

6.1.3 Consideration of Key Issues

Vegetation Clearing and Rehabilitation/Regeneration

The clearing of 43 ha of the White Box Yellow Box Blakely's Red Gum EEC represents a short-term loss of biodiversity and habitat. However, the Department considers that the proposed Biodiversity Offset Strategy would offset this short-term impact and provide a long-term biodiversity benefit.

The Applicant would establish regeneration areas where remnant vegetation exists unaffected by mining. These areas would be managed to promote the improvement of biodiversity values and would be linked by woodland rehabilitation areas to existing habitat corridors. At the completion of rehabilitation works, a greater area of the site would be covered by native vegetation than currently exists.

The Department acknowledges that proposed biodiversity areas could be threatened in the future by development. However, any such proposal would be subject to environmental impact assessment under the EP&A Act, and would need to meet the relevant standards of the day. The current development proposal and rehabilitation/regeneration package minimises the risk of future development by conserving native vegetation and actively enhancing ecological values.

Impacts on Threatened Species

The Department concurs with the conclusions of the eight part tests for threatened species in that the proposal would be unlikely to significantly affect any threatened species. The Department notes that mitigation and rehabilitation/regeneration measures proposed as part of the project are critical in justifying this conclusion.

Notwithstanding, the implementation of a Flora and Fauna Management Plan would be critical in minimising impacts on known threatened species, particularly woodland birds. The Flora and Fauna Management Plan should contain a number of management strategies to minimise the potential impacts of the proposal, including:

- delineating areas of disturbance;
- protecting areas of vegetation outside the disturbance area;
- pre-clearance surveys for fauna;
- collecting seed for use in the rehabilitation program;
- timing vegetation clearance to avoid nesting/breeding activities;
- capturing and releasing fauna;
- providing nest and roosting boxes in suitable habitat; and
- relocating habitat features salvaged from felled trees.

In addition to the Flora and Fauna Management Plan, the Applicant should also incorporate measures to control weeds and feral animals. Overall, the Department supports the proposed mitigation strategies and commitments outlined in the EIS.

Conclusion

The Department has assessed the key issues relating to the potential flora and fauna impacts of the proposal. The proposal would have short and long-term impacts on a vegetation remnant and threatened species listed under the TSC Act. The proposed mitigation and environmental management of the site would ameliorate those impacts to some degree. More important, however, is the suite of proposed rehabilitation /regeneration measures that would provide compensatory habitat for displaced species and provide real long-term conservation outcomes. The Department considers that these mitigation measures adequately balance the residual flora and fauna impacts of the project and therefore believes that the proposal would be unlikely to affect the long-term viability, or contribute to the extinction, of any threatened species or ecological community.

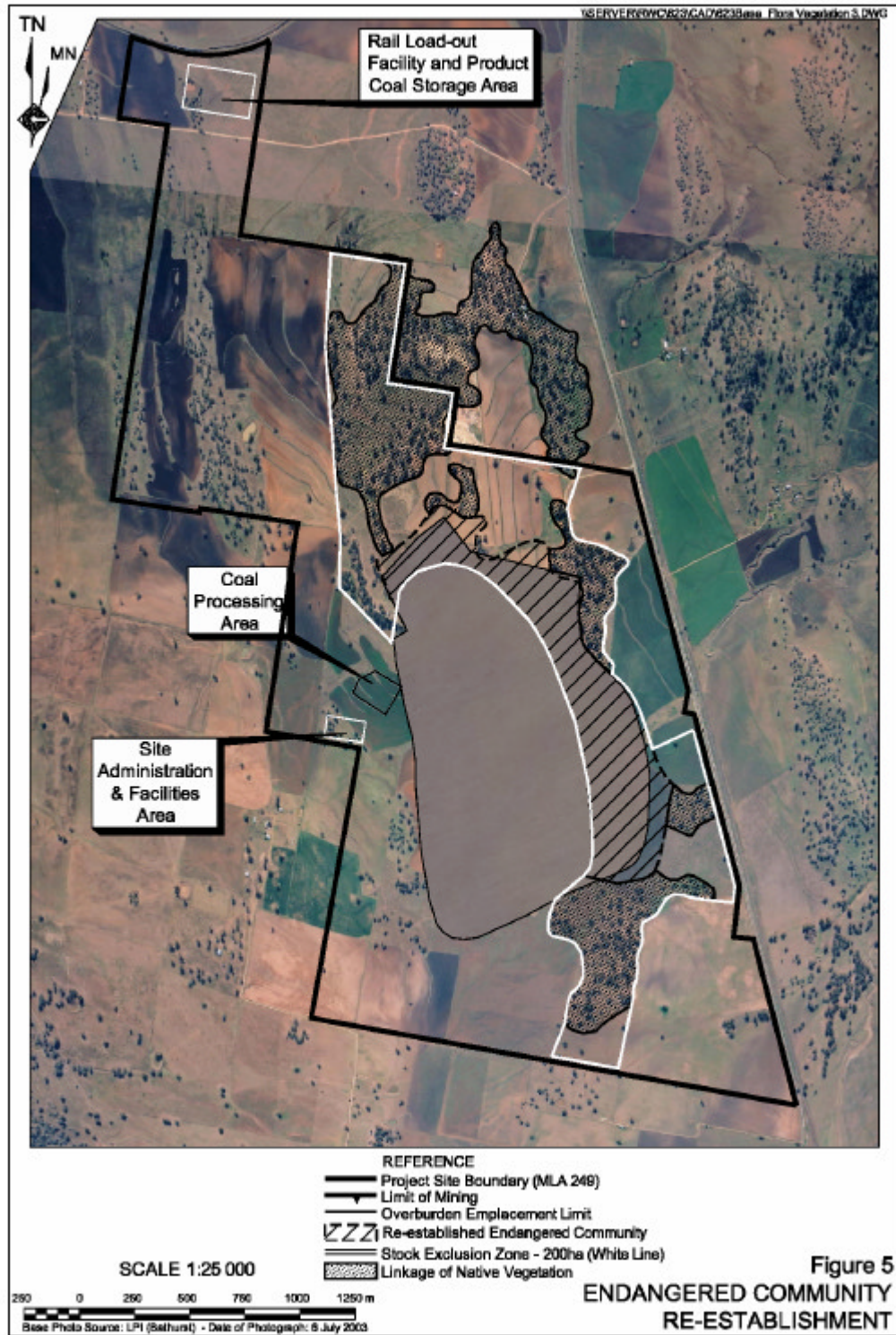


Figure 7: Biodiversity Offset Areas

To ensure that flora and fauna impacts are appropriately managed, the Conditions of Consent require the Applicant to:

- conduct a detailed flora and fauna monitoring program;
- provide long-term biodiversity benefits through rehabilitation/regeneration;
- develop a Flora and Fauna Management Plan;
- re-use cleared vegetation for rehabilitation efforts;

- regularly review and report on the success of flora and fauna management and the Biodiversity Offset Strategy; and
- ensure long-term conservation outcomes.

6.2 AIR QUALITY

6.2.1 Air Quality Impact Assessment

Richard Heggies Associates (RHA) has assessed the potential air quality impacts of the proposal (see Part 8 of the EIS Compendium) in accordance with the *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (EPA, 2001)*.

RHA used the Ausplume dispersion model along with a site-representative particulate matter emissions inventory and meteorological data (1 year of hourly average data for 2001) generated by the The Air Pollution Model (TAPM). The assessment indicates that the proposal would not exceed ANY of the relevant criteria (see Table 2).

Parameter	Period	Criterion	Maximum Value - all residential receptors
Dust Deposition - Increment due to mining	Month	2.0 g/m ² /month	1.8 g/m ² /month
Dust Deposition - Total	Month	3.6 g/m ² /month	3.4 g/m ² /month
Total Suspended Particulates - average	Annual	90 ug/m ³	Not modelled. Assessment relies on a comparison with PM ₁₀ modelling.
PM ₁₀ – maximum Increment due to mining	24 Hr average	50 ug/m ³	35 ug/m ³
PM ₁₀ – maximum Total	24 Hr average	50 ug/m ³	48 ug/m ³
PM ₁₀ – average Total	Annual	30 ug/m ³	17 ug/m ³

Table 2: Air Quality Assessment Criteria

RHA did not directly assess the impacts of the proposal against the criterion of 90 ug/m³ (annual mean) for TSP adopted by the DEC. This approach was based on data that indicates, for rural areas, the PM₁₀ fraction represents about 50% of the TSP. Accordingly, the annual average criterion of 30 ug/m³ represents a more stringent standard than the DEC criterion which corresponds to a PM₁₀ criterion of about 45 ug/m³.

The air quality impact assessment was based on the following approximations and assumptions:

- meteorological data was used from Tamworth, 45 km distant from the site;
- not all proposed mitigation measures have been incorporated in the assessment (due to difficulties in modelling the mitigation measures);
- the Ausplume air dispersion model is known to significantly over-predict 24 hr average PM₁₀ concentrations (by factors of between 2 and 4), and
- the use of 1.6 g/m²/month as the background value for dust deposition is conservative when compared to other known rural background levels of 0.5 to 1.0 g/m²/month.

These assumptions are reasonable and provide a sound basis to assess the impact of the proposal. Even with the use of these conservative data, the proposal is predicted to comply with all relevant air quality criteria.

6.2.2 Mitigation Measures

RHA assessed the effects of best management practices for dust mitigation qualitatively. These best management practices include dust mitigation on haul roads, works areas, dumps, drilling operations, blasting and water sprays for coal crushing and screening operations.

6.2.3 Issues Raised in Submissions

14 submissions raised concerns about the potential air quality impacts of the proposal. The key issues raised in these submissions were:

- general amenity issues of increased dust at residences (requirement for additional cleaning within and outside homes) in the vicinity of the proposal;
- impact on drinking water supplies collected from roofs;
- impact on pastures and stock water dams;
- requests for dust monitoring; and
- health impacts of dust.

6.2.4 Consideration of Issues

The Department is satisfied with the Applicant's assessment of air quality impacts and that it provides a robust basis for assessing the impacts of the proposal.

The Department is satisfied that it is unlikely that there would be any significant amenity or health impacts. The air quality impact assessment indicates that all relevant DEC criteria are likely to be met and the Applicant proposes to implement best practice mitigation measures to limit dust emissions; which are likely to further reduce predicted dust emissions in practice.

To ensure that these criteria are met the Department considers that the Applicant should be required to implement an Air Quality Monitoring Program in consultation with the DEC.

In regards to potential impacts on drinking water supply, the Department considers that, although the dust deposition levels are predicted to be within the DEC criterion, it is possible that residents may notice a change in the aesthetic quality of their drinking water.

The Applicant's assessment indicates that the proposal would not result in exceedances of the DEC criteria, which are set at levels to protect the health and amenity of residents in NSW. Consequently, the Department considers that there would not be any impacts on pastures or stock.

6.2.5 General Terms of Approval

The DEC reviewed the air quality assessment in the EIS and agreed that that the information presented demonstrates that no residences are predicted to be impacted by particulate emissions exceeding the DEC's air quality goals.

The DEC's GTAs, in relation to air impact assessment, require the installation of monitoring points for PM₁₀ at locations representative of most affected residences in the vicinity of the proposed mine and the rail load-out facility.

6.2.6 Conclusion

The Department is satisfied with the Applicant's assessment of air quality impacts of the proposal, which is predicted to comply with all relevant DEC air quality criteria for all privately-owned residences located in proximity to the proposed mine and rail load-out facility.

Nevertheless, the Applicant should be required to:

- comply with the air quality impact assessment criteria;
- carry out comprehensive air quality monitoring for dust deposition rate and PM₁₀ at sites representative of the most affected residences in the vicinity of the proposed mine and rail load-out facility; and
- implement best practice dust mitigation measures to minimise the dust generated by the development.

6.3 NOISE

6.3.1 Noise Impact Assessment

Spectrum Acoustics Pty Ltd (SA) conducted a detailed noise impact assessment of the proposal, generally in accordance with the Environment Protection Authority's *NSW Industrial Noise Policy* (see Part 7 of the EIS Compendium).

In this assessment, SA used the Environmental Noise Model along with typical sound power level and topographical data to predict noise levels at 10 representative locations around the mine under calm and adverse meteorological conditions for:

- construction activities (0 – 4 months) (see Table 3);
- initial mining operations (5 – 6 months) **with** an acoustic bund (see Table 4);
- intermediate mining operations (7 – 12 months); and
- advanced mining operations (Year 4).

Location	Meteorological Condition					
	Lapse	Inversion	SE wind	NW wind	Criterion	Differential
Werris Creek	20	26	20	20	43	-17
Zeolite Australia	35	45	45	39	40	5
"Cintra"	35	40	35	40	40	0
"Old Colliery"	31	38	38	36	40	-2
"Preston Park"	29	38	36	35	40	-2
"Hillview"	34	40	36	38	40	0
"Railway View"	36	45	39	37	40	5
"Hazeldene"	22	30	20	29	43	-13
"Almawillee"	20	29	20	27	43	-14

Table 3: Predicted Noise Levels for Construction Activities

Location	Meteorological Condition					
	Lapse	Inversion	SE wind	NW wind	Criteria	Differential
Werris Creek	<20	23	<20	<20	38/35*	-15/-12
Zeolite residence	24	30	30	23	35	-2
"Cintra"	27	35	27	35	35	0
"Old Colliery"	28	34	31	34	35	-1
"Preston Park"	25	33	31	34	35	-1
"Hillview"	26	35	32	30	35	0
"Railway View"	31	38	32	35	35	3
"Hazeldene"	22	30	21	29	38/35*	-8/-5
"Almawillee"	22	30	21	27	38/35*	-8/-5

Table 4: Predicted Noise Levels With an Acoustic Bund (Months 5-6)

Even with best practice mitigation, the proposal is predicted to cause exceedances of the construction and project specific noise criteria at three residences during the first five to six months of the proposal, after which it is likely to comply with all the relevant noise criteria, even under adverse weather conditions.

To address these exceedances, the Applicant has secured agreements with the affected owners, who are prepared to accept the predicted impacts during the first year of operations.

As the DEC noise criteria do not apply to properties owned by the mining company or where private agreements allow for specified exceedances of the criteria, the Werris Creek coal mine proposal is predicted to comply with the relevant noise criteria under all meteorological conditions provided that the following noise mitigation measures are employed:

- mid-high frequency broadband reverse beepers fitted to mobile equipment;
- tree clearing to be restricted to 9 am to 5 pm on areas exposed to “Railway View”;
- provision of air conditioning to “Railway View” for the life of the mine;
- restriction of hours of mining activities until the 15 m high acoustic bund is constructed. These hours are 8 am to 5 pm (April to September) and 7 am to 6 pm (October to March), Monday to Friday and 8 am to 6 pm on Saturday. The placement of overburden on the eastern edge of the bund would be restricted to calm conditions;
- no placement of overburden between the hours of 7 pm and 10 pm prior to the construction of the 15 m high acoustic bund; and
- no mining operations at night (10 pm to 7 am) unless a validation study confirms, to the satisfaction of the DEC and the Director-General, the predictions made in the EIS.

6.3.2 Additional Information Requested

Concern was expressed by the DEC in relation to:

- the implications of using a site-specific ground attenuation input to the ENM acoustical model and, the need for a comparison of modelled noise levels with those obtained by the use of the general ground attenuation input; and
- assessment of train movements, in accordance with the INP, on the currently disused rail spur between the rail load-out facility and the Main Northern Rail Line.

The Applicant has provided additional information that indicates:

- modelled noise impacts using the “general ground effect” provided a variation of between 1 and 3 dB(A) in predicted noise impacts at residential receivers;
- noise impacts of trains at “Cintra” and the Zeolite Australia residences would be about 2 dB(A) higher; and
- the DEC noise criteria for train passby levels are satisfied at residences close to the spur line,

when compared with the predictions in the EIS.

The DEC and the Department are satisfied with the additional information provided by the Applicant.

6.3.3 Issues Raised in Submissions

Twelve submissions from the public raised concerns about the potential noise impacts of the proposal. The key issues raised in these submissions were:

- residential amenity, including sleep arousal and the need for respite from continuous noise; and
- restriction of operating hours for the mine and associated train movements.

6.3.4 Consideration of Key Issues

The Department and the DEC are satisfied with the Applicant's noise assessment in the EIS and:

- supports the presented noise sensitive receiver locations;
- considers that the presented background noise levels are reasonable;
- supports the presented PSNLs;
- agrees with the presented sleep disturbance criteria and the predicted outcomes; and
- agrees with the predicted noise levels under night-time adverse meteorological conditions (following revision to be in accordance with the accepted use of the ENM noise model).

However, the DEC remains concerned about the:

- use of site-specific ground effect inputs in the ENM model; and
- uncertainties introduced to the predicted noise impacts by a reliance on off-site meteorological data.

To address these issues, the Department considers that the Applicant should be required to:

- construct the 15 m high acoustic bund only the eastern side of the mine;
- restrict the operating hours of the proposed mine to 8 am to 5 pm (April to September) and 7 am to 6 pm (October to March), Monday to Friday;
- only extend the operating hours for the proposed mine to 7 am to 10 pm, Monday to Friday, AFTER the acoustic bund is fully constructed; and
- only conduct mining operations between 10 pm and 7 am AFTER a validation study is undertaken, to the satisfaction of the DEC and the Director-General, of the predictions of noise impacts contained in the EIS against those directly measured while the mine is operational. If the noise impacts are greater than predicted, the Applicant will not be allowed to conduct mining operations between 10 pm and 7 am.

The DEC is satisfied with this approach, and the Department believes that the implementation of these measures would ensure that the noise impacts from the various stages of the development can be effectively managed to protect the amenity of local residences.

Residential Amenity

Even with the implementation of all reasonable and feasible mitigation measures, the EIS predicts exceedances of the relevant DEC noise criteria at 3 residences in the vicinity of the proposed mine.

However, all owners of residences predicted to experience noise levels in exceedance of the relevant DEC criteria have entered into written agreements with the Applicant to accept the predicted noise levels.

As the predicted exceedances would occur during some, but not all, adverse meteorological conditions over a 2-month period, the Department considers that these impacts are acceptable, as they are likely to be infrequent. Nevertheless, the Department believes that the Applicant should be required to undertake all practical measures to reduce noise impacts at these residences.

Sleep Disturbance

With the 15 m high acoustic bund in place, exceedances of the DEC's sleep disturbance criterion of 45 dB(A), L_{A1} (1 minute) are only predicted at residences that have a written agreement with the Applicant.

However, to ensure that noise impacts are minimised at night the Department believes the Applicant should:

- not conduct mining activities between 10 pm and 7 am until the 15 m high acoustic bund is constructed; and then
- undertake an acoustical validation study, to the satisfaction of the DEC and the Director-General, of the noise impacts predicted in the EIS before night-time (10 pm to 7 am) mining operations are considered for approval.

With the implementation of these measures, the Department considers that the sleep disturbance criteria are unlikely to be exceeded.

Assessment of Rail Movements on the Spur Line

Train movements on the disused rail spur line, that would be utilised by the Applicant to shunt coal trains to and from the rail load-out facility, would be required to meet the conditions of the Environment Protection Licence held by the Australian Rail Track Corporation (ARTC). However, the conditions of this Licence are more applicable to main line operations than those anticipated on the spur line at Werris Creek, which currently does not have any noise impacts from train movements.

For some residences, particularly the Patterson residence, there will be an increase in noise impacts due to the operation of the spur line. The owners of this residence have entered into a written agreement with the Applicant to accept a certain level of noise impact.

Nevertheless, the Department believes that the Applicant should be required to produce and implement a Management Plan for the operation of the rail spur line that employs best practice techniques to minimise and mitigate the impacts of train movements on the rail spur. This management plan would concentrate on noise and vibration impacts, but would consider other impacts such as train headlights and safety and traffic disruption at level crossings.

6.3.5 General Terms of Approval

The DEC has granted its GTAs for the development, which include:

- noise limits at residences;
- recognition of the existence of written agreements, indicating acceptance of noise impacts above relevant DEC criteria, between the Applicant and owners of noise-impacted residences;
- restrictions on the hours of operation of the mine in the initial stages of the development, especially until the construction of the 15 m high acoustic bund is completed;
- the requirement for a noise impact validation study to be conducted, and demonstrate the development's ability to operate at, or within, the noise predictions of the EIS, before approval of night-time mining operations will be considered; and
- a noise monitoring program.

6.3.6 Conclusion

The proposal is predicted to adversely affect several residences to the east of the proposed mining area and in the vicinity of the rail load-out facility. The owners of all residences that would be adversely impacted for more than 2 months have entered into written agreements with the Applicant to accept the level of noise impact predicted in the EIS. However, while Department supports these agreements, it believes the Applicant should be required to:

- implement best practice noise control measures to minimise and mitigate the predicted noise impacts;
- comply with the noise impact assessment criteria;

- carry out attended noise monitoring at representative locations of the most-affected residences; and
- undertake a validation study of noise impact predictions contained in the EIS, to the satisfaction of the DEC and the Director-General, prior to consideration of approval for night-time mining operations

6.4 BLASTING and VIBRATION

6.4.1 *Blasting Noise and Vibration Impact Assessment*

SA assessed the potential blasting and vibration impacts of the proposed development (see Part 7 of the EIS Compendium).

Blasting would occur at a maximum of once a day between 9 am and 5 pm. The precise time of blasting would vary depending on meteorological conditions.

Blasting operations at the mine are predicted to comply with the relevant DEC airblast overpressure and ground vibration “annoyance” criteria at all residences. These criteria are:

- the maximum airblast overpressure limit is 115 dB(Linear) for 95% of blasts, with no blast to exceed 120 dB(Linear) in a year; and
- the maximum Peak Vector Sum (PVS) ground vibration limit is 5 mm/s for 95% of blasts, with no blast to exceed 10 mm/s in a year.

The Applicant would, on request, notify any nearby landowner prior to each blast.

6.4.2 *Issues Raised in Submissions*

The Department received 10 submissions raising concerns about potential blasting impacts. One submission raised the potential for ground vibrations to damage the water supply pipeline from Quipolly Dam to Werris Creek, while most submissions considered that blasting could damage residences, farm buildings and disturb livestock. Several residents requested they be notified of planned blasting operations and that adequate compensation be provided for any damage caused by blasting operations.

6.4.3 *Consideration of Key Issues*

Impacts on Residential Receivers

The Department is satisfied with the Applicant’s assessment and agrees that it is unlikely that relevant DEC criteria for ground vibration and overpressure would be exceeded, at any residence, by blasting operations of the development.

However, the Department considers it important that a blast monitoring program be developed and implemented to accurately measure the impacts of blasting at representative residential locations in the vicinity of the proposed mine. The results of the monitoring program would enable the blast design to be refined to ensure that the relevant DEC criteria are not exceeded during the life of the mine.

The Department considers that all residents who request notification prior to blasts should be notified. The Applicant has agreed to notify all residents, on request, of proposed blasting operations. The Department supports the Applicant’s proposed program to inform the local community of blasting operations.

Impacts on Infrastructure

The EIS did not consider the potential impacts of blasting, particularly ground vibration, on infrastructure, such as irrigation mains and the water supply pipeline from Quipolly Dam to Werris Creek.

The Department's view is that the Conditions of Consent should contain a mechanism to allow potentially affected landowners to request the Applicant provide an independent inspection and assessment of their infrastructure for blasting damage. If damaged, the Applicant would be required to repair the infrastructure. This mechanism would also apply to public infrastructure, such as the Quipolly Dam to Werris Creek water pipeline.

In addition, the Department considers that a precautionary approach should be employed when blasting is undertaken within 500 m of the Quirindi to Werris Creek Road, or the Northern Rail Line, to guard against potential flyrock impacts. Consequently, it believes the Applicant should be required to ensure:

- adequate warning is given to road users prior to blasting;
- public roads are safe and clear of debris; and
- blasting does not delay the transportation of children to or from school.

6.4.4 General Terms of Approval

The DEC provided GTAs to regulate blasting at the development, including a restriction on the hours during which blasting may be undertaken. The Department has incorporated these GTAs into the proposed conditions of consent.

6.4.5 Conclusion

The Department is satisfied with the Applicant's assessment of blasting impacts, and that the Applicant can comply with the relevant DEC criteria for airblast overpressure and ground vibration at all residential receivers.

However, the Department believes the Applicant should be required to:

- comply with the relevant DEC criteria for airblast overpressure and ground vibration at any residence on privately-owned land;
- carry out all blasting between 9 am and 5 pm, Monday to Friday; with no blasting on Saturdays, Sundays or public holidays;
- conduct a maximum of 1 blast a day, except with the written approval of the DEC;
- carry out blasting operations to ensure the safety of public road users and without causing any delay to children travelling to or from school;
- carry out a property inspection, at the request of any landowner, within 2 km of the site;
- prepare and implement a program to monitor overpressure and ground vibration at locations representative of the most affected privately-owned residences in the vicinity of the mine; and
- commission an independent property investigation if any landowner within a 2 km radius of the site claims that his/her property or rural infrastructure has been damaged as a result of blasting at the development.

6.5 SURFACE WATER

6.5.1 Surface Water Impact Assessment

Approximately 143 ha of the project site lies within the Werris Creek catchment and 536 ha lies within the Quipolly Creek catchment. There are no permanent streams on site, with surface runoff flowing to either to Werris Creek or Quipolly Creek.

Natural drainage patterns on the site have been modified through the installation of a number of contour/diversion banks and dams, although the overall drainage pattern towards Werris and Quipolly Creeks remains unaltered. There are 11 dams on the site with a combined storage capacity of 13 350 m³.

The Applicant proposes to manage surface water within, and around, the site by the implementation of the following principles:

- diverting clean water around disturbed areas;
- capturing dirty water and treating it so that it could be discharged in accordance with relevant guidelines;
- capturing and treating contaminated water prior to discharge from the site; and
- maintaining as much vegetation cover (particularly grass) on the site as possible.

The Applicant has prepared a Surface Water Management Plan for the site and included this Plan in the EIS.

The Applicant plans to utilise captured dirty water, and water harvested within the maximum harvestable water right for its landholdings, to supply most of the operational water the mine would need for activities such as dust suppression. The predicted shortfall in water supply that would be obtained from existing groundwater bores on the Applicant's landholdings (see Section 4.1 of the EIS).

The Applicant assessed the potential surface water impacts of the proposed development and concluded that the proposed mitigation measures would prevent the discharge of contaminated water from the site.

6.5.2 Issues Raised in Submissions

The Department received 5 submissions on the potential surface water impacts of the proposal. These submissions questioned the mine's capacity to manage its water production during the development, and raised concerns about the redirection of surface water flows from the mine, in terms of:

- concentration of wet weather flows onto neighbouring land;
- capture of surface flows for use by the mine during dry periods; and
- the potential for surface waters exiting the mine to be contaminated by coal, sediment or salt.

6.5.3 Consideration of Key Issues

The Department and the DEC consider the surface water assessment in the EIS to be adequate. The Department generally supports the surface water controls proposed by the Applicant.

The Department is satisfied that:

- the capacity of the proposed mine water management is sufficient to accommodate wet weather flows conditions, and is therefore unlikely to affect any downstream landowners;
- the diversion of clean water around the mine site would be adequate to reduce the risk of off-site impacts; and
- there may be a slight reduction in catchment yields, but this is unlikely to have other than minimally affect downstream landholders.

However, the Department believes the Applicant should be required to prepare and implement a Surface Water Monitoring Program to monitor the performance of the proposed surface water management system. If adverse impacts on neighbouring properties are identified, the Applicant has committed, in the EIS, to pump water to other storage structures on the development to reduce or eliminate the impacts.

6.5.4 General Terms of Approval

The DEC has provided its GTAs for the proposed development.

These GTAs require the Applicant to:

- comply with Section 120 of the *Protection of the Environment Operations Act 1997* during the development (which prohibits the pollution of waters);
- ensure that discharges from sediment dams on the development comply with the following limits:

Pollutant	Units of measure	100 percentile concentration limit
pH	pH	6.5 = pH = 8.5
Total Suspended Solids	mg/litre	TSS = 50
Grease & Oil	mg/litre	= 10

- monitor the above parameters at any licenced discharge point at the development during discharge; and
- monitor the quality of the receiving waters at locations upstream and downstream of confluence of the Northern catchment into Werris Creek and the Southern catchment into Quipolly Creek during the development.

The Department has incorporated these GTAs into the proposed conditions of consent.

6.5.5 Conclusion

The Department is confident that the proposed mine water management system would perform adequately under a range of dry and wet weather conditions.

Nevertheless, the Department believes the Applicant should be required to:

- prepare and implement a detailed Surface Water Monitoring Program for the development;
- undertake water transfers within the site's water management system if adverse impacts are identified on neighbouring properties;
- prepare and implement an Erosion and Sediment Control Plan;
- review the mine's site water balance annually; and
- provide an annual review of surface water monitoring and observable trends, compiled by a suitably qualified and independent hydrogeologist.

6.6 GROUNDWATER

6.6.1 Groundwater Impact Assessment

Robert Carr & Associates (RCA) assessed the potential groundwater impacts of the proposed development using a computer-based simulation model (see Part 2 of the EIS Compendium).

This assessment predicts the proposed development would:

- reduce aquifer pressures within a radius of about 1.6 km from the mine over the next 20 years;
- not affect any groundwater bores utilising the alluvial aquifers adjacent to Quipolly Creek;
- produce a limited draw down of standing water levels in surrounding bores. The predicted draw down is less than 10 centimetres at distances greater than 1 km from the mine;
- have a marginal effect on two groundwater bores not owned by the Applicant;
- lower the groundwater level immediately around the mine by up to 85 m, although the existing groundwater level of 365 m AHD would be re-established in 20 years;
- create a lake of about 20 ha in the final void of the mine;

- have a minimal interaction with flooded underground mine workings of the former Werris Creek Colliery;
- not contribute contaminated water (either by increased acidity or salinity) from the coal seam aquifer to local and regional groundwater aquifers due to the presence of a low permeability layer separating the mining activities from the underlying aquifers;
- create a final void, which would act as a localised groundwater sink, with slightly brackish water, ranging from a low of 1150 uS/cm to a high of 1800 uS/cm.

It concludes that:

- the proposed development would not significantly affect any existing water supply bores or wells;
- contamination of local or regional aquifers would be unlikely; and
- detailed monitoring should be undertaken to measure groundwater quality and trends.

6.6.2 Additional Information Requested

The Department was concerned about some of the assumptions used in the groundwater model and potential impacts on local and regional groundwater quality and requested the following additional information:

- conceptualisation of the groundwater model in terms of whether the coal measures were connected to the underlying local and regional aquifers;
- an explanation of why the water quality in the final void would not mimic the poor (acid) water quality of the flooded workings of the former Werris Creek Colliery;
- parameters used in the groundwater model;
- the confidence of the prediction of marginal impact on surrounding groundwater users; and
- contingency plans should significant impacts be observed in the quality and quantity of the groundwater.

The DEC also requested the following additional information:

- an explanation of the poorer water quality measured in the flooded underground workings of the former Werris Creek Colliery;
- a prediction of the final water quality in the open cut void; and
- the measures to be put into place to prevent off-site groundwater impacts.

RCA provided the requested additional information, including the results of re-running the mathematical model with changes to the input parameters suggested by the Department. The resultant plots of predicted draw down levels were essentially unchanged from those shown in the EIS.

The additional information provided by RCA also demonstrated that:

- as the underground workings are predicted to supply only 0.3% of the total predicted inflow to the final void, the water quality in the final void would be essentially unaffected by the water quality of the underground workings; and
- as the level of water in the final void is predicted to be less than the surrounding landforms, it is predicted that there would be no discharge of water from the void to surface waters.

The Applicant accepted that, as the effects of mining on groundwater regimes is not known with absolute certainty, a detailed monitoring program of existing groundwater bores should be supplemented by strategically located piezometers to provide an indication of the impacts of the proposed mine on the aquifers of the area.

The Applicant also accepted contingency measures should be in place to replace groundwater supplies or compensate the landowner, if any groundwater bore was adversely affected by the development.

Both the Department and the DEC considered the combination of the information contained in the EIS, and the additional information provided, was adequate to issue GTAs.

6.6.3 Issues Raised in Submissions

The Department received 13 submissions on the potential groundwater impacts of the proposed development.

These submissions were concerned about the potential groundwater impact of the proposed development on individual landowners' ability to access groundwater of the same quality and quantity as is currently available.

Most landowners concerned with impacts on groundwater were from the Quipolly Creek area, where landowners irrigate from the alluvial aquifer associated with the creek. Other landowners located to the east and northwest of the proposed mine were concerned with potential contamination of groundwater or loss of yield within the zone of predicted draw down effect.

Some landowners were concerned that if they experienced a loss in groundwater yield from existing bores that they would incur additional costs (purchase of larger pumps and increased running costs) if they needed to pump water from increased depths.

6.6.4 Consideration of Key Issues

Potential Impacts on Quipolly Creek Alluvial Aquifer

The information presented in the EIS, and the additional information provided by the Applicant, indicates that the shallow alluvial aquifer adjacent to Quipolly Creek would be outside the area predicted to be affected by draw down from the proposed development. It also indicates that the shallow aquifer adjacent to Quipolly Creek is unlikely to be affected by the deeper regional aquifer which, in turn, is unlikely to be contaminated by mining operations because the low permeability layer at the base of the coal mine will restrict the movement of minewater into the underlying aquifer.

Consequently, the Department is generally satisfied that the proposal would not affect any existing groundwater users dependent upon the Quipolly Creek alluvial aquifer, and the proposal would not result in the contamination of the groundwater aquifers surrounding the mine.

Nevertheless, the Department is still concerned that there may be connectivity, through cracks in the low permeability layer, of minewater to the underlying aquifers, and the Applicant should be required to prepare and implement a detailed groundwater monitoring program to monitor groundwater quality and detect any changes in its quality over time.

Potential Impacts to the East and Northwest

The predicted drawn down effect on bores to the east and northwest of the development is less than 20 centimetres (a very minor loss of water level in the affected bores) that is unlikely to affect the landowners' use of the bores. One resident to the northwest was concerned that contaminated surface waters would migrate from the rail loading facility and affect water quality in a shallow bore.

The Department is confident that the measures proposed in the EIS to prevent contamination of surface waters at the rail loading facility would, if effectively implemented, prevent contamination of surface waters and accordingly, protect the quality of shallow groundwater in this area.

Final Void Water Quality

The Department and the DEC are concerned that the final void water quality cannot be predicted with certainty. Rainwater has the potential to mobilise salts in the overburden and then leach them into the water contained in the final void. Whether these salts would be diluted by additional rainfall or concentrated by evaporation has not been accurately predicted. However, the Department is satisfied that interactions with the acidic and saline water contained in the flooded underground workings of the former Werris Creek Colliery would not significantly affect the quality of the water in the final void.

The Department's view is that the Applicant should prepare and implement a detailed groundwater and final void water quality monitoring program to monitor any changes to groundwater quality and to give an early indication of any likely impacts on current beneficial uses of groundwater in the area surrounding the development.

6.6.5 General Terms of Approval

The Department has issued its GTAs for the proposal.

These GTAs require the Applicant to:

- conduct regular monitoring of groundwater levels in the area surrounding the development;
- prepare and implement a Groundwater Management Program for the development;
- prepare a Groundwater Contingency Plan to monitor impacts, establish trigger criteria, mitigate any impacts and, if necessary, provide for compensation to affected landowners; and
- compensate any landowner whose groundwater supply is adversely affected by the development.

The Department has incorporated these GTAs into the proposed Conditions of Consent.

6.6.6 Conclusion

The Department is satisfied that the Applicant has provided as much information on the predicted groundwater impacts of the development as can be obtained by groundwater modelling and the existing data on local groundwater quality.

However, there exists a degree of uncertainty of the likely impacts of the development on the quality of the water in the final void and the effectiveness of the low permeability layer separating the coal measures from the underlying local and regional aquifers.

Therefore, the Department believes the Applicant should be required to:

- prepare a Groundwater Contingency Plan to the satisfaction of the Director-General;
- establish and implement a detailed Groundwater Management Program to detect trends in groundwater quality and standing water levels in sufficient time to allow the implementation to implement any required contingency measures; and
- provide an annual review of groundwater monitoring and observable trends, compiled by a suitably qualified and independent hydrogeologist.

6.7 ABORIGINAL CULTURAL HERITAGE

6.7.1 *Aboriginal Cultural Heritage Impact Assessment*

The Applicant conducted an Aboriginal cultural heritage assessment which included:

- a site survey in conjunction with the Nungaroo LALC;
- a search of relevant literature; and
- a search of the DEC's Aboriginal Heritage Information Management System.

The assessment re-located a set of 25 axe-grinding grooves, which had been previously recorded, within the western edge of the proposed mining area (the "Narrawolga Site").

Subsequently, the Applicant, in consultation with the Nungaroo LALC, altered the planned extent of open cut mining to avoid the grinding grooves. Consequently, the Applicant would not need a section 90 consent from the DEC for the site.

6.7.2 *Issues Raised in Submissions*

Aboriginal cultural heritage was not raised as an issue in public submissions. However, the Applicant has consulted with the Nungaroo LALC and incorporated its views in proposed measures to protect the grinding grooves from blasting impacts and involve its members in the management of the grinding grooves. The DEC indicated its support for the proposed measures.

6.7.3 *Consideration of Key Issues*

The key issue is the protection of the grinding grooves from the effects of blasting and the involvement of the Nungaroo LALC in any activities that may impact on Aboriginal cultural heritage.

The Applicant has undertaken to implement the following recommendations of the Nungaroo LALC:

- construct a fenced buffer around the "Narrawolga Site";
- install and maintain a protective barrier or mat when blasting activities at the development are within 500 metres of the "Narrawolga Site";
- engage a suitably qualified, experienced and independent blasting expert to assess and report on the likely impacts of blasting on the "Narrawolga Site" and recommend measures to protect the site from any potential blasting impacts;
- provide a copy of the report to the Nungaroo LALC; and,
- following validation by the Nungaroo LALC, implement the recommendations of the report.

The Applicant has also undertaken to convene regular meetings with the Nungaroo LALC to discuss the management of the site, in addition to more general issues.

6.7.4 *Conclusion*

The Department supports the measures proposed by the Applicant to protect the "Narrawolga Site" and its commitment to consult with the Nungaroo LALC in relation to Aboriginal heritage issues associated with the development.

Nevertheless, the Department believes that the conditions of consent should require the Applicant to:

- implement the recommendations of the Nungaroo LALC in respect of the "Narrawolga Site"; and
- produce and implement a Archaeology and Cultural Heritage Management Plan that describes consultation with the Nungaroo LALC and provides for training of mine employees in Aboriginal cultural heritage awareness and protection.

6.8 TRAFFIC AND TRANSPORT

6.8.1 *Traffic Impact Assessment*

The potential traffic impacts of the proposed development were assessed in the EIS (see sections 2.8 and 4.10 of the EIS).

The development is predicted to generate from 30 to 80 light vehicle movements and up to 20 heavy vehicle movements a day during the construction period of up to 4 months. Once operational, the mine is predicted to generate 60 to 100 light vehicle movements a day and an average of 8 heavy vehicle movements to transport coal to domestic markets.

The assessment indicates that this represents a very small proportion of the traffic on the local road network (i.e. 8%) and would therefore not have a significant impact on road capacity, safety and trip times for road users.

The traffic impact assessment also considered the performance and safety of the haul road and Escott Road intersection as well as the construction of the mine entry intersection. The Applicant also provided a concept design for the mine entry intersection in accordance with relevant RTA standards.

6.8.2 *Issues Raised in Submissions*

The Department received 5 submissions on the potential traffic impacts of the proposal, mostly objecting to the potential use of local roads by mine-related traffic. Of particular concern was the potential use of Taylors Lane by coal trucks, and Paynes Road and Wadwells Lane by vehicles accessing the development.

Liverpool Plains Shire Council provided a submission, which raised the issues of the safe operation of road intersections, the standard of their construction and the need for their ongoing maintenance.

6.8.3 *Consideration of Key Issues*

The Applicant has stated that Paynes Road and Wadwells Lane would only be utilised by mine vehicles associated with various environmental monitoring programs or in the normal course of conducting agricultural activities.

The Department concurs with the Applicant's assessment of traffic impacts. However, the Department's view is that safety issues associated with the intersection of the haul road and Escott Road are of prime importance and that a management plan for the operation of the intersection should be prepared and implemented to the satisfaction of Council.

The Department believes the Applicant should be required to construct the mine entry and the Quirindi to Werris Creek Road intersection to the appropriate RTA standard.

Council recommended, and the Applicant accepted, that, to improve sight distances, the mine entry intersection be relocated 300 m to the south of the location shown in the EIS. The Department agrees with the Council's recommendation.

6.8.4 *General Terms of Approval*

The Council has issued its GTAs for the proposal.

These GTAs require the Applicant to:

- design, construct and maintain the proposed intersections of the mine entry and the Quirindi to Werris Creek Road and of the haul road and Escott Road to the satisfaction of Council;
- provide lighting at these intersections in accordance with local electricity guidelines;
- maintain the intersection of Escott Road and the Quirindi to Werris Creek Road; and
- prepare and implement Traffic Management Plans for the proposed road works.

The Department has incorporated these GTAs into the proposed Conditions of Consent.

6.8.5 Conclusion

The Department is satisfied with the Applicant's assessment of traffic impacts associated with the proposal, and that the proposal would have minimal impact on the general road network.

However, to ensure that the traffic impacts on local road users are minimised, the Applicant should be required to:

- design, construct, operate and maintain any new roadworks associated with public roads for the life of the mine to the satisfaction of Council;
- maintain the Escott Road and Quirindi to Werris Creek Road intersection for the life of the mine;
- tar seal the internal access road and coal haul road;
- generally restrict road haulage to domestic markets to daylight hours;
- restrict road haulage of coal to domestic markets to not more than 30,000 tonnes a year; and
- keep records and report the amount of coal transported from the development and the number of truck movements each year.

6.9 VISUAL

6.9.1 Visual Impact Assessment

The potential visual impacts of the proposed development were assessed in the EIS (see section 4.8 of the EIS).

The visual impact assessment indicates the following:

- the development would be clearly visible from residences on elevated land to the east of the proposed mine, such as “*Railway View*” and “*Hillview*”;
- residences to the north, such as the residence at the zeolite processing plant and “*Escott*”, would have close views of the train load-out facility;
- residences along Paynes Road and Taylors Lane would experience more distant views of the development, particularly of the overburden emplacements;
- travellers using the Quirindi to Werris Creek Road and users of local roads such as Paynes Road, Taylors Lane and Escott Road would also experience views of the development;
- the disturbance caused by earthworks and the emplacement of overburden would create a strong colour contrast with the surrounding rural landscape; and
- the mine would create a night glow that would be observable from many surrounding properties.

The Applicant proposes to undertake the following measures to mitigate visual impacts of the development:

- construction of a 15 m high bund along the eastern margin of the mine to restrict views of active mining areas from travelers on the Quirindi to Werris

Creek Road, and to some extent from the residences located on elevated land to the east of the development;

- the progressive rehabilitation of the eastern bund, and other disturbed areas, as quickly as possible to reduce the colour contrast of disturbed earth to the surrounding rural landscape; and
- emplacement of overburden to continue the landform of the existing ridge, when observed from the Quirindi to Werris Creek Road.
- the mine's flood lights would be managed so that they would not shine directly towards neighboring residences or roads.

6.9.2 Issues Raised in Submissions

The Department received 7 submissions in respect of visual impacts and 4 submissions concerned with the effects of night lighting at the development. Most were concerned that the development would be out of character with the existing rural landscape and that the enjoyment of the scenic rural landscape would be lost. The issue of visual impact was strongly related to submissions objecting to the development on the grounds that it would impact on current landowners' rural residential amenity.

6.9.3 Consideration of Key Issues

The Department considers that, even with the implementation of the mitigation measures proposed by the Applicant, there would be visual impacts from the development that would affect the residential amenity of some residences in close proximity to the mine and train load-out facility.

Consequently, the Department believes the Applicant should be required to implement additional measures to lessen the visual impacts of the development on local residents and road users. In particular, if a resident within 2 km of the mine who has direct views of the mine, considers that their visual amenity is affected by the mine, should be able to require the Applicant to commission a suitably qualified person to investigate ways to minimise the visual impacts on the residence and implement the recommendations of the investigation. These may involve landscaping or ameliorative works at the affected landholding.

6.9.4 Conclusion

While the Department is satisfied that visual impacts of the development can be managed and mitigated to some degree, there would still be short-term impacts at some residences on elevated land to the east of the development, even with the implementation of the proposed mitigation measures.

Consequently the Department believes it is appropriate to require the Applicant to investigate and implement additional measures to minimise visual impacts on these residences, and any residence located within 2 kilometres of the development, in consultation with the affected landowner.

In addition, although the rehabilitation of mines is generally dealt with under the Mining Act, the Department believes the Applicant should be required to ensure that progressive rehabilitation of disturbed lands is carried out to reduce the length of time that visual impacts are experienced by neighbours and road users.

In regard to night lighting, the Department believes that the Applicant's proposed management measures can effectively ensure that night lighting would not significantly affect the amenity of local residents, the safety of local road users or the Siding Springs observatory. Nevertheless, the Department believes the Applicant should be required to:

- take all practicable measures to mitigate off-site lighting impacts; and

- ensure that all external lighting associated with the development complies with the relevant Australian Standard.

6.10 ECONOMIC

6.10.1 Economic Impact Assessment

The Applicant has assessed the potential economic impacts of the proposal (see Section 4.9 of the EIS).

This assessment concludes that the proposal would have significant economic benefits for Australia and NSW in general, and for the Liverpool Plains (Werris Creek) region in particular. Over the life of the mine (about 7 years), the increased coal production would generate significant revenues for the company, increased royalties and taxes for Government, and increased spending in both the Liverpool Plains and State economies (see Table 5).

Item	2005 -2012
Sales Revenue	\$500 million
Royalties	\$29.4 million
Taxes	\$234 million
Capital	\$10 million
Labour and Consumables	\$210 million

Table 5: Economic Contribution Estimates, Werris Creek Coal Mine

In addition, the Werris Creek coal mine would offer employment for 50 direct employees and 20 full-time equivalent contract employees; a total of 70 new positions for the region.

According to the NSW Minerals Council, 1 job in the mining sector creates 3 jobs in associated sectors. Using this as a guide, the proposal could generate (or support) about 210 jobs over the life of the mine. The increased employment in the Liverpool Plains area would provide a significant economic stimulus to an area that has been experiencing a slow decline in population and services in local towns.

Initially, up to 80% of the mineworkers are expected to be from outside the region. The Applicant has indicated that efforts would be made to increase the proportion of local workers to 80%, with a resultant improvement in the skills base for the regional workforce. Due to the slow decline in the regional population over recent years, there is an ample housing to accommodate the 40 workers that the proposal is expected to attract to the region who would help underpin and retain existing services.

6.10.2 Issues Raised in Submissions

The Department received 10 submissions (8 from individuals, 1 from the Australian Railway Monument Inc. and 1 from the Liverpool Plains Shire Council) supporting the project on the grounds of the improved economic activity for Werris Creek and the Liverpool Plains region that would occur if the mine were to be approved. The submissions highlighted the importance of improved employment opportunities that the mine would create, including those associated with the provision of goods and services.

6.10.3 Conclusion

The Department is satisfied that the proposal would have significant economic benefits for the people of NSW. It would generate export revenue for Australia, royalties and taxes for Government spending, create and sustain up to 280 jobs for about 7 years, and provide an important economic impetus to the Liverpool Plains region.

6.11 OTHER ISSUES

The Applicant has assessed the potential European heritage (see section 4.4.3 of the EIS), waste (see section 2.11 of the EIS), greenhouse gas emissions (see section 4.7.5.4 of the EIS), soil and agricultural land (see section 4.2 of the EIS) and bushfire hazard (see section 3.5 of the EIS) impacts of the proposal.

The Department is satisfied that the proposal is unlikely to have other than minimal adverse impacts on European heritage, greenhouse gas emissions and waste or bushfire management.

The Department believes the Applicant should, rather than rely on diesel powered generators, utilise mains electric power for the operation of the rail load-out facility and coal processing plant to reduce greenhouse gas emissions and to minimise the quantity of liquid fuels stored on the development.

The reduction in land available for agricultural production has been offset by an increase in the amount of land available for the Biodiversity Offset Strategy. Nevertheless, the Department believes the Applicant should be required to comply with a number of standard conditions of consent to ensure that these matters receive appropriate attention during the development.

7. SECTION 79C CONSIDERATIONS

Section 79C of the EP&A Act sets out the matters that a consent authority must take into consideration when it determines a DA.

The Department has assessed the proposal against these matters, and is satisfied that:

- the proposal is generally consistent with the provisions of the relevant planning instruments;
- the potential impacts of the proposal can either be mitigated or managed; and
- the proposal is generally in the public interest.

8. RECOMMENDED CONDITIONS OF CONSENT

The Department has prepared recommended Conditions of Consent for the proposal.

These conditions are required to:

- prevent, minimise and/or offset adverse environmental impacts;
- set standards and performance measures to monitor environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the development.

The Applicant has accepted these recommended conditions.

9. CONCLUSION

The proposal will generate some environmental impacts.

Firstly, it will change the predominantly rural nature of the landscape, and generate a range of noise, dust, water, and visual impacts that will be noticeable to the local community living in the vicinity of the proposed mine. While most of these impacts are unlikely to be significant and are predicted to comply with the relevant criteria for acceptable environmental performance, most of the local residents are likely to perceive the mine as an intrusive activity

Secondly, the proposal is predicted to cause significant exceedances - of up to 6dB(A) – of the construction and project specific noise criteria at 3 residences during the first 6 months of operations. Although these exceedances are likely to attract the attention

from the local community to the mine's operations, the Applicant has secured agreements with the affected landowners, who are prepared to accept these predicted exceedances.

Finally, the proposal will remove 43 hectares of the endangered White Box Yellow Box Blakely's Red Gum vegetation community.

Notwithstanding these costs, it is important to stress that the proposal will generate some significant benefits.

Firstly it will generate significant social and economic benefits for the regional economy focused on Werris Creek in particular, and NSW more generally, by extracting a valuable natural resource; generating \$500 million in revenue, \$230 million in taxes, and \$30 million in royalties; and employing 70 people during operations.

Secondly, it will provide a regional conservation benefit in the medium to long term by ensuring that there is at least 200 hectares of the endangered White Box Yellow Box Blakely's Red Gum vegetation community on the site.

In the Department's view, these benefits vastly outweigh the costs associated with the proposal.

10. RECOMMENDATION

It is RECOMMENDED that the Minister:

- (1) Consider the findings and recommendations of this report;
- (2) Approve the DA under Section 80 of the Act; and
- (3) Sign the attached Instrument of Consent (tagged A).

David Kitto
Manager
Mining & Extractive Industries

Sam Haddad
Deputy Director-General