system employed, or planned to be employed, to deal with the waste;
(i) how often the performance of the waste management practices will be assessed;
(j) the indicators or other criteria on which the performance of the waste management practices will be assessed; and
(k) staff training and induction to the waste management program.

Waste Disposal

(E2) All general and regulated waste other than authorised under condition E3, must be removed from the site to a facility that is lawfully able to accept the waste.

(E3) The only waste that can be disposed of on site is waste generated on site and is limited to:

(a) waste rock;
(b) tailings;
(c) tyres; and
(c) general waste including construction and demolition waste, green waste, putrescibles waste and commercial waste.

(E4) General waste deposited in the active waste disposal trench must be compacted and covered with a layer of inert material following placement of the waste into the trench.

(E5) Litter control methods must be effectively implemented at the active waste disposal trench.
The active waste disposal trench must be constructed, designed, engineered and operated to minimise the generation of leachate including a system of diversion drains or embankments to divert surface waters away from any area where contact with wastes or sources of contamination may occur.

Completed waste disposal trenches must be capped with a low permeability material and compacted and contoured to effectively minimise water infiltration.

Prior to constructing a waste disposal trench Schedule J – Figure 5 (Waste Disposal Trenches) is required to be updated. Any waste disposal trench constructed must be maintained in accordance with the waste disposal area identified in Schedule J – Figure 5 (Waste Disposal Trenches). Notwithstanding any other condition of this environmental authority, such records must be maintained until the administering authority approves the surrender of this environmental authority.

Incineration of explosive packaging and handling material must be undertaken in accordance with documented procedures that are to be included in the Waste Management Program, detailed in condition E1 that ensures:

(a) only these materials will be incinerated on site;
(b) incineration is conducted in an environmentally sound manner, in a designated area / facility;
(c) practices are in place to minimise nuisance from smoke and ash;
(d) procedures are developed and implemented on how ashes will be dealt with after incineration; and
(e) a contingency plan is developed and implemented if nuisance is caused by incineration.

Unless operating in accordance with condition E9, waste must not be burnt or taken off site and burnt.

Regulated Waste

Regulated waste, other than that authorised to be disposed of on site under this authority, must only be removed and transported from the site by a person who holds a current authority to transport such wastes to a facility that is lawfully able to accept the waste under the Environmental Protection Act 1994.

Regulated waste generated in the mining activity can be temporarily stored on site prior to removal provided it is for a period no longer than six (6) months and it is stored in a manner to prevent risk of fire or contamination of land or waters.

Each container of regulated waste stored awaiting movement from the licensed place must be clearly marked to identify the contents.

Where regulated waste is removed from the licensed place, the holder of this environmental authority must ensure that:

(a) Records are kept of the following:
   (i) the date, quantity and type of waste removed; and
   (ii) name of the regulated waste transporter that removed the waste; and
   (iii) the intended treatment/disposal destination of the waste.

Note: Records of documents maintained in compliance with a waste tracking system established under the Environmental Protection Act 1994 or any other law for regulated waste will be deemed to satisfy this environmental authority condition.

If the holder of this environmental authority becomes aware that a person has removed regulated waste from the licensed place and disposed of the regulated waste in a manner which is not authorised by this environmental authority or improper or unlawful, then the holder of this environmental authority must, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.
Tailings Disposal

(E16) Tailings must be managed in accordance with procedures contained within the current plan of operations. These procedures must include provisions for:
   a) containment of tailings
   b) the management of seepage and leachates both during operation and the foreseeable future
   c) the control of fugitive emissions to air
   d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings
   e) maintaining records of the relative locations of any other waste stored within the tailings
   f) rehabilitation strategy
   g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

Capping System Plan

(E17) One (1) month following deposition of tailings in the tailings storage facility the holder of this environmental authority must commence trials to establish suitable capping systems for infrastructure on site including but not limited to the tailings storage facility and waste rock dumps.

(E18) Two (2) years following deposition of tailings in the tailings storage facility and once every two (2) years thereafter the holder of this environmental authority must submit a report to the administering authority detailing the success and findings from the capping system trials required in condition E17.

(E19) Four (4) years following deposition of tailings in the tailings storage facility the holder of this environmental authority must submit to the administering authority a report nominating the most appropriate capping system based on results from trials required in condition E17. The holder of this environmental authority must give due consideration to any comments made on the capping system plan by the administering authority and amend the capping system plan accordingly.

Waste Rock Disposal

(E20) By 31 March 2017, the holder of this environmental authority must develop, implement and submit to the administering authority a waste rock management plan.

(E21) Waste rock disposal must not occur on the site unless the holder of this environmental authority has submitted to the administering authority a waste rock management plan. The waste rock management plan must be certified by an appropriately qualified person, to ensure the plan has addressed the requirements of this environmental authority in accordance with best practice environmental management.

(E22) The waste rock management plan must include:

   (a) a detailed design of the waste rock dumps
   (b) characterisation of the waste rock to predict the quality of runoff and seepage generated, including salinity, acidity, alkalinity, dissolved metals, metalloids and non-metallic inorganic substances;
   (c) a program of progressive sampling to validate pre-mine waste rock characterisation. The waste rock sampling program must include validation of salinity, acid and alkali producing potential and metal concentrations including antimony, arsenic, boron, cadmium, chromium, cobalt, copper, lead, molybdenum, selenium, silver, zinc and fluoride;
   (d) where the acid rock drainage potential/neutral mine drainage potential of waste rock material has not been conclusively determined, geochemical kinetic testing must be conducted to indicate oxidation rates, potential reaction products and effectiveness of control strategies;
(e) records must be maintained of all waste rock characterisation and disposal including contingency planning for the management of acid rock/neutral mine drainage;

(f) a materials balance and disposal plan demonstrating how potentially acid forming and acid forming waste rock will be selectively placed and/or encapsulated to minimise the generation of acid mine drainage;

(g) a materials balance and disposal plan demonstrating how waste rock that has a potential to generate neutral and/or saline mine drainage will be selectively placed and managed to minimise the generation of neutral and/or saline mine drainage;

(h) a sampling program to verify encapsulation and/or placement of potentially acid forming and acid forming waste rock and waste rock that has a potential to generate neutral mine drainage;

(i) how often the performance of the plan will be assessed;

(j) a rehabilitation strategy which meets the rehabilitation objectives specified in Schedule C of this environmental authority; and

(k) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of the placed materials, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

(E23) Waste rock dumps must be constructed and maintained in accordance with the drawings identified in Table E1 (Waste Rock Dump Design Plans).

Table E1 (Waste Rock Dump Design Plans)

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 5a-5f</td>
<td>Plan location of Waste Rock Dumps (WRD) with respect to other site infrastructure (author: AWA)</td>
</tr>
</tbody>
</table>

1 Figures referenced from the Mungana Gold Open Pit Development Environmental Management Plan (September 2011)

(E24) The waste rock dumps must be designed, constructed and maintained to prevent any water other than incidental rainfall from entering the waste rock dump.

(E25) Any seepage from the waste rock dumps must be captured and directed to the processing plant, Mine Water Dam, Mungana TSF or open pit.

(E26) Only waste rock that does not cause acid, neutral or saline mine drainage may be used for the construction of temporary or permanent structures within the operation areas.

PAF Waste Rock Storage (General)

(E27) The waste rock stockpile must be constructed to prevent any surface water runoff entering the stockpile.

(E28) Any seepage from the waste rock stockpile must be directly discharged to the Mine Water Dam.

PAF Waste Rock Storage (Mungana underground development and King Vol underground mine)

(E29) PAF waste rock must be disposed of to the underground voids and managed in accordance with the conditions of the environmental authority.

PAF Waste Rock Storage (Mungana Gold Open Pit Development)

(E30) PAF waste rock awaiting placement in the waste rock dump must only be stored on the ROM pad and for no longer than two (2) weeks after it was initially deposited on the ROM pad.

Tyre Storage and Disposal

(E31) Tyres stored awaiting disposal or transport for take-back and recycling or waste-to-energy options must be stockpiled in volumes less than 3m in height and 200m² and at least 10m from any other tyre storage area.

(E32) Fire prevention measures must be implemented including the removal of all combustible materials, including grass and vegetation, within a 10m radius of any tyre storage area.
Subject to demonstrating to the administering authority that no other use higher in the waste management hierarchy can be practicably implemented, waste tyres generated from the mining activity may be disposed of on site in non-acid forming waste rock dumps or underground stopes.

END OF CONDITIONS FOR SCHEDULE E
SCHEDULE F - NOISE

General:

(F1) Unless authorised by this environmental authority, noise from the mining activity must not cause environmental nuisance at any sensitive place or commercial place.

(F2) In the event of a complaint made to the administering authority (considered in the opinion of an authorised officer to be neither frivolous or vexatious) about noise generated in carrying out the licensed activity and the noise is considered by the administering authority to be an unreasonable noise, the holder of this environmental authority must take action to ensure that it will not in the future cause unreasonable noise.

Noise Monitoring:

(F3) Ensure that noise generated by the mining activity does not cause the criteria in Table F1 (Noise Limits) to be exceeded at any sensitive place or commercial place.

Table F1 (Noise Limits)

<table>
<thead>
<tr>
<th>Noise Level dB(A) measured as:</th>
<th>Monday to Saturday</th>
<th>Sundays and Public Holidays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7am to 6pm</td>
<td>6pm to 10pm</td>
</tr>
<tr>
<td>( L_{A10, , \text{adj}, , 10 , \text{mins}} )</td>
<td>BG+5</td>
<td>BG+5</td>
</tr>
<tr>
<td>( L_{A1, , \text{eq}, , 10 , \text{mins}} )</td>
<td>BG+10</td>
<td>BG+10</td>
</tr>
</tbody>
</table>

Note: In the event that the measured background noise level (BG) is less than 25 dB(A), then 25 dB(A) can be substituted for the measured background level.

(F4) When requested by the administering authority, noise monitoring and recording must be undertaken within a timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place or commercial place and the results must be provided to the administering authority within ten (10) business days following completion of monitoring.

(F5) Noise monitoring and recording must include the following descriptor characteristics and matters:

(a) \( L_{\text{NAT}} \) (where \( N \) equals the statistical levels of 1, 10 and 50 and \( T = 15 \, \text{mins} \));
(b) Background noise \( L_{\text{AMB}} \);
(c) The level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
(d) Atmospheric conditions including temperature, relative humidity and wind speed and directions;
(e) Effects due to any extraneous factors such as traffic noise;
(f) Location, date and time of monitoring;
(g) If the complaint concerns low frequency noise, Max \( L_{p_{\text{min}}} \) and
(h) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 - 200 Hz range.

(F6) The method of measurement and reporting of noise levels must comply with the most recent edition of the administering authority's Noise Measurement Manual or the most recent version of AS1055 Acoustics - Description and measurement of environmental noise.
Air Blast & Ground Vibration

(F7) The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in Table F2 (Blasting Noise Limits) to be exceeded at any sensitive place or commercial place.

Table F2 (Blasting Noise Limits)

<table>
<thead>
<tr>
<th>Blasting noise limits</th>
<th>Sensitive or commercial place limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airblast overpressure</td>
<td>Piano, Red Dome 4 and Red Dome 5 caves: 115 dB (Linear) Peak for nine (9) out of ten (10) consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time. Eclipse cave section of Chillagoe National Park and Mungana 2: 140dB (Linear) Peak.</td>
</tr>
<tr>
<td>Ground vibration peak particle velocity</td>
<td>Piano, Red Dome 4 and Red Dome 5 caves: 5mm/second peak particle velocity for nine (9) out of ten (10) consecutive blasts and not greater than 10 mm/second peak particle velocity at any time. Eclipse cave section of Chillagoe National Park and Mungana 2: 26mm/second peak particle velocity.</td>
</tr>
</tbody>
</table>

1 Measured 10m from the entrance of nominated caves.

(F8) The holder of this environmental authority must develop and implement a blast monitoring program at the nearest sensitive place identified as locations in Table B3 (Air Quality Monitoring Sites) at least 3 months prior to any blasting taking place at the Mungana Open Pit to monitor compliance with Table F2 (Blasting Noise Limits).

(F9) Where blast monitoring detects non-compliance with Table F2 (Blasting Noise Limits):

(a) take steps to ensure compliance is achieved by subsequent blasts; and
(b) continue to monitor all consecutive blasts until at least three (3) successive blasts comply with Table F2 (Blasting Noise Limits).

(F10) The holder of this environmental authority must undertake vibration monitoring upon request by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of an authorised officer) of environmental nuisance at any sensitive place or commercial place.

(F11) The results of the investigation conducted in accordance with condition F10 must be provided to the administering authority on request.

(F12) The method of measurement and reporting of vibration levels must comply with the most recent edition of the administering authority's guideline Noise and vibration from blasting.

Airblast Overpressure

(F13) If monitoring indicates exceedence of the relevant limits in Table F2 (Blasting Noise Limits) then the holder of this environmental authority must immediately implement airblast overpressure abatement measures to ensure that airblast overpressure from the activity does not result in further environmental nuisance.
(F14) When requested by the administering authority, airblast overpressure monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within ten (10) business days to the administering authority following completion of monitoring.

(F15) Airblast overpressure monitoring must include the following descriptors, characteristics and conditions:

(a) location of the blast(s) within the mining area (including which bench level);
(b) atmospheric conditions including temperature, relative humidity and wind speed and direction; and
(c) location, date and time of recording.

(F16) The method of measurement and reporting of airblast overpressure levels must comply with Appendix J of AS 2187.2-2006.

(F17) The ground vibration transducer (or array) must be attached to a buried block so as to ensure good coupling with the ground. The mass shall be buried so that its upper most surface is at the same level as the ground surface.

(F18) The ground vibration transducer (or array) must be placed at the same point at which the air blast is monitored.

(F19) A Blast Management Plan must be developed, which

(a) is prepared prior to commencement of any blasting and made available to the administering authority on request; and
(b) provides for at least the following:

(i) procedures for charging blasting holes
(ii) initiation and sequencing design guidelines
(iii) actions to be taken if levels of induced air over pressure or ground vibration approach the maximum permissible levels
(iv) actions to prevent environmental harm in a defined Conservation Zone
(v) initial monitoring at designated locations including Mungana 2, Eclipse Tower (Eclipse Cave), Piano Tower (Piano Cave) and Red Dome 5 limestone karsts. Monitoring is to comprise:
- up to 5 blasts are monitored over a 3 month period
- all 5 locations are monitored over a 8 month period
(vi) Monitoring is to be continued for each blast at any monitoring location where the peak particle velocity is expected to exceed 5 mm per second
(vii) The initial monitoring sequence is to be repeated if the blast instantaneous charge is increased.

END OF CONDITIONS FOR SCHEDULE F
SCHEDULE G - WATER

Red Dome/Mungana

General

(G1) Contaminants that will, or have the potential to cause environmental harm, must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

(G2) Releases to waters must be undertaken so as to minimise erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

Water Quality Monitoring Metadata

(G3) The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format when requested:

(a) the date and time when the sample was taken;
(b) the monitoring point where the sample was taken;
(c) the measured or estimated daily quantity of the contaminants released from all release points;
(d) the release flow rate at the time of sampling for each release point;
(e) the results of all monitoring and details of any exceedances of the conditions of this environmental authority; and
(f) all water quality monitoring data.

Stream Flow Monitoring

(G4) The holder of this environmental authority must establish stream cross-section and discharge data at the locations specified in Table G1 (Stream Flow Monitoring). Stream discharge data is to be reviewed by 31 August each year to adjust for changes in stream cross-section. For the purpose of Schedule G, flow events are determined in Table G4 (Contaminant Release During Flow Events) by data recorded at the relevant stations specified in Table G1 (Stream Flow Monitoring).

Table G1 (Stream Flow Monitoring)

<table>
<thead>
<tr>
<th>Receiving water description</th>
<th>Release point</th>
<th>Gauging station description</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
<th>Flow recording Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome Creek</td>
<td>OCS 6: Raw Water Dam (via Opera Creek)</td>
<td>TBA¹</td>
<td>TBA¹</td>
<td>TBA¹</td>
<td>Weekly. Daily in a discharge event</td>
</tr>
</tbody>
</table>

¹ Details to be provided to the administering authority prior to the recommencement of mining or processing.

Mine-affected Water Release Events

(G5) The release of mine-affected waters must only occur from the release points specified in Table G2 (Contaminant Release Points) and depicted in Schedule J - Figure 1 (Monitoring Points).

Table G2 (Contaminant Release Points)

<table>
<thead>
<tr>
<th>Release points</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
<th>Contaminant source</th>
<th>Receiving waters description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCS 6: Raw Water Dam spillway</td>
<td>221622</td>
<td>B105682</td>
<td>Raw Water Dam</td>
<td>Welcome Creek</td>
</tr>
<tr>
<td>Southern Waste Rock Dump Wetland</td>
<td>222033</td>
<td>B104132</td>
<td>Seepage water from Southern Waste Rock Dump</td>
<td>Welcome Creek</td>
</tr>
</tbody>
</table>
Unless otherwise permitted under the conditions of this environmental authority, the release of mine-affected water to receiving waters must only take place in accordance with the criteria specified in Table G4 (Contaminant Release During Flow Events) for the release point(s) specified in Table G2 (Contaminant Release Points).

Unless otherwise permitted under the conditions of this environmental authority, the release of mine-affected water to receiving waters must not exceed the release rates and limits stated in Table G4 (Contaminant Release During Flow Events) and Table G5 (End of Pipe Release Limits) when measured at the monitoring points specified in Table G2 (Contaminant Release Points) for each quality characteristic specified in Table G5 (End of Pipe Release Limits).

The holder of this environmental authority must submit to the administering authority 80th percentile reference values (>18 data points) in accordance with ANZECC 2000 methodology, specific to surface water for Welcome Creek for all parameters listed in Table G3 (Contaminant Release Monitoring), along with seasonal flow rates gathered from the gauging stations listed in Table G1 (Stream Flow Monitoring) within 12 months of recommencement of mining or processing.

The release of contaminants to waters from the authorised release points must be monitored at the locations specified in Table G2 (Contaminant Release Points) for each quality characteristic and at the frequency specified in Table G3 (Contaminant Release Monitoring).

### Table G3 (Contaminant Release Monitoring)

<table>
<thead>
<tr>
<th>Quality Characteristic</th>
<th>Unit</th>
<th>Monitoring Frequency[^1.4]</th>
<th>Major Cations &amp; Anions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physicochemical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical conductivity</td>
<td>µS/cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>pH units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbidity</td>
<td>NTU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Hardness (CaCO₃)</td>
<td>mg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorophyll a[^5]</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Major Cations &amp; Anions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sulphate (SO₄[^2–])</td>
<td>mg/L</td>
<td>• Event based sampling of discharge</td>
<td></td>
</tr>
<tr>
<td>• Nitrate (as N)</td>
<td>µg/L</td>
<td>One sample must be taken within twelve (12) hours of a release event or flow event commencing. A second sample must be taken between twelve (12) and twenty four (24) hours after the release event or flow event commences.</td>
<td></td>
</tr>
<tr>
<td>• Ammonia (as N)</td>
<td>µg/L</td>
<td>Where a release or flow event has a duration of twenty four (24) hours or greater, samples must be taken daily for one (1) week, and weekly thereafter until the release or flow event ceases.</td>
<td></td>
</tr>
<tr>
<td>• WAD Cyanide</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fluoride</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Metals &amp; Metalloids (measured as total and dissolved)</strong>[^2.3.6]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimony</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molybdenum</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver[^8]</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boron[^8]</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromium[^8]</td>
<td>µg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oils and greases</td>
<td>(visual)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A release or flow event is a release of water from a release point as specified in Table G2 (Contaminant Release Points).

Grab sampling is the preferred method for sampling collection, however the use of remote sampling techniques such as automated methods is acceptable, except for the use of establishing reference data.

The reference data set must be based on grab samples.

Monitoring during discharge events will only be conducted where safe access can be gained.

For grab samples all metals and metallic oxide must be measured as total (unfiltered) and dissolved (filtered) – filtering should be conducted in the field.

Table G4 (Contaminant Release During Flow Events)

<table>
<thead>
<tr>
<th>Receiving water description</th>
<th>Release point</th>
<th>Flow event</th>
<th>Maximum release rate for all combined release points</th>
<th>Release limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome Creek</td>
<td>OCS 6: Raw Water Dam (via Opal Creek)</td>
<td>Low flow¹ - A flow event period of at least four (4) days, with one day of at least $0.1\text{m}^3/\text{s}$ average flow. Maximum flow rate of $1\text{m}^3/\text{s}$</td>
<td>Low flow¹ - Release may occur during a low flow event and for up to 4 weeks after the natural low flow event ceases. Maximum total release rate:² - Post low flow is 100L/s - No restrictions during low flow event</td>
<td>As specified in Table G5 (End of Pipe Release Limits)</td>
</tr>
</tbody>
</table>

Maximum release rate of 2% (1:50 dilution) of river flow if water quality meets relevant standards in Table G6 (End of Pipe Release Limits). Maximum total release rate:² - No restrictions during high flow event.

Maximum release rate of 5% (1:20 dilution) of river flow if water quality meets relevant standards in Table G6 (End of Pipe Release Limits). Maximum total release rate:² - No restrictions during high flow event.

1. Release of contaminants that meets the quality characteristics of the release limits for low flow as specified in Table G5 (End of Pipe Release Limits) may occur at any time during any high flow event in the river, with no restrictions on volume release.

2. Maximum local release rate from all release points.

3. The downstream compliance point for each release point is specified in Table G6 (Receiving Water Reference Sites, Downstream Compliance Monitoring Points and Downstream Monitoring Points).

4. The holder of this environmental authority is to provide stream flow following the first wet season after the recommencement of mining or processing.
(G10) Releases must not cause water quality to exceed the low flow release limits listed in Table G5 (End of Pipe Release Limits) when monitored at the downstream compliance points listed in Table G6 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points).

Table G5 (End of Pipe Release Limits)

<table>
<thead>
<tr>
<th>Quality Characteristic</th>
<th>Release limit$^2$ for Low Flow</th>
<th>Release limit for high flow$^3$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1:20 dilution (5%) release limits</td>
</tr>
<tr>
<td><strong>Physicochemical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Conductivity</td>
<td>680$^4$</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>(μS/cm)</td>
<td>Ph (pH units)</td>
<td>6.0 (minimum)</td>
</tr>
<tr>
<td></td>
<td>7.3$^4$ (maximum)</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>30$^4$</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Water Hardness (CaCO3)</td>
<td>(mg/L)</td>
<td>For interpretation purposes</td>
</tr>
</tbody>
</table>

**Major Cations & Anions**

<table>
<thead>
<tr>
<th>Component</th>
<th>Release Limit$^2$</th>
<th>Release Limit for High Flow$^3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfate (SO4$^{2-}$) (mg/L)</td>
<td>5.4$^4$</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Nitrate (as N) (μg/L)</td>
<td>30$^6$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Ammonia (as N) (μg/L)</td>
<td>10$^4$</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Free Cyanide (μg/L)</td>
<td>7$^6$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>WAD Cyanide (μg/L)</td>
<td>80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Fluoride (μg/L)</td>
<td>2.12$^6$</td>
<td>TBA$^{11}$</td>
</tr>
</tbody>
</table>

**Metals & Metalloids**

<table>
<thead>
<tr>
<th>Component</th>
<th>Release Limit$^2$</th>
<th>Release Limit for High Flow$^3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Antimony (μg/L)</td>
<td>9$^{th}$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Total Arsenic$^6$ (μg/L)</td>
<td>13$^6$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Total Cadmium (μg/L)</td>
<td>0.2$^6$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Total Cobalt (μg/L)</td>
<td>1.4$^{10}$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Total Copper (μg/L)</td>
<td>1.4$^6$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Total Lead (μg/L)</td>
<td>3.4$^6$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Total Molybdenum (μg/L)</td>
<td>34$^{10}$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
<tr>
<td>Total Selenium (μg/L)</td>
<td>5$^5$ or 80$^{th}$ percentile$^7$ of reference$^8$, whichever is higher</td>
<td>TBA$^{11}$</td>
</tr>
</tbody>
</table>
### Environmental authority EPML00562913

<table>
<thead>
<tr>
<th>Total Zinc (µg/L)</th>
<th>Organic</th>
<th>TBA11</th>
<th>TBA11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oils and greases</td>
<td>No visible film</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. All metals and metalloids must be measured as dissolved (filtered) concentrations.
2. The release limits are based on default trigger limits or the 90th percentile of reference system, whichever is the higher. Where appropriate the default trigger values may be hardness adjusted in accordance with ANZECC/ARMCANZ (2000) section 7.4.4.
3. No low flow release is authorised until relevant reference data has been submitted as detailed in condition G12 and appropriate release limits have been populated in this table.
4. Site-specific trigger levels calculated from posted routine data from reference sites OMG2, WGR11, BeiG01 and RH1 (>18 data points).
5. The trigger value is the value for Total Dissolved Nitrogen as there is no specific value for nitrate.
6. Default trigger values from ANZECC/ARMCANZ (2000) trigger values for aquatic ecosystems indicative of slightly-to-moderately disturbed tropical Australian upland river ecosystems Tables 3.3.1 and Table 3.4.1 (high reliability trigger values) and recodono or low reliability trigger values (Section 8.3) if no value available in Table 3.4.1.
7. 90th percentiles calculated using ANZECC (2000) methodology (section 7.4.4.1).
8. Reference sites defined in Table G7 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points).
9. Specified arsenic concentrations for As (II) and As (V) only required if 13 µg/L is exceeded - note the sample bottle requirements for As (total species) and As (speciated) may differ.
11. To be updated when the holder of this environmental authority provide sufficient reference data for Welcome Creek.

### Annual Review of Release Limits (G11)

By 1 July each year the holder of this environmental authority must provide the administering authority an update of monitoring data and associated contaminant limits specified in Schedule G of this environmental authority, incorporating monitoring data obtained during the previous twelve (12) months.

### Receiving Waters Monitoring (G12)

If a release of mine-affected waters cause an exceedance of the low flow release limits listed in Table G5 (End of Pipe Release Limits) when monitored at the downstream compliance points listed in Table G5 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points), the holder of this environmental authority must compare the downstream results to the reference site results and:

(a) where the trigger values, identified as the low flow release limits listed in Table G5 (End of Pipe Release Limits) are not exceeded then no action is to be taken; or

(b) where the downstream results exceed low flow release limits listed in Table G5 (End of Pipe Release Limits) for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and:

(i) if the downstream result is less than the background monitoring site data, then no action is to be taken;

(ii) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within 3 months, outlining:
   i. details of the investigations carried out;
   ii. details of the environmental impacts observed; and
   iii. actions taken to prevent environmental harm.

Note: Where an exceedance of a release limit has occurred and is being investigated, in accordance with part (b) of this condition, no further reporting is required for subsequent trigger events of an equal-to or lesser extent for that quality characteristic.

### (G13)

An estimate of the daily quantity of contaminants released from each release point must be based on available measured data recorded at the monitoring points in Table G2 (Contaminant Release Points).
(G14) The holder of this environmental authority must monitor the quality of the receiving waters as specified in Table G6 (Receiving Water Reference Sites and Downstream Compliance Monitoring Points) and shown in Schedule J – Figure 1 (Monitoring Points) for each quality characteristic and at the frequency stated in Table G3 (Contaminant Release Monitoring).

Table G6 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points)

<table>
<thead>
<tr>
<th>Monitoring Points</th>
<th>Receiving Waters Location Description</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference 1 Monitoring Points</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WCref1</td>
<td>Welcome Creek</td>
<td>220 618</td>
<td>8 104 755</td>
</tr>
<tr>
<td>OMC2</td>
<td>One Mile Creek</td>
<td>220 700</td>
<td>8 107 924</td>
</tr>
<tr>
<td>RH1</td>
<td>Welcome Creek (Tributary of Welcome Creek at Red Hill, west of the leases)</td>
<td>218 749</td>
<td>8 108 381</td>
</tr>
<tr>
<td>BelC01</td>
<td>Belgravia Creek (in the Red Cap catchment approximately 50m downstream of the Cathedral Caves, north of the leases)</td>
<td>224 772</td>
<td>8 108 150</td>
</tr>
<tr>
<td>L.iter (sediment sampling only)</td>
<td>Lady Jane Creek (upstream of mining disturbance)</td>
<td>223 311</td>
<td>8 105 879</td>
</tr>
</tbody>
</table>

Downstream Compliance Monitoring Points

<table>
<thead>
<tr>
<th>Monitoring Points</th>
<th>Receiving Waters Location Description</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCS 2</td>
<td>Opera Creek (100m downstream of the Raw Water Dam Spillway)</td>
<td>221 493</td>
<td>8 105 587</td>
</tr>
<tr>
<td>WCS 3</td>
<td>Welcome Creek (50m downstream of the confluence with Opera Creek)</td>
<td>220 468</td>
<td>8 105 058</td>
</tr>
<tr>
<td>LC7</td>
<td>Lily Creek (350m downstream from the Red Dome TSF spillway)</td>
<td>225 292</td>
<td>8 104 120</td>
</tr>
<tr>
<td>Site 9</td>
<td>Welcome Creek (downstream of the Mungana TSF spillway)</td>
<td>220 550</td>
<td>8 104 919</td>
</tr>
<tr>
<td>OMC4</td>
<td>One Mile Creek (downstream of from the Mungana WRD)</td>
<td>220 165</td>
<td>8 106 806</td>
</tr>
</tbody>
</table>

1. Reference sites must:
   (a) be from the same bio-geographic and climatic region;
   (b) have similar geology, soil types and topography;
   (c) contain a range of habitats similar to those at the test sites;
   (d) have a similar flow regime; and
   (e) not be so close to the test sites that any disturbance at the test site also results in a change at the reference site.

2. Monitoring is required to commence at these sites prior to commencement of development of the Mungana Gold Open Pit Development.

Stream Sediment

(G15) Sediment quality of receiving waters and reference waters must be monitored at the locations defined in Table G6 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring points) and identified on Schedule J – Figure 1 (Monitoring Points) and for the parameters defined in Table G7 (Stream Sediment Trigger and Contaminant Levels).
(G10) If the quality characteristics of sediments exceed any of the trigger levels specified in Table G7 (Stream Sediment Trigger and Contaminant Levels), the holder of this environmental authority must compare the downstream site to the data from reference monitoring sites and:

(a) if the level of contaminants at the downstream site does not exceed the reference monitoring site data, then no action is to be taken; or

(b) if the level of contaminants at the downstream site is greater than the reference monitoring site data, complete an investigation in accordance with the ANZECC and ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority within three (3) months, outlining:

(i) details of the investigations carried out;

(ii) details of the environmental impacts observed; and

(iii) actions taken to prevent environmental harm.

Note: Where an exceedance of a release limit has occurred and is being investigated, in accordance with part (b) of this condition, no further reporting is required for subsequent trigger events of an equal-to or lesser extent for that quality characteristic.

(G17) All stream sediment sampling must be undertaken in accordance with the most recent version of Australian Standard AS 5597.12 Guidance on Sampling of Bottom Sediments.

(G18) The sediment quality contaminant limit specified in Table G7 (Stream Sediment and Contaminant Levels) must not be exceeded at the downstream sediment quality compliance points identified in Table G8 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points).

### Table G7 (Stream Sediment Trigger and Contaminant Levels)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Trigger Level</th>
<th>Contaminant Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoride</td>
<td>mg/kg</td>
<td>Reference value²</td>
<td>3 times the reference² value</td>
</tr>
<tr>
<td>Total Cyanide</td>
<td>mg/kg</td>
<td>Reference value²</td>
<td>3 times the reference² value</td>
</tr>
<tr>
<td>Antimony</td>
<td>mg/kg</td>
<td>2⁴ or reference value², whichever is higher</td>
<td>25⁴ or 3 times the reference², whichever is higher</td>
</tr>
<tr>
<td>Arsenic</td>
<td>mg/kg</td>
<td>2⁵ or reference value², whichever is higher</td>
<td>70⁴ or 3 times the reference², whichever is higher</td>
</tr>
<tr>
<td>Cadmium</td>
<td>mg/kg</td>
<td>1,5⁴ or reference value², whichever is higher</td>
<td>10⁴ or 3 times the reference², whichever is higher</td>
</tr>
<tr>
<td>Cobalt</td>
<td>mg/kg</td>
<td>Reference value²</td>
<td>3 times the reference² value</td>
</tr>
<tr>
<td>Copper</td>
<td>mg/kg</td>
<td>65⁴ or reference value², whichever is higher</td>
<td>270⁴ or 3 times the reference², whichever is higher</td>
</tr>
<tr>
<td>Lead</td>
<td>mg/kg</td>
<td>50⁴ or reference value², whichever is higher</td>
<td>220⁴ or 3 times the reference², whichever is higher</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>mg/kg</td>
<td>Reference value²</td>
<td>3 times the reference² value</td>
</tr>
<tr>
<td>Selenium</td>
<td>mg/kg</td>
<td>Reference value²</td>
<td>3 times the reference² value</td>
</tr>
<tr>
<td>Zinc</td>
<td>mg/kg</td>
<td>200⁴ or reference value², whichever is higher</td>
<td>4·10⁴ or 3 times the reference², whichever is higher</td>
</tr>
</tbody>
</table>

Particle size distribution For interpretation purposes

¹ All samples must be sieved to the sand fraction (63 - 2000 μm) prior to analysis.
² Reference sites are defined in Table G6 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points).
⁴ ANZECC/ARMCANZ (2000) ISQG – high values based on total concentrations in sediments.

Twice a year (Once at the end of the wet season, and once at the end of the dry season).
Receiving Environment Monitoring Program (REMP)

(G19) A Receiving Environment Monitoring Program (REMP) must be developed and implemented by 31 June 2017.

(G20) The REMP will monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site.

Note: For the purposes of the REMP, the receiving environment is the waters and connected waterways of Welcome Creek, One Mile Creek, Lily Creek and connected waterways within 2 kilometres downstream of the release.

(G21) A REMP Design Document that addresses the requirements of the REMP must be prepared and made available to the administering authority upon request.

(G22) A report outlining the findings of the REMP, including all monitoring results and interpretations must be prepared annually and made available on request to the administering authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

(G23) Until the REMP as required by condition G19 is developed and implemented, the current REMP prevails.

Water Management Plan

(G24) A Water Management Plan must be developed by an appropriately qualified person and implemented.

Erosion and Sediment Control

(G25) Prior to commencement of mining or processing, an Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activity on the licensed place to prevent or minimise erosion and the release of sediment to receiving waters and the contamination of storm water.

(G26) Until the Erosion and Sediment Control Plan as required by condition G25 is developed and implemented, the current Erosion and Sediment Control Plan prevails.

Groundwater

Monitoring Bore Construction, Maintenance and Decommissioning

(G27) Groundwater monitoring bores must be constructed, maintained and decommissioned in accordance with methods prescribed in the latest edition of the Agriculture and Resource Management Council of Australia and New Zealand manual titled Minimum Construction Requirements for Water Bore in Australia.

(G28) Oil-based drilling fluids, oil-based additives, synthetic based drilling fluids or synthetic based additives must not be used in the construction of groundwater monitoring bores.

(G29) Remedial measures must be taken immediately if the holder of this environmental authority becomes aware that either monitoring bore construction, maintenance or decommissioning have resulted in a change in groundwater quality, groundwater levels or have caused the interconnection of aquifers.

(G30) If the quality characteristics as measured in the compliance bores listed in Table G8 (Groundwater monitoring locations and frequency) exceed any of the trigger levels specified in Table G9 (Groundwater trigger levels and Contaminant Limits), the holder of this environmental authority must compare the results from the compliance bores to the data from the reference bores and:

(a) if the level of contaminants as measured in the compliance bore does not exceed the reference bore results, then no action is to be taken;

(b) if the level of contaminants at the compliance bore is greater than the reference bore results, complete an investigation in accordance with the ANZECC & ARMCANZ 2000, into the potential for environmental harm and provide a written report to the administering authority within three (3) months, outlining:
i. details of the investigations carried out;
ii. details of environmental impacts observed, and
iii. actions taken to prevent environmental harm.

Note: Where an exceedance of a release limit has occurred and is being investigated, in accordance with part (b) of this condition, no further reporting is required for subsequent trigger events of an equal-to or lesser extent for that quality characteristic.

<table>
<thead>
<tr>
<th>Monitoring point</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
<th>Surface RL (m)</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Bores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB14:</td>
<td>221 536</td>
<td>8 107 969</td>
<td>324.6</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td></td>
<td>Located north of Mungana, off the mine lease. Potable water source.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBAa</td>
<td>TBAa</td>
<td>TBAa</td>
<td>TBAa</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>Compliance Bores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OB53: NP Monitoring bore near National Park Boundary</td>
<td>222915</td>
<td>8106174</td>
<td>328.3</td>
<td>Monthly – Levels</td>
</tr>
<tr>
<td>TD17r</td>
<td>224754</td>
<td>8103619</td>
<td></td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>QC6: Opera Creek</td>
<td>222569</td>
<td>8105269</td>
<td>313.4</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>WB8: Pit inflows, Located between Red Dome Pit and the National Park boundary.</td>
<td>223924</td>
<td>8105764</td>
<td>346.3</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>New Bore: NP monitoring bore located between OB53 and the Mungana Pit</td>
<td>TBAa</td>
<td>TBAa</td>
<td>TBAa</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>Monitoring Bores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TD4: Red Dome TSF eastern saddle dam. Located north-west of the TSF, outside of the fence.</td>
<td>225624</td>
<td>8103769</td>
<td>331.4</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>TD8: Red Dome TSF eastern saddle dam. Located downslope of TD4.</td>
<td>225732</td>
<td>8103676</td>
<td>330.3</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>HL1: Red Dome heap leach area. Located at the beginning of the heap leach launders.</td>
<td>224254</td>
<td>8104092</td>
<td>354.3</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>SP1: Red Dome process ponds. Located downslope of the storm pond.</td>
<td>223431</td>
<td>8104506</td>
<td>335.1</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>924: Mungana decline area.</td>
<td>221520</td>
<td>8107248</td>
<td>345.6</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>925: Mungana decline area. Located adjacent to access road.</td>
<td>221794</td>
<td>8107088</td>
<td>331.9</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>926: North of Mungana decline.</td>
<td>221564</td>
<td>8107166</td>
<td>360.2</td>
<td>Monthly – levels.</td>
</tr>
<tr>
<td>526: North of Mungana Decline area.</td>
<td>221610</td>
<td>8107398</td>
<td>340.5</td>
<td>Quarterly – water quality Monthly – levels</td>
</tr>
<tr>
<td>529: Mungana decline area.</td>
<td>221312</td>
<td>8107408</td>
<td>349.6</td>
<td>Monthly – levels.</td>
</tr>
<tr>
<td>WB999: Mungana decline area.</td>
<td>221701</td>
<td>8107140</td>
<td>337.8</td>
<td>Monthly – levels.</td>
</tr>
</tbody>
</table>

1. Reference sites must:
   (a) be from the same biogeographic and climatic region;
   (b) have similar geology, soil types, topography and flow regime;
   (c) not be so close to the test sites that any disturbance to the test site also results in a change at the reference site.
2. RL measurement to be taken from top of bore casing to the nearest 5cm.
3. Details to be provided to the administering authority prior to commencement of mining or processing.

(G31) Groundwater from Compliance Bores identified in Table G8 (Groundwater monitoring locations and frequency), must not exceed any of the contaminant limits defined in Table G9 (Groundwater trigger levels and Contaminant Limits).

### Table G9 (Groundwater Trigger Levels and Contaminant Limits)

<table>
<thead>
<tr>
<th>Quality characteristic</th>
<th>Contaminant trigger level</th>
<th>Contaminant limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical conductivity ($\mu$S/cm)</td>
<td>435&lt;sup&gt;th&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;3&lt;/sup&gt; of reference&lt;sup&gt;3&lt;/sup&gt;, whichever is higher. TD17r: 1493&lt;sup&gt;10&lt;/sup&gt;</td>
<td>1000&lt;sup&gt;th&lt;/sup&gt; or 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;1&lt;/sup&gt;, whichever is higher.</td>
</tr>
<tr>
<td>pH (pH units)</td>
<td>Minimum: 6.0&lt;sup&gt;7&lt;/sup&gt; or 20&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;3&lt;/sup&gt;, whichever is the lower.</td>
<td>5 (minimum)</td>
</tr>
<tr>
<td></td>
<td>Maximum: 7.5&lt;sup&gt;6&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;3&lt;/sup&gt;, whichever is the higher. OC6: 8.4&lt;sup&gt;12&lt;/sup&gt; TD17r: 7.97&lt;sup&gt;17&lt;/sup&gt;</td>
<td>9&lt;sup&gt;5&lt;/sup&gt; (maximum)</td>
</tr>
<tr>
<td>Water hardness (CaCO₃) (mg/L)</td>
<td>Interpretation purposes only</td>
<td></td>
</tr>
<tr>
<td>Sulphate ($SO₄^{2-}$) (mg/L)</td>
<td>80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;3&lt;/sup&gt;</td>
<td>500&lt;sup&gt;th&lt;/sup&gt; or 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;3&lt;/sup&gt;, whichever is higher.</td>
</tr>
<tr>
<td>Quality characteristic</td>
<td>Contaminant trigger level</td>
<td>Contaminant limit</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Nitrate (as N) (µg/L)</td>
<td>80th percentile of reference or 30, whichever is higher</td>
<td>11000 or 95th percentile of reference, whichever is higher. TD17r: 24700</td>
</tr>
<tr>
<td>Ammonia (as N) (µg/L)</td>
<td>80th percentile of reference or 6, whichever is higher</td>
<td>500 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Free Cyanide (µg/L)</td>
<td>80th percentile of reference or 7, whichever is higher</td>
<td>22 or 95th percentile of reference</td>
</tr>
<tr>
<td>WAD Cyanide (µg/L)</td>
<td>80th percentile of reference</td>
<td>500 or 95th percentile of reference</td>
</tr>
<tr>
<td>Fluoride (µg/L)</td>
<td>80th percentile of reference</td>
<td>1500 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Antimony (µg/L)</td>
<td>80th percentile of reference or 9, whichever is higher</td>
<td>30 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Arsenic (µg/L)</td>
<td>80th percentile of reference or 13, whichever is higher</td>
<td>70 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Cadmium (µg/L)</td>
<td>80th percentile of reference or 0.2, whichever is higher</td>
<td>10 or 95th percentile of reference, whichever is higher. OC6, WBB: 2</td>
</tr>
<tr>
<td>Cobalt (µg/L)</td>
<td>80th percentile of reference or 1.4, whichever is higher</td>
<td>1000 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Copper (µg/L)</td>
<td>80th percentile of reference or 1.4, whichever is higher</td>
<td>1000 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Lead (µg/L)</td>
<td>80th percentile of reference or 3.4, whichever is higher</td>
<td>100 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Molybdenum (µg/L)</td>
<td>80th percentile of reference or 34, whichever is higher</td>
<td>50 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Selenium (µg/L)</td>
<td>80th percentile of reference or 11, whichever is higher</td>
<td>20 or 95th percentile of reference, whichever is higher.</td>
</tr>
<tr>
<td>Zinc (µg/L)</td>
<td>80th percentile of reference or 8, whichever is higher</td>
<td>20000 or 95th percentile of reference, whichever is higher.</td>
</tr>
</tbody>
</table>

1 All metals and metalloids must be measured as dissolved (filtered).
2 Default trigger values – from ANZECC/ARMCANZ (2000) trigger values for aquatic ecosystems indicative of slightly-to-moderately disturbed tropical/Australian upland river ecosystems Tables 3.4.4 and Table 3.4.1 (high reliability trigger values) and moderate or low reliability trigger values (Section 8.3) if no value available in Table 3.4.1.
3 Reference sites as specified in Table Q8 (Groundwater monitoring locations and frequency).
4 For aquatic ecosystem protection, based on QWPG 2009, Table G.4, Gulf zone.
5 80th and 95th percentiles are calculated using ANZEC 2000 methodology.
Mungana TSF groundwater monitoring

(G32) Groundwater quality and standing water level must be monitored:

(a) at the locations specified in Table G10 - Groundwater monitoring locations and frequency;

(b) at the frequencies specified in Table G10 - Groundwater monitoring locations and frequency; and

(c) for the quality characteristics identified in Table G11 - Groundwater contaminant limits for the aquifer in which the bore is located.

(G33) Groundwater in any compliance bore specified in Table G10 - Groundwater monitoring locations and frequency must not exceed the corresponding limit A specified in Table G11 - Groundwater contaminant limits on any five (5) consecutive sampling occasions.

(G34) Groundwater in any compliance bore specified in Table G10 - Groundwater monitoring locations and frequency must not exceed the corresponding limit B specified in Table G11 - Groundwater contaminant limits on any three (3) consecutive sampling occasions.

Note: Consecutive sampling occasions means any number of sampling results obtained sequentially regardless of frequency and includes resampling events as required by Condition G35.

Table G10 - Groundwater monitoring locations and frequency

<table>
<thead>
<tr>
<th>Monitoring Point</th>
<th>Location (GDA94, Zone 59J)</th>
<th>Bore Details</th>
<th>Monitoring Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Latitude</td>
<td>Longitude</td>
<td>Total Depth (m)</td>
</tr>
<tr>
<td>Dargalong Melanochs</td>
<td>Compliance bores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GWMTD1: Mungana TSF: Monitoring bore approximately 50m down gradient of the Mungana TSF well</td>
<td>221458</td>
<td>-8104490</td>
<td>32.0</td>
</tr>
<tr>
<td>GWMTD2: Mungana TSF: Monitoring bore approximately 25m down gradient of the Mungana TSF well</td>
<td>221263</td>
<td>-81034445</td>
<td>34.0</td>
</tr>
</tbody>
</table>

1. RL must be measured to the nearest 5cm.
<table>
<thead>
<tr>
<th>Quality Characteristic</th>
<th>Unit</th>
<th>Limits</th>
<th>Limit Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td><strong>GW MT001</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water hardness (CaCO₃)</td>
<td>(mg/L)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Major anions and cations</td>
<td>(mg/L)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>pH</td>
<td>pH Units</td>
<td>6.02 - 7.32</td>
<td>6.36 - 7.70</td>
</tr>
<tr>
<td>Electrical Conductivity</td>
<td>(μS/cm)</td>
<td>1,335</td>
<td>1,413</td>
</tr>
<tr>
<td>Sulphate</td>
<td>(mg/L)</td>
<td>95</td>
<td>120</td>
</tr>
<tr>
<td>Fluoride</td>
<td>(μg/L)</td>
<td>1,200</td>
<td>1,400</td>
</tr>
<tr>
<td>Nitrate (as N)</td>
<td>(μg/L)</td>
<td>7,200</td>
<td>NA</td>
</tr>
<tr>
<td>Ammonia (as N)</td>
<td>(μg/L)</td>
<td>900</td>
<td>NA</td>
</tr>
<tr>
<td>Cyanide Free</td>
<td>(μg/L)</td>
<td>7</td>
<td>NA</td>
</tr>
<tr>
<td>Cyanide WAD</td>
<td>(μg/L)</td>
<td>500</td>
<td>NA</td>
</tr>
<tr>
<td>Antimony</td>
<td>(μg/L)</td>
<td>1.4</td>
<td>NA</td>
</tr>
<tr>
<td>Arsenic</td>
<td>(μg/L)</td>
<td>1.4</td>
<td>NA</td>
</tr>
<tr>
<td>Cadmium</td>
<td>(μg/L)</td>
<td>1.4</td>
<td>NA</td>
</tr>
<tr>
<td>Cobalt</td>
<td>(μg/L)</td>
<td>3.4</td>
<td>NA</td>
</tr>
<tr>
<td>Copper</td>
<td>(μg/L)</td>
<td>44</td>
<td>NA</td>
</tr>
<tr>
<td>Lead</td>
<td>(μg/L)</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>(μg/L)</td>
<td>51</td>
<td>NA</td>
</tr>
<tr>
<td>Selenium</td>
<td>(μg/L)</td>
<td>500</td>
<td>NA</td>
</tr>
<tr>
<td>Zinc</td>
<td>(μg/L)</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td><strong>GW MT002</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water hardness (CaCO₃)</td>
<td>(mg/L)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Major anions and cations</td>
<td>(mg/L)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>pH</td>
<td>pH Units</td>
<td>7.02 - 7.52</td>
<td>6.97 - 7.33</td>
</tr>
<tr>
<td>Electrical Conductivity</td>
<td>(μS/cm)</td>
<td>1,400</td>
<td>1,504</td>
</tr>
<tr>
<td>Sulphate</td>
<td>(mg/L)</td>
<td>132</td>
<td>206</td>
</tr>
<tr>
<td>Fluoride</td>
<td>(μg/L)</td>
<td>2,400</td>
<td>2,600</td>
</tr>
<tr>
<td>Nitrate (as N)</td>
<td>(μg/L)</td>
<td>7,200</td>
<td>NA</td>
</tr>
<tr>
<td>Ammonia (as N)</td>
<td>(μg/L)</td>
<td>900</td>
<td>NA</td>
</tr>
<tr>
<td>Cyanide Free</td>
<td>(μg/L)</td>
<td>7</td>
<td>NA</td>
</tr>
<tr>
<td>Cyanide WAD</td>
<td>(μg/L)</td>
<td>500</td>
<td>NA</td>
</tr>
<tr>
<td>Quality Characteristic</td>
<td>Unit</td>
<td>Limits</td>
<td>Limit Type</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Antimony</td>
<td>(µg/L)</td>
<td>9</td>
<td>NA</td>
</tr>
<tr>
<td>Arsenic</td>
<td>(µg/L)</td>
<td>13</td>
<td>NA</td>
</tr>
<tr>
<td>Cadmium</td>
<td>(µg/L)</td>
<td>0.2</td>
<td>NA</td>
</tr>
<tr>
<td>Cobalt</td>
<td>(µg/L)</td>
<td>1.4</td>
<td>NA</td>
</tr>
<tr>
<td>Copper</td>
<td>(µg/L)</td>
<td>1.4</td>
<td>NA</td>
</tr>
<tr>
<td>Lead</td>
<td>(µg/L)</td>
<td>3.4</td>
<td>NA</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>(µg/L)</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Selenium</td>
<td>(µg/L)</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>Zinc</td>
<td>(µg/L)</td>
<td>31</td>
<td>NA</td>
</tr>
</tbody>
</table>

1. Limits are derived from control data.
2. Extracted from Table 5.4.1 of the Australian and New Zealand guidelines for fresh and marine water quality (ANZECC & ARMCANZ 2000), trigger values for toxicants for typical slightly- to moderately disturbed freshwater environments. The 80% species protection value is applied for zinc; as the site-specific data is frequently in excess of the 90% species protection value, molybdenum, cobalt and antimony are freshwater low reliability trigger values extracted from section 8.3.7 Detailed descriptions of chemicals. Nitrate as N toxicity value for the protection of 95% freshwater species is based on the revised calculation by Chris Wills (National Institute of Water & Atmospheric Research Ltd, memorandum dated 30 September 2002).
4. Specified arsenic concentrations can be included for analysis from the cuisel or alternatively, an arsenic (total species) sample can be determined for analysis for As(III) and As(V) only if required if 15 µg/L is exceeded — note that the sample bottle requirements for As (total species and As (speciated) may differ.

(G35) If groundwater measured at any compliance bore specified in Table G10 - Groundwater monitoring locations and frequency exceeds the corresponding limit B specified in Table G11 - Groundwater contaminant limits on one (1) sampling occasion the environmental authority holder must resample the groundwater within the compliance bore for all exceeding parameters within 10 business days of receipt of results.

Annual Groundwater Monitoring Report

(G36) The holder of this environmental authority must complete an annual groundwater monitoring report by 1 July each year and submit this report to the administering authority upon request. The report must be prepared by an appropriately qualified person and must address the following requirements as a minimum:

(a) analyses of groundwater chemistry and hydrogeological data for all groundwater monitoring bores required in condition G30 and G32;
(b) identify exceedance of any contaminant trigger levels or limits listed in Table G9 (Groundwater Trigger Levels and Contaminant Limits) and in Table G11 (Groundwater contaminant limits);
(c) discuss effectiveness of the current groundwater monitoring regime and any improvements that could be made to ensure early detection of impacts to groundwater;
(d) detail proposed actions and timeframes to undertake further investigation of potential environmental impacts for any exceedance identified;
(e) detail proposed mitigation measures for any detected impact to groundwater resulting from the mining activity;
(f) changes in groundwater levels plotted as a function of time to identify seasonal patterns and possible draw-down effects;
(g) groundwater elevation contours and flow direction; and...
(h) Interpretation and discussion of exceedance of any contaminant trigger levels or limits listed in Table G9 (Groundwater Trigger Levels and Contaminant Limits) and in Table G11 (Groundwater contaminant limits) and the implications for compliance with this Environmental Authority.


**Raw Water Dam**

(G38) The water quality in the raw water dam must be managed to ensure that the water quality in the dam is maintained or improved. Discharges from the licensed activity into the raw water dam are only permitted if the water quality of the discharged is equal to or better than the water quality in the raw water dam.

**Onsite Water Storages**

(G39) Waters onsite must be monitored at the locations defined in Table G12 (Onsite Water locations and water storage monitoring locations) for parameters in Table G13 (Onsite Water limits) and at a frequency of:

For the routine monitoring of onsite water locations:
- Quarterly
- Red Dome Pit annually

**Table G12 (Onsite Water locations and water storage monitoring locations)**

<table>
<thead>
<tr>
<th>Monitoring Point</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E6A: Opera Creek: 100 metres downstream of the Red Dome Sediment Dam</td>
<td>223383</td>
<td>8104488</td>
</tr>
<tr>
<td>OCS 6: Raw Water Dam at the spillway</td>
<td>221622</td>
<td>8105682</td>
</tr>
<tr>
<td>Red Dome Sediment Dam: Sediment Dam (located downstream of the heap leach pads, pregnant pond and barren pond)</td>
<td>223477</td>
<td>8104472</td>
</tr>
<tr>
<td>Mine Water Dam: Dam that receives water from Mungana Decline.</td>
<td>222020</td>
<td>8106145</td>
</tr>
<tr>
<td>Mungana TSF: Tailings Storage.</td>
<td>221930</td>
<td>8104800</td>
</tr>
<tr>
<td>Mungana TSF Seepage Sump: Downstream of Mungana TSF wall.</td>
<td>TBA¹</td>
<td>TBA¹</td>
</tr>
<tr>
<td>Mungana Process Water pond: Plant Process water</td>
<td>TBA¹</td>
<td>TBA¹</td>
</tr>
<tr>
<td>Mungana Plant Site Sediment Dam: Downstream of the Mungana process and concentrate storage area and the Process Water Pond</td>
<td>TBA¹</td>
<td>TBA¹</td>
</tr>
<tr>
<td>Red Dome Pit</td>
<td>223840</td>
<td>8105462</td>
</tr>
</tbody>
</table>

¹ Detail to be provided to the administering authority prior to commencement of mining or processing.
In the event that waters defined in Table G12 (Onsite Water locations and water storage monitoring locations) exceed the contaminant limits defined in Table G13 (Onsite Water Limits), the holder of this environmental authority must implement measures to prevent access to waters by all livestock and minimise access by native fauna.

### Table G13 (Onsite water limits)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Test Value</th>
<th>Contaminant Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>pH unit</td>
<td>Range</td>
<td>Greater than $4^5$, less than $9^6$</td>
</tr>
<tr>
<td>EC</td>
<td>µS/cm</td>
<td>Maximum</td>
<td>5970$^1$</td>
</tr>
<tr>
<td>Sulphate</td>
<td>mg/L</td>
<td>Maximum</td>
<td>1000$^3$</td>
</tr>
<tr>
<td>Fluoride</td>
<td>µg/L</td>
<td>Maximum</td>
<td>2000$^3$</td>
</tr>
<tr>
<td>Nitrate</td>
<td>µg/L as N</td>
<td>Maximum</td>
<td>90000$^3$</td>
</tr>
<tr>
<td>Ammonia</td>
<td>µg/L as N</td>
<td>Maximum</td>
<td>500$^3$</td>
</tr>
<tr>
<td>WAD Cyanide</td>
<td>µg/L</td>
<td>Maximum</td>
<td>Mungana TSW refer to conditions D37 - D38, all other dams: 50$^3$</td>
</tr>
<tr>
<td>Antimony$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>30$^4$</td>
</tr>
<tr>
<td>Arsenic$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>500$^4$</td>
</tr>
<tr>
<td>Cadmium$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>10$^4$</td>
</tr>
<tr>
<td>Cobalt$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>1000$^3$</td>
</tr>
<tr>
<td>Copper$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>100$^4$</td>
</tr>
<tr>
<td>Lead$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>150$^4$</td>
</tr>
<tr>
<td>Molybdenum$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>20000$^4$</td>
</tr>
<tr>
<td>Selenium$^2$</td>
<td>µg/L</td>
<td>Maximum</td>
<td>20$^4$</td>
</tr>
</tbody>
</table>

2. Concentrations are for total metals; concentrations only, not soluble metals.
3. Due to unavailability of stock water quality limit a contaminant limit based on drinking water quality guidelines in ADWG (2004) is used.
4. Due to unavailability of stock water quality limit a contaminant limit based on NHMRC (2000) Recreational Water Guidelines (10 x ADWG (assumed use swimming)) is used.
5. Page 4.2.15 of ANZEC (2000) “Soil and animal health will not generally be affected by water with pH in the range of 4.9”.

### Mungana Caves National Park Aquifers – Spring Tower Complex

**G41** During construction of the Mungana Open Pit, aquifers associated with the Spring Tower Complex are not permitted to be intersected. In the event of the intersection of an aquifer reasonably expected to be part of the Spring Tower Complex, the administering authority must be notified in accordance with condition A13 of this environmental authority.

### Saline, Acid and Metalliferous Drainage

**G42** The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline, acid and/or metalliferous mine drainage as a result of the mining activity.

### Applicability of conditions

**G43** Conditions G1 – G42 are only applicable to Red Dome/Mungana.
(G44) By 1 September 2018, the environmental authority holder must submit an amendment application under section 224 of the Environmental Protection Act 1994 to the administering authority proposing contaminant limits in accordance with Table G11 (Groundwater contaminant limits) for all groundwater water quality monitoring bores specified in Table G8 (Groundwater monitoring locations and frequency).

King Vol

(G45) Contaminants that will, or have the potential to cause environmental harm, must not be released directly or indirectly to any receiving waters except as permitted under the conditions of this environmental authority.

(G46) The environmental authority holder must ensure that the mining activities are conducted in a manner that protects all environmental values of receiving waters.

Water Quality Monitoring Metadata

(G47) The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format when requested:

(a) the date and time when the sample was taken;
(b) the monitoring point where the sample was taken;
(c) the measured or estimated daily quantity of the contaminated water released from all release points;
(d) the release flow rate at the time of sampling for each release point;
(e) the results of all monitoring and details of any exceedances of the conditions of this environmental authority; and
(f) all water quality monitoring data.

Stream Flow Monitoring

(G48) The holder must ensure stream flow gauging stations are installed, operated and maintained to define and record stream flows at the locations and flow recording frequency specified in Table G14 (Stream Flow Monitoring).

Table G14 (Stream Flow Monitoring)

<table>
<thead>
<tr>
<th>Receiving water description</th>
<th>Release points</th>
<th>Gauging station description</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
<th>Flow recording Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowler Creek</td>
<td>King Vol Clean Water Dam</td>
<td>Level staff</td>
<td>208212</td>
<td>8125627</td>
<td>Minimum of daily during the release of contaminants</td>
</tr>
<tr>
<td>Bowler Creek tributary (western boundary)</td>
<td>King Vol Mine Water Dam</td>
<td>Level staff</td>
<td>205521</td>
<td>8125680</td>
<td></td>
</tr>
<tr>
<td>Arches Creek (adjacent to Burke Development Road)</td>
<td>King Vol Sediment Dam</td>
<td>Level staff</td>
<td>207175</td>
<td>8126504</td>
<td></td>
</tr>
</tbody>
</table>

1 Flow recording frequency must be sufficient to determine compliance with condition G50.

Contaminated Water Release Events

(G49) The release of contaminants to waters must only occur from the release points specified in Table G15 (Contaminant Release Points).
The release of contaminants to waters must not exceed any quality characteristic release limit specified in Table G16 (Release Limits).

The environmental authority holder must ensure that the release of contaminants to waters is monitored in accordance with the requirements specified in Table G16 (Release Limits).

During contaminant release to waters, the environmental authority holder must ensure that:

a) For a release at a dilution factor of <1:20, there is natural flow in the relevant receiving waters immediately upstream of the release point for the duration of the release event; or

b) For a release at a dilution factor of 1:20-1:50, the flow rate in the relevant receiving waters immediately upstream of the release point is at least twenty (20) times the release rate; or

c) For a dilution factor of >1:50, the flow rate in the relevant receiving waters immediately upstream of the release point is at least fifty (50) times the release rate.

### Table G15 (Contaminant Release Points)

<table>
<thead>
<tr>
<th>Release Points</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
<th>Contaminant Source</th>
<th>Receiving Waters Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>King Vol Clean Water Dam Spillway</td>
<td>206239</td>
<td>8125230</td>
<td>Mine dewatering via production bores</td>
<td>Bowler Creek tributary (western boundary)</td>
</tr>
<tr>
<td>King Vol Mine Water Dam Spillway</td>
<td>205757</td>
<td>8128026</td>
<td>Mine dewatering via the decline, production bores and Sediment Dam</td>
<td>Bowler Creek tributary (western boundary)</td>
</tr>
<tr>
<td>King Vol Sediment Dam</td>
<td>207403</td>
<td>8125721</td>
<td>Surface infrastructure RCW pad and waste rock dump and mine dewatering via decline</td>
<td>Bowler Creek tributary (adjacent to Burke Development Road)</td>
</tr>
<tr>
<td>Bowler Creek Pipeline</td>
<td>206090</td>
<td>8125200</td>
<td>Clean Water Dam</td>
<td>Bowler Creek</td>
</tr>
</tbody>
</table>

### Table G16 (Release Limits)

<table>
<thead>
<tr>
<th>Quality Characteristic</th>
<th>Release Limits</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Conductivity</strong> (µS/cm)</td>
<td>Dilution factor of &lt;1:20: 1,000&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Event based sampling: One sample must be taken within twelve (12) hours of a release event or flow event commencing. A second sample must be taken between twelve (12) and twenty four (24) hours after the release event or flow event commences.</td>
</tr>
<tr>
<td>pH (pH units)</td>
<td>Dilution factor of 1:20 - 1:50: 5.0&lt;sup&gt;4&lt;/sup&gt; (minimum); 8.5&lt;sup&gt;4&lt;/sup&gt; (maximum)</td>
<td>For interpretation purposes</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>Dilution factor of &gt;1:50: 15&lt;sup&gt;5&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Substance</td>
<td>Unit (mg/L or µg/L)</td>
<td>Value</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Sulphate (SO₄²⁻)</td>
<td></td>
<td>250³</td>
</tr>
<tr>
<td>Nitrate (as N)</td>
<td>(mg/L)</td>
<td>11.5⁹, ¹²</td>
</tr>
<tr>
<td>Ammonia (as N)</td>
<td>(µg/L)</td>
<td>411³, ¹²</td>
</tr>
<tr>
<td>Fluoride</td>
<td>(µg/L)</td>
<td>1,500¹⁴</td>
</tr>
<tr>
<td>Antimony (µg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>95ᵗʰ percentile of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum of 10 times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic (µg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50⁰ (total); and, 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50⁰ (total); and, maximum of ten (10) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50⁰ (total); and, maximum of twenty five (25) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium (µg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2⁵ (total); and, 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2⁵ (total); and, maximum of ten (10) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2⁵ (total); and, maximum of twenty five (25) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt (µg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000⁷ (total); and, 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000⁷ (total); and, maximum of ten (10) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000⁷ (total); and, maximum of twenty five (25) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper (µg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000⁷ (total); and, 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000⁷ (total); and, maximum of ten (10) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000⁷ (total); and, maximum of twenty five (25) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead (µg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10⁶ (total); and, 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10⁶ (total); and, maximum of ten (10) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10⁶ (total); and, maximum of twenty five (25) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molybdenum (µg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50⁶ (total); and, 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50⁶ (total); and, maximum of ten (10) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50⁶ (total); and, maximum of twenty five (25) times the 95ᵗʰ percentile⁶ of reference⁶ (dissolved)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where a release of flow event has a duration of twenty four (24) hours or greater, samples must be taken daily for one (1) week, and weekly thereafter until the release or flow event ceases.
<table>
<thead>
<tr>
<th></th>
<th>reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</th>
<th>reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</th>
<th>reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selenium (µg/L)</td>
<td>$10^6$ (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;2&lt;/sup&gt; of reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</td>
<td>$10^9$ (total); and, maximum of ten (10) times the 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;3&lt;/sup&gt; of reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</td>
<td>$10^9$ (total); and, maximum of twenty five (25) times the 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;6&lt;/sup&gt; of reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</td>
</tr>
<tr>
<td>Zinc (µg/L)</td>
<td>$3,000^3$ (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;2&lt;/sup&gt; of reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</td>
<td>$3,000^3$ (total); and, maximum of ten (10) times the 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;3&lt;/sup&gt; of reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</td>
<td>$3,000^3$ (total); and, maximum of twenty five (25) times the 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;6&lt;/sup&gt; of reference&lt;sup&gt;6&lt;/sup&gt; (dissolved)</td>
</tr>
</tbody>
</table>

Oils and greases: No visible film.

1. For water quality, all metals and metalloids must be measured as both "total" (from analysis of an unfiltered sample) and "dissolved" (from analysis of a filtered sample). The relevant method is specified in brackets for each contaminant where applicable.
2. The release limits are based on default trigger limits or the 95<sup>th</sup> percentile of reference system, whichever is the higher. Where appropriate, the default trigger values may be hardness-adjusted in accordance with ANZECC/ARMCANZ (2000) section 7.4.4.4.
4. Default trigger values – from ANZECC/ARMCANZ (2000) trigger values for aquatic ecosystems indicative of slightly- to moderately disturbed tropical Australian upland river ecosystems Tables 3.3.4 and Table 3.4.1 (high reliability trigger values) and moderate of low reliability trigger values (Section 8.3) if no value available in Table 3.4.1.
6. Reference sites defined in Table G17 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points).
7. Default trigger values – from ANZECC/ARMCANZ (2000) section 4.3.3.4 trigger values for livestock drinking water.
8. Australian Drinking Water Guidelines (version 3.2) – Table 10.4 – Guidelines for physical and chemical characteristics.
9. Default trigger values – from ANZECC/ARMCANZ (2000) trigger values for aquatic ecosystems indicative of slightly- to moderately disturbed tropical Australian upland and lowland rivers Table 3.3.5.
10. Where the 95<sup>th</sup> percentile of a Release Limit is exceeded at a Downstream Compliance Monitoring Point and the Reference Monitoring Point also exceeds this concentration during the release event, the value of the Reference Monitoring Point applies as the water quality Release Limit for the duration of the event.
11. Site-specific Release Limits for water quality (95<sup>th</sup> percentile of reference site concentration) must be calculated in accordance with GWQG (2009) and ANZECC (2000) methodology if sufficient monitoring data is available. The environmental authority holder must maintain a database documenting all relevant water quality monitoring data and calculation of 95<sup>th</sup> percentiles adopted as water quality Release Limits.
12. Values converted to Nitrate (as N) and Ammonia (as N).

(G53) The rate and daily quantity of contaminated water released from each release point must be measured and recorded.

(G54) The release of contaminants to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

Receiving Waters Monitoring

(G55) The quality of receiving waters must be monitored at the locations specified in Table G17 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points) as depicted in Schedule D Figure 1b (King Val - Monitoring Points) and in accordance with the requirements specified in Table G18 (Receiving waters trigger levels and contaminant limits).

(G56) Quality characteristics measured in receiving waters must not exceed the contaminant limit specified in Table G18 (Receiving waters trigger levels and contaminant limits).

(G57) If the exceedance of any trigger level listed in Table G18 (Receiving waters trigger levels and contaminant limits) is identified in receiving waters, the holder of this environmental authority must compare the downstream results to the reference site results and:
(a) if the downstream result is less than the background monitoring site data, then no action is to be taken;

(b) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within 3 months, outlining:
   i. details of the investigations carried out;
   ii. details of the environmental impacts observed; and
   iii. actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger value has occurred and is being investigated, in accordance with part (b) of this condition, no further reporting is required for subsequent trigger events of an equal- or lesser extent for that quality characteristic.

Table G17 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points)

<table>
<thead>
<tr>
<th>Monitoring Points</th>
<th>Receiving Waters Location Description</th>
<th>Easting (GDA 94 MGA - Zone 55)</th>
<th>Northing (GDA 94 MGA - Zone 55)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference 1 Monitoring Points</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KV03</td>
<td>Archies Creek</td>
<td>207183</td>
<td>8123531</td>
</tr>
<tr>
<td>M04</td>
<td>Ashton Creek</td>
<td>209761</td>
<td>8124064</td>
</tr>
<tr>
<td>Downstream Compliance Monitoring Points</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KV04</td>
<td>Bowier Creek</td>
<td>206149</td>
<td>8124094</td>
</tr>
<tr>
<td>KV05</td>
<td>Bowier Creek</td>
<td>207858</td>
<td>8123223</td>
</tr>
<tr>
<td>M01</td>
<td>Archies Creek</td>
<td>208038</td>
<td>8125227</td>
</tr>
<tr>
<td>M05</td>
<td>Bowier Creek</td>
<td>208269</td>
<td>8124950</td>
</tr>
</tbody>
</table>

1 Reference sites must:
   (a) be from the same bio-geographic and climatic region;
   (b) have similar geology, soil types and topography;
   (c) contain a range of habitats similar to those at the test sites;
   (d) have a similar flow regime; and
   (e) not be so close to the test sites that any disturbance at the test site also results in a change of the reference site.

Table G18 (Receiving waters trigger levels and contaminant limits)

<table>
<thead>
<tr>
<th>Quality Characteristic</th>
<th>Water Quality 2, 3</th>
<th>Monitoring Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Characteristic</td>
<td>Trigger Levels 4, 5</td>
<td>Contaminant Limit 1, 4</td>
</tr>
<tr>
<td>Electrical Conductivity (µS/cm)</td>
<td>500th or 90th percentile of reference, whichever is higher</td>
<td>1,000³</td>
</tr>
<tr>
<td>pH (pH units)</td>
<td>8.0⁵ (minimum) or 20th percentile of reference, whichever is lower</td>
<td>8.0⁵ (minimum) or 8.5⁴ (maximum)</td>
</tr>
<tr>
<td></td>
<td>7.5⁴ (maximum) or 80th percentile of</td>
<td></td>
</tr>
<tr>
<td>Parameter</td>
<td>Thresholds and References</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>15&lt;sup&gt;th&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td>Water Hardness (CaCO₃) (mg/L)</td>
<td>For interpretive purposes only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>release event or flow event commencing. A second sample must be taken between twelve (12) and twenty four (24) hours after the release event or flow event commences.</td>
<td></td>
</tr>
<tr>
<td><strong>Major Cations &amp; Anions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulphate (SO₄&lt;sup&gt;2-&lt;/sup&gt;) (mg/L)</td>
<td>80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250&lt;sup&gt;12&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Nitrate (as N) (mg/L)</td>
<td>7.2&lt;sup&gt;th&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.5&lt;sup&gt;12&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Ammonia (as N) (µg/L)</td>
<td>80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>41&lt;sup&gt;14, 12&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Fluoride (µg/L)</td>
<td>80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,500&lt;sup&gt;12&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Metals &amp; Metalloids&lt;sup&gt;1&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimony (µg/L)</td>
<td>9&lt;sup&gt;th&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
<tr>
<td>Arsenic&lt;sup&gt;8&lt;/sup&gt; (µg/L)</td>
<td>13&lt;sup&gt;th&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500&lt;sup&gt;11&lt;/sup&gt; (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
<tr>
<td>Cadmium (µg/L)</td>
<td>0.2&lt;sup&gt;5&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2&lt;sup&gt;12&lt;/sup&gt; (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
<tr>
<td>Cobalt (µg/L)</td>
<td>1&lt;sup&gt;49&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,000&lt;sup&gt;11&lt;/sup&gt; (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
<tr>
<td>Copper (µg/L)</td>
<td>1&lt;sup&gt;49&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,000&lt;sup&gt;11&lt;/sup&gt; (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
<tr>
<td>Lead (µg/L)</td>
<td>3&lt;sup&gt;49&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10&lt;sup&gt;12&lt;/sup&gt; (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
<tr>
<td>Molybdenum (µg/L)</td>
<td>34&lt;sup&gt;th&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50&lt;sup&gt;12&lt;/sup&gt; (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
<tr>
<td>Selenium (µg/L)</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; or 80&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt;, whichever is higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10&lt;sup&gt;12&lt;/sup&gt; (total); and, 95&lt;sup&gt;th&lt;/sup&gt; percentile&lt;sup&gt;5&lt;/sup&gt; of reference&lt;sup&gt;7&lt;/sup&gt; (dissolved)</td>
<td></td>
</tr>
</tbody>
</table>

Where a release or flow event has a duration of twenty four (24) hours or greater, samples must be taken daily for one (1) week, and weekly thereafter until the release or flow event ceases.
Zinc (μg/L)  | 8th or 80th percentile of reference, whichever is higher | 3,000ppm (total); and, 95th percentile of reference (dissolved)

**Organics**

| Oils and greases | No visible film |

1. For water quality, all metals and metalloids must be measured as both 'total' (from analysis of an unfiltered sample) and 'dissolved' (from analysis of a filtered sample). All trigger levels are based on dissolved metal concentrations; for water quality objectives, the relevant method is specified in brackets for each contaminant where applicable.

2. Water quality levels and limits are based on default trigger limits of the 8th and 90th percentile of reference system, whichever is the higher. Where appropriate the default trigger values may be handpicked adjusted in accordance with ANZECC/ARMCANZ (2000) section 7.4.4.


4. Values converted to Nitrate (as N) and Ammonia (as N).

5. Default trigger values – from ANZECC/ARMCANZ (2000) trigger values for aquatic ecosystems indicative of slight-to-moderately disturbed tropical Australian upland rainforest ecosystems Tables 3.3.4 and Table 3.4.4 (High reliability trigger values) and moderate to low reliability trigger values (Section 6.3) if no value available in Table 3.4.1.

6. 8th and 95th percentiles calculated using ANZECC (2000) methodology (section 7.4.4.1).

7. Reference values defined in Table G17 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Point).

8. Specified arsenic concentrations for As (III) and As (V) only required if 13 μg/L is exceeded - note that the sample bottle requirements for As (total species) and As (speciated) may differ.

9. Interim (low reliability) value from ANZECC (2000) Section 8.3.7.1

10. Default trigger values – from ANZECC/ARMCANZ (2000) trigger values for aquatic ecosystems indicative of slight-to-moderately disturbed tropical Australian upland and lowland rivers Table 3.3.5

11. Default trigger values – from ANZECC/ARMCANZ (2000) section 4.3.3.4 trigger values for livestock drinking water.

12. Australian Drinking Water Guidelines (version 3.2) – Table 10.4 – Guideline values for physical and chemical characteristics.

13. For aquatic ecosystem protection, based on CDWG 2000, Table G.4, Gulf zone.

14. Where the 80th / 95th percentile of a water quality Trigger Level / Contaminant Limit is exceeded at a Downstream Compliance Monitoring Point and the Reference Monitoring Point also exceeds this concentration during the release / flow event, the value of the Reference Monitoring Point applies as the water quality Trigger Level / Contaminant Limit for the duration of the event.

15. Site-specific Trigger Levels and Contaminant Limits for water quality (80th and 95th percentiles of reference site concentration) must be calculated in accordance with CDWG (2000) and ANZECC (2009) methodology if sufficient monitoring data is available. The environmental authority holder must maintain a database documenting all relevant water quality monitoring data and calculation of 80th / 95th percentiles adopted as water quality Trigger Levels and Contaminant Limits.


**Stream Sediment**

**G56** Sediment quality of receiving waters must be monitored at the locations defined in Table G17 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring points) as depicted in Schedule J – Figure 1b (Monitoring Points) and for the parameters defined in Table G19 (Stream Sediment Trigger and Contaminant Levels).

**G60** If the quality characteristics of sediments exceed any of the trigger levels specified in Table G19 (Stream Sediment Trigger Levels and Contaminant Limits), the holder of this environmental authority must compare the downstream site to the data from reference monitoring sites and:

(a) If the level of contaminants at the downstream site does not exceed the reference monitoring site data, then no action is to be taken; or

(b) If the level of contaminants at the downstream site is greater than the reference monitoring site data, complete an investigation in accordance with the ANZECC and ARMCANZ 2009 methodology, into the potential for environmental harm and provide a written report to the administering authority within three (3) months, outlining:

(i) details of the investigations carried out;

(ii) details of the environmental impacts observed; and

(iii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger value has occurred and is being investigated, in accordance with part (b) of this condition, no further reporting is required for subsequent events of an equal-case or lesser extent for that quality characteristic.

**G60** All stream sediment sampling must be undertaken in accordance with the most recent version of Australian Standard AS 5867:12 Guidance on Sampling of Bottom Sediments.
(G61) The sediment quality contaminant limit specified in Table G19 (Stream Sediment Trigger Levels and Contaminant Limits) must not be exceeded in receiving waters.

Table G19 (Stream Sediment Trigger Levels and Contaminant Limits)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Trigger Level¹,²</th>
<th>Contaminant Limit¹,³</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoride</td>
<td>mg/kg</td>
<td>2 times the reference² value</td>
<td>3 times the reference² value</td>
<td>Twice a year (Once during the wet season, and once during the dry season)</td>
</tr>
<tr>
<td>Antimony</td>
<td>mg/kg</td>
<td>2³ or 2 times the reference³ value, whichever is higher</td>
<td>25⁴ or 3 times the reference², whichever is higher</td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td>mg/kg</td>
<td>2⁰ or 2 times the reference² value, whichever is higher</td>
<td>70⁴ or 3 times the reference², whichever is higher</td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>mg/kg</td>
<td>1.5⁵ or 2 times the reference² value, whichever is higher</td>
<td>10⁴ or 3 times the reference², whichever is higher</td>
<td></td>
</tr>
<tr>
<td>Cobalt</td>
<td>mg/kg</td>
<td>2 times the reference² value</td>
<td>3 times the reference² value</td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>mg/kg</td>
<td>65⁶ or 2 times the reference² value, whichever is higher</td>
<td>270⁴ or 3 times the reference², whichever is higher</td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>mg/kg</td>
<td>50⁷ or 2 times the reference² value, whichever is higher</td>
<td>220⁴ or 3 times the reference², whichever is higher</td>
<td></td>
</tr>
<tr>
<td>Molybdenum</td>
<td>mg/kg</td>
<td>2 times the reference² value</td>
<td>3 times the reference² value</td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
<td>mg/kg</td>
<td>2 times the reference² value</td>
<td>3 times the reference² value</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>mg/kg</td>
<td>20⁰ or 2 times the reference² value, whichever is higher</td>
<td>410⁴ or 3 times the reference², whichever is higher</td>
<td></td>
</tr>
</tbody>
</table>

Particle size distribution

For interpretation purposes:

1. Sediment sampling, analysis and interpretation of results must be conducted in a manner consistent with the 'Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines, CSIRO (May 2013)' and 'AS 5667 12:1989 (R2000) - Guidance on Sampling of Bottom Sediments'.
2. Reference sites are defined in Table G17 (Receiving Water Reference Monitoring Points and Downstream Compliance Monitoring Points).
3. Interim Sediment Quality Guidelines (ISQG) - low values in Table 2 and the decision tree framework in Figure 1 of CSIRO (May 2013).
4. ISQG - high values in Table 2 and the decision tree framework in Figure 1 of CSIRO (May 2013).
5. For sediment quality, compliance site monitoring results are to be compared:
   a) Directly to the guideline values from the 'Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines, CSIRO (May 2013)', if sufficient reference site monitoring data is available; or
   b) The relevant reference site monitoring data, which must be normalised to account for any difference in particle size distribution (i.e. conduct a fractionated sediment analysis based on comparing the metals concentrations of the <53µm sediment fraction with the >53µm to <2mm sediment fraction).

Receiving Environment Monitoring Program (REMP)

(G62) By 31 June 2017, the environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to environmental values of receiving waters due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically and while contaminants are being discharged from the site. For the purposes of the REMP, the receiving environment is the waters
of Bowier Creek, Archie Creek, Ashton Creek and connected or surrounding waterways within 2km downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity and that will potentially be directly affected by an authorised release of mine affected water.

(G63) A REMP Design Document that addresses the requirements of the REMP must be prepared and made available to the administering authority upon request.

(G64) A report outlining the findings of the REMP, including all monitoring results and interpretations must be prepared annually and made available on request to the administering authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

Water Management Plan

(G65) A Water Management Plan must be developed by an appropriately qualified person and implemented.

Erosion and Sediment Control

(G66) An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to prevent or minimise erosion and the release of sediment to receiving waters and the contamination of storm water.

Groundwater

(G67) The environmental authority holder must ensure that all dewatering activities are carried out in a manner that protects environmental values of receiving waters, including the subterranean wetlands (caves) groundwater dependent ecosystem.

Monitoring Bore Construction, Maintenance and Decommissioning

(G68) The construction, maintenance and management of groundwater monitoring bores must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain representative samples of the targeted aquifer.

Groundwater Management Program

(G69) A Groundwater Management Program must be developed and certified by an appropriately qualified person and implemented by the environmental authority holder prior to extraction of groundwater for mine dewatering.

(G70) The Groundwater Management Program required by condition G69 must include adequate monitoring of all receiving waters to determine compliance with all conditions of this environmental authority by an appropriately qualified person and achieve the following objectives:

a) be capable of detecting any impacts to groundwater levels and groundwater quality due to the mining activity;

b) determine compliance with condition G67; and

c) ensure all potential groundwater impacts due to the mining activity are identified, mitigated and monitored.

(G71) The Groundwater Management Program required by condition G69 must be reviewed by 1 July each year by an appropriately qualified person. The annual review must include:

a) an assessment against the objectives in condition G70;

b) recommended actions including timeframes for implementation, to ensure that any groundwater impacts not authorised under this environmental authority are prevented;

c) interpretation and discussion of exceedance of any contaminant trigger levels or contamination limits listed in Table G21 (Groundwater Trigger Levels and Contaminant Limits).

(G72) In relation to the annual review required by condition G71, the environmental authority holder must:

a) upon receipt of the annual review, implement any recommendations from the review within the recommended timeframes; and
h) upon request, provide the administering authority a copy of the annual review and written notification of actions being taken to address any recommendations from the annual review, including any changes necessary to the Groundwater Management Program.

(G73) Groundwater quality and levels must be monitored at the locations and frequencies specified in Table G20 (Groundwater monitoring locations and frequency) as depicted in Schedule J – Figure 4b (King Vol – Groundwater Monitoring Bore Network) for all quality characteristics specified in Table G21 (Groundwater Trigger Levels and Contaminant Limits).

Table G20 (Groundwater monitoring locations and frequency)

<table>
<thead>
<tr>
<th>Monitoring point</th>
<th>Easting (GDA 94 MGA – Zone 55)</th>
<th>Northing (GDA 94 MGA – Zone 55)</th>
<th>Surface RL (m)</th>
<th>Screened interval (m)</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Bores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KVMB004B</td>
<td>206445</td>
<td>8126152</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>Compliance Bores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KVMB002A</td>
<td>207352</td>
<td>8125465</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>KVMB002B</td>
<td>207347</td>
<td>8124823</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>KVMB003</td>
<td>208138</td>
<td>8123766</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>KVMB007</td>
<td>207292</td>
<td>8125595</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>KVMB008</td>
<td>206450</td>
<td>8125000</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>Monitoring Bores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KVMB001A</td>
<td>206816</td>
<td>8125556</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>KVMB001B</td>
<td>206930</td>
<td>8125465</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
<tr>
<td>KVMB006B</td>
<td>200303</td>
<td>8125744</td>
<td>TBA</td>
<td>TBA</td>
<td>Quarterly – water quality Monthly – Levels</td>
</tr>
</tbody>
</table>

1 Reference sites must:
   a. be from the same bio-geographic and climatic region;
   b. have similar geology, soil types, topography and flow regime; and
   c. not be so close to the test sites that any disturbance at the test site also results in a change at the reference site.

2 RL measurement to be taken from top of bore casing to the nearest 5cm.

3 Detail to be provided to the administering authority by 1 February 2017.

(G74) Groundwater from Compliance Bores identified in Table G20 (Groundwater monitoring locations and frequency), must not exceed any of the contaminant limits defined in Table G21 (Groundwater Trigger Levels and Contaminant Limits).

Table G21 (Groundwater Trigger Levels and Contaminant Limits)

<table>
<thead>
<tr>
<th>Quality characteristic</th>
<th>Contaminant trigger level$^{13, 14}$</th>
<th>Contaminant limit$^{13, 14}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical conductivity (µS/cm)</td>
<td>500$^a$ or 80$^b$ percentile$^c$ of reference$^d$, whichever is higher</td>
<td>1,000$^e$</td>
</tr>
<tr>
<td>Quality characteristic</td>
<td>Contaminant trigger level$^{15,14}$</td>
<td>Contaminant limit$^{13,14}$</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>pH (pH units)</td>
<td>6.0$^2$ (minimum) or 20$^{th}$ percentile$^3$ of reference$^3$, whichever is lower</td>
<td>6.0$^2$ (minimum)</td>
</tr>
<tr>
<td>Water hardness (CaCO$_3$) (mg/L)</td>
<td>7.5$^5$ (maximum) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>8.5$^{11}$ (maximum)</td>
</tr>
<tr>
<td>Major cations and anions</td>
<td>Interpretation purposes only$^7$</td>
<td>Interpretation purposes only</td>
</tr>
<tr>
<td>Sulphate (SO$_4^{2-}$) (mg/L)</td>
<td>80$^{th}$ percentile$^8$ of reference$^3$</td>
<td>250$^{11}$</td>
</tr>
<tr>
<td>Nitrate (as N) (mg/L)</td>
<td>7.2$^{10}$ or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>11.5$^{11,12}$</td>
</tr>
<tr>
<td>Ammonia (as N) (µg/L)</td>
<td>80$^{th}$ percentile$^8$ of reference$^3$</td>
<td>411$^{11,12}$</td>
</tr>
<tr>
<td>Fluoride (µg/L)</td>
<td>80$^{th}$ percentile$^8$ of reference$^3$</td>
<td>1,500$^{11}$</td>
</tr>
</tbody>
</table>

**Metals and Metalloids$^1$**

<table>
<thead>
<tr>
<th>Metal</th>
<th>Contaminant trigger level$^{15,14}$</th>
<th>Contaminant limit$^{15,14}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony (µg/L)</td>
<td>9$^9$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Arsenic (µg/L)$^{10}$</td>
<td>13$^7$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>500$^2$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Cadmium (µg/L)</td>
<td>0.2$^2$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>2$^{11}$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Cobalt (µg/L)</td>
<td>1.4$^9$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>1,000$^6$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Copper (µg/L)</td>
<td>1.4$^9$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>1,000$^6$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Lead (µg/L)</td>
<td>3.4$^9$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>10$^{11}$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Molybdenum (µg/L)</td>
<td>34$^7$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>60$^{11}$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Selenium (µg/L)</td>
<td>5$^2$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>10$^{11}$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
<tr>
<td>Zinc (µg/L)</td>
<td>8$^2$ (dissolved) or 80$^{th}$ percentile$^6$ of reference$^3$, whichever is higher</td>
<td>3,000$^{11}$ (total); and, 95$^{th}$ percentile$^8$ of reference$^3$ (dissolved)</td>
</tr>
</tbody>
</table>

$^1$ For water quality, all metals and metalloids must be measured as both 'total' (from analysis of an unfiltered sample) and 'dissolved' (from analysis of a filtered sample). All trigger levels are based on dissolved metal concentrations; for water quality objectives, the relevant method is specified in brackets for each contaminant where applicable.

$^2$ Default trigger values – from ANZECC/ARMCANZ (2000) trigger values for aquatic ecosystems indicative of slightly to moderately disturbed tropical Australian upland river ecosystems Tables 3.3.4 and Table 3.4.1 (high reliability trigger values) and moderate or low reliability trigger values (Section 5.3) if no value available in Table 3.4.1.

$^3$ Reference sites as specified in Table G20 (groundwater monitoring locations and frequency).

$^4$ For aquatic ecosystem protection, based on QWWS 2003, Table G.4, Gulf zone.

$^5$ 80$^{th}$ and 95$^{th}$ percentiles are calculated using ANZECC 2000 methodology.
For protection of livestock drinking water, based on ANZEC 2003 section 4.3.3.4 trigger values for livestock drinking water:

Contaminant trigger values may be adjusted for water hardness (50mg/L calcium carbonate) in accordance with Table 3.4.3 of ANZEC. The hardness modified trigger values (HMTV) will be compared with the contaminant trigger values specified in Table G21 and if the monitoring result exceeds the HMTV it will then constitute an exceedance of the trigger values specified in Table G21. An investigation will then be required under condition G75 of this environmental authority.

Based on toxicity studies "Response of stream macroinvertebrates to changes in salinity and the development of a salinity index", Heneghan et al (2006), Marine and Freshwater Research.

Interim flow reliability value from ANZECC (2003) Section 8.3.7.1.

Speciated arsenic concentrations can be included for analysis from the future or alternatively, an arsenic (total species) sample can be determined with analysis for As (III) and As (V) only required if 13 μg/L is exceeded — note that the sample bottle requirements for As (total species) and As (speciated) may differ.

Contaminant limit based on drinking water quality guidelines in ACWG (2011), Australian Drinking Water Guidelines (version 3.2) — Table 10.4 – Guideline values for physical and chemical characteristics.

Values converted to Nitrate (as N) and Ammonia (as N).

Where the 80th/95th percentile of a water quality trigger Level/Contaminant Limit is exceeded at a Compliance Bore and the Reference Bore(s) also exceed this concentration during the sampling event, the value of the Reference Bore applies as the water quality Trigger Level/Contaminant Limit for the duration of the event.

Site-specific Trigger Levels and Contaminant Limits for water quality 80th and 95th percentile of reference site concentrations must be calculated in accordance with QWQC (2000) and ANZECC (2000) methodology if sufficient monitoring data is available. The environmental authority holder must maintain a database documenting all relevant water quality monitoring data and calculation of 80th/95th percentiles adopted as water quality Trigger Levels and Contaminant Limits.


Exceedance investigation

(G75) If the quality characteristics as measured in the compliance bores listed in Table G20 (Groundwater monitoring locations and frequency) exceed any of the trigger levels specified in Table G21 (Groundwater Trigger levels and Contaminant Limits), the holder of this environmental authority must compare the results from the compliance bores to the data from the reference bores and:

(a) if the level of contaminants as measured in the compliance bore does not exceed the reference bore results, then no action is to be taken;

(b) if the level of contaminants at the compliance bore is greater than the reference bore results, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 into the potential for environmental harm and provide a written report to the administering authority within three (3) months, outlining:

i. details of the investigations carried out;

ii. details of environmental impacts observed, and

iii. actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with part (b) of this condition, no further reporting is required for subsequent trigger events of an equal-to or lesser extent for that quality characteristic.

Water Reuse

(G76) Contaminants may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party (with the consent of the third party).

Applicability of conditions:

(G77) Conditions G45 – G76 are only applicable to King Vol.

END OF CONDITIONS FOR SCHEDULE G
SCHEDULE H – SEWAGE TREATMENT

Sewage Treatment

(H1) All effluent released from the sewage treatment plants must be monitored at the frequency and for the parameters specified in Table H1 (Sewage effluent quality targets for dust suppression and irrigation).

Table H1 (Sewage effluent quality targets for dust suppression and irrigation)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>limit</th>
<th>Units</th>
<th>Limit type</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total suspended solids</td>
<td>30</td>
<td>mg/l</td>
<td>4 out of 5 consecutive samples</td>
<td>Six monthly</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td></td>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>Biological oxygen demand</td>
<td>20</td>
<td>mg/l</td>
<td>4 out of 5 consecutive samples</td>
<td>Six monthly</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td></td>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>pH between</td>
<td>6.5</td>
<td>pH unit</td>
<td>Range</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td>8.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faecal coliforms</td>
<td>1,000</td>
<td>CFU/100</td>
<td>Median¹</td>
<td>Quarterly</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td></td>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>Free residual chlorine level</td>
<td>0.2</td>
<td>mg/L</td>
<td>Range</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Median of at least 5 but no more than 10 consecutive samples

(H2) Sewage effluent must not exceed sewage effluent release limits defined in Table H1 (Sewage effluent quality targets for dust suppression and irrigation).

(H3) Sewage effluent used for dust suppression or irrigation must not cause spray drift or over spray to any occur sensitive place.

(H4) Sewage effluent from sewage treatment facilities must be reused or evaporated and must not be directly or indirectly released to any receiving waters.

END OF CONDITIONS FOR SCHEDULE H
SCHEDULE 1 – DEFINITIONS

Words and phrases used throughout this Environmental Authority are defined below except where identified in the Environmental Protection Act 1994 or subordinate legislation. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

“acceptance criteria” means the measures by which actions implemented are deemed to be complete. The acceptance criteria indicate the success of the decommissioning and rehabilitation outcomes or remediation of areas which have been significantly disturbed by the environmentally relevant activities. Acceptance criteria may include information regarding:

a) stability of final land forms in terms of settlement, erosion, weathering, pondage and drainage;
b) control of geochemical and contaminant transport processes;
c) quality of runoff waters and potential impact on receiving environment;
d) vegetation establishment, survival and succession;
e) vegetation productivity, sustained growth and structure development;
f) fauna colonization and habitat development;
g) ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes;
h) microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration;
i) effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development;
j) resilience of vegetation to disease, insect attack, drought and fire;
k) vegetation water use and effects on ground water levels and catchment yields.

“acid mine drainage (AMD)” means any contaminated release emanating from a mining operation formed through a series of chemical and biological reaction, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining operations.

“acid rock drainage” means any contaminated release emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of the mining activity.

“AEP” means the Annual Exceedance Probability, which is the probability that at least one event in excess of a particular magnitude will occur in any given year.

“affected person” means someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life or property can be put at risk due to dwellings or workplaces being in the path of a dam break flood.

“airblast overpressure” means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

“ambient (or total) noise” at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

“annual inspection report” means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);
(a) against recommendations contained in previous annual inspections reports;
(b) against recognised dam safety deficiency indicators;
(c) for changes in circumstances potentially leading to a change in consequence category;
(d) for conformance with the conditions of this authority;
(e) for conformance with the 'as constructed' drawings;
(f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems);
(g) for evidence of conformance with the current operational plan.

"annual exceedance probability" or "AEP" the probability that at least one event in excess of a particular magnitude will occur in any given year.

"appropriately qualified person" means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

"assessed" or "assessment" by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:
(a) exactly what has been assessed and the precise nature of that determination;
(b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
(c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
(d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

"associated works" in relation to a dam, means:
(a) operations of any kind and all things constructed, erected or installed for that dam; and
(b) any land used for those operations.

"authority" means environmental authority (mining activities) under the Environmental Protection Act 1994.

"blasting" means the use of explosive materials to fracture:
(a) rock, coal and other minerals for later recovery; or
(b) structural components or other items to facilitate removal from a site or for reuse.

"bunded" means within bunding consistent with Australian Standard 1940.

"certification", "certifying" or "certified" means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEOs (ID: 1.4 (2A)).

"CFU" means colony forming units.

"chemical" means:
(a) an agricultural chemical product or veterinary chemical product within the meaning of the Agricultural and Veterinary Chemicals Code Act 1994 (Commonwealth); or
(b) a dangerous good under the dangerous goods code; or
(c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997;
(d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers' Advisory Council and published by the Commonwealth; or
(e) any substance used as, or intended for use as:
i. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product, or
ii. a surface active agent, including, for example, soap or related detergent; or
iii. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or
iv. a fertiliser for agricultural, horticultural or garden use; or
v. a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or
vi. manufacture of plastic or synthetic rubber.

"commercial place" means a work place used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees accommodation or public roads.

"construction" or "constructed" in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for purposes of preparing a design plan.

"contaminate" means to render impure by contact or mixture.

"contaminated" means the substance has come into contact with a contaminant.

"contaminant" A contaminant can be:
   a) a gas, liquid or solid; or
   b) an odour; or
   c) an organism (whether alive or dead), including a virus; or
   d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
   e) a combination of contaminants.

"control measure" means any action or activity that can be used to prevent or eliminate a hazard or reduce it to an acceptable level.

"consequence" in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flammable substances.

"consequence category" means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1993).

"dam" means a land-based structure or a void that contains, diverts or controls flammable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.

"dam crest volume" means the volume of material (liquids and/or solids) that could be within the walls of the dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).

"design plan" is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

"design storage allowance" or "DSA" means an available volume, estimated in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1993) published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.
"Designer" for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam.

"domestic waste" means waste, other than domestic clean-up waste, green waste, recyclable waste, interceptor waste or waste released to a sewer, produced as a result of the ordinary use or occupation of domestic premises.

"dwelling" means any of the following structures or vehicles that is principally used as a residence:
   a) a house, unit, motel, nursing home or other building or part of a building; or
   b) a caravan, mobile home or other vehicle or structure on land;
   c) a water craft in a marina.

"effluent" treated waste water released from sewage treatment plants.

"emergency action plan" means documentation forming part of the operational plan held by the holder of a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to affected persons and the implementation of protection measures. The plan must require dam owners to annually review and update contact information as required.

"environmental authority holder" means the holder of the environmental authority.

"environmentally relevant activity" means an environmentally relevant activity as defined under Section 18 of the Environmental Protection Act 1994 and listed under Schedule 2 of the Environmental Protection Regulation 2006.

"Existing structure" means a structure that was in existence prior to the adoption of this schedule of conditions under the authority.

"Extreme Storm Storage"—means a storm storage allowance determined in accordance with the criteria in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2015/1993) published by the administering authority.

"flowable substance" means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids, fluids, solids, or a mixture that includes water and any other liquids, fluids or solids either in solution or suspension.

"feasible future" is the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year feasible future with an acceptable probability of failure before that time.

"general waste" means waste other than regulated waste.

"hazard" in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

"hazard category" means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

"hazardous waste" means a substance, whether liquid, solid or gaseous that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause environmental harm.
"hydraulic performance" means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1993).

"infrastructure" means water storage dams, roads and tracks, buildings and other structures built for the purpose and duration of the conduct of the environmentally relevant activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams, waste dumps, voids, or stockpiles and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of land.

"King Vol" means the mining project located at ML20659.

"land capability" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land suitability" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land use" term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

"landfill" means land used as a waste disposal site for lawfully putting solid waste on the land.

"levee" means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases, and does not store any significant volume of water or flowable substances at any other times.

"licensed place" means the mining activities carried out at the mining tenements detailed in Table A1 (Authorised Mining Activities) (page 4) of this environmental authority.

"mg/L" means milligrams per litre.

"mandatory reporting level or MRL" means a warning and reporting level determined in accordance with the criteria in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1993) published by the administering authority.


"mineral" means a substance which normally occurs naturally as part of the earth's crust or is dissolved or suspended in water within or upon the earth's crust and includes a substance which may be extracted from such a substance, and includes:

a) clay if mined for use for its ceramic properties, kaolin and bentonite;
b) foundry sand;
c) hydrocarbons and other substances or matter occurring in association with shale or coal and necessarily mined, extracted, produced or released by or in connection with mining for shale or coal or for the purpose of enhancing the safety of current or future mining operations for coal or the extraction or production of mineral oil therefrom;
d) limestone if mined for use for its chemical properties;
e) marble;
f) mineral oil or gas extracted or produced from shale or coal by in situ processes;
g) peat;
h) salt including brine;
i) shale from which mineral oil may be extracted or produced;
j) silica, including silica sand, if mined for use for its chemical properties;
k) rock mined in block or slab form for building or monumental purposes;
   But does not include:
l) living matter,
m) petroleum within the meaning of the Petroleum Act 1923;
n) soil, sand, gravel or rock (other than rock mined in block or slab form for building or monumental purposes) to be used or to be supplied for use as such, whether intact or in broken form,
o) water.

"ML" means megalitres.

"mL" means millilitres.

"Modification or modifying" (see definition of 'construction')

"NAF waste rock" means non-acid forming waste rock.

"NATA" means National Association of Testing Authorities, Australia.

"natural flow" means the flow of water through waters caused by nature.

"noxious" means harmful or injurious to health or physical well being.

"offensive" means causing reasonable offence or displeasure, is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

"operational plan" includes:
(a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance);
(b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.

"PAF waste rock" means potentially acid forming waste rock and includes any mined material with the potential for net generation of acidity; where there is uncertainty regarding the material's acid-forming potential, it must be treated as PAF waste rock until demonstrated otherwise.

"peak particle velocity (ppv)" means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mm/s). "process water" means water used or produced during the mineral development activities.

"prescribed environmental matters" is defined in section 19 of the Environmental Offsets Act 2014, limited to the matters of State environmental significant listed in schedule 2 of the Environmental Offsets Regulation 2014.

"progressive rehabilitation" means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

"receiving environment" means all groundwater, surface water, land, and sediments that are not disturbed areas authorized by this environmental authority.
"receiving waters" means all waters that are impacted or may be impacted by the mining activities, including groundwater;

"recommencement of mining" is any activity conducted on site that removes/extracts ore or waste rock material from ML4901, ML4911, ML4921, ML4928, ML4977, ML5176, ML5319 and/or ML20640.

"recommencement of processing" is any activity where the ore is processed, crushed, treated, leached or concentrated on ML4901, ML4911, ML4921, ML4928, ML4977, ML5176, ML5319 and/or ML20640.

"Red Dome/Mungana" means the mining project located at ML4910, ML4911, ML4921, ML4928, ML4977, ML5176, ML5319 and ML20640.

"register of regulated structures" includes:
(a) Date of entry in the register;
(b) Name of the dam, its purpose and intended/actual contents;
(c) The consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2015/1993);
(d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;
(e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;
(f) For the regulated dam, other than in relation to any levees—
   i. The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
   ii. Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area;
   iii. Dam crest volume (megalitres);
   iv. Spillway crest level (metres AHD);
   v. Maximum operating level (metres AHD);
   vi. Storage rating table of stored volume versus level (metres AHD);
   vii. Design storage allowance (megalitres) and associated level of the dam (metres AHD);
   viii. Mandatory reporting level (metres AHD);
(g) The design plan title and reference relevant to the dam;
(h) The date construction was certified as compliant with the design plan;
(i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;
(j) Details of the composition and construction of any liner;
(k) The system for the detection of any leakage through the floor and sides of the dam;
(l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
(m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;
(n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

"regulated dam" means any dam in the significant or high consequence category as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2015/1993) published by the administering authority.
"regulated structure" means any structure in the significant or high consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority. A regulated structure does not include:

- a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container;
- a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities;
- a flare pit

"regulated waste" means non-domestic waste mentioned in schedule 7 of the Environmental Protection Regulation 2008 (whether or not it has been treated or immobilised), and includes:

a) for an element – any chemical compound containing the element, and
b) anything that has contained the waste.

"rehabilitation" the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

"residual drilling material" means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

"residual void" means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

"the holder" means the holder of this environmental authority

"release event" means a surface water discharge from water storages or contaminated areas on the licensed place.

"representative" means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activity.

"RL" means reduced level, relative to mean sea level as distinct from depths to water.

"saline mine drainage" The movement of waters, contaminated with salt(s), as a result of the mining activity.

"self sustaining" means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

"sensitive place" means:

a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises, or
b) a motel, hotel or hostel; or
c) an educational institution; or
d) a medical center or hospital; or
e) a protected area under the Nature Conservation Act 1992, the Marine Parks Act 1992 or a World Heritage Area; or
f) a public park or gardens.

"significant disturbance" – includes land:

(a) if it is contaminated land; or
(b) it has been disturbed and human intervention is needed to rehabilitate it;
   (i) to a state required under the relevant environmental authority, or
   (ii) if the environmental authority does not require the land to be rehabilitated to a particular state – to
its state immediately before the disturbance.

Some examples of disturbed land include:
(a) areas where soil has been compacted, removed, covered, exposed or stockpiled;
(b) areas where vegetation has been removed or destroyed to an extent where the land has been made susceptible to erosion; (vegetation and topsoil)
(c) areas where land use suitability or capability has been diminished;
(d) areas within a watercourse, waterway, wetland or lake where the mining activity occur;
(e) areas submerged by tailings or hazardous contaminant storage and dam/structure walls in all cases;
(f) areas under temporary infrastructure. Temporary infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity have ceased; or
(g) areas where land has been contaminated and a suitability statement has not been issued.

However, the following areas are not included:
(e) areas off lease (e.g. roads or tracks which provide access to the mining lease);
(b) areas previously significantly disturbed which have achieved the rehabilitation outcomes;
(c) by agreement with the administering authority, areas previously significantly disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);
(d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner. The agreement to leave permanent infrastructure must be recorded in the Landowner Agreement and lodged with the administering authority;
(e) disturbances that pre-existed the grant of the tenure unless those areas are disturbed during the term of the tenure.

'significant residual impact' is defined in section 8 Environmental Offsets Act 2014.

"spillway" means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

"stable" in relation to land, means land form dimensions are and will remain within tolerable limits now and in the foreseeable future. Issues to be properly considered in regard to whether or not the landform is stable include geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geomorphological stability with respect to seepage, leachate and related contaminant generation.

"structure" means dam or levee.

"suitably qualified and experienced person" in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 2002, and has demonstrated competency and relevant experience.
* for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design.
* for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments.

Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competency and relevant experience in either geomechanics, hydraulic design or engineering hydrology.

"system design plan" means a plan that manages an integrated containment system that shares the required DSA volume across the integrated containment system.

"tolerable limits" means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing pondage and limiting infiltration and percolation.
"trivial harm" means environmental harm which is not material or serious environmental harm and will not cause actual or potential loss or damage to property of an amount of, or amounts totalling more than $5,000.

"μS/cm" means micro siemens per centimetre.

"void" means any constructed, open excavation in the ground.

"waste management hierarchy" has the meaning given by the Environmental Protection (Waste Management) Policy 2000.

"waste water" means used water from the activity, process water or contaminated storm water.

"watercourse" has the meaning in Schedule 4 of the Environmental Protection Act 1994 and means a river, creek or stream in which water flows permanently or intermittently—
(a) in a natural channel, whether artificially improved or not; or
(b) in an artificial channel that has changed the course of the watercourse.
Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

"water quality" means the chemical, physical and biological condition of water.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, and groundwater and any part thereof.

"wet season" means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.

END OF DEFINITIONS FOR SCHEDULE I
SCHEDULE J – FIGURES

Figure 1a (Red Dome/Mungana - Monitoring Points)
Figure 2b (King Vol - Domain Map)
Figure 3 (Air Quality Monitoring Sites)
Figure 4b (King Vol - Groundwater Monitoring Bore Network)

[Diagram showing groundwater monitoring bore network with labels and coordinates]

PROJECT: Supporting Information to amend the King Vol Project EIA (EPML00562913), August 2018
TITLE: King Vol groundwater monitoring bores

SOURCE: [Details of data sources and contributors]

JDD NO: AU 0002 04
DATE: September 2018
Figure 5 (Waste Disposal Trenches)

NOTE: Prior to construction of any waste disposal trenches, this figure will be required to be updated.
Figure 6 (Water Management Layout Drawing)

END OF SCHEDULE J

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