Section 6

Evaluation and Justification of the Project

PREAMBLE

This section concludes the assessment of the proposed Werris Creek Coal Mine LOM Project. The key assessment requirements (identified in the Director-General's Requirements) and other issues identified as having higher unmitigated risk rankings (see Section 3.3) are re-assessed based on the implementation of the proposed safeguards, controls and mitigation measures and a residual risk level determined. The LOM Project is then evaluated based on the residual risk posed and in consideration of ecologically sustainable development (ESD) principles.

A justification for the LOM Project is then provided based on the residual impacts of the LOM Project, the likely economic and social benefits that would be generated and the consequences locally, regionally and nationally of the LOM Project not proceeding.

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6.1 INTRODUCTION

As a conclusion to the *Environmental Assessment*, the development and operation of the Werris Creek Coal Mine LOM Project is evaluated and justified through consideration of its potential impacts on the environment and potential benefits to the local and wider community.

An evaluation of the LOM Project has been undertaken by re-assessing the risks posed to the local environment by the proposed activities, considering the implementation of the commitments for controls, safeguards or mitigation measures identified throughout Section 4B and summarised in Section 5. The LOM Project has also been evaluated against the principles of Ecologically Sustainable Development (ESD) in order to provide further guidance as to its acceptability.

Section 6.3, which presents the justification of the LOM Project, re-visits the predicted residual impacts on the biophysical environment, considers the socio-economic benefits which would be provided and assesses the consequences of not proceeding with the Project.

6.2 EVALUATION OF THE PROJECT

6.2.1 Residual Environmental Risk and Impacts

Following consideration of the proposed operational safeguards, controls and mitigation measures that would be implemented by the Proponent as part of the LOM Project design, **Table 6.1** re-assesses the risk associated with each of the potential environmental impacts identified in Section 3.3. It is noted that in some cases no residual risk rating has been allocated as the assessment recorded in Section 4B has determined that the impact would not occur.

Table 6.1
Analysis of Mitigated Risk

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Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Mitigated Risk Rating*
Groundwater				
Reduced groundwater availability for existing uses	Impacts restricted to groundwater bores on Proponent owned land	2	C	M
	Reduction in water level <15% of non-project related bores	2	D	L
	Reduction in water level >15% of non-project related bores	2	E	L
Degradation of groundwater dependent ecosystems	Impacts restricted to groundwater bores on Proponent owned land			
	Impacts to local groundwater dependent ecosystems	2	E	L
	Impacts to regional groundwater dependent ecosystems	2	E	L
Change in the hydrology/ geomorphology of the surrounding creek systems	Minor changes to hydrology/ geomorphology of the local creek systems	1	D	L
	Moderate changes to hydrology/ geomorphology of the local creek systems			
	Large scale changes to hydrology/ geomorphology of the local creek systems			

Table 6.1
Analysis of Mitigated Risk (Cont'd)

Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Mitigated Risk Rating*
Groundwater (Cont'd)				
Impacts on groundwater quality		**2**	**D**	**L**
Reduced availability of water to local landowners		**2**	**D**	**L**
Degradation of aquatic communities	Impacts restricted to aquatic communities on Proponent owned land	**1**	**D**	**L**
	Impacts to local aquatic communities	**2**	**D**	**L**
	Impacts to regional aquatic communities			
Surface Water				
Reduced downstream surface water quality	Impacts restricted to surface water on Proponent owned land	**2**	**D**	**L**
	Localised impacts to surface water	**2**	**D**	**L**
	Regional impacts to surface water	**2**	**E**	**L**
Reduced flows to downstream vegetation due to a reduction of environmental flows through the mine site		**2**	**D**	**L**
Reduced flows in surrounding creek systems due to a reduction of environmental flows through the mine site		**2**	**D**	**L**
Changes to the coverage and frequency of flooding due to altered flood regimes		**1**	**D**	**L**
Increased flows and/or flooding in natural drainage lines for a short period due to dam failure.		**2**	**C**	**M**
Uncontrolled discharge of dirty, saline, contaminated water outside licence conditions		**2**	**D**	**L**
Erosion and Sedimentation				
Loss of soil resources		**1**	**D**	**L**
Increased sedimentation within downstream creeks		**1**	**D**	**L**
Mobilisation of heavy metals				
Biodiversity				
Loss of threatened fauna habitat		**3**	**D**	**M**
Threatened vegetation stress/death		**1**	**C**	**L**
Reduction in species diversity		**1**	**B**	**M**
Loss of threatened vegetation species or communities		**2**	**A**	**H**
Reduction in threatened aquatic vegetation numbers	Increased stress to threatened aquatic fauna			
	Reduction in localised numbers of aquatic threatened fauna			
	Reduction in regional numbers of aquatic threatened fauna			

Table 6.1
Analysis of Mitigated Risk (Cont'd)

Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Mitigated Risk Rating*
Aboriginal Heritage				
Disturbance to or destruction of Aboriginal sites or artefacts	Destruction of a minor Aboriginal site or artefact	2		
	Destruction of a significant Aboriginal site or artefact	3		
	Destruction of a currently unidentified Aboriginal site or artefact	3	D	M
	Loss of archaeological knowledge	2	D	L
Non-Aboriginal Heritage				
Disturbance to or destruction of a site or object of historic /heritage significance	Destruction of a site or object which holds minor historic or local heritage significance	1	M	M
	Destruction of a site or object which holds major historic or wider heritage significance			
Noise				
Health related issues to noise impacts		2	C	M
Sleep deprivation from noise impacts		2	C	M
Noise impacts on livestock		1	D	L
Nuisance/ amenity impacts on the surrounding landowners/ residents		2	C	M
Structural damage to buildings or structures from airblast overpressure	Minor damage to buildings or structures	2	D	L
	Significant damage to buildings or structures	3	E	M
Vibration				
Damage to buildings and structures	Minor damage to buildings or structures	2	D	L
	Significant damage to buildings or structures	3	E	M
Nuisance/ amenity impacts to surrounding landowners		2	D	L
Air Pollution				
Increased deposited dust levels and suspended particulate matter concentration		2	C	M
The release of sulphur dioxide and its associated odour relating to a spontaneous combustion outbreak		1	D	L
Reduced local amenity due to the production of nitrogen oxide from blasting operations		1	D	L
Greenhouse and other gas emissions		1	A	H
Minor health impacts associated with emissions of sulphur dioxide and nitrogen oxide				

Table 6.1
Analysis of Mitigated Risk (Cont'd)

Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Mitigated Risk Rating*
Visual Amenity				
Decreased visual amenity during the life of the mine		**2**	**C**	**M**
Altered visual outlook following mine closure		**2**	**C**	**M**
Nuisance/ amenity impacts from mine lighting		**2**	**D**	**L**
Sleep deprivation from mine lighting		**1**	**D**	**L**
Traffic and Transport				
Potential vehicle accidents		**3**	**E**	**M**
Altered conditions at rail crossings resulting in:	Delays to local road traffic.	**1**	**E**	**L**
	Possible delays to emergency service (police, ambulance, etc.) response.	**2**	**E**	**M**
Soil and Land Capability				
Erosion of stripped, stockpiled and replaced soils		**2**	**D**	**L**
Insufficient soil quantities/ qualities for rehabilitation				
Reduced productivity of the final landform		**3**	**D**	**M**
Contaminated soil and land due to hydrocarbon/ chemical spills		**2**	**D**	**L**
Rehabilitation, Final Landform and Biodiversity Offsets				
Reduced amenity of the final landform		**2**	**D**	**L**
Reduced productivity of the rehabilitated land	<10% reduction in expected productivity	**1**	**D**	**L**
	10 to 50% reduction in expected productivity	**2**	**D**	**L**
	>50% reduction in expected productivity	**3**	**E**	**M**
Reduction in native fauna species diversity	<10% reduction in fauna species diversity	**1**	**C**	**L**
	10 – 50% reduction in fauna species diversity	**2**	**C**	**M**
	>50% reduction in fauna species diversity	**3**	**E**	**M**
Reduction or degradation of biodiversity offset areas	< 10% reduction or degradation			
	10 to 50% reduction or degradation			
	>50% reduction or degradation			
Reduced vegetative species diversity within the Biodiversity Offset				
Reduced native fauna populations within the biodiversity offset areas				
Change in the structure of vegetation communities in rehabilitated areas from original structure		**2**	**C**	**M**
Change in habitat in rehabilitated areas from original structure		**2**	**C**	**M**

Table 6.1
Analysis of Mitigated Risk (Cont'd)

Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Mitigated Risk Rating*
Waste Management				
Contamination of downstream surface waters		**2**	**D**	**L**
Contamination of groundwater		**2**	**E**	**L**
Contamination of downstream lands				
Reduced visual amenity		**2**	**C**	**M**
Land Contamination				
Surface water and land contamination	Minor surface water and land contamination	**1**	**D**	**L**
	Moderate surface water and land contamination	**2**	**E**	**L**
	Significant surface water and land contamination	**3**	**E**	**M**
Reduced availability of soils	<10% loss of soil resource	**1**	**D**	**L**
	10 to 50% loss of soil resource			
	>50% loss of soil resource			
Bushfire				
Destruction of equipment or assets.		**2**	**D**	**L**
Injury or fatality to employees or surrounding residents.		**3**	**E**	**M**
Injury or death of livestock.		**2**	**E**	**L**
Adverse impact on native biota.		**2**	**E**	**L**
Spontaneous Combustion				
Uncontrolled fire event		**2**	**E**	**L**
Odour and subsequent emission of sulphur dioxide		**1**	**D**	**L**
Socio-Economic Impacts				
Changed economic activity and related social impacts		**N/A**	**N/A**	
Change in the socio economic structure of the local community	Minor change in the local community			
	Moderate change in the local community			
	Significant change in the local community			

Through the implementation of the proposed controls, safeguards and mitigation measures identified in Section 4B, and summarised in the Statement of Commitments in Section 5, the risk rating for the majority of potential environmental impacts has been reduced.

In some cases, a rating is no longer provided as the relevant assessment recorded in Section 4B determined the likelihood to be so low, or consequence so insignificant, as to be virtually non-existent. This approach was taken generally when the risk rating could not be considered any lower than "high" due to a likelihood classification as "almost certain" or consequence classification as "catastrophic" so as not to suggest a significance that does not exist.

Further consideration is given to the potential impacts which retain a "high" risk rating as follows.

- Loss of threatened vegetation species/communities

  Although a Biodiversity Offset Strategy (BOS) is proposed to mitigate the impacts of clearing an additional 194ha of the NSW TSC Act and EPBC Act listed EEC - Grassy White Box Woodland and Derived Native Grassland and 0.35ha of Brigalow community, listed as an EEC under the NSW TSC Act and a TEC under the Commonwealth EPBC Act, this area of threatened vegetation communities will still be lost as a result of the LOM Project.

- Greenhouse gas and other emissions

  Although the LOM Project would contribute minimal greenhouse gas compared to NSW and national emissions, by the nature of coal mining it is certain that greenhouse emissions would be released.

6.2.2 Ecologically Sustainable Development

6.2.2.1 Introduction

Sustainable practices by industry, all levels of government and the community are recognised to be important for the future prosperity and well-being of the world. The principles of Ecologically Sustainable Development (ESD) that have been recognised for over a decade were based upon meeting the needs of the current generation while conserving our ecosystems for the benefit of future generations. In order to achieve sustainable development, recognition needs to be placed upon the integration of both short-term and long-term environmental, economic, social and equitability objectives.

Throughout the design of the LOM Project, the Proponent has endeavoured to address each of the sustainable development principles. The following sub-sections draw together the features of the LOM Project that reflect the four principles of sustainable development, namely:

- the precautionary principle;
- the principle of social equity;
- the principle of the conservation of biodiversity and ecological integrity; and
- the principle for the improved valuation and pricing of environmental resources.

6.2.2.2 The Precautionary Principle

In order to satisfy this principle of ESD, emphasis must be placed on anticipation and prevention of environmental damage, rather than reacting to it. During the planning phase for the LOM Project, and throughout the preparation of the *Environmental Assessment*, the Proponent engaged specialist consultants to examine the existing environment, predict possible impacts and recommend controls, safeguards and/or mitigation measures in order to ensure that the level of impact satisfies statutory requirements or reasonable community expectations. Throughout the development of the LOM Project, the Proponent and its consultants have adopted an anticipatory approach to impacts by undertaking an analysis of the risks posed by activities of the LOM Project, an appropriate level of research and baseline investigations and environmental evaluation. The controls, safeguards and/or mitigation measures have therefore been planned with a comprehensive knowledge of the existing environment and the potential risk of environmental degradation posed by LOM Project activities.

The implementation of the environmental safeguards, controls and mitigation measures has been formalised by the Proponent as the draft Statement of Commitments presented as Section 5.

Examples of matters relating to the precautionary principle that were considered during the various stages of the LOM Project are listed below.

Identification of Project Objectives

The LOM Project has been designed with the principal objective of maximising resource recovery and efficiency of mining operations, through the extension of the open cut area in order to recover all available coal resources of the Werris Creek Coal Measures. This objective also requires that the recovery of the coal is undertaken in a safe and environmentally responsible manner which meets the requirements of local and State government agencies, accepted industry standards and wherever possible, reasonable community expectations. The Proponent recognises that only through comprehensive environmental assessment, consideration of feasible mitigation measures and an environmentally responsible approach to the design and operation of the LOM Project can the risk of harm to the environment be minimised.

Design of Project Components

Several design aspects of the proposed LOM Project required the consideration of potential impacts on the local environment to ensure the requirements of local and State government agencies, accepted industry standards and wherever possible, reasonable community expectations were met. These are broken into potential impacts and included the following.

Noise and Blast Management and Mitigation

- The LOM Project has been designed to accommodate the construction of an Acoustic and Visual Amenity Bund on the northern perimeter of the proposed limit of open cut mining and an acoustic barrier on the northeastern side of the relocated Coal Processing Area. These structures have been included in the LOM Project design in an attempt to reduce noise and visual impacts from the operation on the town of Werris Creek.

- Where practicable, mining related infrastructure of the LOM Project has been located behind a hill in order to reduce noise related impacts to residents to the north of the LOM Project Site.
- Blasts would be designed to satisfy environmental and public safety requirements. Blast design would be refined based on measured operational and environmental performance.

Air Quality Management and Mitigation

- Where practicable, mining related infrastructure of the LOM Project has been located to the south of "Cintra" Hill in order to reduce dust related impacts to residents to the north of the Project Site.
- All conveyors would be fitted with appropriate cleaning and collection devices to minimise the amount of material falling from the return conveyor belts and therefore minimise dust emissions from conveyors.

Biodiversity Management and Mitigation

- The majority of overburden removed would be placed within the completed section of the open cut, limiting the additional area of land required for the creation of out-of-pit overburden emplacements and thus limiting the amount of vegetation that would be required to be cleared for the LOM Project.
- The placement of the ancillary infrastructure for the LOM Project has been located preferentially in areas of lower conservation value, i.e. cleared land and exotic pasture which minimises the requirement to clear land containing threatened vegetation communities of higher condition class.
- Areas currently utilised for, or approved for the stockpiling of soil and cleared vegetation resources would continue to be used in preference to other undisturbed locations.
- A Biodiversity Offset Strategy (BOS) has been proposed and the design of the final rehabilitated landform incorporates significant areas of native vegetation (779.6ha of which 567.4ha is Grassy White Box Woodland and Derived Native Grassland EEC) to offset the proposed clearance of two listed EEC's.

Surface Water and Groundwater Management and Mitigation

- The final void would be backfilled with overburden above the equilibrium water level following the cessation of mining in order to avoid leaving a potentially saline water body.
- Water management infrastructure has been designed to ensure that dirty water generated from disturbed areas, would be captured and diverted in a manner that minimises the potential for concentrated overland flow and subsequent erosion.
- The water management system has been designed so that no extra licensed discharge points are required. Limiting the number of licensed discharge points allows for the water management system to be managed more effectively and to reduce the potential for discharges to impact on the downstream environment.

Traffic and Transport Management and Mitigation

- Escott Road and the Escott Road – Werris Creek Road intersection would be upgraded to ensure that they are able to withstand the increase in traffic flow (including an increase in the transport of product coal by road) and that this increase would not present a safety hazard on Escott Road or its intersection with Werris Creek Road.
- Two level crossings would be constructed across the turn-around rail loop to allow access across the rail turn-around loop. An emergency side track would also be constructed around the rail loop to allow emergency access should the road be blocked by a train.
- The Proponent would continue to provide a contribution to the maintenance of Taylors Lane.
- The Proponent has also committed to contributing (on an equitable basis) to any upgrade of the Werris Creek Road – Taylors Lane and Taylors Lane – Kamilaroi Highway intersections.

Management and Mitigation of Impacts on Visual Amenity

- Tree screens would be planted at the perimeter of the extended Product Coal Storage Area and to the north of the footprint of the Acoustic and Visual Amenity Bund to reduce visual impacts associated with the LOM Project.

Integration of Safeguards and Procedures

The framework for ongoing environmental management, operational performance and rehabilitation of the Project Site would be provided through the project approval and be managed in accordance with approved management plans (which would involve the input from relevant State and local government agencies). The Mining Operations Plan or Rehabilitation Environmental Management Plan, which would contain a range of site specific environmental procedures to achieve consistency with specified outcomes and to control identified risks, would be updated periodically. An Annual Environmental Management Report would report on the progress of the operation and provide an opportunity to review the effectiveness of the environmental management strategies adopted. In addition, the following safeguards and procedures would be implemented for the LOM Project.

General Safeguards and Procedures

- All on-site procedures would be regularly reviewed, particularly in light of monitoring results.
- Surface water, groundwater, noise, blasting, deposited dust and PM_{10} levels would be monitored at locations potentially most affected by the LOM Project in order to ensure the continued compliance with the goals outlined in this document.
- Soil would be stripped, stockpiled and re-spread on the basis of the quality of the soil (as indicated by the soil unit) and planned final land use of different areas of the final landform.

Noise and Blasting Related Safeguards and Procedures

- A number of noise attenuation measures would be implemented on equipment in order to reduce noise emissions from the Project Site, especially under noise enhancing conditions.
- Whilst the Coal Processing Area remains in its current location, truck / excavator numbers would be restricted to 10 / 3 respectively under inversion conditions to reduce noise impacts associated with the LOM Project at residences to the south of the Project Site.
- All mobile equipment operating at surface to the north of the advancing open cut would be stood down under noise enhancing conditions during the evening and night-time, i.e. temperature inversion and winds from the south-southeast or northwest to reduce noise impacts from the LOM Project on residents to the north during these conditions. Overburden emplacement activities would also be preferentially undertaken on the lower lifts of the overburden emplacement under noise enhancing conditions during the evening and night-time.
- Real-time noise, wind and inversion monitoring would be undertaken and a protocol developed to ensure that operations are managed pro-actively to avoid any exceedance of noise criteria.
- When blasting is to be undertaken within 500m of the road and/or rail line, these would be closed in accordance with a road and rail closure procedure.

Biodiversity Related Safeguards and Procedures

- Clearing of vegetation would be undertaken on a campaign basis to ensure that clearing is undertaken during periods when local fauna is unlikely to be nesting, roosting or over-wintering within the trees and shrubs to be cleared.
- Given the occurrence of White Box (*Eucalyptus albens)*, a listed Koala feed tree species, within the areas of remnant native vegetation to be disturbed, and the known or potential occurrence of a number of threatened fauna species in these areas, a Pre-start Clearing Inspection of the proposed disturbance area would be completed prior to each clearing campaign to identify if Koalas (or other threatened fauna species) are present in trees nominated for clearing. In the event a Koala (or other threatened fauna species) is present, clearing would be suspended until it moves away from the subject area or is relocated by a suitably qualified person. Pre-start Clearing Inspections would also identify biological resources within the disturbance area including habitat resources and the availability of endemic seed.
- Habitat augmentation through the placement of previously cleared timber would be conducted on rehabilitated areas.

Surface Water and Groundwater Related Safeguards and Procedures

- Wherever possible, areas not required for mining-related activities or not already disturbed by previous mining activities would remain vegetated to assist in minimising erosion and reducing the suspended sediment load in surface water flowing through the Project Site.
- Water collected in the open cut, groundwater storage cells and/or dirty water dams would be preferentially used for dust suppression or operational purposes.
- Sediment control structures would be maintained to design capacities to ensure optimum settling rates.
- An effective revegetation, maintenance and monitoring program for all water management infrastructure would be implemented to ensure that all water management infrastructure is operating in accordance with its design.
- Water generated on the Project Site that requires discharge would be conducted in accordance with the appropriate discharge protocol in order to avoid discharges that are not compliant with licence conditions. Water may also be treated prior to discharge to reduce the TSS in the water column.

Air Quality Related Safeguards and Procedures

- Vegetation clearing and soil stripping procedures would be implemented to ensure that dust emissions from these processes are minimised.
- Prior to the relocation of the Coal Processing Area, overburden emplacement would be limited on the top lift of the overburden emplacement area when winds are from a northerly direction and greater than 3m/s over more than four consecutive 15 minute periods.
- Water would be applied to coal both during processing and prior to being loaded onto trains, in order to minimise dust emissions from site as well as to minimise dust emissions from coal wagons.
- Coal processing activities would cease during periods of concurrent high winds and temperatures which may cause coal dust dispersal, independent of water applications.
- Water would be applied to exposed surfaces, with emphasis on those areas subject to frequent vehicle / equipment movements which may cause dust generation and dispersal.
- Water injection would be used on all operating drill rigs where required to reduce dust emissions from drilling operations.
- All product coal trucks would be covered prior to leaving the Project Site to minimise dust emissions from road transport associated with the LOM Project.

Traffic and Transport Related Safeguards and Procedures

- The upgrade of Escott Road and intersections with the Northern Site Access Road and Werris Creek Road would be designed and constructed to meet Austroads standards and any additional reasonable requirements of Liverpool Plains Shire Council.

Aboriginal Heritage Related Safeguards and Procedures

- The Narrawolga Axe Grinding Grooves would be re-instated to a position as close as possible to their original location following rehabilitation of the Project Site in consultation with local Aboriginal community representatives.
- Staff and contractors would undergo cultural heritage awareness training as part of Whitehaven Coal site inductions.
- In the event the Project Site disturbance footprint changes, the Proponent would ensure that appropriate consultation and field survey is undertaken to confirm no sites or object of Aboriginal heritage significance are impacted.
- In the event any previously unidentified 'objects' or other Aboriginal sites (such as burials) are uncovered, work in that area would be suspended and the DECCW Western Regional Archaeologist (Dubbo Office) and local Aboriginal community contacted to discuss how to proceed.

Visual Amenity Related Safeguards and Procedures

- Floodlights would continue to be positioned and directed to minimise emissions, with lighting not required at any given time not to be used. Where the use of floodlights is required in the open cut, on the overburden emplacements or within the coal handling and processing area, they would be directed downwards and towards the west.

Waste Management Related Safeguards and Procedures

- Waste management practices would be implemented to ensure that waste produced on the Project Site is appropriately managed.

Hazard Related Safeguards and Procedures

- An appropriate bushfire management strategy would be developed in consultation with the local Rural Fire Service to ensure that the appropriate management and response procedures are implemented to reduce the risk of bushfire hazard on the Project Site and subsequently the potential safety risk to employees and the local community.
- A hazard reduction strategy would be implemented to manage the potential for spontaneous combustion outbreaks on site.
- A hazard reduction strategy would be implemented to manage the potential for land contamination associated with the storage and handling of hydrocarbons or hazardous materials on the Project Site.

Rehabilitation and Subsequent Land Use

Long term adverse impacts on the local environment would be avoided through the design and rehabilitation of disturbed areas to a landform and vegetation structure equivalent to that outlined in Section 2.14 of this document. The rehabilitated landform has been designed to incorporate 37ha of land with Class III land capability and Class 2 agricultural suitability. The remainder of the rehabilitated area would be restored back to woodland communities consistent with those communities identified on the lands of the LOM Project BOS to be conserved.

Progressive rehabilitation of all available areas would also occur for the LOM Project in order to assist in reducing TSS concentrations (and possible high pH and EC levels) in runoff from disturbed areas as well as reducing dust emissions from the Project Site.

Conclusion

The precautionary principle has been considered during all stages of the design and assessment of the LOM Project. The approach adopted, i.e. risk analysis, initial assessment, consultation, specialist investigations and safeguard design, provides a high degree of certainty that the LOM Project would not result in any major unforeseen impacts.

6.2.2.3 Social Equity

Social equity embraces value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to the community. Social equity includes for both inter-generational (between generations) and intra-generational (within generations) equity considerations.

Equity within generations requires that the economic and social benefits of the development be distributed appropriately among all members of the community. Equity between generations requires that the non-material well-being or "quality of life" of existing and future residents of the local community would be maintained throughout and beyond the life of the LOM Project.

Both elements of social equity are addressed through the design of the Project itself, the implementation of operational safeguards to mitigate any short-term or long-term environmental impacts and the proposed rehabilitation of the areas directly disturbed. Examples of matters relating to social equity that are relevant to the proposed LOM Project are listed below.

Identification of Project Objectives

The LOM Project has been designed with an objective of maintaining current employment numbers at the Werris Creek Coal Mine for up to 20 more years than what would occur based on the current approved limit of mining. Also, with an increase in production rates for the LOM Project, it is anticipated that an additional 10 full time equivalent jobs would be created. If the LOM Project does not proceed, no new jobs would be created and all employment and flow-on effects associated with the Werris Creek Coal Mine would cease once the coal resource which is currently approved for recovery is exhausted. This would ultimately lead to a loss of income and economic benefit to the local community and loss of an opportunity to exploit a valuable resource for use in a variety of ways in both the domestic and export markets. Finally, there would be a loss of royalties to the State Government.

Werris Creek Coal Mine would no longer be able to provide funds the local Community Enhancement Fund (CEF) if the LOM Project does not proceed. The CEF provides valuable social resources to the local government area that the Council would otherwise not be able to provide for (without affecting funding to another area).

The LOM Project has also been designed with an objective to ensure the continued viability of surrounding land uses throughout and beyond the life of the LOM Project.

Design of Project Components

The Project has been designed to maintain inter-generational equity, i.e. in recognition that mining is a relatively short-term land use and to ensure components of the existing biological, social and economic environment available to existing generations would also be available to future generations.

- The location and design of the LOM Project disturbance footprint, has been designed to minimise disturbance upon native vegetation and sensitive fauna habitats. A Biodiversity Offset Strategy (BOS) would also be developed to compensate for the disturbance of some of the listed threatened vegetation communities.
- The location and design of the LOM Project disturbance footprint has been designed to ensure that the relocated Narrawolga Axe-Grinding Grooves would not be disturbed. A commitment has also been made that the Narrawolga Axe-Grinding Grooves would be re-instated to a position as close as is possible to their original location, in consultation with Aboriginal stakeholders, following restoration and rehabilitation of the final landform.
- The availability of groundwater to surrounding landholders, although not predicted to be noticeably affected by the LOM Project, would be monitored throughout the life of the mine and ameliorative measures taken should a short-term reduction in the availability of groundwater to local landholders occur.
- The LOM Project has been designed to ensure that discharge of water to the surrounding environment is minimised and that when discharge occurs, the quality of the water would not adversely impact the surrounding environment.
- The rehabilitation of the Project Site has been designed to re-establish native woodland communities for nature conservation. However 37ha of the rehabilitated area would also re-establish land that may be used for Class III land capability agricultural purposes.
- The final void would be backfilled with overburden above the equilibrium water level following the cessation of mining in order to avoid leaving a potentially saline water body.

Integration of Safeguards and Procedures

The Proponent recognises that all members of the local surrounding communities should benefit appropriately from the LOM Project, either directly or indirectly. In order to ensure a realistic distribution of benefits, the Proponent would continue to consult with the local community and maintain a pro-active approach to issues of interest. This dialogue would also include a system to record, manage and respond to any complaints relating to the operation.

Rehabilitation and Subsequent Land Use

The final landform would be constructed and rehabilitated in a manner that would generally retain land for native vegetation management with some land retained for agricultural purposes. The land retained for agricultural purposes would provide a basis for continuing economic activity in the local community. The areas rehabilitated for woodland ecological communities may provide an area for recreational activities for the local community.

Conclusion

The principle of social equity has been addressed throughout the design of the LOM Project. The LOM Project would maintain the economic activity of the surrounding local communities through maintaining current employment and increasing future employment, therefore increasing demand for local goods and services and flow-on effects in the future. As such, the benefits of the LOM Project would be distributed throughout the local community. The LOM Project has also been designed such that elements of the existing environment available to this generation, including local biodiversity and agricultural land would continue to be available to future generations. The Proponent would continue to adopt a pro-active approach in identifying and addressing any concerns identified by the local community.

6.2.2.4 Conservation of Biological Diversity and Ecological Integrity

The protection of biodiversity and maintenance of ecological processes and systems are central goals of sustainability. It is important that developments do not threaten the integrity of the ecological system as a whole or the conservation of threatened species in the short- or long-term. Details of how the LOM Project has been designed to achieve compliance with these principles are set out below.

Identification of Project Objectives

It is the objective of the Proponent to undertake the development and operation of the LOM Project in a safe and environmentally responsible manner.

The Proponent also proposes to construct a final landform and rehabilitate the Project Site with species that replicate the pre-mining and pre-agriculture environment. The area to be rehabilitated back to nature conservation would be greater that what is currently available for nature conservation within the Project Site, as the majority of the land has been previously been cleared of trees for agricultural purposes.

Design of Project Components

The LOM Project has been designed to ensure that the proposed activities would not threaten the integrity of an ecological system as a whole or the conservation of a threatened species in the short or long term. The key design components relating to the conservation of biological diversity and ecological integrity are as follows.

- The LOM Project has been designed to rehabilitate the bulk of the disturbed areas as woodland ecological community. The biodiversity value of the overall Project Site would therefore (in the long term) be either equal to or better than what is currently established within the Project Site.
- A Biodiversity Offset Strategy (BOS) would also be developed to compensate for the disturbance of the listed threatened vegetation communities that occur on the Project Site.

Integration of Safeguards and Procedures

The following safeguards and procedures would be integrated into the LOM Project with the objective of maintaining biological diversity and ecological integrity.

- Clearing of vegetation would be undertaken on a campaign basis to ensure that clearing is undertaken during periods when local fauna is unlikely to be nesting, roosting or over-wintering within the trees and shrubs to be cleared.
- Given the occurrence of White Box (*Eucalyptus albens)*, a listed Koala feed tree species, within the areas of remnant native vegetation to be disturbed, and the known or potential occurrence of a number of threatened fauna species in these areas, a Pre-start Clearing Inspection of the proposed disturbance area would be completed by an ecologist prior to each clearing campaign to identify if Koalas (or other threatened fauna species) are present in trees nominated for clearing. In the event a Koala (or other threatened fauna species) is present, clearing would be suspended until it moves away from the subject area or is relocated by a suitably qualified person. Pre-start Clearing Inspections would also identify biological resources within the disturbance area including habitat resources and the availability of endemic seed.
- Habitat augmentation through the placement of previously cleared timber would be conducted on rehabilitated areas.

Progressive Rehabilitation and Subsequent Land Use

As noted above, the final landform and rehabilitation design for the Project Site would ensure that the area would be suitable for predominantly nature conservation with some agricultural use. The area to be rehabilitated back to nature conservation would be greater that what is currently available for nature conservation within the Project Site, as the majority of the land has been previously cleared of trees for agricultural purposes.

Conclusion

The LOM Project would address the principles of Conservation of Biological Diversity and Ecological Integrity as follows.

- Minimisation of disturbance to areas of native vegetation and re-establishment of comparable areas of native vegetation.
- Increasing connectivity of native vegetation by providing a continuous habitat corridor from east to west across the northern Quipolly Creek catchment area.
- Should threatened species be identified within those areas of the Project Site to be disturbed, these would be relocated or managed appropriately.

6.2.2.5 Improved Valuation and Pricing of Environmental Resources

The issues that form the basis of this principle relate to the acceptance that the polluter pays, all resources are appropriately valued, cost-effective environmental stewardship is adopted and the adoption of user pays prices based upon the full life cycle of the costs. A reflection of these issues on the proposed LOM Project is set out below.

Identification of Project Objectives

The LOM Project has been designed with the principal objective of maximising resource recovery and efficiency of mining operations, through the extension of the open cut area in order to recover all available coal resources of the Werris Creek Coal Measures in a safe and environmentally responsible manner that enables compliance with all relevant requirements. In addition, by identifying the objective of rehabilitating the Project Site comparable to what currently exists and a future land use of native vegetation management and some agriculture, the Proponent had indicated the value placed on both of these non-coal elements of the environment.

Design of Project Components and Integration of Safeguards and Procedures

The extent of research, planning and design of environmental safeguards and mitigation measures to prevent irreversible damage to environmental resources, other than the coal to be mined, is evidence of the value placed by the Proponent on these resources. These include the following.

- The location and layout of the LOM Project disturbance footprint, have been designed to minimise disturbance upon native vegetation and sensitive fauna habitats. A Biodiversity Offset Strategy (BOS) would also be developed to compensate for the disturbance of some of the listed threatened vegetation communities.
- The LOM Project has been designed to maximise the area of woodland ecological community restoration in the final landform. The ecological value of the overall Project Site would therefore (in the long term) be either equal to or better than what is currently established within the Project Site.
- The location and layout of the LOM Project disturbance footprint has been designed to ensure that the relocated Narrawolga Axe-Grinding Grooves would not be disturbed. A commitment has also been made that the Narrawolga Axe-Grinding Grooves would be re-instated to a position as close as is possible to their original location on consultation with Aboriginal stakeholders following restoration and rehabilitation of the final landform.

Progressive Rehabilitation and Subsequent Land Use

The design of the final landform to integrate ongoing agricultural activities with the re-establishment of native vegetation illustrates the value placed by the Proponent on both the agricultural and ecological elements of the Project Site.

Conclusion

The value placed by the Proponent on the environmental resources, other than the coal to be mined, is evident in the identification of proposal objectives, extent of research, planning and environmental safeguards and measures to be implemented to prevent irreversible damage of these resources undertaken in association with the LOM Project and the design of a post-mining landform amenable to future land uses comparable or better than what is currently in place. It is planned that the price of the product sold would be sufficient to enable the Proponent to undertake all environmentally-related tasks and meet any commitments made to the local community.

6.2.2.6 Conclusion

The approach taken in planning for the LOM Project has been multi-disciplinary, involved consultation with potentially affected local residents and various government agencies. The emphasis has been on the application of appropriate safeguards to minimise potential environmental, social and economic impacts. The design of the proposed LOM Project has addressed each of the sustainable development principles and on balance, it is concluded that the proposal achieves a sustainable outcome for the local and wider environment.

6.3 JUSTIFICATION OF THE PROJECT

6.3.1 Introduction

In assessing whether the development and operation of the LOM Project is justified, consideration has been given to both biophysical and socio-economic factors including the predicted residual impacts on the environment and the potential benefits of the LOM Project. This section also considers the consequences of the LOM Project not proceeding, the planning considerations involved in the design of the LOM Project and the alternatives considered as part of the final Project design.

6.3.2 Biophysical Considerations

6.3.2.1 Introduction

Table 6.1 presents the range of mitigated residual impacts on the biophysical environment predicted should the LOM Project proceed based on the assessments summarised in Section 4B. The residual impacts considered being of greatest significance and the proposed management of these are summarised in the following sections.

6.3.2.2 Groundwater Resources

The groundwater impact assessment (RCA, 2010) determined that there would be minimal impact on groundwater quality or access to groundwater by surrounding users as a result of the LOM Project. However, the Proponent would implement appropriate mitigation measures if it is determined that impacts to groundwater resources have occurred as a result of the LOM Project.

6.3.2.3 Surface Water Resources

The conclusion of the surface water assessment (GSSE, 2010a) is that there would be limited residual impacts to surface water as a result of the LOM Project. However, the Proponent would implement appropriate mitigation measures if it was determined that impacts to surface water resources have occurred as a result of the LOM Project.

6.3.2.4 Noise

Noise modelling completed as part of the noise assessment for the LOM Project (Spectrum, 2010), predicts that the LOM Project would generate noise levels over and above those currently experienced throughout the existing environment surrounding the Project Site. These noise levels, assuming the implementation of the Proponent's operational commitments, would comply within the DECCW nominated criteria for all construction and operational activities under non-noise enhancing conditions. However, it is predicted that exceedances of up to 5dB(A) would occur under infrequent noise enhancing conditions at a number of residences surrounding the Project Site. At the "Plain View" residence, noise exceedances may be greater than 5dB(A) during Scenario 1 (approximately Year 2) operations. The Proponent is currently negotiating an agreement with the owner of the "Plain View" property and anticipates having an agreement in place prior to the commencement of the LOM Project.

The noise predictions modelled for the LOM Project represent noise levels significantly reduced from those originally predicted. This has been achieved through the implementation of all reasonable and feasible noise attenuation measures. It is considered that the modelled noise levels represent the lowest noise level that could practically be achieved by the Proponent under the conditions modelled.

The Proponent proposes to implement real-time noise and meteorological monitoring surrounding the Project Site. This monitoring would enable mine management to have an accurate real-time record of the noise levels being received at selected residences, or potential noise enhancing conditions which could lead to elevated noise levels at these residences. This would ensure that restrictions or modifications to operations could be made if practicable in a timely manner in the event that exceedances are identified or noise levels are approaching relevant noise criteria. The Proponent would also continue its monthly attended noise monitoring program and add at least four extra residences to this program.

6.3.2.5 Air Quality

The air quality assessment for the LOM Project (Heggies, 2010), predicted that there would be two scenarios where the maximum 24-hour PM_{10} concentrations would slightly exceed (by up to 1µg/m^3) the nominated criteria. However, these predictions are considered conservative and it was determined that if all proposed dust mitigation measures were implemented, that the likelihood of these exceedances occurring would be minimal.

Monitoring of emissions to air would be continued, incorporating the existing Werris Creek Coal air quality monitoring network to ensure that the conservative predictions summarise above are correct. The Proponent would augment the existing air monitoring network by installing and managing real-time particulate monitors prior to commencement of LOM Project operations. The real time monitoring would provide the Proponent with information on increasing particulate concentrations, allowing upwind/downwind concentrations of PM_{10} to be assessed, and mine contributions to ambient concentrations calculated. Should concentrations be noted to be approaching trigger criteria, relevant and contributing project operations would be identified and activity appropriately reduced until such time as the monitoring information provided confidence that concentrations had been reduced.

Predictions of air quality impacts within Quirindi from rail transport emissions have indicated that maximum 24-hour average PM_{10} concentrations may be exceeded on some occasions. Heggies (2010) recommends that the Proponent discuss with the rail transport companies the possibility of the rail transport companies conducting an air quality monitoring campaign to gain an understanding of the air quality impacts of coal transport through Quirindi (and other townships).

6.3.2.6 Biodiversity

Based on the conclusions of the biodiversity assessment for the LOM Project (ELA, 2010), the following residual impacts relating to biodiversity would result.

The LOM Project would result in the removal of 194ha of Grassy White Box Woodland and Derived Native Grasslands, which also could provide habitat for threatened species known to occur within the Project Site. However, the impact was not considered significant if the proposed mitigation measures as outlined in Section 4B are implemented including the development of the LOM Project BOS and the proposed mine rehabilitation plan which would establish the majority of the rehabilitated areas to woodland communities for nature conservation.

The complete displacement of an old growth remnant of the Brigalow-Belah Woodland EEC would constitute a significant impact. However, it is noted that the proposed rehabilitation of the Project Site would significantly reduce the impact which when considered in conjunction with other mitigation measures was assessed as a positive outcome. Furthermore, the conservation of an additional 567.4ha of another EEC represents satisfaction of the "like for like or better" criteria of DECC (2008d) (Principle 12).

6.3.2.7 Socio-economic Considerations

The LOM Project, if approved, would enable the Proponent to continue to obtain access to a valuable coal resource for domestic and export markets. The LOM Project would also provide a continued source of employment and income for residents in the local area and the surrounding district and assist in maintaining the local economies. Income in the form of royalties would also continue to be paid to the State government as a result of the Project.

6.3.3 Planning Considerations

This subsection reviews the compliance of the LOM Project with local, regional and State planning instruments. It is noted that whilst the relevance of these instruments may change in the future, the following represents the application of these in their current form to the LOM Project as described in Section 2.

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

The SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development, as defined in NSW legislation. **Table 3.1** presents a summary of each element requiring consideration and a reference to the section in the *Environmental Assessment* where this is addressed.

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

The quantity of explosive precursors to be stored on the Project Site required a *Preliminary Hazard Analysis* (PHA) under the SEPP 33 (in accordance with DoP, 2008) to be conducted. A PHA (**Appendix 4**) has previously been completed for the approved facility on the Project Site (Advitech, 2008). **Appendix 3** provides a risk assessment for other potentially hazardous materials to be stored on the Project Site. The results of the SEPP 33 risk assessment triggered the requirement to complete a preliminary hazard analysis (PHA) for the storage and use of ammonium nitrate (an explosives pre-cursor). A PHA completed by Advitech (2008) confirmed that the LOM Project does not represent a hazardous industry and therefore, SEPP 33 is not required to be considered further.

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

The Biodiversity Impact Assessment completed by Eco Logical Australia Pty Limited (ELA, 2010) for the LOM Project has confirmed the finding of previous studies (GCNRC, 2004 and GCNRC, 2009) that one of the species listed in Schedule 2 of SEPP 44 is found within the LOM Project Site. This is *Eucalyptus albens* (White Box) - a species that is dominant within many of the remnants of native vegetation present within and surrounding the Project Site.

More than 15% of the trees present within the remnant native vegetation areas within the Project Site are White Box and so these areas can be regarded as "potential Koala habitat". However, fauna surveys conducted on the Project Site between 2004 and 2010 (CES, 2004, Ecotone, 2009, and ELA, 2010) have failed to identify any signs of Koala habitation of the area. As such, the Project Site is not considered core Koala habitat, although the Proponent would implement a Pre Clearance Inspection protocol to ensure that no Koalas are present within these areas prior to clearing.

6.3.4 Consequences of not Proceeding with the Project

The consequences of not proceeding with the LOM Project include the following.

i) The coal recoverable by open cut methods would not be mined by the Proponent. Such an outcome would be contrary to the State's and the Proponent's objective to maximise resource utilisation.

ii) There would be a loss of jobs for those currently employed at the Werris Creek Coal Mine once the coal resource is exhausted to the currently approved limit.

iii) The opportunity to create an additional 10 full-time jobs (in addition to between 5 and 20 construction jobs) would be foregone.

iv) The disposable wages for both the current workforce and the additional full-time workforce would be foregone ($10Mpa), a substantial proportion of which would be spent in the local area.

v) Foregoing the additional taxes for the 20 year life of the mine associated with the annual payment of $10M in wages.

vi) Foregoing additional coal royalties and payments to State Authorities ($9M), as well as export earnings which would help offset, at least in part, Australia's foreign debt.

vii) Foregoing the additional annual expenditure of $90M associated with the operation of the LOM Project.

viii) The additional impacts on the local biophysical environment would not eventuate.

It is considered that the benefits of proceeding with the LOM Project therefore far outweigh the impacts on the environment that would result. The nominated consequences of not proceeding with the LOM Project also weigh heavily in favour of proceeding with the LOM Project.

6.4 CONCLUSION

The proposed Werris Creek Coal Mine LOM Project has, to the extent feasible, been designed to address the issues of concern to the community and all levels of government. The LOM Project provides for the production, sale and despatch of up to 2.5Mtpa of thermal and PCI coal products to domestic and export markets. The ongoing operation of the Werris Creek Coal Mine would ensure that current employment opportunities associated with the operation are maintained and that more employment opportunities would arise which would continue to contribute to the local economy. The post-mining landform would integrate the re-establishment of native woodland for native conservation with land for agricultural purposes resulting in a net land use benefit.