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 unmitigated 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 Longwall 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, and review of previous environmental studies, environmental monitoring and environmental planning documentation 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 Longwall Project involved a combination of consultation and background investigations and research. This included:

- consultation with surrounding landowners and the local community (Section 3.2.2.1);
- consultation with State and local government agencies (Section 3.2.2.2);
- reference to relevant NSW government policies and guidelines (Section 3.2.3); and
- a review of previous environmental studies undertaken on the Mine Site and ongoing environmental monitoring (Section 3.2.4).

3.2.2 Consultation

3.2.2.1 Consultation with Surrounding Landowners and the Local Community

Initial Notification and Consultation Regarding Proposed Mining within Narrabri Shire (2004-2007)

Prior to the preparation of an *Environmental Assessment* for the Stage 1 Narrabri Coal Project, the Proponent held discussions with a number of people within the village of Baan Baa to introduce Narrabri Coal Operations Pty Ltd, the proposal to commence underground mining at the Mine Site and potential future plans for longwall mining at the then proposed Narrabri Coal Mine. Generally, those consulted were in favour of the then proposed project. The wider local community has also been 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 associated economic and social benefits to the local area.

Additional one-on-one consultation, as well as the distribution of two community newsletters followed this initial consultation to ensure that all potentially affected members of the local community were kept informed and provided with opportunity to raise concerns over the then proposed coal mine.

As part of the initial consultation for the Narrabri Coal Mine, a number of representatives of the Narrabri community were interviewed as part of Social Impact Study completed by Key Insights Pty Ltd (Key Insights, 2007) (in relation to the potential impact of mining and mining related industry on the socio-economic fabric of Narrabri Shire.

Those interviewed consistently noted that there was broad support for the Narrabri Coal Project 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 issues raised and identified in Key Insights (2007) remain relevant to the proposed Longwall Project and are addressed, and where appropriate updated, in Section 4B.12.

Consultation and Community Involvement Following Commencement of the Narrabri Coal Mine (2007-2008)

Following the granting of approval for the Narrabri Coal Mine and commencement of site establishment activities, and to provide a link between the mining operations and the local community, the Proponent conducted a Mine Open Day on 1 October 2008. A bus tour of the Pit Top Area was organised and those attending provided with information on the works conducted at that time and the timetable for completing site establishment and commencing mining. A total of 49 people from across the district (Baan Baa, Turrawan, Narrabri and other locations) visited the mine on this day with none of those visiting the Mine Site raising objections or concerns with the operations.

The Proponent has maintained dialogue with Narrabri Shire Council, with senior management visiting a number of Council meetings since the commencement of operations. In addition, the General Manager of Narrabri Coal Operations Pty Ltd has addressed various community groups such as the Narrabri Rotary Club to explain operations at the mine and plans for future development. An open door policy has been maintained by the Proponent at the Narrabri Coal Mine with numerous visits by members of the community and community groups hosted by mine management.

Consultation Regarding the Proposed Longwall Project (2008-2009)

Once the decision to progress the mining operations to the Stage 2 Longwall Project was made, a *Preliminary Environmental Assessment* for the proposed Longwall Project was prepared and a copy provided to the owners, residents or leaseholders of properties within and adjacent to (within 2km) the Mine Site to inform them of the Proponent's intention to develop the longwall mine. Along with the *Preliminary Environmental Assessment*, an invitation was provided to the land owners / residents to comment on the proposal. This initial approach was taken as many of the land owners within and adjacent to the Mine Site do not reside on these properties and make only occasional visits to their properties. By providing the *Preliminary Environmental Assessment* and a written invitation to comment on the proposal, the Proponent could be more

certain that each land owner was provided with an opportunity to raise any concerns they might have with the proposal. An application for project approval was then lodged with the Department of Planning and this application was advertised in the *Namoi Valley Independent* and *Narrabri Courier* on 9 October 2008. Readers of the advertisement were directed to the *Preliminary Environmental Assessment* for the Longwall Project on the Department of Planning's website for further detail on the proposal. It is noted the modified application and project description lodged with the Department of Planning during August 2009 was also advertised in the Narrabri Courier on 25 August 2009.

Following the distribution of the *Preliminary Environmental Assessment*, the Proponent contacted the owners or leaseholders of properties within the Mine Site. Of these fourteen properties, the leaseholder resides on only two properties, all of which are owned by the Proponent. The potential impacts of the proposed Longwall Project were discussed, as was the requirement of the resident having to vacate the premises at some point throughout the life of the mine as a consequence of impacts subsidence would have on the structural stability of the residence. Each leaseholder or property owner was informed that further consultation would be undertaken once more detailed information on the possible impacts of the Longwall Project was available.

On 15 May 2009, a Community Consultation Day was held at the Baan Baa Town Hall where representatives of the Proponent and consultant team were available to discuss the operations and predicted impacts of the proposed Longwall Project. Invitations were sent to all land owners and leaseholders on and adjacent to the Mine Site (including all those identified in **Figure 4A.4**) and an advertisement inviting any interested people placed in the local print media on Thursday 7, Tuesday 12 and Thursday 14 May. Approximately 160 people were recorded as attending between 11:00am and 7:00pm, with considerable support expressed for the proposed Longwall Project. Individual concerns or issues raised were compiled and have been addressed in the relevant section of the *Environmental Assessment*.

Consultation with the Local Aboriginal Community (2009)

Initial consultation with the local Aboriginal community was undertaken by the Proponent's consultant archaeologist and is summarised in AS&R (2009a) (Part 5 of the *Specialist Consultant Studies Compendium*) and Section 4B.5.2.3 of this document. This consultation, including an advertisement placed in the *Narrabri Courier* on 26 August 2008 inviting any stakeholders to register an interest in taking part in an archaeological study for the Longwall Project, met the requirements of the DECC guideline document *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005). Two Aboriginal stakeholders participated in the consultation, namely the Narrabri Local Aboriginal Land Council (LALC) and the Narrabri Gomeroi Traditional Owner Group (Gomeroi).

Following the completion of the first field survey over the Mine Site ("the Panels 1 to 7 Survey Area"), a representative of the Proponent met with representatives of Gomeroi to discuss the completion of field survey over the remaining areas of the Mine Site that could be affected by the proposed Longwall Project ("the Panels 8 to 26 Survey Area"). Mutual agreement over a proposed approach to the field survey of the Panels 8 to 26 Survey Area was reached and the survey was completed between 6 and 14 July 2009. Similar to the process followed following the completion of the field survey of the Panels 1 to 7 Survey Area, a listing of all sites recorded during the investigation was forwarded to both Narrabri LALC and Gomeroi and a request made for each stakeholder to provide their comments and/or recommendations in relation to the identified sites.

Prior to the receipt of any correspondence from the Aboriginal stakeholder groups, the Aboriginal stakeholder groups were again contacted by the archaeologist and invited to take part in field surveys of the Brine Storage Area and Water Pipeline Route. Both Aboriginal stakeholder groups accepted the invitation and provided a representative to take part in the field surveys on the 29 and 30 July.

Following the completion of these surveys, the Proponent finalised a Statement of Commitments in relation to the management of the identified Aboriginal sites and Aboriginal cultural heritage on the Mine Site in general. Meetings between representatives of the Proponent and both Narrabri LALC (6 August 2009) and Gomeroi (13 August 2009) were convened in which the Statement of Commitments was explained and a request for written comment on the proposed site management made. Both Aboriginal stakeholder groups agreed to provide formal correspondence to the Proponent commenting on the proposed management of the identified Aboriginal sites and Aboriginal cultural heritage on the Mine Site.

Other Consultation (2009)

Since lodging the project application, the Proponent has received enquiries from domestic coal customers throughout northern NSW regarding the opportunities to purchase small quantities of coal. The supply of coal to these enterprises would only be possible by road. Whilst discussions remain ongoing in relation to this issue, the Proponent does not envisage any proposed road transport of coal in the immediate future. Any such proposal would be the subject of a future application for project approval (or modification).

3.2.2.2 Consultation with Government Authorities

A Planning Focus Meeting was held for the proposed Longwall Project on 2 September 2008. 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 2 October 2008. 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.

- Soil and Water – with particular emphasis to be placed upon:
  - Any potential impacts on the Great Artesian Basin intake beds;
  - The requirements of the NSW Great Artesian Basin Groundwater Sources Water Sharing Plan, and the Upper and Lower Namoi Groundwater Water Sharing Plan;
  - Management of mine water, especially groundwater dewatered from the mine; and
  - Potential subsidence-induced soil and stream erosion.
- Subsidence.

- Noise.
- Air Quality – including a greenhouse gas assessment.
- Biodiversity – with particular emphasis to be placed upon providing:
  - accurate estimates of vegetation clearing;
  - detailed assessment of potential impacts, particularly from subsidence, on threatened species, populations, ecological communities or their habitat; and
  - description of the measures to be implemented to maintain or improve biodiversity values.
- Heritage – both Aboriginal and non-Aboriginal;
- Transport.
- Visual Amenity.
- Rehabilitation – including a detailed description of the proposed rehabilitation strategy and final landform.
- Socio-economic – with particular emphasis to be placed upon any increased demand for infrastructure and services in the Narrabri – Gunnedah region.

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.

Following the issuing of the DGRs on 2 October 2008, further consultation was undertaken with government agencies and authorities. A summary of the further consultation is provided as follows.

Department of Planning

The Department of Planning (DoP) has been regularly updated as to the status of project planning and the preparation of the *Environmental Assessment*. Based on correspondence with the DoP, it is understood that of critical importance will be demonstration that impacts attributable to the Longwall Project have been predicted and assessed with an acceptable level of certainty, ie. predictions are made based on sufficient site specific data from the local area/region or justifiable assumptions. This issue has been addressed in Section 1.4.4 of this document.

The Proponent discussed the implications of the need to pump water to the Mine Site from the Namoi River and for increased brine storage capacity with the DoP with the consequent updated project application lodged on 12 August 2009. The updated project application resulted in the Department re-issuing the DGRs for the Stage 2 Longwall Project on 27 August 2009.

Department of Environment, Climate Change and Water (Formerly Department of Environment and Climate Change)

Following the receipt of DGRs from the Department of Planning, representatives of the then Department of Environment and Climate Change (DECC) were contacted (22 September 2008 and 13 October 2008) to discuss the proposed methods for assessing impacts on Mine Site ecology and Aboriginal heritage. In both instances, the DECC representatives declined to

provide feedback on the proposed methodology but drew reference to the relevant DECC guidelines for both areas of study (*Draft Guidelines for Threatened Species Assessment*, DEC/DPI, 2005, and the *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*, DEC 2005).

Throughout January and February 2009, ongoing consultation was undertaken with DECC personnel (both by the author of the *Environmental Assessment* and the archaeologist commissioned to undertake the Aboriginal heritage assessment) to inform the DECC of progress of the archaeological surveys over the Mine Site. At the recommendation of DECC personnel, a meeting on the Mine Site to discuss the issues relevant to the Aboriginal heritage field survey and assessment was convened by the Proponent with representatives of both registered Aboriginal stakeholders. Further detail on consultation with the local Aboriginal community was provided in Section 3.2.2.1.

On 29 July 2009, contact was again made with a representative of the then DECC regarding the water quality requirements of the proposed discharge of raffinate to the Namoi River. While not able to provide a definitive limit on the electrical conductivity of water able to be discharged to the river, the DECC representative indicated that an increase in the salt load of the Namoi River may require some form of 'green offset', eg. planting of vegetation to take up the salt within the catchment, cap and piping of bores currently discharging water with elevated salinity or other methods to be negotiated.

The Proponent advised the DECCW in August 2009 of the intended modified application relating to the water pipeline from the Namoi River and the increased brine storage capacity.

Department of Water and Energy (now within the Department of Environment, Climate Change and Water – NSW Office of Water)

Impacts of the proposed longwall mining on the groundwater sources on and surrounding the Mine Site, in particular those of the Upper Namoi Alluvium and Intake Beds of the Great Artesian basin, was identified very early on as an issue requiring careful consideration for the project. In particular, the Department of Water and Energy (DWE) was particularly interested in the building and calibration of a groundwater model which would be used to predict impacts related to groundwater drawdown and mine in-flow. Following the completion of a draft groundwater model and report, a copy was supplied and a presentation given to DWE representatives (M. O'Rourke and D. Berhane) by Aquaterra (groundwater consultant to the Proponent) in November 2008 with an invitation to provide feedback on the draft model and report. The model was subsequently updated based on feedback received with representatives of Aquaterra maintaining communication with DWE representatives as to the status of modelling and reporting.

In addition, the DWE was consulted regarding the location of recorded Groundwater Dependent Ecosystems (GDEs) in the vicinity of the Mine Site. The DWE provided information on local GDEs in November 2008.

The Proponent (or Proponent representative) has also been in regular contact with licensing officers of the DWE in relation to obtaining appropriate water licences for the proposed Longwall Project. The Proponent now holds licences for extraction of water from the Intake Beds of the Great Artesian Basin groundwater source and Gunnedah Basin groundwater source.

The Proponent also advised the NSW Office of Water of the intended modified application relating to the water pipeline from the Namoi River and the increased brine storage capacity.

Industry and Investment NSW (Incorporating the former Department of Primary Industries – Mineral Resources)

Ongoing consultation with the former Department of Primary Industries – Mineral Resources (DPI-MR) was restricted to a request for the DPI-MR to review the Subsidence Assessment for the Longwall project prior to finalisation. The DPI-MR informed the Proponent that it would not provide this role. The Proponent has subsequently engaged an independent consultant to peer review the Subsidence Assessment prior to finalisation. A copy of the peer review is included behind the Subsidence Assessment in the *Specialist Consultant Studies Compendium*.

Roads and Traffic Authority

The Longwall Project would have very little impact on the local road network given all coal will be transported from the Mine Site by rail. The Roads and Traffic Authority (RTA) was approached by the Proponent in July 2009 regarding the proposed installation of a water pipeline under the Kamilaroi Highway. The RTA representatives contacted indicated that the boring of a tunnel under the road (at 90º to the alignment of the road surface) would be permissible following the issue of a Section 138 Permit under the *Roads Act 1993*.

Australian Rail Track Corporation

A representative of the Australian Rail Track Corporation (ARTC) was contacted in July 2009 regarding the possibility of using the ARTC easement for the placement of section of the proposed water pipeline between the Namoi River and Mine Site. The ARTC representative indicated that placing the pipeline parallel to the rail line would not be permitted as this could possibly affect future rail works within the easement. The ARTC indicated they had no objection, however, to the subsurface installation of the pipeline across (at 90º) the easement.

Narrabri Shire Council

Since lodging the project application for the Longwall Project, Narrabri Shire Council (Council) has been kept informed over the progress of project planning and the preparation of the *Environmental Assessment*. Council officers have visited the Mine Site during this time.

On 29 July 2009, a meeting between the authors of the *Environmental Assessment* and Council staff was held (at Narrabri Shire Council) where issues related to the existing and predicted future status of local infrastructure was discussed. Follow-up consultation was undertaken to clarify information related to Narrabri Shire Council infrastructure or services. Information provided by Council in this meeting has been compiled and incorporated into the socio-economic assessment for the Longwall Project (see Section 4B.12).

3.2.3 Review of Planning issues and Environmental Guidelines

3.2.3.1 Introduction

A number of NSW and regional planning instruments apply to the proposed Longwall 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.

3.2.3.2 State Planning Issues

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

This SEPP was gazetted on 17 February 2007, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries. The quoted aims of the 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 SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development, as defined in NSW legislation. A summary of the matters that a consent authority needs to consider when assessing a new or modified proposal (Part 3 - Clauses 12 to 17 of the SEPP) are as follows.

- **Clause 12**: Compatibility of proposed mine, petroleum production or extractive industry with other land uses.

  Consideration must be given to:
  - the existing uses and approved uses of land in the vicinity of the development;
  - the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and
  - any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.

  The respective public benefits of the development and the existing, approved or preferred land uses must be evaluated and compared, along with any measures proposed by the Proponent to avoid or minimise the incompatibility.

- **Clause 13:** Compatibility of proposed development with mining, petroleum production or extractive industry.

  Consideration must be 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. Measures taken by the Proponent to avoid or minimise any incompatibility are to be considered. The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.

- **Clause 14:** Natural resource management and environmental management.

  Consideration must be given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure:

  – impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;

  – impacts on threatened species and biodiversity, are avoided or minimised; and

  – greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.

- **Clause 15:** Resource recovery.

  This clause requires the efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, be considered.

- **Clause 16:** Transportation.

  Consideration must be given to alternative means of product transportation other than by road and that a code of conduct for the transport of materials on public roads is prepared.

- **Clause 17:** Rehabilitation.

  The rehabilitation of the land affected by the development must be considered including:

  – the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;

  – the appropriate management of waste generated by the development;

  – remediation of any soil contaminated as a result of 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.

Each of the considerations presented in Clauses 12 to 17 is addressed in the relevant sections of this document, with a summary provided in Section 6.3.4.

State Environmental Planning Policy No. 33 (SEPP 33) – Hazardous and Offensive Developments

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 Mine 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). A risk assessment process in accordance with DUAP (1997) has previously been completed for the Narrabri Coal Mine. Based on this risk assessment the mine does not represent a potentially hazardous or offensive industry. As there would be no change to the use, storage or transport of potentially offensive or hazardous materials as part of the proposed modification, the original assessment remains valid and SEPP 33 is not considered further (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 Mine 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, 2009 - see *Specialist Consultant Studies Compendium* - Part 3), with a summary provided in Section 4B.4.

3.2.3.3 Regional Planning Issues

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

The Mine Site lies within a 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 region includes all local government areas falling within 200km of the observatory. The Mine 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 Local Planning Issues

Narrabri Local Environmental Plan (LEP) 1992

The land of the Mine Site is zoned General Rural (1a) under Narrabri LEP 1992 with development for the purpose of mining not identified as a prohibited development or activity, ie. mining is permitted with development consent. Notably, development for the purpose of coal mining meets the objective of this zone which is to promote the proper management and utilisation of resources by protecting, **enhancing** and conserving valuable deposits of minerals, **coal**, petroleum and extractive materials by controlling the location of development for other purposes in order to ensure the efficient extraction of those deposits.

3.2.3.5 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 Previous Environmental Studies and Monitoring

3.2.4.1 Previous Environmental Studies

As part of the *Environmental Assessment* for the Stage 1 Narrabri Coal Mine *Environmental Assessment* (RWC, 2007), environmental studies in the fields listed below were completed.

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

These studies identified that while the Stage 1 operations could be undertaken without unacceptable impacts on the local environment, the following issues were identified as requiring careful management.

- Groundwater in-flows to the mine were predicted to reach up to 785ML/year which would result in a significant surplus of water to be managed at surface. As the groundwater is generally saline, future management of this water using reverse osmosis to reduce the salinity levels of the water may be required and has been accounted for.
- As a consequence of the predicted in-flows to the underground mine, drawdown of local groundwater levels is expected. Critically, the level of drawdown within the Intake Beds of the Great Artesian Basin and Lower and Upper Namoi River Alluvial Groundwater Sources must be carefully considered given the importance of these water sources to local agriculture and current NSW Government embargo on the issuing of licences from these groundwater sources.
- Noise generated by the construction of the Pit Top Area facilities and the operation of ventilation fan were identified as approaching the nominated noise criterion at the closest residences.
- A number of Aboriginal artefacts were identified within and adjacent to the Pit Top Area. While activities within the Pit Top Area were located to avoid disturbance to these artefacts, careful management of these as part of a Cultural Heritage Management Plan has been required.

3.2.4.2 Environmental Monitoring

Since the commencement of construction at the Narrabri Coal Mine, the Proponent has monitored the impact of the operations on a number of environmental parameters (see Section 1.4.3.3.3). The following provides a summary of the results to date and their evaluation.

- **Noise** – Monitoring during the construction phase of the Stage 1 Narrabri Coal Mine has identified that the severity of local inversion conditions had been underestimated in the initial noise modelling undertaken for the Stage 1 Narrabri Coal Mine. In June 2008, monitoring identified a 1dB exceedance at "Westhaven", a 3dB exceedance at "Greylands" and 13dB exceedance at "Kurrajong" during the early morning when the inversion conditions prevailed[1].

[1] Notably noise measurements taken during the afternoon when inversion conditions do not occur suggested compliance with the nominated noise criteria.

Additional restrictions have been placed on morning operations when inversion conditions occur and regular (monthly) monitoring has subsequently confirmed that noise generated by the Narrabri Coal Mine now complies with the criteria contained within PA 05_0102.

Managing noise generated by the additional surface activities of the Longwall Project has been identified as an important component of environmental management on the Mine Site.

- **Air Quality** – The Proponent maintains and monitors eight dust deposition gauges and two High Volume Air Samplers (for measuring PM_{10} concentration levels) around the Pit Top Area of the Mine Site. As noted in Section 1.5.5.3, since the commencement of operations on the Mine Site there has been no exceedance of dust deposition criteria, with only a single exceedance of 24 hour PM_{10} criteria.

  The proposed Longwall Project would result in some additional dust generating activities, eg. elevated drop height from ROM and product coal conveyors, reject stockpiling and management, additional drilling associated with ventilation and gas drainage, and while it is not anticipated that dust and PM_{10} levels would increase significantly from current levels, managing dust, particulate matter and gaseous emissions from the Mine Site has been identified as an important component of environmental management for the Longwall Project.

- **Groundwater** – Groundwater monitoring has been undertaken on and surrounding the Mine Site since 2006. Although the Narrabri Coal Mine is still in the site establishment and development phase, the monitoring of groundwater level responses during gas extraction trials has allowed an assessment to be made of the hydraulic properties on the seam and the drawdown response to pumped extractions.

  The management of groundwater levels would continue to be an important component of operational and environmental management on the Mine Site.

- **Surface Water** – As noted in Section 1.4.3.3.3, monitoring of water within the Pine and Kurrajong Creeks and their tributaries both upstream and downstream of the Pit Top Area has been undertaken following significant rainfall. To date, there has been no evidence of elevated sediment or other contaminants attributable to the operations within the Pit Top Area at these monitoring locations.

- **Blasting** – Ground vibration and air blast overpressure has been monitored at the two closest residences to the Pit Top Area for the four blasts associated with the development of the box cut. There have been no exceedances of the criteria nominated by PA 05_0102 and no further blasting at surface is anticipated for the development and operation of the Narrabri Coal Mine.

Based on the monitoring completed to date on and surrounding the Mine Site, further consideration of the impact of the proposed Longwall Project on local noise levels, air quality and water resources is required to ensure that impacts remain within acceptable levels.

3.2.5 Summary of the Identified Environmental Issues and Impacts

The consultation and review process described in Sections 3.2.2 to 3.2.4 resulted in the identification of numerous environmental issues that require consideration with the *Environmental Assessment*. The issues identified have been categorised (by environmental parameter) and the Longwall Project design, local environment and other factors reviewed to define potential sources of risk and corresponding environmental impact(s) for each of the environmental parameters. **Table 3.1** presents the identified sources of risk / potential incidents and the subsequent potential 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 Longwall Project with minimal effect 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 have been allocated a risk rating based on the potential consequences and likelihood of occurrence and in accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004.

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**.

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 3.1 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 3.5 provides an assessment of the **unmitigated** risk for each potential environmental impact based on the classifications and definitions provided. 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 and/or control 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 3.5**).
- Issues with a high frequency of identification.

Table 3.1
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Subsidence	• Reduced topographic elevation of land surface above the longwall panels.	• Impacts on structural stability of structures at surface, eg. houses, sheds, service infrastructure. • Changes to local drainage. • Increased erosion. • Changes to vegetation / ecosystem structure.	• Houses, other buildings and infrastructure on the Mine Site. • Pine and Kurrajong Creeks and tributaries. • Land above the longwall panels, in particular drainage lines of the Mine Site. • Vegetation on the Mine Site	• Damage or destruction of structures. • Localised drainage line realignment, ponding, loss of flow. • Decreased water quality and loss of topsoil resources. • Change to structure or composition of vegetation communities and fauna habitat.
	• Fracturing of groundwater aquifers.	• Changes to flow paths of groundwater. • Reduction in groundwater contained within affected aquifers.	• Groundwater aquifers above the underground mine.	• Reduced availability of higher quality water within Intake Beds of the Great Artesian Basin Groundwater Source.
	• Disturbance / movement of Aboriginal sites and/or artefacts.	• Damage to Aboriginal artefacts.	• Land above the longwall panels and associated archaeological material.	• Damage to or movement of Aboriginal artefacts.
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: – Intake Beds of the Great Artesian Basin Groundwater Source; – Gunnedah Basin Groundwater Source; and – Lower and Upper Namoi Alluvial Groundwater Source.	• Aquifers of the: – Intake Beds of the Great Artesian Basin Groundwater Source; – Gunnedah Basin Groundwater Source; and – Lower and Upper Namoi Alluvial Groundwater Source.	• Reduced groundwater levels within the aquifers of the impacted groundwater sources. • Reduced volume of water maintained within the embargoed groundwater sources of the: – Intake Beds of the Great Artesian Basin Groundwater Source; and – Lower and Upper Namoi Alluvial Groundwater Source. • Reduced groundwater availability, especially within the Namoi Alluvial aquifer.
	• 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 availability of water to local landowners. • 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.		
Surface Water / Flooding	• Reduction in environmental flows through the Mine Site.	• 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. • Degradation of local waterways, soils and vegetation.	• Local creeks and tributaries. • Mine Site soils and vegetation.	• Reduced quality of downstream waters. • Indirect impacts on soil quality and vegetation.
	• Altered flood regimes.	• Changes to coverage and frequency of flooding.	• Local communities, ecosystems and agricultural lands.	• Change to the structure or composition of vegetation communities and fauna habitat. • Reduction in value of affected agricultural land.
Erosion / Sediment Minimisation	• Erosive actions of wind and water. • Suspension of sediments within runoff resulting from erosion of disturbed areas	• Loss of soil resources. • Increased sedimentation within downstream creeks and Namoi River.	• Mine Site soil resource. • Kurrajong and Pine Creeks and tributaries. • Namoi River.	• Soil erosion. • Increased sediment load in drains and/or waterways.
Threatened Flora and Fauna	• Removal of native vegetation due to land clearing activities.	• Removal of habitat and disturbance to threatened species.	• Vegetation within Mine Site and area of influence.	• Clearing of threatened flora species or vegetation community. • Loss of, or alteration to, threatened flora and fauna habitat.
	• Reduced topographic elevation of land surface above the longwall panels.	The risk sources and potential impacts are considered attributable to “subsidence” and are considered in that section of the risk analysis.		
	• Damage to vegetation as a result of saline water discharge (water and mine ventilation).	• Vegetation stress/death.	• Vegetation within Mine Site and area of influence.	• Direct impact on threatened flora species or vegetation community. • Loss of, or alteration to, threatened flora and fauna habitat.
	• Disturbance to fauna and fauna habitat as a result of project operations, eg. noise, dust etc.	• Reduction in biodiversity of the Mine Site.	• Local communities and ecosystems.	• Reduced local and regional biodiversity. • Direct impact on threatened flora species or vegetation community. • Loss of, or alteration to, threatened flora and fauna habitat.

Table 3.1 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Aboriginal Heritage	• Removal or destruction of Aboriginal sites and/or artefacts due to the proposed Longwall Project construction and mining activities.	• Disturbance to or destruction of Aboriginal sites or artefacts.	• Local archaeological context. • Local Aboriginal community	• Impact on identified sites and/or artefacts as a result of the proposed construction and mining activities. • Impact on unidentified sites and/or artefacts as a result of subsidence.
Noise	• Elevated noise levels resultant from the proposed Longwall Project construction, mining and processing activities.	• Reduced amenity of the local area. • Health related issues. • Impacts on livestock. • Decreased land values.	• Residents, landowners and leaseholders of properties on and surrounding the Mine Site. • Livestock located on properties on and surrounding the Mine Site.	• Increased noise and levels associated with the activities of the proposed Longwall Project causing annoyance, distractions, ie. amenity impacts. • Increased noise and/or vibration levels associated with the proposed Longwall Project impacting on the health of local residents. • Sleep disturbance as a result of maximum noise levels. • Increased noise levels associated with the project leading to reduced production, ie. impacts on livestock.
Vibration	• Increased levels of vibration from 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.
Air Pollution – Dust, Odour, Greenhouse Gases, other	• Dust generation resulting from the proposed Longwall Project construction, mining and processing activities (including wind erosion from stockpiles and disturbed surfaces).	• Increased deposited dust levels and suspended particulate matter concentration.	• Local airshed. • Surrounding residences on properties surrounding the proposed activities of the Longwall Project.	• Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc. • Adverse health impacts (if PM_{10} levels are excessive).
	• Mine ventilation.	• Impacts on vegetation as a result of saline nature of water contained within the air vented from the underground mine.	• Surrounding vegetation.	• Vegetation die-off.
	• Vehicle emissions. • Mine ventilation and gas drainage. • 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 the greenhouse effect.
Visual Amenity	• Changes in visual characteristics of the Mine Site.	• Altered visual outlook during the life of the mine. • Altered visual outlook following mine closure.	• 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.
Traffic and Transport	• Increased traffic levels due to increased production and additional employment at the mine. • Additional traffic on the Main Northern Railway Line.	• Increased vehicle movements on local roads. • Increased rail movements on local rail network.	• Surrounding road network. • Local rail network.	• Increased traffic congestion. • Elevated risk of accident/incident on local roads. • Road pavement deterioration. • Elevated risk of rail related accident/incident.
Soil and Land Capability	• Reduction in soil quality and availability (as a result of poor management practices).	• Structural damage and reduced biological activity of soils. • Erosion of stripped, stockpiled and replaced soils.	• Mine Site soils.	• Insufficient soil quantities for rehabilitation. • Reduced soil quality. • Elevated erosion or erosion potential.
	• Decreased land capability in final landform.	• Reduced productivity of Mine Site agricultural land.	• Mine Site soils.	• Decreased land and agricultural capability of the final landform.
Rehabilitation, Final Landform & Biodiversity Offsets	• Modified final landform. • Modified land uses on the Mine Site.	• Reduced visual amenity of the Mine Site. • Reduced agricultural capability of land on the Mine Site.	• The Mine Site.	• Reduced amenity of the final landform. • Reduced availability of agricultural land. • Increase in areas designated for native vegetation conservation.
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.	• The Mine 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 Mine Site due to poor rubbish, litter management.

Table 3.1 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
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 of the Mine Site and surrounding environs.	• Injury resultant from fire. • Impact on 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.
	• 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.
	• Implications of the increased workforce on the need for services and infrastructure.	• Insufficient services and infrastructure to cater for increased population.	• Narrabri, Gunnedah, Boggabri, Baan Baa.	• Existing services and infrastructure could be insufficient to meet expectations of existing and future residents.
Source: Modified after template provided by HB203:2006 - Table 3				

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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)					

The Proponent recognises that due to the breadth of the consultation for the Longwall 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.

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 Part 4B, namely:

1. Subsidence
2. Groundwater
3. Surface Water/Flooding and Drainage
4. Flora and Fauna
5. Aboriginal Heritage
6. Noise and Vibration
7. Air Quality
8. Soils and Land Capability
9. Traffic and Transport
10. Visual Amenity
11. Socio-economic Setting

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 4B. All other issues generally allocated a "moderate" or "low" level of priority, have been addressed to the level considered appropriate throughout the *Environmental Assessment*.

Table 3.5
Analysis of Unmitigated Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Subsidence				
Damage or destruction of structures / infrastructure	Impact on residential / domestic structures on the Mine Site	3	B	H*
	Impact on residential / domestic structures off the Mine Site	3	E	M
	Impact on services infrastructure, eg. power lines, pipelines	3	D	M
Alteration of local drainage	Ponding and altered hydrological flows along local creeks and tributaries	2	C	M
	Realignment of local creeks and tributaries	2	D	L
	Altered surface flows affecting contour banks and drainage on agricultural land	1	C	L
Increased erosion along drainage lines and subsequent decrease in water quality		2	D	L
Change to structure or composition of vegetation communities and fauna habitat		3	D	M
Reduced availability of groundwater as a result of fracturing altering hydrogeological flow paths.		3	E	M
Disturbance of, or damage to Aboriginal sites or artefacts		1	E	L
Groundwater				
Groundwater Pollution by leaking/spilt hydrocarbon	Contamination requiring minor recovery works	1	D	L
	Contamination requiring major recovery works	3	E	M*
Drawdown of groundwater	Reduced water levels within the aquifers of the Intake Beds to the Great Artesian Basin Groundwater Source	2	E	L
	Reduced water levels within the aquifers of the Lower and Upper Namoi Alluvial Groundwater Source	2	E	L
	Reduced water levels within the aquifers of the Gunnedah Basin Groundwater Source	2	D	L
Reduction in groundwater bore yields	Impacts restricted to groundwater bores on Proponent owned land	1	B	M
	Reduction in yield of <15% of non-project related bores	1	C	L
	Reduction in yield of >15% of non-project related bores	2	E	L
Impacts on Groundwater Dependent Ecosystems		2	E	L

* 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.

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 3.5 (cont'd)
Analysis of Unmitigated Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Surface Water/Flooding and Drainage				
Reduced natural surface water flows	Reduced productivity of downstream grazing lands	2	E	L
	Stressing of downstream native vegetation due to restricted flows	2	E	L
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	D	L
	Continuing discharge of contaminated water resulting in ongoing degradation of water quality in local creeks and tributaries, eg. regular discharge of saline or dirty water	4	D	H
	Isolated and major event resulting in temporary but wider spread degradation of water quality, eg. discharge of hydrocarbons reaching Namoi River	4	D	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	5	C	E
Changes to local flooding patterns.	Change to structure and composition of vegetation communities and fauna habitat	2	C	M
	Reduction in the value of agricultural land	1	C	L
Soil Erosion and Sedimentation				
Soil erosion	Minor gully erosion of drainage lines, stockpiles or created slopes	1	B	M
	Minor sheet or gully erosion of rehabilitated landform	1	C	L
	Major gully or sheet erosion formation	2	C	M
Sediment Load and Turbidity	One-off discharge of dirty water from the Mine Site	2	A	H
	Regular discharge of dirty water from the Mine Site	3	C	H
Threatened Flora and Fauna				
Loss of, or alteration to, existing habitats.	Disturbance to native vegetation / habitat in accordance with the proposed activities	1	A	H
	Disturbance to native vegetation / habitat outside the areas nominated as part of the proposed activities	2	C	M
Direct adverse impact on threatened species.	Disturbance to Threatened flora, fauna or endangered communities	3	C	H
	Disturbance leading to local population reduction	4	D	H
	Disturbance leading to local extinction(s)	4	E	H
Reduced biodiversity	Local biodiversity	3	D	M
	Regional biodiversity	4	D	H
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 DECC		4	D	H
Impact on unidentified sites and/or artefacts of Aboriginal cultural heritage as a result of subsidence and without the permission of LALC or DECC		3	C	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

Table 3.5 (cont'd)
Analysis of Unmitigated Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Noise and Blasting				
Increased noise levels associated with Mine Site activities causing annoyance, distractions, ie. amenity impacts.	Occasional minor exceedance of noise criteria (1-2dB(A))	1	C	L
	Regular minor exceedance of noise criteria (1-2dB(A))	2	C	M
	Marginal exceedance of noise criteria (3-5dB(A))	2	C	M
	Regular marginal exceedance of noise criteria (3-5dB(A))	3	C	H
	Occasional major exceedance of noise criteria (>5dB(A))	2	C	M
	Regular major exceedance of noise criteria (>5dB(A))	3	C	H
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))	1	C	L
	Regular minor exceedance of noise criteria (1-2dB(A))	2	C	M
	Marginal exceedance of noise criteria (3-5dB(A))	2	C	M
	Regular marginal exceedance of noise criteria (3-5dB(A))	3	C	H
	Occasional major exceedance of noise criteria (>5dB(A))	2	C	M
	Regular major exceedance of noise criteria (>5dB(A))	3	C	H
Maximum noise levels resulting in sleep disturbance.		3	C	H
Increased noise levels associated with the project leading to reduced production, ie. impacts on livestock.		2	E	L
Blasting related ground vibration resulting in structural damage to buildings and structures		3	D	M
Nuisance/amenity impacts on surrounding landowners / residents resultant from blasting related ground vibration and air overpressure soundwaves		2	D	L
Reduced agricultural production resultant from blasting related distress to livestock		2	E	L
Air Quality				
Nuisance – deposited dust	Deposited dust levels attributable to the Longwall Project occasionally exceed (for one or two months every year) the DECC guideline	1	C	L
	Deposited dust levels attributable to the Longwall Project regularly exceed (for >5 months per year) the DECC guideline	3	C	H
Health – PM_{10}	PM_{10} levels attributable to the Longwall Project occasionally above the project goal at non-project related residences	2	D	L
	PM_{10} levels attributable to the Longwall Project regularly exceed (>5 times per year) the project goal at non-project related residences	3	C	H
Ventilation of Saline Water resulting in impacts on vegetation	Restricted to predominantly non-native vegetation within immediate vicinity of ventilation shaft	1	C	L
	Impacts on native vegetation or extending beyond immediate vicinity of ventilation shaft	2	D	L
	Impacts extend beyond the Mine Site or impact on extensive areas of native vegetation.	3	D	M
Increased 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 3.5 (cont'd)
Analysis of Unmitigated Risk

Potential Environmental Impacts (see Table 3.1)	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 Mine Site landform	Temporary disturbance to landform	1	A	H
	Marginally identifiable change to the landscape in the final landform	2	A	H
	Highly identifiable change to the landscape in the final landform	2	C	M
Impacts on the effectiveness of the Siding Springs Observatory		2	D	L
Traffic and Transport				
Increased traffic congestion		1	D	L
Road pavement deterioration		1	D	L
Elevated risk of accident/incident on local roads	Minor accident – no injury	1	C	L
	Minor accident – minor injury	2	D	L
	Major accident –moderate injuries requiring hospitalisation	3	E	M
	Severe accident – severe injuries or death injury	4	E	H
Elevated risk of rail related accident/incident	Minor accident – no injury	1	C	L
	Minor accident – minor injury	2	D	L
	Major accident –moderate injuries requiring hospitalisation	3	E	M
	Severe accident – severe injuries or death injury	4	E	H
Soil and Land Capability				
Insufficient soil quantities for rehabilitation.		2	D	L
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
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
Waste Management				
Contamination by waste oil.	Contamination requiring minor recovery works	1	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 Mine Site due to poor rubbish, litter management		1	C	L
Land Contamination				
Transfer of contaminated material	Small area affected (<0.01ha)	1	D	L
	Large area affected (>0.01ha)	2	D	L
Contamination of surface water as a result of exposing contaminated lands	Minor and temporary contamination of water quality in local creeks and tributaries	1	C	L
	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

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 3.5 (cont'd)
Analysis of Unmitigated Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Spontaneous Combustion				
Injury sustained as a consequence of fire	Minor injury	**1**	**D**	**L**
	Moderate injury requiring first aid	**2**	**E**	**L**
	Injury requiring hospitalization	**3**	**E**	**M**
	Severe injury or death	**4**	**E**	**H**
Impacts on native flora and fauna in the event of fire spreading beyond coal stockpiles	Small fire within Mine Site	**1**	**D**	**L**
	Moderate fire extending beyond the Mine Site	**2**	**E**	**L**
	Large fire extending far beyond the Mine Site	**3**	**E**	**M**
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	**1**	**C**	**L**
	Moderate term decrease in property values	**2**	**C**	**M**
	Long term decrease in property values	**3**	**D**	**M**
Impacts on Services and Infrastructure	Short term impacts on services/infrastructure Long term impacts on services/infrastructure	**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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