

Section 3

Issue Identification and Prioritisation

This section describes how the environmental issues assessed in the Environmental Assessment were identified and prioritised. In summary:

- (i) a comprehensive list of all relevant environmental issues was assembled through consultation with the local community and local and State government agencies, completion of preliminary environmental studies 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) an analysis of risk for each potential environmental impact was then completed with a risk rating assigned to each impact based on likelihood and consequence of occurrence; and*
 - (iv) through a review of the allocated risk ratings and the frequency with which each issue was identified, the relative priority of each issue was determined, with this priority used to provide an order of assessment and breadth of coverage within Section 4.*
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3.1 INTRODUCTION

In order to undertake a comprehensive *Environmental Assessment* of the proposed Narrabri Coal Project, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community. To ensure this has occurred, a program of community and government consultation, preliminary environmental studies and literature review was undertaken to identify relevant environmental issues and potential impacts. This 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 the *Environmental Assessment*.

3.2 ISSUE IDENTIFICATION

3.2.1 Introduction

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

- consultation with surrounding landowners (Section 3.2.2.1);
- consultation with the wider local community (Section 3.2.2.2);
- consultation with State and local government agencies (Section 3.2.2.3);
- consultation with relevant community business people and representatives as part of a social impact assessment (Section 3.2.2.4);
- reference to relevant NSW government policies and guidelines (Section 3.2.3); and
- preliminary environmental studies (Section 3.2.4).

3.2.2 Consultation

3.2.2.1 Consultation with Surrounding Landowners

Consultation with the surrounding landowners (within an approximate 4km to 6km radius of the Pit Top Area) commenced in March 2004 with representatives of the Proponent meeting with the owners of nine local properties and NSW Forests to discuss the project in a general / conceptual manner. Several landowners were contacted on more than one occasion during this period (March to June 2004). Discussions with the wider community were also commenced by the Proponent at this time (see Section 3.2.2.2).

In late June and July 2004, the Proponent recommenced discussions with the property owners within the Proponent's exploration licence area (EL 6243) regarding access arrangements for drilling. Further detail on the project was discussed and the possibility of purchase raised by several landowners. Once a viable resource was identified, follow-up consultation (between August and November 2005) concentrated upon negotiating the purchase of the properties required for the proposed Pit Top Area. A total of nine landholders were included in the follow-up discussions with six of these visited on more than one occasion.



Since August 2005, the Proponent has purchased and reached agreement to purchase four properties within the Project Site focussing on the Pit Top Area. Consultation has subsequently focussed on one-on-one discussions with these and other landowners regarding the specific project design of the first stage of the project, possible environmental impacts and the approvals process. The contacted landowners raised a range of issues relating to the project with most indicating possible impacts on groundwater availability and property values were of greatest concern. The Proponent and their representatives have placed considerable emphasis upon discussions with one landowner whose concerns included possible impacts on the availability of water resources (both ground and surface), value of the property, “peace and quiet” offered by the rural setting, possible subsidence and the safety of the local school bus service. This landowner has plans to establish a tourist venture on this property that adjoins the Project Site, but has not at this stage lodged a development application for the venture with Narrabri Shire Council. Another local landowner raised concerns related to visibility, noise and dust. Acknowledging the concerns of many local landowners over possible impacts on their groundwater supplies, a representative of the Proponent visited the owners of properties surrounding the Project Site to confirm the details of all property bores. It was noted that only one bore identified was unlicensed and not originally addressed in the groundwater assessment by the specialist groundwater consultant (see Part 2 of the *Specialist Consultant Studies Compendium*).

A complete consultation log summarising the consultation undertaken to date is included in Part 9 of the *Specialist Consultant Studies Compendium*. **Table 3.1** also summarises the issues raised during consultation with the local and owners and wider local community.

3.2.2.2 Consultation with the Local Community

In June 2004, the Proponent held preliminary discussions with a number of people within the village of Baan Baa to introduce the project. Those consulted were generally in favour of the then proposed project. The wider local community was kept informed through a number of newspaper articles in the local press (“*The Land*”, “*Namoi Valley Independent*”, “*North West Magazine*” and “*The Courier*”) since 2004 with respect to the project. These articles have largely been supportive of the project and the potential economic and social benefits to the local area that would result from the development of the project.

The “Application for the Project Approval” was advertised in the local press on 3 and 5 January 2006, with the associated Project Description Report (see **Appendix 1**) available on the DoP website for public viewing.

In February 2006, Community Consultation Newsletter No. 1 was hand delivered to all surrounding landowners, as well as to the residents of Baan Baa. This newsletter provided information on the proposed Narrabri Coal Project – Stage 1, the environmental assessments that were being undertaken for compilation into the *Environmental Assessment* and the project assessment and approvals process under Part 3A of the *Environmental Planning and Assessment Act 1979*.

In July 2006, Community Consultation Newsletter No.2 was hand delivered to all surrounding land owners and the residents of Baan Baa. The newsletter recapped the information on the project, provided an updated project overview (based on the completion of a number of specialist environmental and technical studies), presented information on the approvals process for the project and summarised the findings of all specialist environmental studies.



3.2.2.3 Consultation with Government Authorities

A Planning Focus Meeting was held for the project on 29 September 2005. The meeting was attended by representatives from all relevant government agencies and included a site visit and a presentation about the project.

A number of issues to be covered in the *Environmental Assessment* were identified during the meeting and these issues were subsequently formalised in correspondence from each government agency. This correspondence was forwarded to the Department of Planning (DoP) and was distilled into the Director-General's requirements (DGRs), originally issued by the DoP on 6 January 2006. The DGRs were re-issued on 24 January 2007 to reflect the need for a greenhouse gas assessment. The DGRs identify key assessment requirements which are required to be addressed in the *Environmental Assessment* together with a description of what measures would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor these impacts. The key issues raised in the DGRs were as follows.

- Subsidence.
- Soil and Water
- Noise.
- Air Quality.
- Greenhouse Gases
- Traffic and Transport.
- Flora and Fauna.
- Heritage.
- Visual Amenity.
- Socio-economic.
- Cumulative Impacts.

Appendix 2 presents an itemised and tabulated summary of both the individual issues that were provided in the correspondence of the government agencies to DoP and the formal DGRs.

An initial *Environmental Assessment* was submitted to the Department of Planning and other government agencies in July 2006 for an assessment of adequacy with feedback received from the Department of Planning, Department of Natural Resources and Department of Environment and Conservation seeking additional information or further clarity within the *Environmental Assessment*. This triggered the completion of additional assessments in the areas of groundwater, surface water management, soils, ecology, noise and traffic. This document incorporates the results of the additional studies and assessments required to satisfy the requests of the three departments.

3.2.2.4 Social Impact Assessment Consultation

Key Insights Pty Ltd undertook a social impact assessment (SIA) to identify the potential social impacts of Stage 1 of the Narrabri Coal Project (see Section 4B.10 and *Specialist Consultant Studies Compendium* - Part 9). Part of this SIA involved interviews with the following people in various sectors of the Narrabri and district community.

- Rob Gilbert and Paul Thomas (Real Estate Agents from Narrabri).
- Pete Smith from Narrabri TAFE.
- Viv Fouracre, the Principal of Baan Baa Public School.
- Councillor Ken Bates (Narrabri Shire Council).
- Bill Birch, the Narrabri Council Economic Development Officer.



The most common theme in the interviews was a broad support for this and other coal mining proposals in the area. There was an understanding that mining in the area would lead to increased economic and social benefits for the area. Furthermore, those interviewed acknowledged that mining would represent a welcome diversification of the economic base in the Narrabri area.

The key issues that were raised during this consultation were as follows.

- **Education & Training Capacity**
 - For mining personnel.
 - To support local employment.
 - For the families of miners (children, teenagers and partners).
- **Housing Capacity**
 - To support population growth.
 - Local government support through LEPs and zoning.
- **Economic Development and Employment Capacity**
 - Ability to attract local supply industries.
 - Ability to staff and train local workers in the supply industries.
 - Career pathways, particularly for young locals.
 - Local government support through zoning and development programs.

Further information on the SIA is presented in Section 4B.10.

3.2.3 Review of Planning issues and Environmental Guidelines

3.2.3.1 Introduction

A number of State and regional planning instruments apply to the project. These planning instruments were reviewed to identify any environmental aspects requiring consideration in the *Environmental Assessment*. In addition, the DGRs identified a number of guideline documents to be referenced / reviewed during the preparation of the *Environmental Assessment* (see **Table A2-1**).

A brief summary of each relevant planning instrument is provided in Sections 3.2.3.2 to 3.2.3.4. The application and relevance of planning instruments related to specific environmental issues have been assessed in the relevant specialist consultant assessments. Section 3.2.3.5 briefly outlines the approach taken to referencing and reviewing environmental guideline documents.

3.2.3.2 State Planning Issues

State Environmental Planning Policy No. 33 (SEPP 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.



While it is noted that under the *Narrabri Local Environmental Plan 1992*, the project is not classified as an ‘industry’, the hazardous substances and dangerous goods to be held or used on the Project Site are required to be identified and classified in accordance with the risk screening method contained within the document entitled *Applying SEPP 33 2nd edition*, (DUAP, 1997). As the hazardous substances and dangerous goods to be used / stored on the Project Site would be restricted to well managed diesel fuel, the project is not considered to be a hazardous or offensive industry (see **Appendix 3**).

State Environmental Planning Policy No. 44 (SEPP 44) – Koala Habitat Protection

The Narrabri Local Government Area (LGA) is identified in Schedule 1 of this policy as an area that could provide habitat for Koalas. The policy requires an investigation be carried out to determine if core or potential Koala habitat is present on the areas of the Project Site likely to be disturbed. Core Koala habitat comprises land with a resident population of Koalas whereas potential Koala habitat comprises land with native vegetation with known Koala feed trees constituting at least 15% of the total number of trees present on a site.

SEPP 44 has been addressed by the ecological consultant to the project (Ecotone, 2007 - see *Specialist Consultant Studies Compendium* - Part 3).

3.2.3.3 Regional Planning Issues

Orana Regional Environmental Plan (REP) No 1 – Siding Spring

The Project Site lies within a new region, called the Siding Spring Observatory Dark Skies Region, declared by the (then) Minister for Infrastructure and Planning to better protect the observing conditions at the Siding Spring Observatory. The new region includes all local government areas falling within 200km of the observatory. The Project Site is approximately 140km northeast of the Siding Spring Observatory. Under Section 8 of the REP, consultation and/or concurrence is only required for locations within 100km of the observatory. As such, this REP has not been considered further.

Additionally, the lighting proposed for the Pit Top Area (Section 2.4.5), would be soft lighting to minimise visual intrusion to the surrounding landholders and as such, would not significantly impact on the Siding Spring Observatory given the separation distance.

3.2.3.4 Environmental Guidelines

The DGRs require that in assessing the identified key assessment requirements, reference be made to one or more guideline documents. In addition, a number of the government agencies consulted in relation to the project required reference to other environment guideline documents. Each of these guidelines was obtained, reviewed and where appropriate forwarded to the relevant specialist consultant for incorporation into the specialist environmental studies.



3.2.4 Preliminary Environmental Studies

Following the confirmation that a mineable resource was present within the northern half of EL 6243, and during the initial project design phase, a number of preliminary environmental studies were commenced to identify the constraints posed by the local environment and what elements of the local environment would require further consideration and assessment should a development application for the Narrabri Coal Project be submitted. Studies in the fields listed below were commenced.

- Aboriginal Heritage
- Flora and Fauna
- Noise
- Visibility
- Water Resources
- Soil
- Air Quality
- Subsidence

None of the identified issues were considered of a magnitude that would prevent the preparation of a project design and submission of a development application.

3.2.5 Summary of the Identified Environmental Issues and Impacts

Table 3.1 presents a summary of the environmental issues identified, and the frequency with which each was identified, as part of the identification process. The frequency of identification provides an initial indication of those environmental aspects perceived to be at greatest risk and hence of greatest priority and **Table 3.1** has been ordered accordingly (from most to least frequently identified).

Following a review of the project design, the local environment and other factors, a number of potential sources of risk and their corresponding potential environmental impacts were identified for each of the environmental issues presented in **Table 3.1**. **Table 3.5** presents the identified sources of risk / potential incidents and the subsequent potential environmental impacts.

The risk associated with identified environmental impacts of **Table 3.5** has been determined in accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004 and through consideration of the potential consequence(s) of the environmental impacts.

3.3 ANALYSIS OF RISK AND ISSUE PRIORITISATION

3.3.1 Analysis of Risk

Risk is the chance of something happening that will have an impact upon the objectives or the task, which in this case is development and operation of the project with minimal affect on the local environment. Risk is measured in terms of consequence (severity) and likelihood (probability) of the event happening. For each environmental issue identified in **Table 3.1**, the potential environmental impacts (see **Table 3.5**) have been allocated a risk rating based on the potential consequences and likelihood of occurrence.



Table 3.1
Summary of Identified Environmental Issues

Environmental Issue	Source and Frequency of Identification				Summary
	Government Consultation ¹	Community Consultation ²	Preliminary Environmental Studies ³	Legislation, Policies & Guidelines ⁴	
Groundwater	7	3	1	5	16
Air pollution - dust/odour/other	6	1	1	4	12
Erosion/sediment minimisation	9			3	12
Surface Water / Flooding	8	1		2	11
Threatened flora and fauna protection	7		2	2	11
Noise	6	1	1	2	10
Subsidence	5	1	1	2	9
Traffic and transport	6				6
Rehabilitation, final landform & biodiversity offsets	5	1			6
Aboriginal heritage	2	1	1	2	6
Visual amenity	3	2	1		6
Vibration	2	1	1	1	5
Waste management				3	3
Soils and land Capability	2	1			3
Land and/or water contamination	2				2
Spontaneous combustion	1				1
Socio-economic impacts	1				1
Property values		1			1
Note 1: Summarised from the Director-General's Requirements and attached correspondence to DoP from consulted government agencies (see Appendix 2). Note 2: Summarised from one-on-one discussions held with surrounding landowners and consultation undertaken as part of SIA (see Part 9 of the <i>Specialist Consultant Studies Compendium</i>). Note 3: Based on the identified constraints of preliminary environmental studies conducted by the specialist consultants for the project. Note 4: A record of the environmental legislation, planning documents and guidelines required to be referenced in the preparation of the <i>Environmental Assessment</i>.					

The allocation of a consequence rating was based on the definitions contained in **Table 3.2**. It is noted that the assigned consequence rating represents the highest level applicable, ie. if a potential impact is assigned a level of 4 - Major based on impact to the environment and 2 - Minor based on area of impact, the consequence level assigned would be 4 - Major.

The likelihood or probability of each impact occurring was then rated according to the definitions contained in **Table 3.3**.

The risk associated with each environmental impact was assessed without the inclusion of any operational controls or safeguards in place and 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 of **Table 3.4**.



Table 3.2
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 detrimental 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 - Table 4(B)

Table 3.3
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 - Table 4(A)

Table 3.4
Risk Rating

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 - Table 4(C)



Table 3.5
Risk Sources and Potential Environmental Impacts

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Environmental Issue (see Table 3.1)	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Groundwater	• Pollution of groundwater due to hydrocarbon spills.	• Decreased groundwater quality.	• Surrounding landholders utilising bores or spear pumps.	• Reduced groundwater quality causing reduced availability for existing uses.
	• Reduction of groundwater levels due to mine in-flows.	• Reduction in the quantity of water stored in aquifers of the Great Artesian Basin Groundwater Management Area. • Reduction in the quantity of water stored in aquifers of the Gunnedah Basin Groundwater Management Area. • Reduction in the quantity of water stored in aquifers of the Upper Namoi Groundwater Management Area.	• Aquifers of the Great Artesian Basin, Gunnedah Basin and Upper Namoi groundwater management areas.	• Reduction in recharge to the embargoed Great Artesian Basin. • Reduction in groundwater levels within the aquifers of the impacted groundwater management areas.
	• Reduced yields of groundwater bores and/or springs.	• Decrease in availability of groundwater to adjoining landowners and/or groundwater dependent ecosystems.	• Groundwater bores and/or springs of adjoining landowners.	• Reduced yields of local groundwater bores. • Degradation of groundwater dependent ecosystems.
	• Pollution of surface lands or water as a consequence of uncontrolled discharge of dewatered mine in-flows.	The risk sources and potential impacts are considered attributable to "surface water" and are considered in that section of the risk analysis.		
Air Pollution – Dust, Odour, Greenhouse Gases, other	• Dust generation resulting from vehicle movements on unsealed roads.	• Increased deposited and suspended particulates.	• Surrounding residences and buildings.	• Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.
	• Wind action on disturbed areas and stockpiles.			• Adverse health impacts (if PM ₁₀ levels are excessive).
	• Mine ventilation.	• Saline nature of vented air from underground workings.	• Surrounding vegetation.	• Vegetation die-off.
	• Vehicle emissions. • Emissions resultant from the transport and burning of the mined and sold coal.	• Increased greenhouse and other gas emissions.	• Local air-shed. • Global air-shed	• Increased contribution to green house effect.
Erosion / Sediment Minimisation	• Erosive actions of wind and water. • Suspension of sediments within runoff resulting from erosion of disturbed areas	• Loss of topsoil. • Increased sedimentation within downstream creeks and Namoi River.	• Project Site soils. • Kurrajong and Pine Creeks and tributaries. • Namoi River.	• Soil erosion. • Increased sediment load in drains and/or waterways.
Surface Water / Flooding	• Reduction in environmental flows through on-site capture of water.	• Reduced flows to downstream vegetation. • Decreased availability of water to downstream stock watering dams.	• Downstream flora and fauna. • Downstream agricultural lands.	• Reduced natural surface water flows resulting in stress to native vegetation and degradation of fauna habitats and/or reduced viability of grazing lands.
	• Discharge of dirty, saline or contaminated water.	• Decreased water quality. • Impacts on local soils and vegetation.	• Local creeks and tributaries. • Project Site soils and vegetation.	• Reduced quality of downstream waters. • Indirect impacts on soil quality and vegetation.
	• Altered flood regimes.	• Altered flood regimes.	• Local communities and ecosystems.	• Changes to local flooding patterns and indirect impacts on native vegetation communities and ecosystems.
Threatened Flora and Fauna Protection	• Removal of native vegetation due to land clearing activities.	• Removal of habitat and disturbance to threatened species.	• Vegetation within Project Site and area of influence.	• Loss of, or alteration to, existing habitats. • Direct adverse impact on threatened species.
	• Damage to vegetation as a result of saline water discharge (water and mine ventilation).	• Vegetation stress/death.		
	• Disturbance to fauna and fauna habitat as a result of project operations, eg. noise, dust etc.	• Reduction in biodiversity of the Project Site.	• Local communities and ecosystems.	• Reduced biodiversity. • Direct adverse impact(s) on threatened species, populations or communities.
Noise	• Increased noise levels resulting from operation of mobile equipment, crushing and screening equipment and product transportation.	• Decreased amenity. • Health related issues. • Impacts on livestock. • Decreased land values.	• Surrounding residents, landowners and livestock.	• Increased noise and levels associated with construction and operational activities causing annoyance, distractions, ie. amenity impacts. • Increased noise and/or vibration levels associated with the project road and rail traffic causing annoyance, distractions, ie. amenity impacts. • Sleep disturbance as a result of maximum noise levels. • Increased noise levels associated with the project leading to reduced production, ie. impacts on livestock.



Table 3.5 (Cont'd)
Risk Sources and Potential Environmental Impacts

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Environmental Issue (see Table 3.1)	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Subsidence	• Reduced topographic elevation of land surface above underground workings.	• Changes to local drainage. • Changes to local land use as a consequence of lowered elevation, altered drainage.	• Land above underground workings and associated drainage.	• Impacts on surface and groundwater flows. • Increased erosion potential. • Decreased agricultural value of affected land.
	• Movement of Aboriginal sites and/or artefacts.	• Damage to Aboriginal artefacts.	• Land above underground workings and associated vegetation and archaeological material.	• Damage to Aboriginal artefacts.
Traffic and Transport	• Increased traffic levels due to movement of workforce and contractors. • Addition of rail loop to local rail network.	• Increased vehicle movements (especially heavy vehicles) on local roads. • Impacts associated with rail loop construction. • Increased rail movements on local rail network.	• Surrounding road network. • Land on which the rail loop is to be constructed. • Local rail network.	• Increased traffic congestion. • Elevated risk of accident/incident on local roads. • Road pavement deterioration. • Elevated risk of rail related accident/incident.
Rehabilitation, Final Landform & Biodiversity Offsets	• Modified landform on completion of the project. • Modified land uses on the Project Site.	• Reduced amenity of the Project Site. • Reduced agricultural capability of Project Site lands.	• Project Site lands.	• Reduced amenity of altered Project Site landform. • Reduced access to agricultural lands. • Increase in areas designated for native vegetation conservation.
Aboriginal Heritage	• Removal or destruction of Aboriginal sites and/or artefacts due to Project Site construction and mining activities.	• Loss or damage to Aboriginal artefacts.	• Local Aboriginal community	• Impact on identified sites and/or artefacts of Aboriginal cultural heritage as a result of the proposed construction and mining activities. • Impact on unidentified sites and/or artefacts of Aboriginal cultural heritage as a result of subsidence.
Vibration	• Increased levels of vibration from mine blasting. • Increased vibration levels from surface operations, including rail transport.	• 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. • Reduced agricultural production.
Visual Amenity	• Changes in visual characteristics of the Project Site.	• Changed visual outlook during operation	• Surrounding residents and local motorists.	• Decreased visual amenity.
	• Lighting influencing effectiveness of the Siding Springs Observatory.	• Reduced effectiveness of the Siding Springs Observatory.	• Siding Springs Observatory.	• Reduced effectiveness of the Siding Springs Observatory.
Waste Management	• Production of contaminating or polluting materials, eg. acid producing overburden, waste oils, saline water, general rubbish.	• Contamination of downstream surface waters. • Contamination of groundwater. • Contamination of downstream lands. • Reduced visual amenity.	• Project Site land and water resources. • Downstream land and water resources. • Groundwater.	• Hydrocarbon contamination of surface water. • Hydrocarbon contamination of groundwater. • Acid generation from overburden used in construction of bunds and Pit Top Area structures. • Saline water contamination of downstream waters and lands. • Reduced amenity of Project Site due to poor rubbish, litter management.
Soil and Land Capability	• Reduction in soil quality and availability through poor management practices.	• Structural damage to soils through poor management practices. • Reduced biological activity of soils. • Erosion of stripped, stockpiled and replaced soils.	• Project Site soils.	• Insufficient soil quantities for rehabilitation. • Reduced soil quality. • Elevated erosion or erosion potential.
	• Decreased land capability in final landform.	• Reduced productivity of Project Site agricultural land.	• Project Site soils.	• Decreased land and agricultural capability of the final landform.
Land Contamination	• Mining and other excavations exposing previously contaminated materials.	• Transfer of contaminated materials to non-contaminated areas.	• Areas receiving contaminated material (including surface waters).	• Transfer of contaminated material. • Surface water contamination.
Spontaneous Combustion	• Spontaneous combustion event.	• Uncontrolled fire event.	• Coal stockpiles, Project Site and surrounding environs.	• Injury resultant from fire. • Destruction of vegetation resultant from spreading fire.
Socio-Economic Impacts	• Alteration of social activities or employment due to employment generation and capital expenditure.	• Reduced unemployment and increased local spending.	• Local community and businesses	• Improved economic activity and related social impacts attributable to reduced unemployment
	• Perceived or real impacts on local amenity of neighbouring properties.	• Reduced property values.	• Surrounding property owners.	• Reduced quality of life (actual or perceived). • Reduced property values.
Property Values	• Reduction in property values due to presence of mining operation.	• Changed property values	• Surrounding landowners	• Possible short-term reduction in land values versus increases from increased economic growth.

Source: Modified after HB203:2006 - Table 3



The four risk rankings are defined as follows.

- Low (L): 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): 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): 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): 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 3.5 presents the identified potential impacts that may be associated with each environmental issue based on the source or risk or potential incident, potential consequences and local receptor/surrounding environment.

Table 3.6 provides an assessment of the unmitigated risk for each potential environmental impact based on the classifications and definitions provided on Pages 3-9 and 3-10. 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** in Section 6 provides an analysis of risk following the implementation of operational and safeguards measures.

3.3.2 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.

- The key assessment requirements of the DGRs (see Section 3.2.2.3 and **Appendix 2**).
- Issues identified with a greater frequency of impacts with high or extreme risk ratings (see **Table 3.6**).
- Issues with a high frequency of identification (see **Table 3.1**).

The Proponent recognises that due to the breadth of the consultation for the project, some community representatives are likely to have been consulted on more than one occasion or as part of more than one stakeholder group. Similarly, the various government agencies consulted invariably duplicated many issues requiring assessment. As a consequence, the frequency of



identification for some issues may be slightly elevated. Notwithstanding this duplication, and considering the comprehensive nature of the consultation program, the potentially elevated frequency of identification for some issues, is not assessed as unduly influencing the prioritisation of issues given those issues likely to be repeated would generally be noted by many stakeholders and are therefore likely to be highly identified in any event.

Table 3.6
Analysis of Risk

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Potential Environmental Impacts (see Table 3.5)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Groundwater				
Groundwater Pollution by leaking/spilt hydrocarbon	Contamination requiring minor recovery works	2	D	M
	Contamination requiring major recovery works	4	E	H
Drawdown of groundwater within the aquifers of the GWMA's considered	Reduced water levels within the aquifers of the Great Artesian Basin GWMA reducing recharge to this GWMA.	4	D	H
	Reduced water levels within the aquifers of the Gunnedah Basin GWMA.	2	B	H
	Reduced water levels within the aquifers of the Upper Namoi GWMA.	3	C	H
Reduction in groundwater bore yields	Impacts restricted to groundwater bores on Proponent owned land	2	A	H
	Reduction in yield of <15% of non-project related bores	2	B	H
	Reduction in yield of >15% of non-project related bores	3	C	H
Impacts on Groundwater Dependent Ecosystems		3	D	M
* Impacts resultant from uncontrolled discharges of dewatered mine in-flows are considered as part of the Surface Water / Flooding and Drainage section of the risk analysis.				
Air Quality				
Nuisance - deposited dust	Deposited dust levels attributable to the project occasionally (for one or two months every year) above DEC guideline, affects only adjacent landholders.	2	C	M
	Deposited dust levels attributable to the project regularly (exceedances greater than DEC guideline for >5 months per year) affects landholders some distance from the Project Site.	3	C	H
Health - PM10	PM ₁₀ levels attributable to the project occasionally (once every 1 to 2 years) above the project goal, affects only adjacent landholders.	2	C	M
	PM ₁₀ levels attributable to the project occasionally (>5 times per year) above the project goal, affects landholders some distance from Project Site.	3	C	H
Ventilation of Saline Water resulting in impacts on vegetation	Restricted to predominantly non-native vegetation within immediate vicinity of ventilation shaft	2	C	M
	Impacts on native vegetation or extending beyond immediate vicinity of ventilation shaft	3	B	H
	Impacts extend beyond the Project Site or impact on extensive areas of native vegetation.	4	D	H
Greenhouse Gas Emissions		1	B	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 3.6 (Cont'd)
Analysis of Risk

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Potential Environmental Impacts (see Table 3.5)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Soil Erosion and Sedimentation				
Soil erosion	Minor gully erosion of drainage lines, stockpiles or created slopes	2	B	H
	Minor sheet or gully erosion of rehabilitated landform	2	C	M
	Major gully or sheet erosion formation	3	B	H
Sediment Load and Turbidity	One-off discharge of dirty water from the Project Site	2	A	H
	Regular discharge of dirty water from the Project Site	3	C	H
Surface Water/Flooding and Drainage				
Reduced natural surface water flows	Reduced productivity of downstream grazing lands	2	D	L
	Stressing of downstream native vegetation due to restricted flows	2	C	M
Reduced quality of downstream waters	Isolated and minor event resulting in temporary degradation of water quality in local creeks and tributaries, eg. minor discharge of saline water	2	A	H
	Continuing discharge of contaminated water resulting in ongoing degradation of water quality in local creeks and tributaries, eg. frequent/periodic discharge of saline or dirty water	4	B	E
	Isolated and major event resulting in temporary but wider spread degradation of water quality, eg. discharge of hydrocarbons reaching Namoi River	3	C	H
	Repeated major event resulting in long-term and wide spread degradation of water quality, eg. continued discharge of saline water reaching the Namoi River	4	C	E
Changes to local flooding patterns and indirect impacts on native vegetation communities and ecosystems.		3	C	H
Threatened Flora and Fauna				
Loss of, or alteration to, existing habitats.	Disturbance to native vegetation / habitat within nominated areas	2	A	H
	Disturbance to native vegetation / habitat outside nominated areas	3	D	M
Direct adverse impact on threatened species.	Disturbance to Threatened flora / fauna and endangered communities	3	C	H
	Disturbance leading to local population reduction	4	D	H
	Disturbance leading to local extinction(s)	5	E	E
Reduced biodiversity	Local biodiversity	3	D	M
	Regional biodiversity	4	D	H
Noise				
Increased noise levels associated with Project Site activities causing annoyance, distractions, ie. amenity impacts.	Occasional minor exceedance of noise criteria (1-2dB(A))	2	C	M
	Regular minor exceedance of noise criteria (1-2dB(A))	3	D	M
	Occasional marginal exceedance of noise criteria (3-5dB(A))	2	C	M
	Regular marginal exceedance of noise criteria (3-5dB(A))	3	D	M
	Occasional major exceedance of noise criteria (>5dB(A))	2	C	M
	Regular major exceedance of noise criteria (>5dB(A))	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				



Table 3.6 (Cont'd)
Analysis of Risk

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Potential Environmental Impacts (see Table 3.5)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Noise (Cont'd)				
Increased noise / vibration levels associated with project road and rail traffic activities causing annoyance, distractions, ie. amenity impacts.	Occasional minor exceedance of noise criteria (1-2dB(A))	2	C	M
	Regular minor exceedance of noise criteria (1-2dB(A))	3	D	M
	Occasional marginal exceedance of noise criteria (3-5dB(A))	2	C	M
	Regular marginal exceedance of noise criteria (3-5dB(A))	3	D	M
	Occasional major exceedance of noise criteria (>5dB(A))	2	C	M
	Regular major exceedance of noise criteria (>5dB(A))	3	D	M
Maximum noise levels resulting in sleep disturbance.		2	C	M
Increased noise levels associated with the project leading to reduced production, ie. impacts on livestock.		3	E	M
Subsidence				
Damage to buildings / structures		3	D	M
Impacts on surface and groundwater flows		3	D	M
Increased erosion potential		2	D	L
Decreased agricultural value of affected land		2	D	L
Damage to Aboriginal artefacts		4	D	H
Traffic and Transport				
Increased traffic congestion		3	D	M
Road pavement deterioration		3	C	H
Elevated risk of accident/incident on local roads	Minor accident - no injury	2	C	M
	Minor accident - minor injury	3	D	M
	Major accident -moderate injuries requiring hospitalisation	4	E	H
	Severe accident - severe injuries or death injury	5	E	H
Elevated risk of rail related accident/incident	Minor accident - no injury	2	D	L
	Minor accident - minor injury	3	D	L
	Major accident -moderate injuries requiring hospitalisation	4	E	H
	Severe accident - severe injuries or death injury	5	E	H
Rehabilitation, Final Landform & Biodiversity Offsets				
Reduced access to agricultural lands.		2	C	M
Increase in areas designated for native vegetation conservation		n/a	n/a	n/a
Aboriginal Heritage				
Impact on identified sites and/or artefacts of Aboriginal cultural heritage as a result of the proposed construction and mining activities and without the permission of LALC or DEC		4	C	E
Impact on unidentified sites and/or artefacts of Aboriginal cultural heritage as a result of subsidence and without the permission of LALC or DEC		3	C	H
Vibration				
Structural damage to buildings and structures		3	D	M
Nuisance/amenity impacts on surrounding landowners / residents		2	D	L
Reduced agricultural production		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 3.6 (Cont'd)
Analysis of Risk

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Potential Environmental Impacts (see Table 3.5)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Visual Amenity				
Reduced amenity of altered Project Site landform	Temporary disturbance to landform	1	A	H
	Marginally identifiable change to landscape	2	A	H
	Highly identifiable change to landscape	3	C	H
Impacts on the effectiveness of the Siding Springs Observatory		2	D	L
Waste Management				
Contamination by waste oil.	Contamination requiring minor recovery works	2	D	L
	Contamination requiring major recovery works	3	E	M
Acid generation from overburden used in construction of bunds and Pit Top Area structures.		3	E	M
Reduced amenity of Project Site due to poor rubbish, litter management		1	C	L
Soil and Land Capability				
Insufficient soil quantities for rehabilitation.		3	C	H
Reduced soil quality	Temporary disturbance to soil	1	B	M
	Degradation of soil quality	2	C	M
Elevated erosion or erosion potential.		2	C	M
Decreased land and agricultural capability of the final landform		3	C	H
Land Contamination				
Transfer of contaminated material	Small area affected (<0.01ha)	2	D	L
	Large area affected (>0.01ha)	3	D	M
Contamination of surface water as a result of exposing contaminated lands	Minor and temporary contamination of water quality in local creeks and tributaries	2	C	M
	Minor and continuing contamination of water quality in local creeks and tributaries	3	D	M
	Major and temporary contamination of water quality in local creeks and tributaries	3	D	M
	Major and continuing contamination of water quality in local creeks and tributaries	5	E	H
Spontaneous Combustion				
Injury sustained as a consequence of fire	Minor injury	2	D	L
	Moderate injury requiring first aid	3	E	M
	Injury requiring hospitalization	4	E	H
	Severe injury or death	5	E	H
Impacts on native flora and fauna in the event of fire spreading beyond coal stockpiles	Small fire within Project Site	2	D	L
	Moderate fire extending beyond the Project Site	3	E	M
	Large fire extending far beyond the Project Site	4	E	H
Socio-Economic Impacts and Property Values				
Improved economic activity and related social impacts attributable to reduced unemployment		n/a	n/a	n/a
Reduced quality of life (actual or perceived)		3	D	M
Reduced property values	Temporary decrease in property values	2	C	M
	Moderate term decrease in property values	3	C	H
	Long term decrease in property values	3	D	H
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				



Based on the issues identified and the risk ratings allocated to the potential environmental impacts of these, the following order of priority has been determined. This order of priority provides for the order of assessment in Parts B and C of Section 4, namely:

1. Surface Water / Flooding and Drainage
2. Groundwater
3. Flora and Fauna
4. Aboriginal Heritage
5. Soils and Land Capability
6. Visual Amenity / Rehabilitation and Final Landform
7. Air Quality
8. Traffic and Transport
9. Noise and Vibration
10. Subsidence Management
11. Social Impact

It is noted that the inclusion of “Socio-economic Setting” at N^o 11 is not a direct consequence of the risk analysis. Rather, it is included at N^o 11 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.

The sources of risk and potential environmental impacts associated with each issue are discussed within relevant subsections within Section 4. All other issues generally allocated a “moderate” or “low” level of priority, have been addressed to the level considered appropriate throughout the *Environmental Assessment*.

