Government of Western Australia
Department of Environment Regulation

Works Approval

Environmental Protection Act 1986, Part V

Works Approval Holder: Big Bell Gold Operations Pty Ltd

Works Approval Number: W5845/2015/1

Registered office: Level 3
18-32 Parliament Place
WEST PERTH WA 6005

ACN: 090 642 809

Premises address: Reedy Mine Dewatering Project
Mining Tenements M20/12, M20/45 and M20/68
MEEKATHARRA WA 6642
As depicted in Schedule 1

Issue date: Thursday, 10 September 2015

Commencement date: Monday, 14 September 2015

Expiry date: Thursday, 13 September 2018

The following category/s from the *Environmental Protection Regulations 1987* cause this Premises to be a prescribed premises for the purposes of the *Environmental Protection Act 1986*:

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
6	Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore	50,000 tonnes or more per year	2,700,000 tonnes per annual period

Conditions
This Works Approval is subject to the conditions set out in the attached pages.

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Alana Kidd
Manager – Licensing (Resource Industries)
Officer delegated under section 20
of the *Environmental Protection Act 1986*

Works Approval Conditions

1 General

1.1 Interpretation

1.1.1 In the Works Approval, definitions from the *Environmental Protection Act 1986* apply unless the contrary intention appears.

1.1.2 In the Works Approval, unless the contrary intention appears:

'Act' means the *Environmental Protection Act 1986;*

'annual period' means the inclusive period from 1 September until 31 August in the following year;

'AS/NZS 5667.10' means the Australian Standard AS/NZS 5667.10 *Water Quality – Sampling – Guidance on sampling of waste waters;*

'CEO' means Chief Executive Officer of the Department of Environment Regulation;

'CEO' for the purpose of correspondence means;

Chief Executive Officer
Department Administering the Environmental Protection Act 1986
Locked Bag 33
CLOISTERS SQUARE WA 6850
Email: info@der.wa.gov.au

'NATA' means the National Association of Testing Authorities, Australia;

'NATA accredited' means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis;

'Premises' means the area defined in the Premises Map in Schedule 1 and listed as the Premises address on page 1 of the Works Approval;

'Schedule 1' means Schedule 1 of this Works Approval unless otherwise stated;

'spot sample' means a discrete sample representative at the time and place at which the sample is taken;

'Works Approval' means this Works Approval numbered W5845/2015/1 and issued under the *Act;* and

'Works Approval Holder' means the person or organisation named as the Works Approval Holder on page 1 of the Works Approval.

1.1.3 Any reference to an Australian or other standard in the Works Approval means the relevant parts of the standard in force from time to time during the term of this Works Approval.

1.1.4 Any reference to a guideline or code of practice in the Works Approval means the current version of the guideline or code of practice in force from time to time, and shall include any amendments or replacements to that guidelines or code of practice made during the term of this Works Approval.

1.2 General conditions

1.2.1 The Works Approval Holder shall construct the works in accordance with the documentation detailed in Table 1.2.1:

Table 1.2.1: Construction Requirements[1]

Document	Parts	Date of Document
Works Approval Application Form	All	24 April 2015
Addendum to Revised Mining Proposal and Works Approval Application Reg ID number 54830, Big Bell Gold Operations Pty Ltd, May 2015	All, including Drawings and Appendices	29 May 2015

Note 1: Where the details and commitments of the documents listed in condition 1.2.1 are inconsistent with any other condition of this works approval, the conditions of this works approval shall prevail.

2 Monitoring

2.1.1 The Works Approval Holder shall ensure that:
(a) all wastewater sampling is conducted in accordance with AS/NZS 5667.10; and
(b) all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured unless indicated otherwise in relevant table.

2.1.2 The Works Approval Holder shall undertake the monitoring specified in Table 2.1.1 at the locations identified in Schedule 1.

Table 2.1.1: Monitoring of dewatering effluent quality

Monitoring point reference	Parameter	Units	Averaging period	Frequency
South Emu, Triton, Jack Ryan and Rand pits	pH[1]	Not specified	Spot sample	Prior to dewatering of the pit lakes
	Aluminum (Al)	mg/L		
	Arsenic (As);			
	Cadmium (Cd);			
	Chromium (Cr);			
	Copper (Cu);			
	Lead (Pb);			
	Manganese (Mn);			
	Mercury (Hg);			
	Nickel (Ni);			
	Selenium (Se);			
	Zinc (Zn);			
	Total Recoverable Hydrocarbons (TRH)			
	Total Dissolved Solids (TDS)			
	Total Suspended Solids (TSS)			

Note 1: In-field non-NATA accredited analysis permitted for pH measurement.

3 Information

3.1 Reporting

3.1.1 The Works Approval Holder shall submit a compliance document to the CEO, following the construction of the works and prior to commissioning of the same.

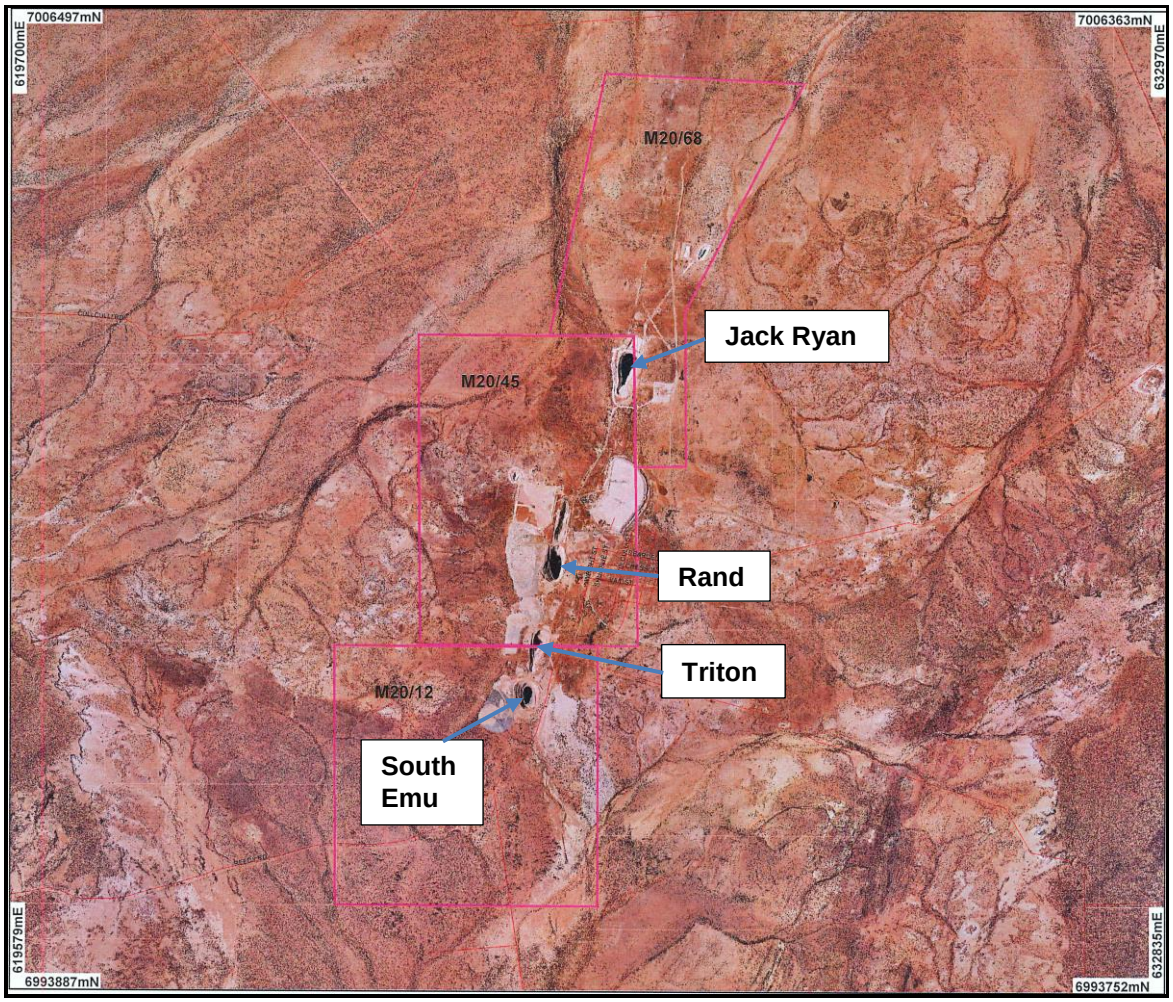
3.1.2 The compliance document shall:

(a) certify that the works were constructed in accordance with the conditions of the Works Approval;
(b) contain the monitoring results recorded under condition 2.1.2 and an interpretation of these results; and
(c) be signed by a person authorised to represent the Works Approval Holder and contain the printed name and position of that person within the company.

Schedule 1: Maps

Premises map

The Premises is shown in the map below. The pink line depicts the Premises boundary.



Government of Western Australia
Department of Environment Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: Big Bell Gold Operations Pty Ltd

Works Approval: W5845/2015/1

Registered office:	Level 3 18-32 Parliament Place WEST PERTH WA 6005
ACN:	090 642 809
Premises address:	Reedy Mine Dewatering Project Mining Tenements M20/12, M20/45 and M20/68 MEEKATHARRA WA 6642
Issue date:	Thursday, 10 September 2015
Commencement date:	Monday, 14 September 2015
Expiry date:	Thursday, 13 September 2018

Decision

Based on the assessment detailed in this document, the Department of Environment Regulation (DER) has decided to issue a works approval. DER considers that in reaching this decision, it has taken into account all relevant considerations and legal requirements and that the Works Approval and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by:	Paul Anderson Licensing Officer
Decision Document authorised by:	Alana Kidd Manager - Licensing (Resource Industries)

Contents

1 Purpose of this Document

This decision document explains how DER has assessed and determined the application and provides a record of DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER's assessment and decision making under Part V of the *Environmental Protection Act 1986.* Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.

2 Administrative summary

Administrative details		
Application type	Works Approval ☒ New Licence ☐ Licence amendment ☐ Works Approval amendment ☐	
Activities that cause the premises to become prescribed premises	**Category number(s)**	**Assessed design capacity**
	6	2,700,000 tonnes per annual period
Application verified Application fee paid	Date: 19 May 2015 Date: 29 May 2015	
Works Approval has been complied with Compliance Certificate received	Yes☐ No☐ N/A☒ Yes☐ No☐ N/A☒	
Commercial-in-confidence claim	Yes☐ No☒	
Commercial-in-confidence claim outcome		
Is the proposal a Major Resource Project?	Yes☒ No☐	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986*?	Yes☐ No☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐

Is the proposal subject to Ministerial Conditions?	Yes☐ No☒	Ministerial statement No: EPA Report No:
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)?	Yes☐ No☒ Department of Water consulted Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes☐ No☒ If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes☐ No☒ If Yes, include details here, eg Site is subject to SO_2 requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

Metals X Limited owns the Central Murchison Gold Project (CMPG) through its subsidiary Big Bell Gold Operations Pty Ltd (BBGO). The CMGP covers six mining projects (Yaloginda, Paddy's Flat, Reedy, Big Bell, Day Dawn and Cuddingwarra) located in the Mid-West region of Western Australia within the Murchison mineral field. The dominant land use within the Murchison bioregion is grazing of sheep and cattle on nature pastures.

BBGO is planning to re-commence mining at Reedy which is located on mining tenements M20/12, M20/45 and M20/68, Meekatharra. The dewatering of existing open pits, which contain pit lakes from the interaction with the groundwater and a small amount of rainwater, will be required prior to the start of underground mining. BBGO has submitted a works approval application to the Department of Environment Regulation (DER) for the dewatering of the Rand, South Emu/Triton and Jack Ryan pits at Reedy.

Dewatering of the pit lakes to allow mining is expected to take a maximum of six months. Approximately 1,250,000 kilolitres (kL) will be dewatered from the Rand open pit, 540,000kL from the South Emu/Triton open pits and 904,000kL from the Jack Ryan open pit prior to mining. Open pit lake dewatering will be conducted at a rate of 170 litres per second (L/s) or 14,700 kL per day, for a period of 8.5 weeks for Rand, four weeks for South Emu/Triton and 12 weeks for Jack Ryan. BBGO proposes to utilise up to 700 kL/day of dewatering effluent water for dust suppression at the Premises once mining activities commence, however these volumes of dewatering effluent water are well in excess of what is required for onsite use for the first six months of operations when no active mining is occurring. Additionally, there are no other nearby mining operations that could utilise the excess water. Therefore the only option proposed by BBGO is to discharge to drainage channels running to the north of Reedy and one to the South. Both discharge locations are located on the Reedy mining tenements.

Following the completion of the pit lake dewatering operations, BBGO proposes to commence open and underground mining in the dewatered pits. The mining, which has an expected mine life of eight years, will also require dewatering to occur to keep underground workings dry. However, it is expected to be significantly less than the pit lake dewatering operations with an anticipated dewatering rate of up to only 10 L/s (864 k/L per day). During this time, the majority of the dewatering effluent (700 k/L per day) will be utilised for dust suppression at the Premises. Any excess mine water will be stored for use or discharged to the dewatering discharge locations if required. This amount is

not expected to be greater than 60,000 kL/yr which just exceeds the 50,000 kL/yr (m^3/yr) requirement for licensing.

Dewatering will be undertaken using a diesel powered self-priming pump (inlet mounted on a pontoon) and pumping through a 450 mm diameter high density polyethylene pipeline to the discharge point at about 170L/s. A flow meter will be installed to record discharge volumes. The discharge pipelines will equipped with non-return valves. At the outflow points, dewatering effluent will be discharged through a length of slotted pipe which will diffuse the flow rate minimising scouring or erosion of the drainage channels. Additionally, riprap will be installed on the drainage channel beds at the discharge points to further reduce any potential scouring impacts.

BBGO will implement during dewatering operations programs for the monthly:

- sampling of the discharged dewatering effluent water for volume, salinity, suspended solids, heavy metals, major ions and contaminates;
- assessment of flora and fauna in the discharge area;
- monitoring of soil and sediment to compare with base line data;
- assessment of erosion in the discharge channels; and
- monitoring of weeds in the discharge channels (fortnightly).

Only mining of ore will be occurring at the Reedy project. All mined ore will be transported to the nearby BBGO Bluebird Gold Mine for processing. BBGO intends to submit a licence amendment application to DER to have the Reedy project incorporated into the current Bluebird Gold Mine Licence L4496/1988/11 as both projects are adjoining by mining tenements which are owned by BBGO. Licence L4496/1988/11 will be converted into a new licence template once all works mentioned in works approval W5845/2015/1 have been completed, and a compliance document and a licence amendment application has been submitted by BBGO. The conversion will include an assessment of all operations at the existing Bluebird Gold Mine and also the decisions made in this assessment of the Reedy project. Only the construction and the operation of the dewatering activities at Reedy are being assessed in this decision document.

DER considers that BBGO's commitments and internal procedures will provide sufficient protection that the risks can be appropriately managed. This works approval has not been assessed as a high risk premises requiring reduced time frames for approvals, therefore, it will be issued for the standard period of three years.

4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987*, and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Works Approval / Licence section	**Condition number** **W = Works Approval** **L = Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
General Conditions	W1.2 L - Licence conditions proposed.	**Construction** Construction requirement conditions have been applied to the Works Approval. **Operation** A condition for the inspection of dewatering infrastructure will be included in the proposed licence amendment. Secondary containment conditions are not required because the dewatering effluent water is considered good quality (see appendix A for justification). In the event of a major leak developing from pipeline infrastructure, dewatering will cease until the failure is repaired. Isolation valves will be fitted at the pump, the discharge point and at key points along the discharge pipeline for maintenance and safety purposes.	Application supporting documentation. *Environmental Protection Act 1986.* *Environmental Protection (Unauthorised Discharges) Regulations 2004.*
Point source emissions to land including monitoring	W2.1.1 and W2.1.2 L - Licence conditions proposed.	**Construction & Operation** Details of DER's assessment and decision making are included in Appendix A.	Application supporting documentation. *Environmental Protection Act 1986.*
Noise	W - N/A L - N/A	**Construction & Operation** No significant noise emissions are expected during construction and operation of the dewatering operations. No conditions relating to noise emissions are required to be added to the works approval or at the proposed Licence amendment stage.	Application supporting documentation.

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L = Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			Environmental Protection (Noise) Regulations 1997
Information	W3.1 L5.1 to L5.3	**Construction** Conditions requiring the Works Approval Holder to submit a compliance document in the required format following the completion of the works, and the results from monitoring required by W2.1.2 have been applied to the Works Approval. **Operation** Administrative conditions including records, reporting and notification will be applied to the amended Licence.	Application supporting documentation. *Environmental Protection Act 1986.*
Works Approval Duration	N/A	DER considers that BBGO's commitments, internal procedures and the monitoring conditions in the Works Approval will provide sufficient protection and that the risks can be appropriately managed. This works approval has not been assessed as a high risk premises requiring reduced time frames for approvals, therefore, it will be issued for the standard period of three years.	N/A

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
8/6/2015	Application advertised in West Australian (or other relevant newspaper)	No comments received.	N/A
5/8/2015	Proponent sent a copy of draft instrument	No comments received.	N/A

6 Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High

Appendix A

Point source emissions to land including monitoring

Emission Risk Assessment - Operations

The potential impacts of concern when discharging dewatering effluent onto land (into drainage channels) is damage to vegetation, increase of weeds, erosion of drainage bed and banks, accumulation of heavy metals in soils and contamination of groundwater. DER has reviewed the proponent's impact assessment for dewatering discharge from the premises and is satisfied that the assessment provided by the proponent has been undertaken in an appropriate manner.

Rockwater Pty Ltd (Rockwater) were employed by BBGO to assess the required rate of dewatering of the mined pit lakes and the water quality in those pits. Rockwater were also employed to assess the hydrology of the onsite surface drainage, and fate of dewatering discharge. This was undertaken because Rockwater determined that the required volumes of water to be extracted from the existing pits to allow mining to occur were too large to consider any other option but dewatering to existing drainage channels in the landscape. Reuse of the dewatering effluent for dust suppression during active mining will occur (up to 700 kL/d), however no major mining activities will be occurring during the initial dewatering of the pits. Additionally, there are no other nearby mining operations that could utilise the excess water.

Rockwater identified two potential drainage channel systems that could be used to receive water discharged from the pits, one flowing to the north of Reedy and one to the south. The northern drainage flows north to Lake Annean; the southern drainage flows south into the westerly flowing Nallan Creek, which discharges to Lake Austin south-west of Cue. Both drainage channels follow relatively well-defined channels high in the catchments and then flow into braided channel systems before discharging into Lake Annean (17 km north) or Nallan Creek (12 km south) which discharges into Lake Austin (50 km away). The drainage channels only have water flow during heavy rainfall events when decaying cyclonic weather systems pass over the region which may only occur once or twice every decade. The drainage channels to be used for dewatering effluent discharge are all located within Mining Tenements held by BBGO. No other sensitive premises are located along these drainage channels.

Lake Annean and Lake Austin are large ephemeral salt lakes located in the Murchison region. The lake beds are generally flat and have a surface of saline and crystalline gypsum salts. The lakes are essentially a drainage sink, with no apparent outflow and most of the water is therefore lost through evaporation. The lake bed is mostly dry throughout the year with accumulations of water in various sections of the lake in winter and following less frequent, intense summer rainfall events associated with cyclonic rain systems. On average, these lakes fill once or twice every ten years. Water quality is highly variable throughout the lake and is largely dependent on rainfall and runoff patterns. Waters are all Na-Cl type waters. Waters range from brackish to hypersaline. Historical sampling of waters at Lake Austin indicate NO3 ranges from 1 mg/L to 130 mg/L, Al ranges from <0.005 mg/L to 0.24mg/L, Fe ranges from <0.01 to 99 mg/L, Pb ranges from <0.001 to 0.2, Zn ranges from <0.005 to 0.18 mg/L and Mn ranges from 0.011 to 2.9mg/L. All other metals are low or detection limit values.

Rockwater estimates that water discharge from pit dewatering at a rate of 170 L/s (14,700 cubic metres per day) could flow about 9.9 km north from discharge points near Jack Ryan (Lake Annean 17 km away) and 7.2 km south of South Emu pit (Nallan Creek 12 km away). Peak flow velocities near the points of water discharge will be about 0.13 metres per second (m/s) (north) and 0.19 m/s (south) which Rockwater consideres too low to cause scouring. The planned dewatering discharge is much smaller than flows in the drainage channels that would follow a 1-in-2 year average recurrence interval (ARI) rainfall. The drainages channels can carry flows from higher ARI rainfalls, but the banks of the northern drainage would be over-topped in a 1-in-100 year rainfall.

Rockwater has determined that dewatering discharge effluent water is not expected to reach the lake systems or any other surface water body (Rockwater*, Hydrology of drainages and fate of dewatering discharge*, May 2015). The calculations by Rockwater are considered to be conservative, because the water will probably flow in multiple channels which will increase infiltration and evaporation rates.

Groundwater, which is approximately 22 metres below ground level, is used for stock watering purposes only and is generally not acceptable for human use due to total dissolved solids in excess of 1,200 mg/L (Australian Drinking Water Guidelines – 2011). Groundwater quality at Reedy ranges from fresh to slightly saline (less than 3,000 mg/L total dissolved solids) with dewatering water below 1,600 mg/L ,and neutral to alkaline (below pH 9). Heavy metals are very low or below detection limit values. The water quality in the pits is considered to represent the groundwater at the Premises because the mined ore is located within the aquifer and therefore the pits are influenced by groundwater inflow. Results of water quality analyses conducted in 2011 is presented in Table 1.

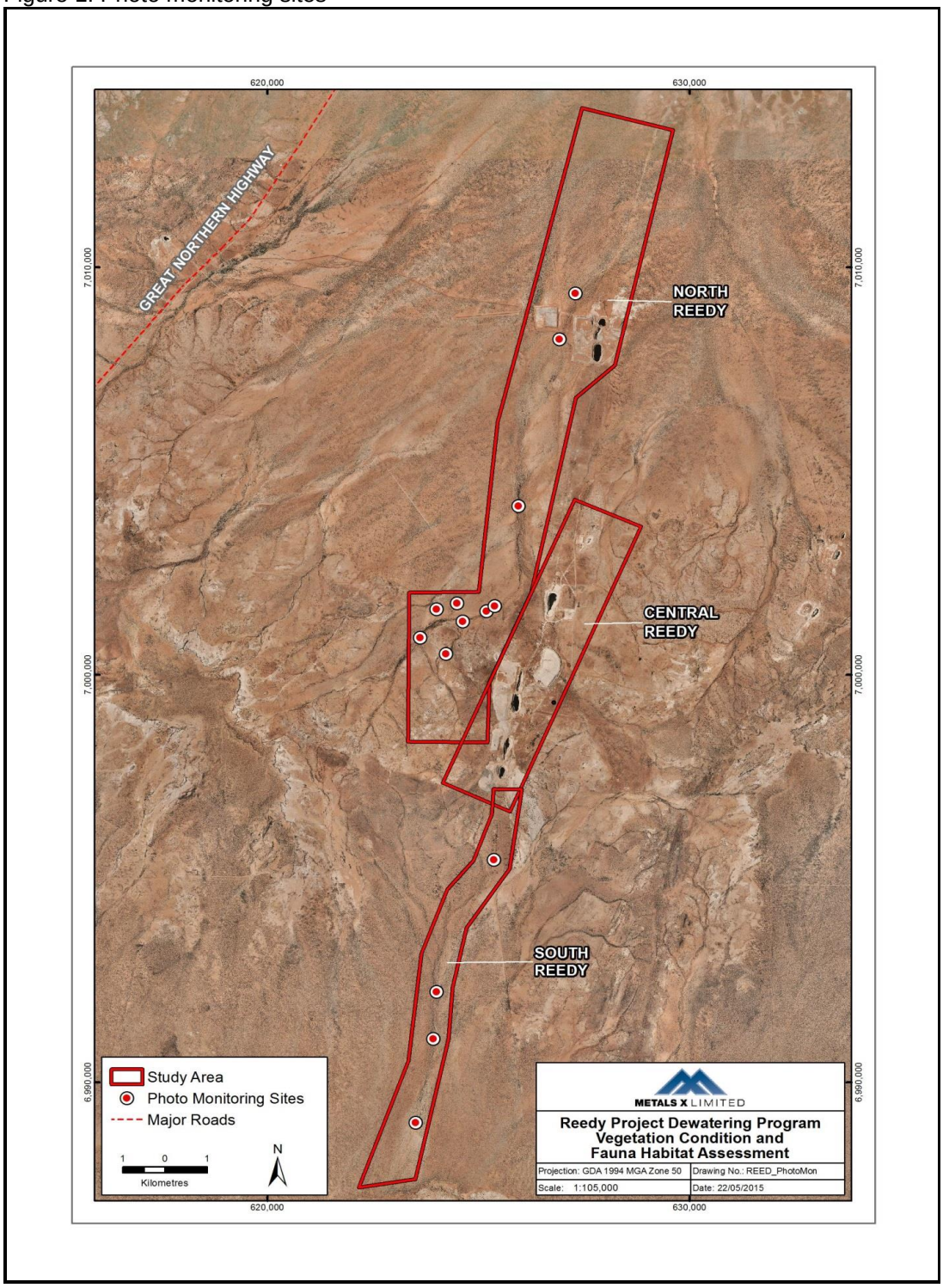
Table 1: Water quality results from pit water analyses

		South Emu Pit	Triton Pit	Jack Ryan Pit	Rand Pit
pH		8.5	8.4	8.9	8.23
TDS	mg/L	1,600	980	470	835
Aluminium	mg/L	<0.02	<0.02	<0.02	No result
Cadmium	mg/L	<0.002	<0.002	<0.002	No result
Chromium	mg/L	<0.005	<0.005	<0.005	<0.05
Manganese	mg/L	0.008	0.013	0.016	0.01
Mercury	mg/L	<100E-6	<100E-6	<100E-6	No result
Zinc	mg/L	0.01	0.02	<0.01	<0.01
Nickel	mg/L	<0.005	<0.005	<0.005	0.3
Copper	mg/L	<0.005	<0.005	<0.005	0.27
Arsenic	mg/L	0.002	<0.001	<0.001	No result
Lead	mg/L	<0.001	<0.001	<0.001	<0.05
Selenium	mg/L	0.003	<0.001	<0.001	No result
Nitrate	mg/L	29	<0.1	<0.1	31

BBGO have compared available water quality results with the ANZECC 2000 Livestock Drinking Water Guidelines (Section 9.3) and ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for Fresh and Marine Water Quality. No waters exceed the ANZECC Stock Water Quality Guidelines or the ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for Fresh and Marine Water Quality for all parameters.

Monitoring sites to determine vegetation condition, weed species, erosion, fauna and soil quality during the dewatering operations were tentatively selected during the field campaign. Figure 1 below illustrates the spatial representation of the proposed monitoring sites throughout both the northern and southern study areas (drainage channels).

Figure 1: Photo monitoring sites



BBGO commissioned a base line vegetation condition assessment of the area identified as being within the predicted extent of the flow of dewatering. A total of ten broad vegetation units were identified within the study area. All vegetation units were observed as extending beyond the study area boundaries and are likely well represented in the local area. No vegetation units comparable to

any Threatened Ecological Communities (TEC's) were recorded within the study area. The vegetation condition within the study area ranged from Very Good to Degraded. Disturbances at the site included past mining operations and drilling programs, vehicle tracks, low density weeds, feral animal grazing and trampling.

In order to establish background data, 21 representative soil samples (top soil profile) were collected from the Reedy area. The samples were analysed for soil texture, chemical properties, organics and heavy metals. Results from the analysis indicate:

- The soil texture was generally classified as clay loam with extremely low gravel content;
- The majority of samples were classified as neutral to moderately alkaline and pH values were observed to increase slightly with profile depth;
- A majority of the soil samples were classified as non-saline;
- The organic carbon percentage is low, which is typical of Australian semi-arid soils;
- There was limited variation in the amount of plant available nitrogen between the soils from the study area. Nitrate values were generally low, ranging between 0 and 3 milligrams per kilogram; and
- Heavy metals are at expected levels for a mineral rich zone.

Following the cessation of dewatering of the pit lakes, the following post-operational monitoring will be conducted:

- Continued vegetation photo-monitoring for a period of six months following the cessation of dewatering to identify any long term effects on vegetation condition and ecosystem health at a rate of one monitoring period per month.
- Continued erosion photo-monitoring until all dewatered water has evaporated or infiltrated; and
- A walkthrough of the dewatering flow extent following the infiltration and evaporation of discharged water will be undertaken to identify any area of erosion or sediment load that may not have been observed during dewatering activities. In the event that higher than expected levels of erosion have occurred within the drainage channels, management measures will be implemented to ensure that the drainage channel is returned to its natural state, as far as practicable. This may involve the engineering of the eroded area of the drainage channel and the repositioning of sediment build up.

Potential drainage channel impacts

Emission Description

Emission: Discharge of mine dewatering effluent into drainage channels.

Impact: Increased water discharge may cause localised erosion of creek bed.

Controls: At the outflow points, dewatering effluent will be discharged through a length of slotted pipe which will diffuse the flow rate minimising scouring or erosion of the drainage channels. Peak flow velocities near the points of water discharge will be about 0.13 metres per second (m/s) (north) and 0.19 m/s (south) which are considered too low to cause scouring. Additionally, riprap will be installed on the drainage channel beds at the discharge points to further reduce any potential scouring impacts. Daily inspections of the discharge point will be conducted. Monthly photo-point monitoring (as per vegetation photo monitoring) will be established after the initial (within days of commencement) walk through has been conducted to identify points that are at high risk of erosion. Contingency plan if above management measures are unsuccessful which includes ceasing dewatering activities. Post operation monthly monitoring following the completion of the pit lake (6 months) dewatering.

Risk Assessment

Consequence: Minor

Likelihood: Rare

Risk Rating: Low

Regulatory Controls

A condition in section 1.3 will be included in the amended Licence which will require the Licensee to undertake daily inspections of the dewatering pipeline and discharge point.

A condition will be included in the amended Licence which will describe the emission points for the dewatering effluent.

A condition will be included in the amended Licence which will require the licensee to discharge mine dewatering effluents in a manner which minimises erosion and scouring impacts, and reduces the likelihood of surface ponding.

Residual Risk

Consequence: Minor
Likelihood: Rare
Risk Rating: Low

Emission Description

Emission: Discharge of mine dewatering effluent into drainage channels.

Impact: Increased water discharge may increase weed growth in drainage channels.

Controls: Fortnightly monitoring for weed species and percentage of cover at the identified photo monitoring sites. Implementation of weed management program in affected areas.

Risk Assessment

Consequence: Insignificant

Likelihood: Possible

Risk Rating: Low

Regulatory Controls

A condition will be included in the amended Licence which will require the Licensee to undertake routine inspections of the discharge area.

A condition will be included in the amended Licence which will require the licensee to discharge mine dewatering effluents in a manner which minimises erosion and scouring impacts, and reduces the likelihood of surface ponding.

Residual Risk

Consequence: Insignificant
Likelihood: Possible
Risk Rating: Low

Emission Description

Emission: Discharge of mine dewatering effluent into drainage channels.

Impact: Discharge water may increase heavy metals or other contaminants in soils.

Controls: Monthly sampling of dewatering effluent water at the discharge location and comparison with ANZECC Livestock Drinking Water and ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for Fresh and Marine Water Quality. In order to establish background data, 21 representative soil samples were collected from the Reedy area. Heavy metals in the discharge water are very low or are below detection limits and are considerably less than the receiving environment (soils). Monthly soil/sediment sampling from the drainage channel while dewatering discharge is

occurring. Diesel generators located on self-contained bunds and refuelling hoses within back draining sleeves into the bund. A majority of the dewatering will only last six months with only a small amount (up to 60,000 k/L/yr) after this time. Water quality sampling of the pit lakes in 2011 and comparing with monthly dewatering sampling.

Risk Assessment
Consequence: Minor
Likelihood: Possible
Risk Rating: Moderate

Regulatory Controls
In order to verify the pit lake sampling results obtained in 2011, monitoring conditions W2.1.1 and W2.1.2 will be included in the Works Approval requiring the Works Approval Holder to undertake monitoring of the pits lakes prior to dewatering to establish base-line data. Monitoring conditions will be included in the amended Licence which will require the Licensee to undertake monthly sampling of dewatering effluent waters (as committed by BBGO). Parameters to be analysed include heavy metals, total dissolved solids, major ions, total suspended solids and total petroleum hydrocarbons. Limits will be established and will be based upon the ANZECC Livestock Drinking Water Guidelines (water use for the area) and the monitoring results from sampling undertaken as per the requirements of the Works Approval.

Residual Risk
Consequence: Minor
Likelihood: Rare
Risk Rating: Low

Potential vegetation impacts

The increased availability of water is expected to have a short period of positive effects on vegetation health. This should return to normal following the cessation of dewatering activities. BBGO has committed to vegetation photo-monitoring for a period of six months following the cessation of dewatering to identify any long term effects on vegetation condition and ecosystem health at a rate of one monitoring period per month.

Emission Description
Emission: Discharge of mine dewatering effluent into a creek.
Impact: Discharge effluent water may cause detrimental impacts to vegetation; creating conditions for weeds, or affecting existing vegetation due to excess water.
Controls: Monthly monitoring of dewatering discharge effluent, daily inspection of dewatering discharge point, fortnightly vegetation condition assessment at each of the established photo points, erosion controls in place, and passive filtration system if an increase in sediment load is detected during monthly sampling.

Risk Assessment
Consequence: Insignificant
Likelihood: Unlikely
Risk Rating: Low

Regulatory Controls

In order to verify the pit lake sampling results obtained in 2011, monitoring conditions W2.1.1 and W2.1.2 will be included in the Works Approval requiring the Works Approval Holder to undertake monitoring of the pits lakes prior to dewatering to establish base-line data.

A condition will be included in the amended Licence which will require the licensee to undertake monthly sampling of dewatering effluent waters (as committed by BBGO).

A condition will be included in the amended Licence which will require the licensee to discharge mine dewatering effluents via the discharge points in a manner which minimises erosion and scouring impacts, and reduces the likelihood of surface ponding.

Residual Risk

Consequence: Insignificant
Likelihood: Unlikely
Risk Rating: Low