Section 3

Consultation, Issue Identification and Prioritisation

PREAMBLE

This section describes how the environmental issues assessed in the Environmental Assessment were identified and prioritised. In summary, the following actions were undertaken.

(i) *A comprehensive list of all relevant environmental issues was assembled through consultation with the local community and local and State government agencies and a review of relevant legislation, planning documents and environmental guidelines.*

(ii) *A review of the Project design and local environment was undertaken to identify risk sources and potential environmental impacts for each environmental issue.*

(iii) *A subsequent analysis of unmitigated risk for each potential environmental impact was completed with a risk rating assigned to each impact based on likelihood and consequence of occurrence.*

(iv) *The relative priority of each issue was determined through a review of the allocated risk ratings and the frequency with which each issue was identified. This priority was then used to provide an order of assessment and breadth of coverage within Section 4.*

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3.1 INTRODUCTION

A program of community and government consultation and a review of preliminary environmental studies, planning and other environmental documentation was undertaken to identify relevant environmental issues and potential impacts. In particular, issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community were identified. This exercise was followed by an analysis of the risk posed by each potential impact in order to prioritise the assessment of the identified environmental issues within this *Environmental Assessment*. Reference should be made to Section 6 where the environmental risks are re-evaluated with the adoption of the mitigation measures proposed by the Proponent, described in Section 4.

3.2 ISSUE IDENTIFICATION

3.2.1 Introduction

Identification of environmental issues relevant to the development and operation of the Project involved a combination of consultation and background investigations and research. This included:

- consultation with surrounding land owners and communities (Section 3.2.2);
- consultation with State and local government agencies (Section 3.2.3); and
- reference to relevant NSW government planning instruments, policies and guidelines, and other strategic planning or environmental documentation (Section 3.3).

3.2.2 Community Consultation

3.2.2.1 Introduction

The Proponent has maintained an open and honest relationship with the community surrounding the Project Site through a range of formal and informal consultations held with individual community members and groups. Community consultation associated with the Project comprised the following components.

- Informal discussions with individual land owners and residents of Nymagee village and surrounding areas.
- A formal bore and residence census completed by the Hera Project Manager to confirm the location of all residences surrounding the Project Site and identify those community members reliant on water obtained from bores.
- Formal community information and feedback forums held in Nymagee village on 16 August 2010, 15 December 2010 and 16 May 2011.

The Project was formally announced to the community via the placement of an advertisement in the weekly local newspaper, the *Cobar Age*, on 24 November 2010, in accordance with the requirements of Clause 8f(3)(b) of the *Environmental Planning and Assessment Regulation 2000*. The Proponent did not receive any enquiries following the placement of the advertisement.

3.2.2.2 Informal Consultation

The Proponent has undertaken informal discussions with all adjoining land owners. These discussions focused particularly on the ongoing exploration operations and the Proponent's plans for the Project. In general, there were no significant issues raised in relation to the ongoing exploration operations and the neighbouring land owners were generally supportive of the Project.

Informal consultation with the wider community has been, and continues to be, undertaken as opportunities arise. It is noted that the Proponent is an integral part of the community surrounding the Project Site. This is evidenced by the fact that the Proponent employs a number of local residents in a range of capacities. Indeed, the onsite Hera Project Manager, Mr Stuart Jeffery, is a long-time resident of the Nymagee area, operating a property approximately 30km to the southeast of the Project Site. As a result, there has been ample opportunity for informal interaction between the Proponent and the surrounding community. In general, the surrounding community is interested in the Project and its progress, with limited environmental issues raised. Those Project-related issues that are raised typically relate to groundwater and noise. The surrounding community, particularly those who live in Nymagee, typically place greater emphasis on the ongoing exploration operations at the former Nymagee Mine that the Project.

3.2.2.3 Formal Consultation

Community information sessions were held in Nymagee on the following dates.

- 20 October 2009.
- 16 August 2010.
- 15 December 2010.
- 16 May 2011.

The sessions on 20 October 2009 and 16 August and 15 December 2010 comprised a presentation by the Proponent and its advisors, followed by a question and answer session. The August and December 2010 sessions were attended by approximately 32 and 25 people, respectively.

The session on 16 May 2011 comprised a poster display and question and answer session that ran from approximately 1pm until approximately 5.50pm. Senior representatives of the Proponent and its advisors were present throughout the session to discuss the Project with attendees and to answer questions. Approximately 18 people attended that session, with 9 registering interest in receiving further information in relation to the Project and notification when it is placed on public exhibition. Of the nine who completed registration forms, all indicated support for the Project.

Each session was advertised through a combination of advertisements in newspapers published in Cobar, signs in the Nymagee Hotel and around Nymagee, and via word of mouth.

A list of issues that were raised during the community information sessions, and where each issue is addressed in this document, is presented in **Table 3.1.**

Table 3.1
Project-related Issues Raised by the Community

Issue Raised	EA Section where Issue Addressed
Project life.	2.12.1
Social impacts.	4.14
Community consultation.	3.2.2
Number of employees.	2.13
Requirement for a Mine Camp and location if required.	2.10
Decommissioning of the Mine Camp.	2.15
Sealing of access roads on site.	2.2.3
Traffic on local roads.	4.9.2
Waste disposal at the Nymagee tip.	2.8
Location of processing plant.	Figure 2.1
Product dispatch and transportation.	2.9
Chemical composition of the concentrate.	2.5.7
Tailings management and the integrity of the Tailings Storage Facility.	2.6
Groundwater contamination.	4.3
Quantity of water required for the Project and source of that water.	2.2.5
Impact of Project on the local water table.	4.3
Nature of chemicals to be used.	2.5.9
Noise monitoring.	4.5
Blasting impacts during box cut construction.	4.5.6
Air quality impacts and the potential for lead contamination.	4.8 and Part 6 of the SCSC
Mining methods to be used and rate of mining.	2.4

3.2.3 Consultation with Government Agencies

3.2.3.1 Planning Focus Meeting

The Planning Focus Meeting, held within the Project Site on 3 September 2010, was attended by the following government agencies. An asterisk (*) indicates agencies who were provided with a copy of the *Preliminary Environmental Assessment* and were invited to the meeting but were unable to attend.

- Department of Planning (DoP)* (now the Department of Planning and Infrastructure).
- Department of Environment, Climate Change and Water (DECCW) (now the Office of Environment and Heritage).
- NSW Office of Water*.
- Cobar Shire Council (Council).
- Industry and Investment NSW (I & I NSW) (now the NSW Department of Trade and Investment, Regional Infrastructure & Services (DTIRIS))
- NSW Roads and Traffic Authority (RTA)*.

During the meeting, an overview of the Project, as it was understood at the time, was presented. All attendees inspected the Project Site. Representatives of the government agencies present provided comments and their requirements verbally, and which subsequently formed part of the written recommendations to the DoP for incorporation into the Director-General's Requirements (DGRs) for the Project.

A copy of the DGRs, provided to the Proponent on 23 November 2010, along with a tabulated summary of all government agency requirements is presented in **Appendix 2**.

A summary of the environmental issues and the number of times raised by the various government agencies, as encapsulated within the DGRs and during the PFM, are presented in **Table 3.2**. The frequency with which each environmental issue was identified by the government agencies are also noted in this table.

Table 3.2
Government Agency Issue Identification

Government Agency	Environmental Issue															
	Air Quality	Greenhouse Gas Emissions	Noise and Vibration	Flora/Fauna	Biodiversity Offset Strategy	Groundwater Resources	Surface Water Resources	Aboriginal Heritage	Rehabilitation & Final Land Use	Waste Management	Cyanide Management	Soils and Land Capability	Traffic Impacts	Socio-economic Impacts	Visual	Infrastructure Requirements and Justification
DoP[1]	1	1	1	3	1	1	3	1	1	2	1	0	1	1	1	0
DECCW[2]	2	4	3	7	1	2	5	6	0	4	1	0	0	0	0	0
NOW	0	0	0	0	0	8	12	0	1	0	0	0	0	0	0	0
I & I NSW[3]	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0
Council	0	0	0	0	0	0	1	0	0	0	0	0	1	2	0	0
RTA	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0

Note 1: now the Department of Planning and Infrastructure

Note 2: now the Office of Environment and Heritage

Note 3: now the NSW Department of Trade and Investment, Regional Infrastructure & Services (DTIRIS)

3.2.3.2 NSW Office of Water

A meeting was held with the NSW Office of Water (NOW) on 4 April 2011 to discuss the licensing requirements for the Project. Present at the meeting were:

- Tim Baker from of NOW;
- James Morrow of The Impax Group; and
- Dean Fredericksen of YTC Resources Limited.

Key outcomes of the meeting were as follows.

- Pump tests results for all bores tested to date were requested by NOW for the purposes of determining groundwater licensing allocations for the existing licences.
- In the event that impacts on neighbouring bores are identified a Groundwater Management Plan will be required. That plan will be required to address the potential impacts and would be a project approval consent condition.
- The groundwater assessment for the Project should address the NSW groundwater policies, namely protection of groundwater quality and quantity and groundwater dependant ecosystems. The main focus of the assessment should be to identify the potential dewatering impacts from the underground mine, potential impacts from the process and tailings facilities on the groundwater aquifer.

3.2.3.3 Office of Environment and Heritage

A meeting was held with the Office of Environment and Heritage (OEH) in Dubbo on 8 August 2011 to discuss the following issues related to the Project.

- Biodiversity Offset Strategy.
- Travelling Stock Route and the proposed Biodiversity Offset Area.

The following persons attended the meeting:

- Dean Fredericksen, Sean Pearce and Sladana Haures of YTC Resources Limited.
- Mitchell Bland of R. W. Corkery & Co. Pty Limited.
- Phil Cameron of OzArk Environmental and Heritage Management Pty Ltd (OzArk).
- Brad Tanswell, Carmen Dwyer, Peter Christie and Erica Baigent of Office of Environment and Heritage.

During the meeting the following items were discussed.

- The Proponent provided an overview of the Project and the proposed Biodiversity Offset Strategy, as it was then envisaged, and OzArk provided an overview of the ecology assessment, including the methodology used during the assessment. OEH sought clarification on a number of matters of technical nature in relation to the ecology assessment.
- OEH indicated that the Department has no fundamental issues with the proposed Biodiversity Offset Strategy. The following points were discussed in relation to the proposed Biodiversity Offset Strategy. This document has been adjusted to reflect those discussions.
  - OEH would prefer that a larger contiguous area of land be included within the proposed Biodiversity Offset Area. The Proponent suggested that the entire section of "The Peak" property east of the Project Site be included in the offset area. Office of Environment and Heritage agreed that this would be preferable outcome. The Proponent subsequently excluded the easternmost 100m of the property from the Biodiversity Offset Area as discussed in Section 3.2.3.6.
  - OEH requested that the Proponent make a commitment in the Environmental Assessment that the Biodiversity Offset Strategy would be assessed using the BioBanking Assessment Methodology and that a Tier 2 Offset would be achieved as a minimum. The Proponent agreed with this request and this document has been adjusted to reflect this agreement.
  - OEH noted the proposed Biodiversity Offset Strategy would require that a section of Travelling Stock Reserve 8792 be cancelled (see Section 3.2.3.6).

– The Proponent noted that it anticipates that the proposed Biodiversity Offset Area may provide more than the required number of credits to adequately offset the proposed areas of disturbance. If that is the case, the Proponent proposes to only retire those credits required for the current Project, with remaining credits retained for future offsetting actions. OEH concurred with this approach.

– OEH requested that the status of the travelling stock reserve in the eastern section of "The Peak" property be confirmed (see section 3.2.3.6).

3.2.3.4 Cobar Shire Council

A meeting was held with Cobar Shire Council on 5 May 2011. Present at the meeting were Dean Fredericksen and Sean Pearce (on behalf of the Proponent) and Gary Ryman and Chris Ansoul (on behalf of Council). The following issues were discussed.

- Construction of the Mine Camp and whether this should be approved under the Part 3A process or whether a separate application for development consent should be made to Council.
- Works associated with upgrading of the Existing Site Entrance intersection and construction of the Main Site Entrance intersection on Burthong Road.
- Commencement of the activities approved under the Part 5 approval for the exploration decline.
- Discussions in relation to the modifications to the planning regime that were in progress at the time of the meeting.

The outcomes of the discussions held can be summarised as follows.

- Council recommended that planning approval for the Mine Camp be sought as part of the Project. The Proponent, would, however, be required to submit applications for construction certificates for the various items of infrastructure required, including the waste water treatment facility and construction of the car park.
- The Proponent would consult with the Council's Director of Engineering Services in relation to the proposed upgrading and construction operations associated with, respectively, the intersections of the Existing Site Entrance and the Main Site Entrance on Burthong Road.

3.2.3.5 Department of Planning and Infrastructure

A meeting was held with the Department of Planning and Infrastructure on 7 June 2011. Attending the meeting were:

- Kane Winwood and Howard Reed of the Department of Planning and Infrastructure (former Department of Planning);

- Rimas Kairaitis, Dean Fredericksen and Sean Pearce of YTC Resources Limited; and
- Mitchell Bland of R. W. Corkery & Co. Pty Limited.

The purpose of the meeting was to provide the Department with a briefing in relation to the proposed activities and an update on the status of the environmental assessments. The meeting provided an opportunity to the Department to ask questions of the Proponent and provide feedback on issues that were seen as critical by the Department.

Outcomes from that meeting were as follows.

- The Proponent should ensure that a detailed justification of the proposed layout of the Project is provided.
- A detailed assessment of the anticipated environmental impacts will be required.

3.2.3.6 Travelling Stock Reserve 8792

As noted in Section 1.4 and in **Figure 1.2**, the eastern section of "The Peak" property is the subject of a Travelling Stock Reserve, TSR8792. Mitchell Bland of RW Corkery & Co Pty Limited contacted Shaun Barker of Department of Primary Industries – Crown Lands Division, the agency responsible for Western Lands Lease WLL2455, on 26 August 2011. Mr Barker indicated that the conditions associated with WLL2455 could be amended to accommodate the proposed Biodiversity Offset Strategy subject to the following.

- The removal of TSR8792 over that section of WLL2455 to which the Biodiversity Offset Strategy applies. In order to cancel a section of TSR8792, the Department would require the concurrence of the Darling Livestock and Pest Authority (DLHPA).
- Preparation of an appropriate Biodiversity Management Plan to the satisfaction of the Office of Environment and Heritage.

On 15 August 2011, the Proponent wrote to DLHPA proposing that the majority of TSR8792 within WLL2455 be cancelled. That proposal included an allowance to retain the easternmost 100m of TSR8792, adjacent to the Nymagee-Condobolin Road, to permit stock movement past WLL2455. The proposed area to be cancelled is indicated on **Figures 2.12** and **2.14**. Further information was provided on 26 August and 12 September. At the time of finalisation of this document, the DLHPA have indicated that they do not support closure of the identified section of TSR8792. It is the Proponent's intention to continue to examine avenues to effect a change in the status of the TSR.

3.3 REVIEW OF PLANNING ISSUES AND ENVIRONMENTAL GUIDELINES

3.3.1 Introduction

A number of State and regional planning instruments apply to the Project. These planning instruments have been reviewed to identify any environmental aspects requiring consideration in the preparation of the *Environmental Assessment*.

A brief summary of each relevant planning instrument is provided in the following sub-sections. The application and relevance of planning instruments related to specific environmental issues have been assessed in the relevant specialist consultant assessments undertaken for the Project.

3.3.2 State Planning Issues

3.3.2.1 State Environmental Planning Policy (Major Development) 2005

Clause 6 of the *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP) identifies that development of the kind identified in Schedule 1 of the SEPP to be a development to which Part 3A of the *Environment Planning & Assessment Act 1979* (EP&A Act) applies. Paragraph 5(1)(b) of Schedule 1 identifies development for the purposes of mining-related works with a capital cost of more than $30 million as development to which the Major Development SEPP applies.

The Proponent estimates that the capital cost for the Project would be approximately $80 million, and for this reason the Project has been declared a Major Project for which project approval under Part 3A of the EP&A Act is necessary.

The Proponent notes that recent amendments to the planning system in NSW do not apply to the Project because Director-General's Requirements had been issued prior to the commencement of those amendments.

3.3.2.2 State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP), gazetted on 17 February 2007, specifies matters requiring consideration in the assessment of any mining-related development, given the importance of mining, petroleum production and extractive industries to New South Wales economy. The aims of the Mining SEPP are as follows.

> *a. To provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State.*
>
> *b. To facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources.*
>
> *c. To establish appropriate planning controls to encourage ecologically sustainable development through the Environmental Assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.*"

The Mining SEPP assesses a proposed mining development with regard to a wide range of criteria encapsulated in Clauses 12 – 17 of the SEPP. An assessment of each of these considerations has been undertaken during the preparation of this *Environmental Assessment*, and **Table 3.3** identifies sections where each criterion has been addressed.

Table 3.3
Application of SEPP Mining, Petroleum Production and Extractive Industries 2007

Relevant SEPP Clause	Description	EA Section
12: Compatibility with other land uses	• Consideration is given to:	
	- the existing uses and approved uses of land in the vicinity of the development;	4.1.5.2
	- the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and	4.2 – 4.13
	- any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	4.2 – 4.13
	• The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared.	4.14
	• Measures proposed to avoid or minimise any incompatibility are considered.	5
13: Compatibility with mining, petroleum production or extractive industry	• Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible.	NR
	• Measures taken by the applicant to avoid or minimise any incompatibility are considered.	NR
	• The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	NR
14: Natural resource and environmental management	• Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure:	4.2 – 4.13
	- impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;	4.3, 4.4
	- impacts on threatened species and biodiversity are avoided or minimised; and	4.2
	- greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	4.8
15: Resource recovery	• The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	2.7, 2.8
16: Transportation	• The following transport related issued are considered.	
	- The transport of some or all of the materials from the site by means other than public road.	2.9.2.2
	- Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools.	2.9.2
	- The preparation of a code of conduct for the transport of materials on public roads.	4.9.4
17: Rehabilitation	• The rehabilitation of the land affected by the development is considered including:	
	- the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;	2.15
	- the appropriate management of development generated waste;	2.15.5
	- remediation of any soil contaminated by the development; and	
	- the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	2.14

Note 1: This is a matter for the Department of Planning to determine NR = Not relevant.

3.3.2.3 State Environmental Planning Policy (Rural Lands) 2008

The aims of *State Environmental Planning Policy (Rural Lands) 2008* (Rural Lands SEPP), as considered relevant to the Project, are to:

a. facilitate the orderly and economic use and development of rural lands for rural and related purposes;

b. implement measures designed to reduce land use conflicts; and

c. identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations.

Specifically, and as described in Clause 12, Rural Lands SEPP aims to provide for the protection of agricultural land:

i. that is of State or regional agricultural significance;

ii. that may be subject to demand for uses that are not compatible with agriculture; and

iii. if the protection will result in a public benefit.

The Project is considered with respect to the above noted aims.

- The land that would be affected by the Project has not been identified as State or regional significant agricultural land by Schedule 2 of the Rural Lands SEPP.
- The Project would require a relatively small proportion of the agricultural land in the locality and, as demonstrated at numerous other mine sites where agricultural activities are undertaken concurrently with mining, would not be incompatible with continued agricultural land use surrounding the Project Site.
- The protection of the land within the Project would not provide any public benefit. In fact, the employment and local economic stimulus that would be generated by the Project would be of far greater public benefit than the current grazing.

As a result of the above considerations, Rural Lands SEPP is not considered further in this document.

3.3.2.4 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

Hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that, without the implementation of appropriate impact minimisation measures, would (or potentially would) pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment.

In accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33), the hazardous materials to be held or used with the Project Site are required to be identified and classified in accordance with the risk screening methodology outlined in *Appendix 4* of *Applying SEPP 33 Consultation Draft July 2008* (DoP, 2008). Hazardous materials are defined within that document as substances falling within the classification of the *Australian Code for the Transportation of Dangerous Goods by Road and Rail* (*Dangerous Goods Code*) published by the Department of Infrastructure, Transport, Regional Development and Local Government in 2009.

The potentially hazardous goods that would be used or stored within the Project Site would include the following.

- Diesel and other hydrocarbons.
- Detonators, boosters and packaged explosives.
- Processing chemicals (see Section 2.5.9).

The results of the risk screening conducted, along with the associated risk rating and identification of risks, are presented in **Appendix 4**.

In summary, Potassium Amyl Xanthate, Sodium Cyanide, Hydrogen Peroxide and Lead Nitrate triggered the threshold quantities to be stored on site and/or the hazardous material transportation limit. A Preliminary Hazard Analysis has been prepared for each of these chemicals and is included **Appendix 4**.

The risk level associated with the transport, storage and use of sodium cyanide have been reduced to a 'tolerable' level i.e., the associated risk level would be acceptably low, with the following proposed actions.

- The preparation of material and incident specific reagent and emergency management plans.
- Implementation of effective communication and training.
- Construction and use of appropriate structures or equipment to store or transport the sodium cyanide.
- The strict enforcement of restricted access to areas of potentially hazardous material storage.

3.3.2.5 State Environmental Planning Policy No. 44 – Koala Habitat Protection

Cobar Local Government Area has not been identified in Schedule 1 of *State Environmental Planning Policy No. 44 – Koala Habitat Protection* as an area that could provide habitat for koalas. This policy will not be considered in this document.

3.3.2.6 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) requires that consent for any development cannot be granted unless the consent authority has considered whether the land is contaminated. If the land is contaminated, the consent authority must be satisfied that:

a. the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out; and/or

b. if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, the land will be remediated before the land is used for that purpose.

Given Project Site has been used principally either for agricultural grazing or mineral exploration, neither of which is likely to result in contamination of the land, the Proponent contends that no contaminated land occurs within the Project Site.

As a result SEPP 55 is not considered further in this document.

3.3.3 Local Planning Issues

The Project Site occurs within the Cobar Shire Local Government Area and permissibility of development is governed by the *Cobar Local Environment Plan 2001* (Cobar LEP). Under the Cobar LEP, the Project Site falls under Zone 1(a) General Rural category. **Figure 1.1** shows the land zoning within and surrounding the Project Site.

Clause 10 of the Cobar LEP identifies the objectives of Zone 1(a) (General Rural) are as follows.

1. To promote the conservation of productive land for agricultural and grazing purposes.

2. To permit the development of appropriate agricultural land uses and prevent development of inappropriate non-agricultural land uses such as small lot rural residential subdivision.

3. To permit the development of mines, extractive, offensive and hazardous industries, but only in an environmentally and sustainable manner.

4. *To permit some non-agricultural land uses and agricultural support facilities, such as rural supply industries, tourist facilities, farm stay facilities, and the like which are in keeping with other zone objectives and which will not have an adverse effect on agricultural productivity.*

Mining is permissible with consent within Zone 1(a) (General Rural).

3.3.4 Environmental Guidelines

The DGRs stipulate that assessments of the identified key issues be undertaken in accordance with the guideline documents listed. Any other guidelines that have been required to be referenced by government agencies consulted in relation to the Project have also been referenced whenever necessary. **Table A2.2** of **Appendix 2** identifies each of these guidelines, and reference is made, as relevant, in the appropriate sections of the *Environmental Assessment* and within specialist consultant reports included in the *Specialist Consultant Studies Compendium*.

3.3.5 Summary of Environmental Issues

The following environmental issues of relevance to the Project have been identified based on the results of the consultation undertaken and a review of relevant planning instruments and environmental guidelines.

- Air Quality
- Noise and Blasting/vibration
- Bushfire
- Heritage (Aboriginal & Non-Aboriginal)
- Ecology (Biodiversity)
- Groundwater
- Land Contamination
- Socio-economic Climate
- Rehabilitation / Final Landform/ End Land Use
- Soil and Land Capability
- Surface Water / Erosion and Sedimentation
- Traffic and Transportation
- Visual Amenity
- Waste Management

The relative priority of the environmental issues identified for the Project is presented in Section 3.4.4.

3.4 ANALYSIS OF ENVIRONMENTAL RISK AND ISSUE PRIORITISATION

3.4.1 Introduction

This sub-section prioritises the identified environmental issues, with respect to the potential for environmental impact. This is initially achieved through an analysis of the risk sources and potential environmental impacts. Once identified, an analysis of risk associated with each environmental issue has been undertaken. The analysis of risk has been completed generally in in accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004 and through consideration of the likelihood and potential consequence(s) of the environmental impacts.

3.4.2 Risk Sources and Potential Impacts

Following the identification of the environmental issues requiring assessment, a review of the Project design, the local environment and other factors was undertaken to identify the environmental risk and their corresponding impacts associated within each issue.

For each of the environmental issues identified, potential environmental impacts associated with the Project have been identified through consideration of the type of impact, receptor(s) to the impact and potential consequences (**Table 3.4**). Through consideration of the potential impacts, the relative priority of each environmental issue is then considered (see Section 3.3).

3.4.3 Analysis of Environmental Risk

Risk, as applicable in this case, is the chance of an event associated with the development and operation of the Project occurring and impacting upon the local environment. It is measured both in terms of consequence (severity) and likelihood (probability) of the event occurring.

The allocation of a consequence rating is based on the definitions contained in **Table 3.5**. The assigned consequence rating represents the highest level applicable. For example, if a potential impact is assigned a 4 - Major level, based on impact to the environment, and 2 - Minor level, based on area of impact, the consequence level assigned would be 4 - Major.

The likelihood or probability of each impact occurring is then rated according to the definitions contained in **Table 3.6**.

The risk associated with each environmental impact is assessed without the inclusion of any operational controls or safeguards in place, and is based on the qualitative assessment of consequence and likelihood, a risk ranking of either; low, medium, high or extreme was assigned to each potential impact based on the matrix presented in **Table 3.7**.

The four risk rankings are defined as follows.

Low (L): Risk requiring a basic assessment of proposed controls and residual impacts. Any residual impacts are unlikely to have any major impact on the local environment or stakeholders.

Moderate (M): Risk requiring a medium level assessment of proposed controls and residual impacts. It is unlikely to preclude the development of the Project but may result in impacts deemed unacceptable to some local or government stakeholders.

High (H): Risk requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures. Ultimately, this level of risk may preclude the development of the Project.

Extreme (E): Risk requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures and possible preparation of a specialised management plan. Unless considered to be adequately managed by the controls and/or management plan, this level of risk is likely to preclude the development of the Project.

Table 3.4
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Groundwater	• Pollution of groundwater due to leaching of contaminants from the Tailings Storage Facility (TSF).	• Local aquifer(s). • Local groundwater users.	• Decreased groundwater quality.	• Reduced availability of water for beneficial uses, eg. domestic water supply, environmental flows. • Detrimental impacts on biota dependent on local surface or groundwater resources.
	• Pollution of groundwater due to hydrocarbon spills.	• Local aquifer(s). • Local groundwater users.	• Decreased groundwater quality. • Detrimental impact on beneficial uses of groundwater.	• Reduced groundwater quality leading to reduction in beneficial uses of the water and therefore availability to existing groundwater users.
	• Reduction of groundwater levels due to mining and associated drawdown.	• Local aquifer(s). • Groundwater bores of adjoining land owners. • Groundwater dependent ecosystems.	• Reduction in the quantity of water stored in local aquifer(s). • Decrease in availability of groundwater to adjoining land owners and/or groundwater dependent ecosystems.	• Reduction in groundwater levels. • Reduced yields of local groundwater bores. • Adverse impact on or reduced viability of groundwater dependent ecosystems.
	• Dewatering of local hard rock aquifers as a result of blasting induced fracturing.	• Hard (bedrock) aquifer.	• Dewatering of fracture flow sourced groundwater bores.	• Dewatering of local groundwater bores.
	• Reduced volume and/or quality of water recharging surface water flows.	• Local streams, and springs.	• Changes to local hydrological regime and surface flows. • Decreased quality of water within local creeks.	• Reduced surface flows to surrounding creeks and rivers. • Degradation of groundwater dependent ecosystems.
Surface Water/ Flooding/ Erosion and Sedimentation	• Reduction in environmental flows through on-site capture of water.	• Downstream water users. • Local and regional biota.	• Reduced flows to downstream water users. • Reduced flows to downstream biota.	• Reduced availability of water to downstream users. • Structural change to / or degradation of downstream vegetation, including Groundwater Dependent Ecosystem (GDEs). • Degradation of aquatic habitats.
	• Discharge of dirty, saline or contaminated water (other than from the TSF)	• Local creeks and tributaries. • Project Site soils and vegetation.	• Decreased water quality. • Contamination of soil resources.	• Pollution of downstream waters. • Pollution of local waterways resulting in death of flora and fauna. • Contamination of soil resources and indirect impacts on end land use.

Source: Modified after HB203:2006 (Standards Australia, 2006) - Table 3

Table 3.4 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source (s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Surface Water/ Flooding/ Erosion and Sedimentation	• Discharge of contaminated water (from the TSF).	• Local and regional catchment ecosystem.	• Introduction of toxic compounds to the environment. • Contamination of soil and water resources.	• Contamination of local waterways. • Contamination of local soils. • Poisoning of native flora and fauna. • Long-term degradation of landform and reduced potential for future beneficial use.
	• Discharge of saline groundwater	• Local creeks and tributaries. • Project Site soils and vegetation	• Decreased water quality. • Contamination of soil resources.	• Pollution of downstream waters. • Pollution of local waterways resulting in death of flora and fauna. • Contamination of soil resources and indirect impacts on future land use.
	• Changes to hydrology of creeks and drainage lines.	• Local creeks and drainage lines.	• Reduced flows. • Changed alignment of hydrological flow.	• Reduced surface flows within the affected waterway(s) and the Box Creek catchment. • Increased erosion potential resultant from changed alignment of flow. • Reduction in the quality of aquatic habitat.
	• Changes to local flood regimes.	• Box Creek and associated communities and ecosystems.	• Changes to frequency or intensity of local flooding.	• Increased erosion potential within local catchments. • Changes to vegetation community structure and habitat value. • Detrimental impacts on surrounding properties as a result of changes to flooding regime.
	• Soil erosion (due to the erosive actions of water).	• Project Site soils.	• Loss of topsoil.	• Erosion of disturbed areas on the Project Site. • Erosion of rehabilitated areas and/or final landform of the Project Site.
	• Sedimentation of water within and discharged from the Project Site.	• Local creeks and drainage features.	• Increased sedimentation within downstream creeks.	• Increased sediment load in drains and/or waterways.
Soil Resources	• Reduction in soil quality and availability through poor management practices.	• Project Site soils.	• Structural damage to soils through poor soil management practices. • Reduced biological activity of soils.	• Insufficient soil quantities for rehabilitation. • Reduced soil quality.
	• Increased erosion or erosion potential of soils.	• See "erosion and sedimentation" above.	• See "erosion and sedimentation" above.	• See "erosion and sedimentation" above.
Source: Modified after HB203:2006 (Standards Australia, 2006) - Table 3				

Table 3.4 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Biodiversity (Flora and Fauna)	• Removal of native vegetation due to clearing activities.	• Vegetation within Project Site and area of influence.	• Removal of habitat and disturbance to threatened species, populations or communities.	• Loss of, or alteration to, existing habitats. • Direct adverse impact on threatened species, populations and communities.
	• Disturbance to threatened species, populations and endangered ecological communities.	• Threatened species, populations and communities identified, known to occur, or considered as potentially occurring within the Project Site.	• Removal of threatened species, populations and communities from the Project Site. • Reduction in the potential for future immigration of threatened species, populations and communities to the Project Site.	• Local or regional reduction in distribution of threatened species, populations and endangered ecological communities. • Possible local extinction of threatened species, populations and endangered ecological communities.
	• Disturbance to flora and fauna habitat as a result of ongoing operations, eg. dust etc.	• Local communities and ecosystems.	• Reduced suitability of habitat on and surrounding the Project Site for native fauna.	• Local or regional reduction in distribution of threatened species, populations and endangered ecological communities. • Possible local extinction of threatened species, populations and endangered ecological communities.
	• Pooling of cyanide - contaminated water within the TSF.	• Local fauna.	• Ingestion of water by local fauna.	• Poisoning of native fauna.
Aboriginal Heritage	• Removal or destruction of known Aboriginal sites and/or artefacts.	• Local archaeological setting.	• Damage or destruction of Aboriginal artefacts or site.	• Destruction of impacted site. • Cumulative reduction of the in-situ archaeological record.
	• Removal or destruction of currently unidentified Aboriginal sites and/or artefacts.			
European Heritage	• Removal or destruction of sites of heritage significance due to project activities.	• Local archaeological setting.	• Loss or damage to heritage sites.	• Loss or destruction of items of heritage significance.

Source: Modified after HB203:2006 (Standards Australia, 2006) - Table 3

Table 3.4 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Noise	• Increased noise levels above relevant criteria resulting from operation of mobile and fixed equipment, and product transportation.	• Surrounding residents, land owners and native fauna.	• Decreased amenity. • Impacts on the health and well-being of local residents. • Decreased land values. • Detrimental effects on local fauna	• Increased noise and levels associated with Project activities causing annoyance, distractions, ie. amenity impacts. • Sleep disturbance as a result of maximum noise levels. • Increased noise levels associated with the Project leading to impacts on local fauna assemblage.
Vibration and Air Blast Overpressure	• Increased levels of vibration or air blast overpressure in excess of relevant criteria from mine blasting.	• Structural damage to buildings and structures. • Reduced local amenity. • Reduced production from livestock.	• Surrounding residences, buildings and other structures. • Local livestock.	• Structural damage to buildings and structures. • Nuisance/amenity impacts on surrounding landowners / residents.
	• Fracture induced dewatering of hard rock aquifer(s).	• Bedrock aquifer. • Groundwater bores.	• Reduced yield / availability of water from affected groundwater bores.	• Reduced yield / availability of water from affected groundwater bores.
Air Pollution – Dust, Odour, Greenhouse Gas Emissions and other	• Dust generation resulting from vehicle movements on unsealed roads and wind action on disturbed areas, waste rock emplacements and stockpiles.	• Surrounding residences and buildings. • Surrounding native vegetation. • Local residents.	• Increased deposited and suspended particulates. • Health-related complaints.	• Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc. • Adverse health impacts (if PM_{10} levels are excessive). • Stress of native vegetation, and indirect impacts on fauna habitat.
	• Greenhouse gas emissions.	• Local and global air-shed	• Increased greenhouse and other gas emissions.	• Increased contribution to greenhouse effect.
Traffic and Transport	• Construction of new entrance to the Project Site.	• Local landforms and road network.	• Impacts associated with road construction (noise, dust, ecology, heritage etc.).	• See "*air pollution*", "*flora and fauna protection*" and "*noise*" and "*Aboriginal heritage*" above. • Temporary inconvenience to commuters if stopped for road works.
	• Increased traffic levels due to movement of workforce and contractors.	• Local road network. • Existing road users.	• Increased vehicle movements (especially heavy vehicles) on local roads.	• Increased traffic congestion. • Elevated risk of accident/incident on local roads. • Road pavement deterioration.
	• Increased heavy vehicle movements for product transportation.			

Source: Modified after HB203:2006 (Standards Australia, 2006) - Table 3

Table 3.4 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Visual Amenity	• Changes in visual characteristics of the Project Site.	• Surrounding residents and local motorists.	• Clearing of native vegetation and increased visibility of the quarry activities.	• Decreased visual amenity.
	• Impacts of night lighting.	• Surrounding residents and local motorists.	• Reduced local amenity. • Distraction to local motorists.	• Decreased visual amenity. • Elevated risk of traffic incident.
Rehabilitation and Final Landform	• Temporary or permanent changes to the landform of the Project Site.	• Project Site land surrounding land owners and/or residents.	• Reduced amenity of the Project Site land and influence on activities/lifestyle of adjoining land owners. • Altered final land use not compatible with activities/lifestyle of adjoining land owners.	• Reduced amenity of the final landform resultant from altered topography. • Final landform and land use that is not compatible with activities/lifestyle of local community.
Waste Management	• Production of contaminating or polluting materials, eg. waste oils, tailings, general non-putrescible and putrescible waste .	• Project Site land and water resources. • Downstream land and water resources. • Local and regional groundwater.	• Contamination of downstream surface waters. • Contamination of groundwater. • Contamination of downstream lands. • Reduced visual amenity.	• Contamination of surface water. • Contamination of groundwater. • Contamination of soil resources by leaking or spilt residue. • Reduced amenity of Project Site due to poor rubbish, litter management.
	• Acid Mine Drainage from mineralised waste rock.	• Project Site land and water resources. • Downstream land and water resources. • Local and regional groundwater.	• Contamination of downstream surface waters. • Contamination of groundwater. • Contamination of downstream lands.	• Contamination of local water and/or soil resources by leaking or spilt residue.

Source: Modified after HB203:2006 (Standards Australia, 2006) - Table 3

Table 3.4 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Receptor/Surrounding Environment	Potential Consequences	Potential Environmental Impacts
Waste Management (Cont'd)	• Management of waste materials.	• Project Site and surrounding landholdings.	• Pollution of local lands and waterways with mine rubbish.	• Reduced visual amenity. • Adverse impacts on local waterways and aquatic habitats.
Land Contamination	• Exposure of previously contaminated materials.	• Areas receiving contaminated material (including surface waters).	• Transfer of contaminated materials to non-contaminated areas.	• Contamination of soil resources. • Contamination of surface water.
	• Creation of contaminated land	• Areas receiving contaminated material (including surface waters).	• Creation of contaminated land and an ongoing risk of transfer of contaminated materials to non-contaminated areas.	• Contamination of soil resources. • Contamination of surface water.
Bushfire	• Initiation of fire on the Project Site and spread to adjoining properties.	• Project Site personnel and equipment. • Project Site and adjoining land.	• Health and safety impacts to project personnel. • Damage to Project Site equipment. • Damage to adjoining properties and/or native vegetation.	• Injury or health impacts on project personnel. • Operational constraint posed by damaged equipment. • Destruction/damage of native vegetation and fauna habitat.
Socio-Economic Impacts	• Alteration of social activities or employment due to employment generation and capital expenditure.	• Local community and businesses. • Local government.	• Reduced unemployment and increased local spending. • Additional population for schools and community services.	• Improved economic activity and related social impacts attributable to reduced unemployment.
	• Reduction in availability of skilled labour for other local industries.	• Local businesses and industries.	• Movement of skilled labour force from other local industries to mine.	• Reduced availability of labour for other businesses and industries.
	• Increased pressure on local infrastructure.	• Community of Nymagee and surrounding communities.	• Increase in pressure on housing / rental market. • Increase costs associated with infrastructure maintenance.	• Increased cost of housing and rental accommodation locally. • Increased costs of services.
	• Perceived or real impacts on local amenity of neighbouring properties.	• Surrounding property owners.	• Reduced property values. • Reduced amenity value of landholdings.	• Reduced quality of life (actual or perceived). • Reduced property values.

Source: Modified after HB203:2006 (Standards Australia, 2006) - Table 3

Table 3.5
Qualitative Consequence Rating

Level	Descriptor	Description
5	Catastrophic	• Massive and permanent detrimental impacts on the environment. • Very large area of impact. • Massive remediation costs. • Reportable to government agencies. • Large fines and prosecution resulting in potential closure of operation. • Severe injuries or death.
4	Major	• Extensive and/or permanent detrimental impacts on the environment. • Large area of impact. • Very large remediation costs. • Reportable to government agencies. • Possible prosecution and fine. • Serious injuries requiring medical treatment.
3	Moderate	• Substantial temporary or minor long term adverse impact to the environment. • Moderately large area of impact. • Moderate remediation costs. • Reportable to government agencies. • Further action may be requested by government agency. • Injuries requiring medical treatment.
2	Minor	• Minor detrimental impact on the environment. • Affects a small area. • Minimal remediation costs. • Reportable to internal management only. • No operational constraints posed. • Minor injuries which would require basic first aid treatment.
1	Insignificant	• Negligible and temporary detrimental impact on the environment. • Affects an isolated area. • No remediation costs. • Reportable to internal management only. • No operational constraints posed. • No injuries or health impacts.
Source: modified after HB 203:2006 (Standards Australia, 2006) - Table 4(B)		

Table 3.6
Qualitative Likelihood Rating

Level	Descriptor	Description
A	Almost Certain	Is expected to occur in most circumstances.
B	Likely	Will probably occur in most circumstances.
C	Possible	Could occur.
D	Unlikely	Could occur but not expected.
E	Rare	Occurs only in exceptional circumstances.
Source: HB 203:2006 (Standards Australia, 2006) - Table 4(A)		

Table 3.7
Risk Rating Matrix

Likelihood	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (Almost Certain)	H	H	E	E	E
B (Likely)	M	H	H	E	E
C (Possible)	L	M	H	E	E
D (Unlikely)	L	L	M	H	E
E (Rare)	L	L	M	H	H
Note: Rating modified after HB 203:2006 (Standards Australia, 2006) - Table 4(C)					

Table 3.8 provides an assessment of the unmitigated risk for each potential environmental impact based on the classifications and definitions provided in **Table 3.5** to **Table 3.7** Where appropriate, and to provide a more realistic assessment of the risks posed by the various environmental issues, the environmental impacts have been further defined using either a level, range or scale of impact providing for the various circumstances which may apply. **Table 6.1** and Section 6.2.1 provide an analysis of risk following the implementation of the proposed management and mitigation measures.

3.4.4 Environmental Issue Prioritisation

The issues identified as requiring assessment within the *Environmental Assessment* have been prioritised based, in decreasing order of emphasis, upon the following.

1. The key assessment requirements of the DGRs (see Section 3.2.3 and **Appendix 2**).
2. Issues with a high frequency of identification (during the consultation program) (see Section 3.2.2).
3. Issues identified with a greater frequency of impacts with high or extreme risk ratings (see **Table 3.8**).

Considering points 1 to 3 noted above and the fact that some environmental issues complement each other with respect to assessment, the following issue prioritization has been established.

1. Ecology.
2. Groundwater.
3. Surface water.
4. Noise and blasting.
5. Aboriginal heritage.
6. Historical heritage.
7. Air quality and energy.
8. Traffic and transportation.
9. Soils and land capability.
10. Visual amenity.
11. Bushfire Management.
12. Socio-economic setting.

It is noted that the inclusion of "Socio-economic Setting" at N^{o} 12 is not a direct consequence of the environmental risk analysis. Rather, it is included at N^{o} 12 to enable all other issues to be considered prior to the consideration of the socio-economic setting as this issue invariably is inter-related with many of the preceding issues.

Table 3.8
Analysis of Unmitigated Environmental Risk

Risk Source (see Table 3.4)	Potential Impact (Including Scale if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Groundwater				
Pollution of groundwater due to leaching of contaminants from the Tailings Storage Facility (TSF).	Reduced availability of water for beneficial uses, eg. domestic water supply, environmental flows.	3	C	H
	Detrimental impacts on biota dependent on local surface or groundwater resources.	2	E	L
Pollution of groundwater due to hydrocarbon spills.	Reduced groundwater quality leading to reduction in beneficial uses of the water and therefore availability to existing groundwater users.	3	D	M
Reduction of groundwater levels due to mining and associated drawdown.	Reduction in groundwater levels.	2	A	H
	Reduced yields of local groundwater bores.	3	C	H
	Adverse impact on or reduced viability of groundwater dependent ecosystems.	3	E	M
Dewatering of local hard rock aquifers as a result of blasting induced fracturing.	Dewatering of local groundwater bores.	3	B	H
Reduced volume and/or quality of water recharging surface water flows.	Reduced surface flows to surrounding creeks and rivers.	3	E	M
	Degradation of groundwater dependent ecosystems.	3	E	M
Surface Water / Flooding / Erosion and Sedimentation				
Reduction in environmental flows through onsite capture of water.	Reduced availability of water to downstream users.	3	C	H
	Structural change to, or degradation of downstream vegetation including Groundwater Dependent Ecosystem (GDEs).	3	D	M
	Degradation of aquatic habitats.	3	E	M
Discharge of dirty, saline or contaminated water (other than from the TSF).	Pollution of downstream waters.	4	D	H
	Pollution of local waterways resulting in death of flora and fauna.	4	D	H
	Contamination of soil resources and indirect impacts on end land use.	3	D	M
Discharge of contaminated water (from the TSF).	Contamination of local waterways.	5	E	H
	Contamination of local soils.	3	D	M
	Poisoning of native flora and fauna.	4	E	H
	Long-term degradation of landform and reduced potential for future beneficial use.	4	E	H
Discharge of saline groundwater	Pollution of downstream waters.	3	C	H
	Pollution of local waterways resulting in death of flora and fauna.	3	C	H
	Contamination of soil resources and indirect impacts on future land use.	3	E	M

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Table 3.8 (Cont'd)
Analysis of Unmitigated Environmental Risk

Risk Source (see Table 3.4)	Potential Impact (Including Scale if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Surface Water / Flooding / Erosion and Sedimentation (Cont'd)				
Changes to hydrology of creeks and drainage lines.	Reduced surface flows within the affected waterway(s) and the Box Creek catchment.	1	B	M
	Increased erosion potential resultant from changed alignment of flow.	2	C	M
	Reduction in the quality of aquatic habitat.	3	E	M
Changes to local flood regimes.	Increased erosion potential within local catchments.	2	D	L
	Changes to vegetation community structure and habitat value.	3	E	M
	Detrimental impacts on surrounding properties as a result of changes to flooding regime.	3	E	M
Soil erosion (due to the erosive actions of water).	Erosion of disturbed areas on the Project Site.	2	C	M
	Erosion of rehabilitated areas and/or final landform of the Project Site.	3	C	H
Sedimentation of water within and discharged from the Project Site.	Increased sediment load in drains and/or waterways.	2	B	H
Soil Resources				
Reduction in soil quality and availability through poor management practices.	Insufficient soil quantities for rehabilitation.	2	C	L
	Reduced soil quality.	3	C	H
Flora and Fauna (Biodiversity)				
Removal of native vegetation due to clearing activities.	Loss of, or alteration to, existing habitats.	2	B	H
	Direct adverse impact on threatened species, populations or endangered ecological communities.	3	C	H
Disturbance to threatened species, populations and endangered ecological communities.	Local or regional reduction in distribution of threatened species, populations or endangered ecological communities.	4	D	H
	Possible local extinction of threatened species, populations or endangered ecological communities.	4	D	H
Disturbance to fauna and fauna habitat as a result of ongoing operations, eg. Dust etc.	Local or regional reduction in distribution of threatened species, populations and endangered ecological communities.	3	D	M
	Possible local extinction of threatened species, populations and endangered ecological communities.	4	E	H
Pooling of cyanide – contaminated water within the TSF	Poisoning of native fauna.	4	C	E

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Table 3.8 (Cont'd)
Analysis of Unmitigated Environmental Risk

Risk Source (see Table 3.4)	Potential Impact (Including Scale if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Aboriginal Heritage				
Removal or destruction of known Aboriginal sites and/or artefacts.	Destruction of impacted site.	3	D	M
	Cumulative reduction of the in-situ archaeological record.	3	D	M
Removal or destruction of currently unidentified Aboriginal sites and/or artefacts	Destruction of impacted site.	3	D	M
	Cumulative reduction of the in-situ archaeological record.	3	D	M
Historical Heritage				
Removal or destruction of sites of heritage significance due to project activities.	Loss or destruction of items of historical heritage significance.	3	D	M
Noise				
Increased noise levels above relevant criteria resulting from operation of mobile and fixed equipment, and product transportation.	Occasional minor exceedance of noise criteria (1-2dB(A)).	2	C	M
	Regular minor exceedance of noise criteria (1-2dB(A))	2	D	L
	Occasional marginal exceedance of noise criteria (3-5dB(A)).	3	D	M
	Regular marginal exceedance of noise criteria (3-5dB(A)).	3	E	M
	Occasional major exceedance of noise criteria (>5dB(A)).	3	E	M
	Regular major exceedance of noise criteria (>5dB(A)).	2	E	L
	Maximum noise levels resulting in sleep disturbance.	3	D	M
	Increased noise levels associated with the Project leading to impacts on the native fauna assemblage.	3	D	M
Blasting / Vibration				
Increased levels of vibration or air blast overpressure in excess of relevant criteria form mine blasting.	Structural damage to buildings and structures.	3	E	M
	Nuisance/amenity impacts on surrounding landowners / residents.	3	D	M
Fracture induced dewatering of hard rock aquifer(s).	Reduced yield / availability of water from affected groundwater bores.	2	E	L

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Table 3.8 (Cont'd)
Analysis of Unmitigated Environmental Risk

Risk Source (see Table 3.4)	Potential Impact (Including Scale if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Air Pollution – Dust, Odour, Greenhouse Gas Emissions, Other				
Dust generation resulting from vehicle movements on unsealed roads and wind action on disturbed areas, waste rock emplacements and stockpiles.	Nuisance / amenity impacts from dust deposited on window sills, cars, surfaces etc.	3	D	M
	Adverse health impacts (if PM_{10} levels are excessive).	4	E	H
	Stress on native vegetation, and indirect impacts on fauna habitat.	3	E	M
Greenhouse Gas Emissions	Increased contribution to greenhouse effect.	1	B	M
Traffic and Transport				
Construction of new entrance to the Project Site	See "*air pollution*", "*flora and fauna protection*", "*noise*" and "*Aboriginal heritage*" above.			
	Temporary inconvenience to commuters if stopped for road works.	1	C	L
Increased traffic levels due to movement of workforce and contractors	Increased traffic congestion.	2	D	L
	Elevated risk of accident / incident on local roads	4	E	H
	Road pavement deterioration.	3	E	M
Increased heavy vehicle movements for product transportation.	Increased traffic congestion.	2	B	M
	Elevated risk of accident / incident on local roads	4	E	H
	Road pavement deterioration.	3	D	M
Visual Amenity				
Changes in visual characteristics of the Project Site.	Decreased visual amenity.	2	D	L
Impacts of night lighting	Decreased visual amenity.	2	C	M
	Elevated risk of traffic incident.	3	E	M
Rehabilitation / Final Landform / End Land Use				
Temporary or permanent changes to the landform of the Project Site	Reduced amenity of the final landform resultant from altered topography.	3	E	M
	Final landform and land use that is not compatible with activities / lifestyle of local community.	2	C	M
Waste Management				
Production of contaminating or polluting materials, eg. waste oils, tailings, general non-putrescible and putrescible waste.	Contamination of surface water.	3	E	M
	Contamination of groundwater.	3	E	M
	Contamination of soil resources by leaking or split residue.	2	D	L
	Reduced amenity of Project Site due to poor rubbish, litter management.	2	D	L

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Table 3.8 (Cont'd)
Analysis of Unmitigated Environmental Risk

Risk Source (see Table 3.4)	Potential Impact (Including Scale if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Waste Management (Cont'd)				
Acid Mine Drainage from mineralised waste rock.	Contamination of local water and/or soil resources by leaking or spilt residue.	3	E	M
Management of waste materials.	Reduced visual amenity.	2	D	L
	Adverse impacts on local waterways and aquatic habitats.	2	E	L
Land Contamination				
Exposure of previously contaminated materials.	Contamination of soil resources.	2	E	L
	Contamination of surface water.	2	E	L
Creation of contaminated land.	Contamination of soil resources.	3	C	M
	Contamination of surface water.	3	C	M
Bushfire				
Initiation of fire on the Project Site and spread to adjoining properties.	Injury or health impacts on project personnel.	4	E	M
	Operational constraint posed by damaged equipment.	2	E	L
	Destruction / damage of native vegetation and fauna habitat.	3	E	M
Socio-Economic Impacts				
Alteration of social activities or employment due to employment generation and capital expenditure.	Improved economic activity and related social impacts attributable to reduced unemployment.	Net benefit		
Reduction in availability of skilled labour for other industries.	Reduced availability of labour for other businesses and industries.	2	C	M
Increased pressure on local infrastructure	Increased cost of housing and rental accommodation locally.	3	D	M
	Increased costs of services.	3	C	H
Perceived or real impacts on local amenity of neighbouring properties	Reduced quality of life (actual or perceived).	3	D	M
	Reduced property values.	3	D	M

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

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