



NSW GOVERNMENT  
**Department of Planning**

## **MAJOR PROJECT ASSESSMENT** **Moolarben Coal Project**



Director-General's  
Environmental Assessment Report  
Section 751 of the  
*Environmental Planning and Assessment Act 1979*

September 2007

Cover Photos: Main Photo: Aerial view of the Moolarben Project Site, looking southeast down Moolarben Valley; and  
Small Photo: The Drip, looking west along the Goulburn River.

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## EXECUTIVE SUMMARY

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Moolarben Coal Mines Pty Limited (Moolarben), a wholly owned subsidiary of Felix Resources Limited, proposes to establish a new coal mine approximately 40 kilometres northeast of Mudgee (see Figure 1).

The proposal – known as the Moolarben Coal Project – involves the construction and operation of three open cut mining pits, an underground mine, and a range of associated infrastructure including a coal handling and preparation plant, and new rail loop and coal loader off the Sandy Hollow-Gulgong railway line. Over 21 years, Moolarben would extract a coal resource of 127 million tonnes of coal at a rate of up to 12 million tonnes of run-of mine (ROM) coal, process this coal on site, and then rail it to domestic and export markets.

The project has a capital investment value of \$405 million, would contribute up to \$350 million a year to the NSW economy, and employ around 320 people during operations. It would also provide royalties and tax income to Government.

The proposal constitutes a 'major project' under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and consequently the Minister is the approval authority for the project application.

The Department exhibited the Environmental Assessment (EA) of the project for 5 weeks from 18 September 2006, and received 601 submissions on the proposal, including 12 from government authorities and 589 from the general public and a range of special interest groups. Around 87% of these submissions objected to the project, raising concerns about a broad array of potential impacts including the water, subsidence, noise, dust, flora and fauna, traffic, greenhouse gas and Aboriginal heritage impacts.

On 21 August 2006, the Minister appointed a Panel of Experts to assess the subsidence, groundwater and noise impacts of the project. This Panel comprised three independent experts chaired by Emeritus Professor Jim Galvin, and reported to the Director-General in late February 2007. The Panel's report contains in-depth technical analysis of the project's key environmental impacts, and a range of recommendations to minimise, control and manage the project's residual environmental impacts and risks.

The Department has assessed the project application, EA, submissions on the project, Moolarben's response to submissions, and the Panel's report, in accordance with the objects of the EP&A Act and principles of ecological sustainable development, and is satisfied that there is sufficient information available to determine the application.

This assessment has found that the project would have a number of environmental impacts, most notably the noise, dust and vegetation clearing of the proposed open cut mining operations; the subsidence and associated water impacts of the proposed underground mining operations; and the potential cumulative impacts associated with the concurrent operation of Moolarben, Ulan and Wilpinjong coal mines.

Nevertheless, the Department is satisfied that the residual environmental and socio-economic impacts of the project can be adequately mitigated, managed, offset and/or compensated for; and has recommended a comprehensive range of conditions to ensure this occurs.

In addition, the Department's assessment recognises the significance and need for the project in terms of securing domestic and international energy needs, bolstering the regional and NSW economies, and generating employment in the State.

After careful consideration, the Department believes, on balance, that the project's benefits sufficiently outweigh its costs, and that it is therefore in the public interest.

Consequently, the Department recommends that Moolarben Coal Project be approved subject to strict conditions of approval.



# 1. PROPOSED PROJECT

## 1.1 Project Description

Moolarben Coal Mines Pty Limited (Moolarben), proposes to establish a new open cut and underground coal mine approximately 40 kilometres northeast of Mudgee (see Figures 1, 2 & 3).

The key components of the proposal, which is known as the Moolarben Coal Project are summarised in Table 1, and depicted in Figures 3, 4, 5 and 6. However, the project is described in full in Moolarben’s Environmental Assessment (EA), which is attached as **Appendix G**.

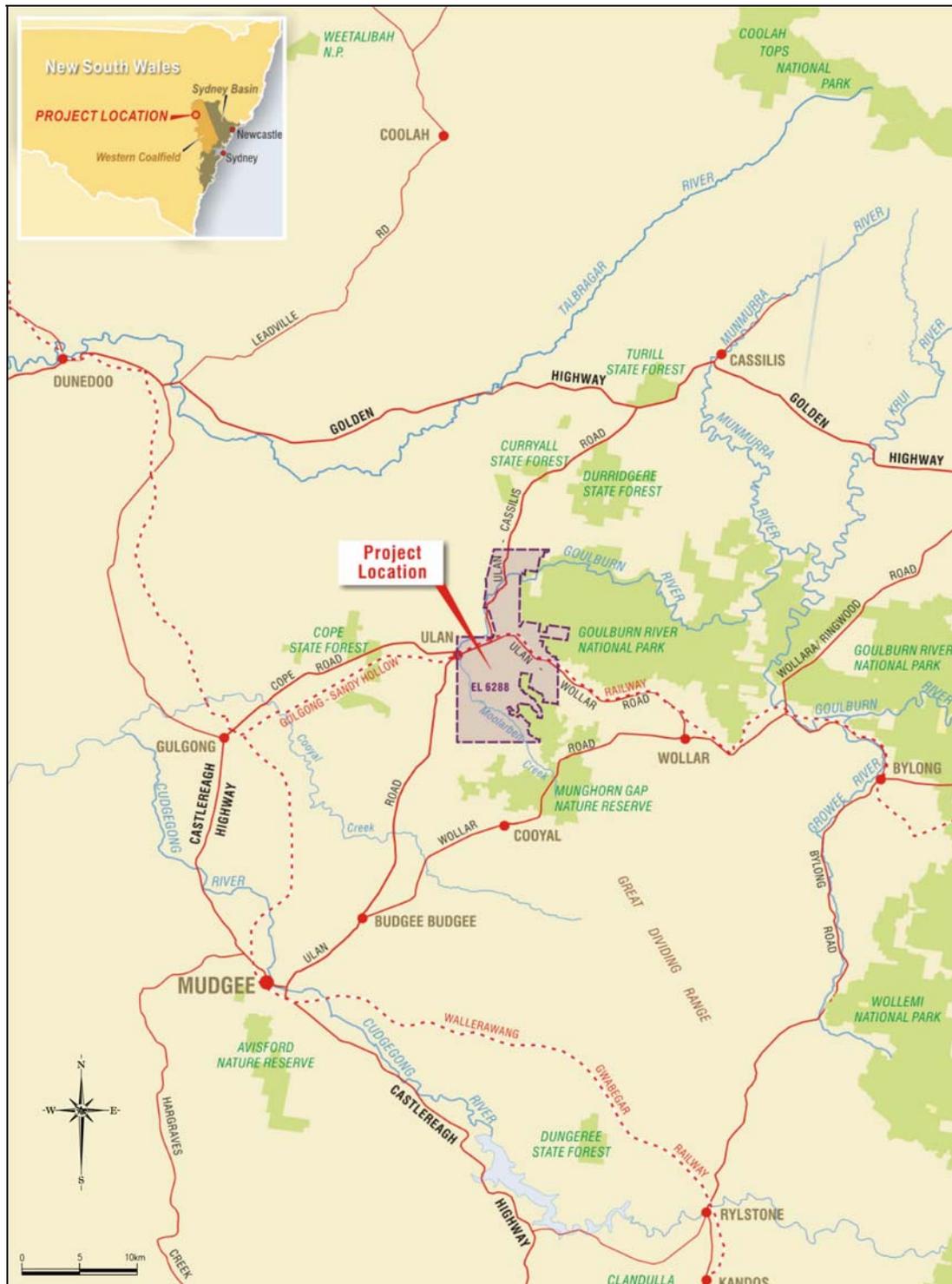


Figure 1: Project Location

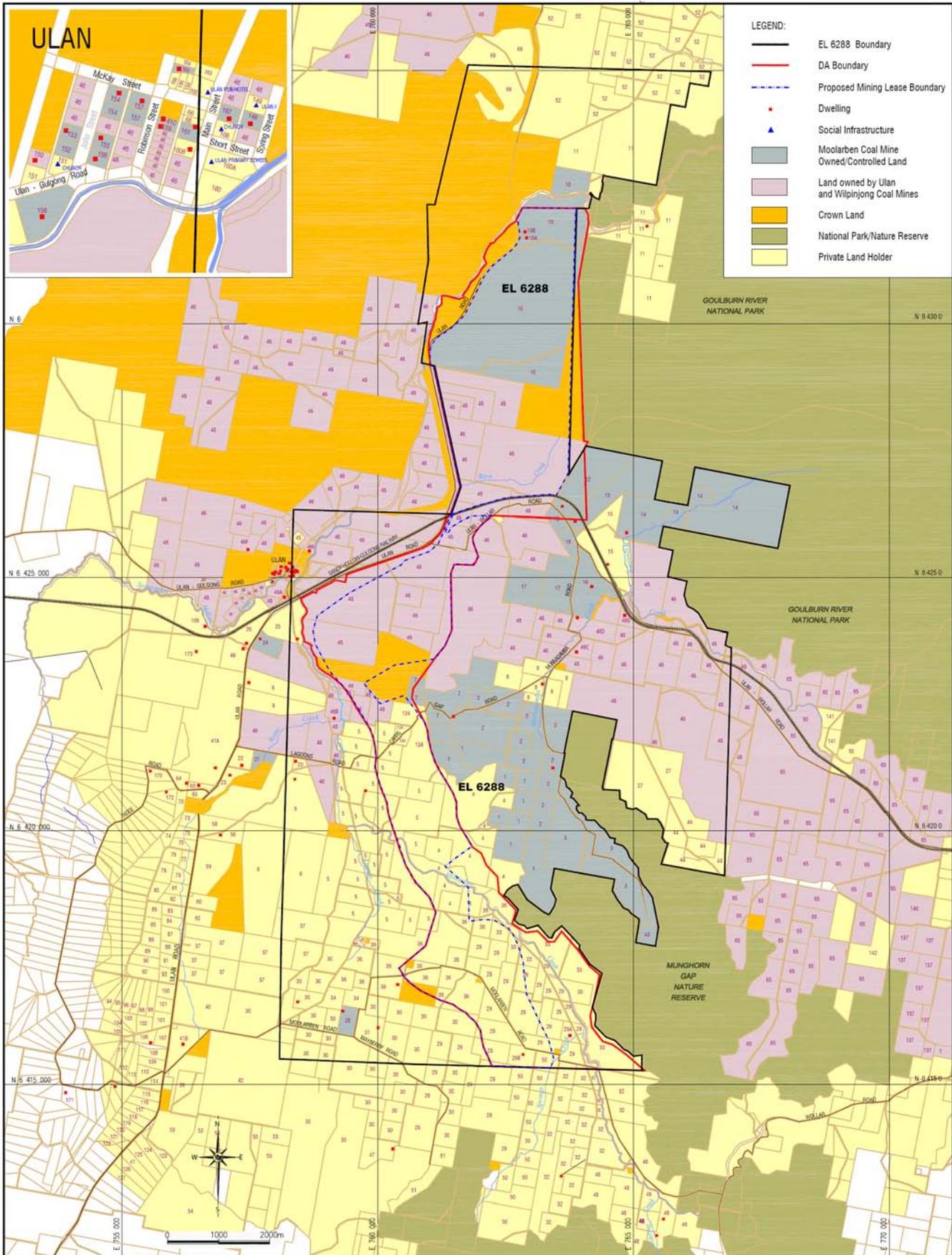


Figure 2: Project Application Area

**Table 1: Major components of the project**

<b>Aspect</b>	<b>Description</b>
<b>Project Summary</b>	<p>Three small open cut mines extracting up to 8 million tonnes of run of mine (ROM) coal a year; and an underground mine extracting up to 4 million tonnes of ROM coal a year.</p> <p>Construction and operation of a range of associated infrastructure, including a coal handling and preparation plant (CHPP), rail loop and coal loader.</p> <p>The coal would be extracted and processed on site before being railed to domestic and export markets.</p>
<b>Mining and Reserves</b>	<p>The project is based on a coal reserve of approximately 127 million tonnes.</p> <p>The open cut mining operations would use trucks, excavators, and blasting to remove overburden and coal, while the underground mining operations would use longwall mining methods.</p>
<b>Mine Waste Rock Management</b>	<p>Waste rock to be deposited within mined-out voids, with some initial out-of-pit emplacement required prior to establishment of pit voids. These out-of-pit emplacements would generally serve as environmental bunds around open cuts 1 and 2.</p>
<b>Coal Washing</b>	<p>Coal from the open cut and underground mining operations would be processed at the coal handling and preparation plant (CHPP) on site. This CHPP would be capable of processing up to 14 million tonnes of ROM coal a year.</p>
<b>Water Demand and Supply</b>	<p>Water demand would vary, however peak demand is predicted to be approximately 6.9 megalitres (ML) a day (2500 ML a year), mainly for coal processing and dust suppression.</p> <p>This water would be sourced primarily from surface run-off within disturbed areas, groundwater inflows into the open cut and underground operations, and a bore field of up to 20 bores.</p>
<b>Coarse Rejects and Tailings Management</b>	<p>Coarse rejects would be placed predominantly within mined-out voids. Tailings would be added to either product or reject streams (for in-pit disposal).</p> <p>An emergency tailings dam (15 ML capacity) would be constructed adjacent to the rail loop and coal stockpiles, with reclaimed tailings to be disposed of in pit voids.</p>
<b>Project Life</b>	<p>21 years (from the date of grant of a mining lease), in general accordance with the following sequence:</p> <ul style="list-style-type: none"> <li>- open cut 1 – years 1 to 7</li> <li>- open cut 2 – years 7 to 9</li> <li>- open cut 3 – years 9 to 12</li> <li>- underground drift and access drives – years 1 to 2</li> <li>- underground mining – years 3 to 16</li> </ul>
<b>Employment</b>	<p>Construction 220; operation 320.</p>
<b>Construction</b>	<p>Construction of CHPP, rail loop, environmental bunds and associated infrastructure would take approximately 18 months.</p>
<b>Hours of Operation</b>	<p>Construction to take place primarily during the day with some limited night-time construction to minimise noise impacts on the Ulan Public School.</p> <p>Mining operations to occur 24 hours a day, 7 days a week.</p>
<b>Product Coal</b>	<p>Up to 10 million tonnes of coal a year for domestic and export markets.</p>
<b>Product Coal Transport</b>	<p>The coal would be railed to market via the Gulgong-Sandy Hollow railway (4 trains a day - 3 during the day and 1 at night).</p>
<b>Mine Access</b>	<p>Access to the open cut mining operations would be via a mine access road off the Ulan-Wollar Road, while access to the underground mining operations would be via a mine access road off the Ulan-Cassilis Road.</p>
<b>Rehabilitation and Offsets</b>	<p>The project would disturb up to 2,100 hectares of land, including 417 hectares of intact native vegetation.</p> <p>At least 130 hectares of the White Box Yellow Box Blakely's Redgum Woodland (WBYYBRW) endangered ecological community (EEC) would be dedicated to the National Estate to offset the loss of 65 hectares of this EEC.</p> <p>All disturbed areas would be progressively rehabilitated.</p> <p>This rehabilitation when combined with a range of proposed vegetation offsets, would result in the conservation of up to 2,087 hectares of trees in the medium to long term.</p>
<b>Community Contributions</b>	<p>The project would contribute \$4.55 million toward local roads and community infrastructure.</p>

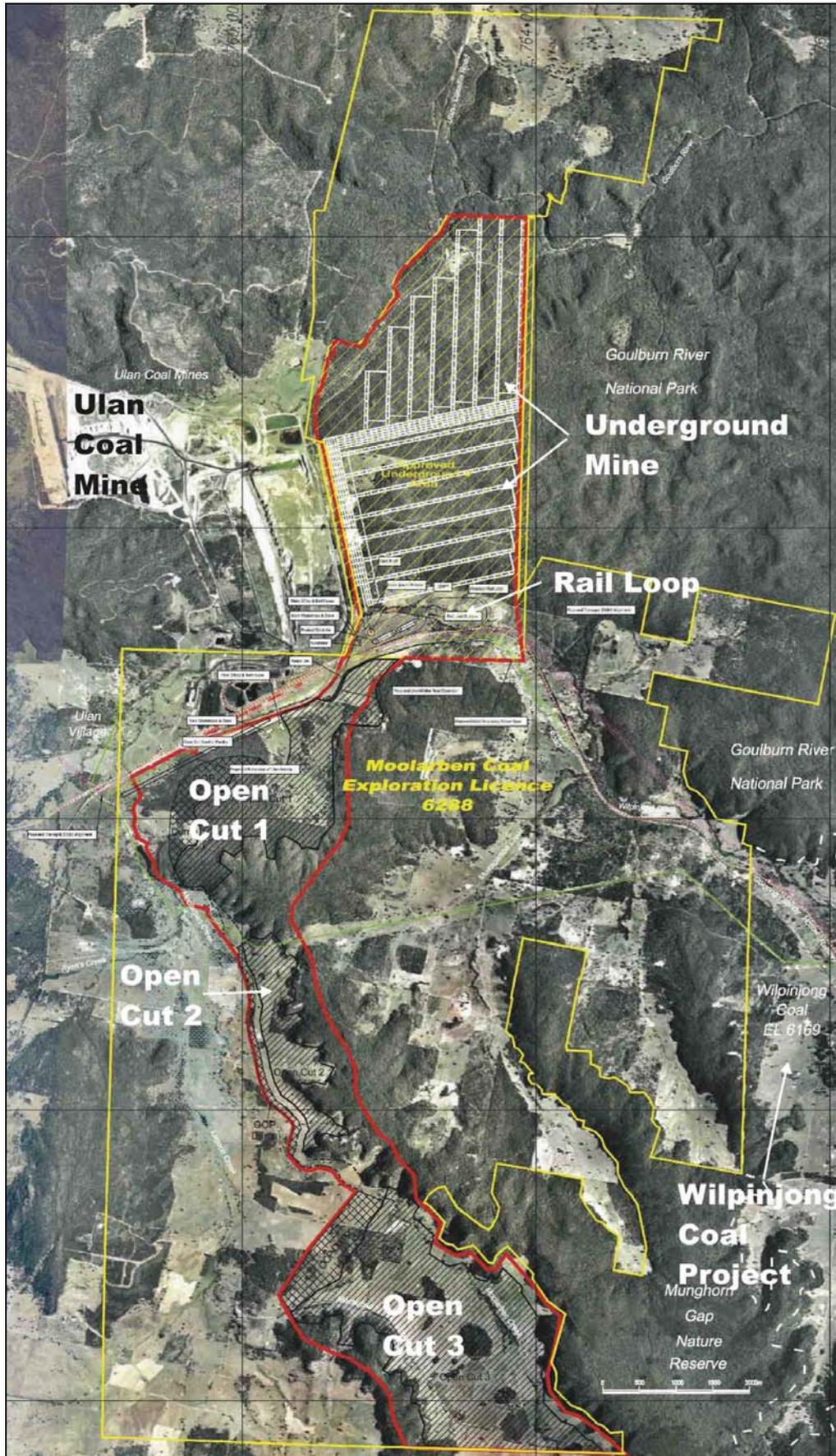


Figure 3: Project Layout

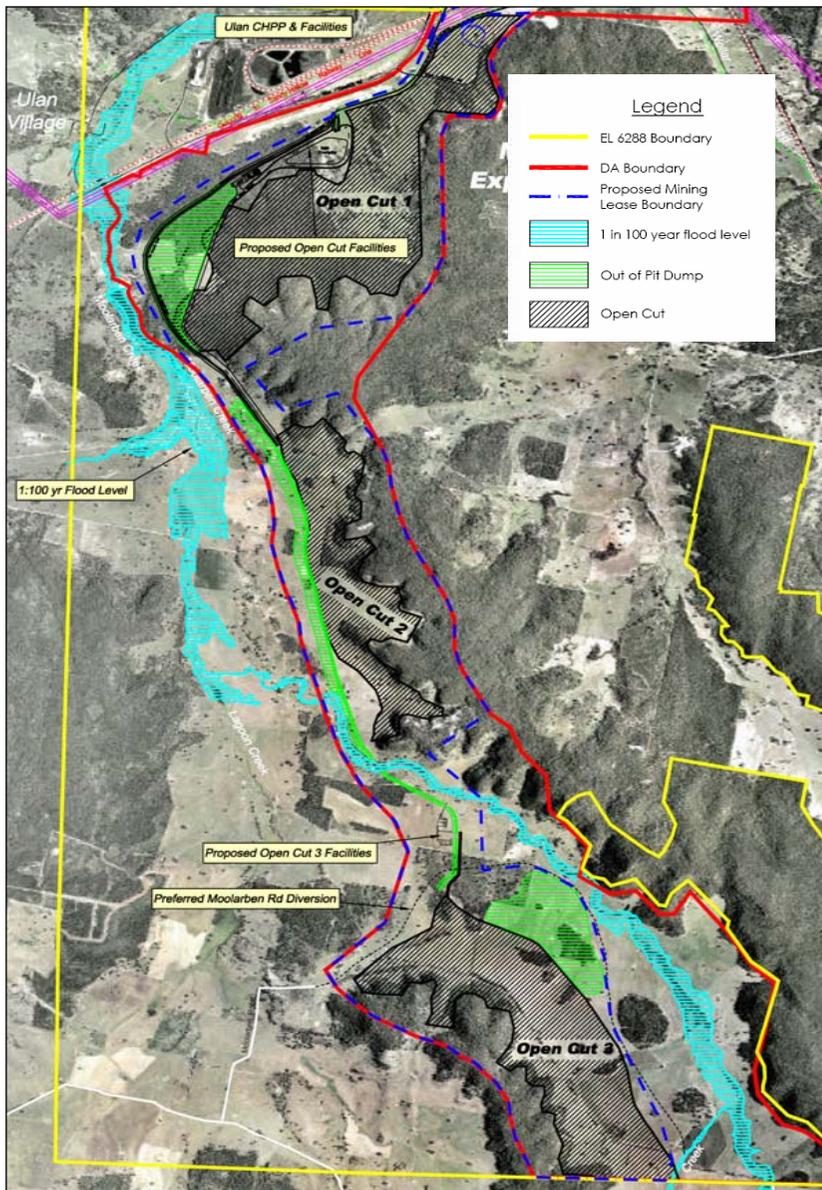


Figure 4: Open Cut Mine Components

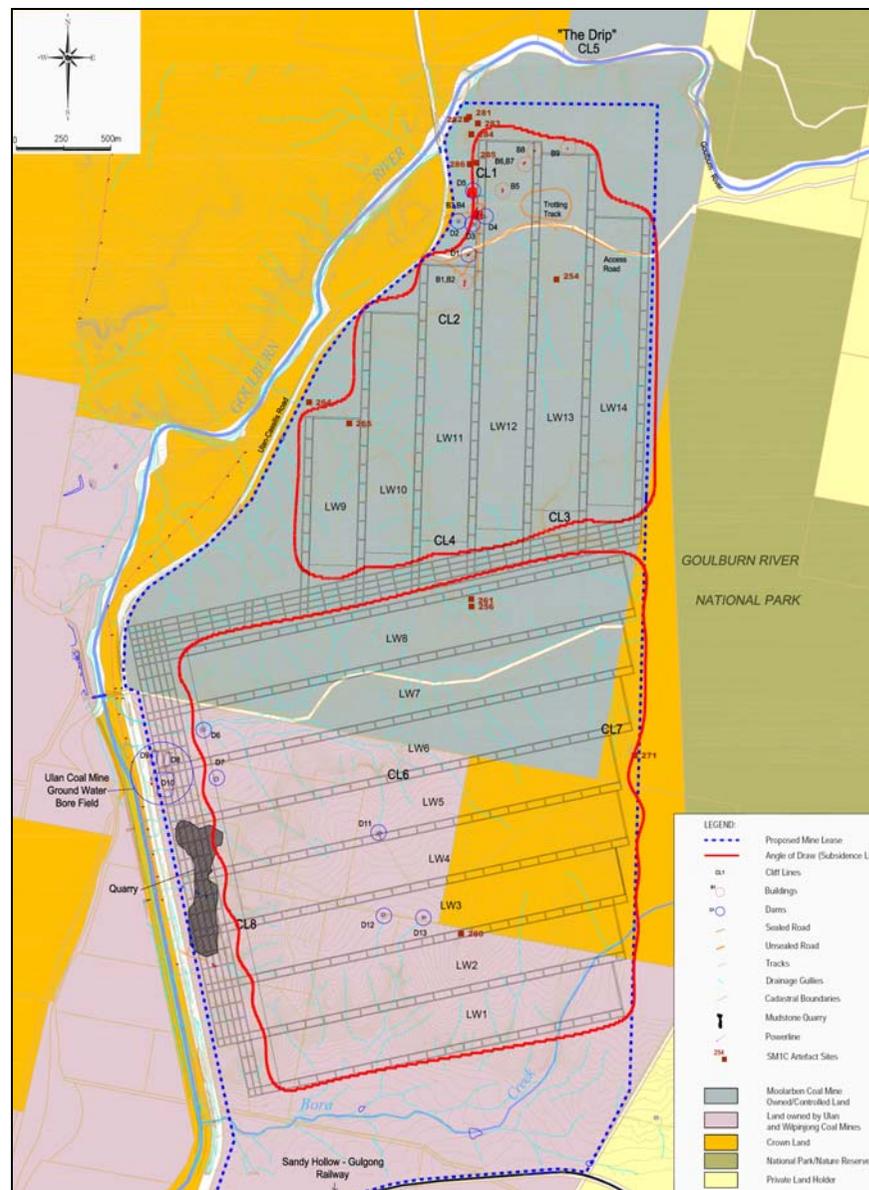


Figure 5: Underground Mine Components

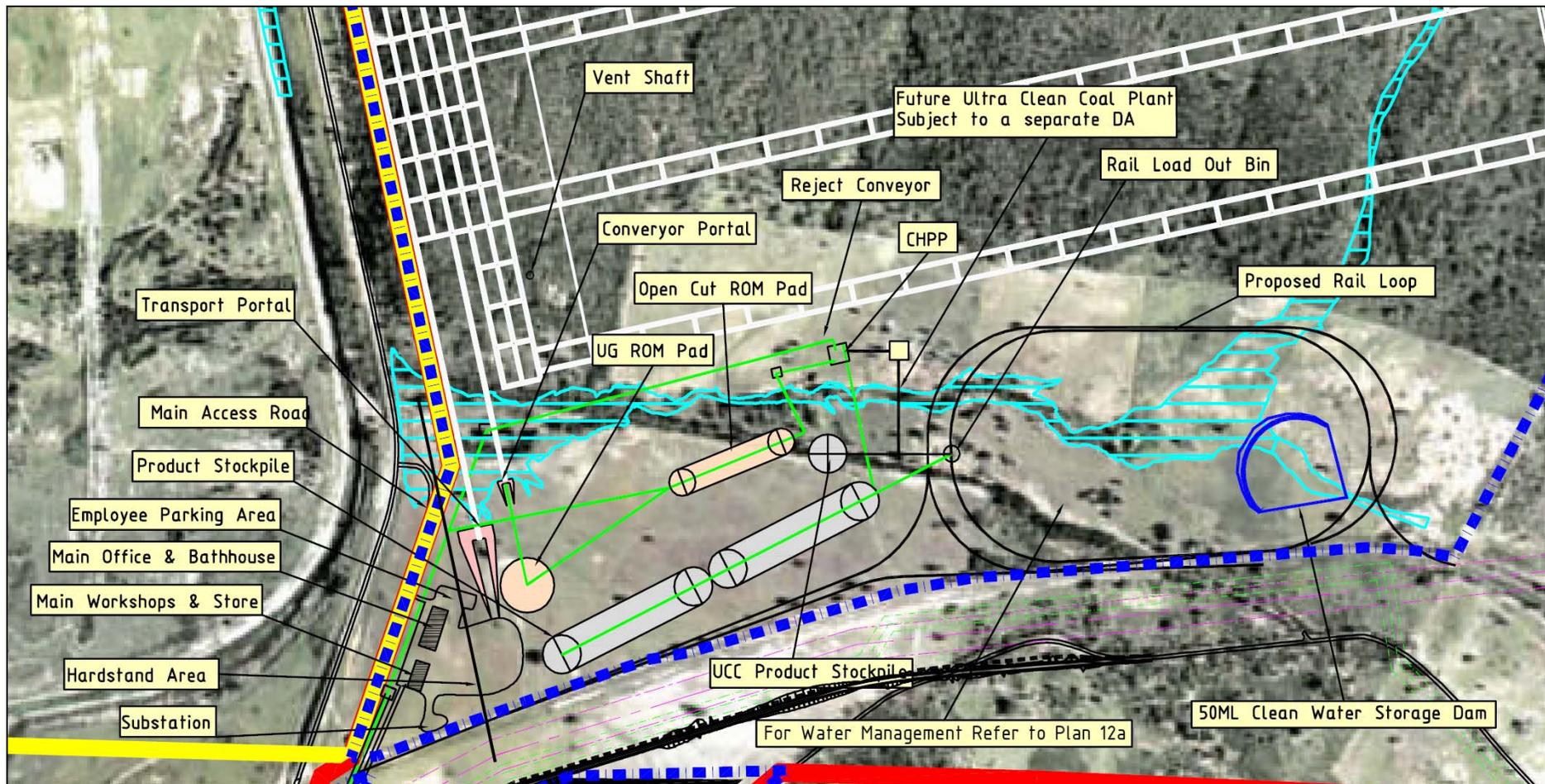


Figure 6: Main Infrastructure Components

## 1.2 Project Setting

The project is located adjacent to the Ulan and Wilpinjong coal mines, and would form part of a large mining complex in the Mudgee region producing up to 30 million tonnes of coal a year (see Figures 1, 2 & 3).

The area to the east of the project is dominated by the Goulburn River National Park and Munghorn Gap Nature Reserve, which are both covered in native vegetation and have high conservation values.

The headwaters of the Goulburn River are located directly to the north of the project. The river flows eastwards through the Goulburn River National Park and eventually feeds into the Hunter River.

To the immediate west of the project is the Ulan Village, which has about 14 houses, a public school, and local pub. All of the houses in the village are now owned by either Moolarben or the adjacent Ulan coal mine.

Further afield, as the region spreads to both Gulgong and Mudgee, the area is dominated by a range of rural and rural-residential uses, primarily on quite small lots.

The proposed open cut mining pits would be located on the larger of the remaining rural lots, which are sandwiched between Ulan Road and the Munghorn Gap Nature Reserve. These properties are currently used for grazing cattle and sheep.

Several of the smaller rural-residential properties in the area offer tourist accommodation, as they are in close proximity to the vineyards in Mudgee, the National Park and significant local features such as the "Drip" (see front cover of the Director-Generals report), which is located directly to the north of the project on the Goulburn River.

Key infrastructure (see Figures 1, 2 & 3) in the area includes the:

- regional and local road network, which includes the Ulan – Cassilis Road (MR214), Cope Road and Ulan–Wollar Road;
- Gulgong–Sandy Hollow railway line;
- proposed Wellington–Wollar 330 KV transmission line, which would bisect the project area and run along the Ulan–Wollar Road alignment; and
- Ulan airstrip and Moolarben Dam, which are located adjacent to the proposed open cut mining area.

## 1.3 Project Need and Justification

The Department recognises that society is heavily reliant on coal to meet its basic energy needs (both at a domestic and international level). Coal provides around 90% of NSW's energy needs, 75% of Australia's energy needs, 24% of global energy needs, and is used to produce 39% of the world's electricity<sup>1</sup>.

Access to energy remains a critical development need, particularly for the one-third of the world's population without electricity. As living standards and development in Third World countries increase, it is expected that the demand for coal will rise to satisfy increasing global energy requirements. Moolarben Coal Project would contribute to supplying this rising annual coal demand. Therefore the ultimate need for the Project is driven by both domestic and international markets to meet current and future energy needs.

From Moolarben's perspective, the Project is justified by a combination of coal resource availability and market opportunity over the proposed 21 year mine life. Moolarben has put forward a case which clearly demonstrates the benefits that would accrue to the local, State and Federal economies, in addition to the generation of a significant number of direct and indirect employment opportunities. In achieving these goals Moolarben is committed to developing a safe and economically viable mine that maximises coal resource recovery, while minimising its environmental and social impacts.

From the State's perspective, the Project would deliver a number of key benefits, including long-term valuable permanent employment opportunities for approximately 320 people, a considerable initial

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<sup>1</sup> According to the Australian Coal Association's website.

capital investment, flow-on regional economic benefits, and significant royalty and tax income for the Government. However, the Department also recognises that a balance must be met in the promotion and co-ordination of the orderly and economic use of land; the proper management and development of the State's resources; and the protection of the environment and ecologically sustainable development.

In summary, the Department considers it is global energy demand that is currently driving new coal mining proposals in New South Wales; and if the project was not allowed to proceed, any resultant shortfall in coal supply would be filled by another coal resource either in NSW, Australia or overseas.

Consequently, the Department is satisfied that there is a demonstrable need for the project in terms of meeting society's need for adequate, reliable and affordable energy. Further, that this need could be met by Moolarben in a manner that has due regard to the economic, social and environmental impacts of the project.

## 2. STATUTORY CONTEXT

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### 2.1 Major Project

The proposal is classified as a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) because it meets the criteria in Clause 5 of Schedule 1 of *State Environmental Planning Policy (Major Projects) 2005*, being development for the purpose of coal mining.

Consequently, the Minister for Planning is the approval authority for the project.

### 2.2 Permissibility

Under Section 75J of the EP&A Act, the Minister cannot approve the carrying out of a project that would be wholly prohibited under an environmental planning instrument.

The land subject to the application is primarily zoned 1(a) (General Rural), under the *Mudgee Local Environmental Plan 1998*, with a smaller portion zoned 7(b) (Environment Protection – Nature Conservation Zone). Mining is permissible with development consent in both of these zones.

Consequently, the Minister may approve the carrying out of the project.

### 2.3 Exhibition

Under Section 75H(3) of the EP&A Act, the Director-General is required to make the EA of a project publicly available for at least 30 days.

After accepting the EA for the project the Department:

- made the EA publicly available from 18 September until 23 October 2006:
  - on the Department's website, and
  - at the Department's Information Centre, Mid-Western Regional Council Offices in Mudgee and Gulgong, Mudgee Library, and at the office of the Nature Conservation Council of NSW;
- notified landowners in the vicinity of the site about the exhibition period by letter;
- notified relevant State Government authorities and Mid-Western Regional Council by letter; and
- advertised the exhibition in the Sydney Morning Herald and the Mudgee Guardian.

This satisfies the requirements in Section 75H(3) of the EP&A Act.

During the assessment process the Department also made a number of documents available on the Department's website. These documents included the:

- project application;
- Director-General's environmental assessment requirements;
- EA; and
- Moolarben's various responses to the issues raised in submissions. And preferred project report.

## 2.4 Independent Hearing and Assessment Panel

On 21 August 2006, the Minister for Planning directed that an Independent Hearing and Assessment Panel (Panel) be constituted, in accordance with section 75G of the EP&A Act, to assess key aspects of the proposal in more detail.

The Panel was comprised of:

- Emeritus Professor Jim Galvin (Panel chair and subsidence expert);
- Mr Col Mackie (groundwater expert); and
- Mr Peter Karantonis (noise expert).

Under its terms of reference, it was required to assess the subsidence, groundwater and noise impacts of the project.

The Panel held hearings in Mudgee from 7 to 9 November 2006, and heard representations from 32 parties, including Government agencies and community representatives.

Following these hearings, Moolarben made several changes to the project, principally to the proposed layout of the proposed underground mining operations. These changes were described in detail and supplemented with a range of additional subsidence and groundwater assessment studies in Moolarben's preferred project report, which was submitted to the Department in December 2006 (see **Appendix E**).

This report contained an in-depth technical analysis of the project, and a range of recommendations to address its potential subsidence, groundwater and noise impacts. However, while the Panel was generally satisfied that most of these impacts had either been addressed by the proposed changes to the mine plan or could be controlled through appropriate conditions of consent, it advised that it was unable to determine with sufficient certainty the magnitude and extent of groundwater impacts of the project, and concluded that it had *“serious reservations concerning the development of an underground mine until such time as its impacts are predicted with increased certainty and found to be acceptable”*.

The Department subsequently required Moolarben to address the Panel's reservations, and received a substantial amount of additional information on the potential groundwater impacts of the proposed underground mine (see **Appendix E**).

After reviewing the last of this information, which was received in August 2007, the Panel concluded that it could *“see no outstanding groundwater related issues that might impede development of underground mining”*, but recommended that a precautionary approach be adopted to the development of the proposed underground mine that includes rigorous groundwater and subsidence monitoring with frequent independent audits of any monitoring data (see **Appendix C**).

The Department has adopted all the Panel recommendations.

## 2.5 Objects of the Environmental Planning and Assessment Act 1979

Decisions under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act.

The objects of most relevance to the Minister's decision on whether or not to approve the project are found in Section 5(a)(i),(ii),(vi)&(vii). They are:

*The objects of this Act are:*

- (a) *to encourage:*
  - (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
  - (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*

- (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- (vii) *ecologically sustainable development, and*

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD “requires the effective integration of economic and environmental considerations in decision-making processes” and that ESD “can be achieved through” the implementation of the principles and programs including the precautionary principle, the principle of inter-generational equity, the principle of conservation of biological diversity and ecological integrity, and the principle of improved valuation, pricing and incentive mechanisms. In applying the precautionary principle, public decisions should be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment and an assessment of the risk-weighted consequences of various options.

The Department has fully considered the objects of the EP&A Act, including the encouragement of ESD, in its assessment of the project application. This assessment seeks to integrate all significant economic, social and environmental considerations and avoid any serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences.

Moolarben has also considered a number of alternatives to the project, including the alternative of not proceeding, and considered the proposal in the light of the ESD principles.

## 2.6 Environmental Planning Instruments

Under Section 75I of the EP&A Act, the Director-General’s report is required to include a copy of or reference to the provisions of any *State Environmental Planning Policy* (SEPP) that substantially governs the carrying out of the project.

The Department has considered the proposal against the relevant provisions of several SEPPs (including SEPPs 11, 33, 44, and 55), and is satisfied that none of these SEPPs substantially govern the carrying out of this project.

Nevertheless, it has considered the relevant provisions of these SEPPs in **Appendix D**.

## 2.7 Statement of Compliance

Under Section 75I of the EP&A Act, the Director-General’s report is required to include a statement relating to compliance with the environmental assessment requirements with respect to the project.

The Department is satisfied that the environmental assessment requirements of the project have been complied with.

# 3. ISSUES RAISED IN SUBMISSIONS

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During the exhibition period, the Department received a total of 601 submissions on the project, including:

- 12 from public authorities;
- 18 from special interest groups;
- 571 from the general public, including 436 form letters.

A copy of these submissions is attached as **Appendix F**.

A summary of the issues raised in these submissions is provided below.

### **Public Authorities**

The **Department of Primary Industries** (DPI) supported the project as an appropriate use of the State’s coal resources, but advised that Moolarben should be required to...“*adopt excellence and beyond compliance practice in mining, rehabilitation, environmental management and community*

*consultation*". DPI also indicated that the following matters should be addressed in any conditions of approval:

- general environmental management and reporting;
- rehabilitation management, final void/landform design and mine closure;
- subsidence monitoring and management;
- geochemical assessment and management and monitoring of overburden, rejects, and coal stockpiles; and
- a water monitoring program to validate modelled predictions.

The **Department of Environment and Climate Change** (DECC) advised that it was able to support the project, subject to a number of amendments to Moolarben's "Statement of Commitments" and the imposition of appropriate conditions of approval to address the:

- impact of noise and dust (particularly PM<sub>10</sub>) on nearby sensitive receptors;
- net loss of 65 ha of an Endangered Ecological Community; and
- impacts on Aboriginal cultural heritage.

The **Department of Water and Energy** (DWE) did not object to the project, but raised concerns about the potential long-term impacts of the project on the region's surface and groundwater resources, including:

- subsidence related impacts on groundwater resources, including fracturing and depressurisation of important water bearing rock strata, loss of baseflow to surface watercourses, and adverse impacts on sensitive and high value groundwater dependent ecosystems, including "the Drip";
- the ability of the project's water demands to be met from local groundwater supply without unacceptable impacts on local water users; and
- increased salinity in surface watercourses and their associated alluvial aquifers.

It recommended that a range strict conditions be imposed on Moolarben to address these concerns.

The **Hunter – Central Rivers Catchment Management Authority** (CMA) did not object to the project, but raised a number of concerns about:

- its potential to have an adverse impact on the area's surface and ground water resources, including water quality and river system health in the upper Goulburn River and tributaries;
- the clearing of native vegetation, including threatened species and Endangered Ecological Communities;
- the loss of significant Aboriginal cultural heritage; and
- potential subsidence-related impacts such as the induced destabilisation of significant cliffs and gorges.

The **Department of Lands** (Lands) did not object to the project, but indicated that the project would:

- require the closure of parts of some Crown public roads; and
- result in access restrictions to a variety of Crown reserves, and land use changes to tenured Crown land held under licence for grazing purposes.

The **Roads and Traffic Authority** (RTA) and **Western Region Development Committee** did not object to the project, but recommended conditions to cover a range of traffic issues, including the construction of the mine access road intersections; proposed realignment of the Ulan-Wollar Road; and protection of the local and regional road network from any blasting and subsidence related impacts.

**Mid-Western Regional Council** (Council) did not object to the project but raised concerns about the:

- potential subsidence impacts on the Drip, the Goulburn River, and other natural and cultural features of the area;
- noise impacts on the Ulan village and public (primary) school, particularly during the construction of the environmental bund around open cut 1;
- potential traffic impacts in the event of a rail failure; and
- effect the project could have on the region's water resources given the water management difficulties experienced at the adjacent Ulan Coal Mine.

The **NSW Heritage Office** did not object to the project, and recommended conditions for the conservation and/or archiving of the heritage items on site.

The **Department of Health** (NSW Health) did not object to the project, but was concerned about the potential dust impacts of the project on the Ulan village and surrounding community. It recommended that a copy of its fact sheet “Mine Dust and You” and the contact details of the Greater Western Public Health Unit should be provided to all surrounding community members if the project is approved.

The **Mine Subsidence Board** did not object to the project, and noted that the site is not located in a Mine Subsidence district.

**TransGrid** was satisfied that the suitable measures were available to protect its approved Wollar-Wellington 330kV transmission line from any blasting or subsidence related impacts of the project.

The **Department of Housing**, did not object to the project, but highlighted that it may put increasing pressure on the availability of affordable housing for disadvantaged community members in the Mudgee region.

### **Community and Interest Groups**

Of the 589 submissions from the community and special interest groups, 512 (87%) objected to the proposal, 65 (11%) did not object but raised concerns, and 12 (2%) supported the proposal.

The special interest groups that made submissions included the:

- Australian Conservation Foundation – Central Coast Branch
- Central West Environment Council Inc
- Hunter Environment Lobby Inc
- Johnsons Creek Conservation Committee
- Lithgow Environment Group
- Maitland Greens
- Moolarben Consultative Committee
- Mudgee District Environment Group Inc
- Murong Gialinga Aboriginal and Torres Strait Islander Corporation
- National Parks Association of NSW
- National Parks Association of NSW Inc – Macarthur Branch
- Nature Conservation Council of NSW
- North East Forest Alliance Hunter Region
- Red Hill Environmental Centre
- Rising Tide Newcastle
- Rivers SOS
- The National Trust of Australia (New South Wales)
- The Sydney Speleological Society Inc

The main grounds for objection from both individuals and interest groups were (in decreasing order of mention):

- *surface and groundwater* (77%), particularly the potential impact on the:
  - Drip – a regionally and culturally significant, permanently seeping, sandstone cliff fronting the Goulburn River, which is located immediately north of the underground mine area;
  - baseflow to the Goulburn River and its associated tributaries; and
  - quality and availability of groundwater to local land owners and the environmental;
- *greenhouse gas emissions and global warming/climate change* (66%), and particularly those emissions generated by the combustion of product coal by down-stream end-users;
- *subsidence* (50%), particularly on significant surface and sub-surface features such as:
  - the Goulburn River and its associated tributaries;
  - the Drip, “Corner Gorge” and other sandstone cliff faces overlying or in close proximity to the proposed underground mining operations;
  - several Aboriginal cultural heritage sites, including a set of grinding grooves;
  - a range of public and private infrastructure, including public roads and bridges, private access roads and tracks, farm dams, the Sandy Hollow-Gulgong railway line, and the CHPP at the Ulan coal mine;
- *dust, noise and blasting* (44%);
- *socio-economic* (44%), as the project would transform the rural nature of the area into a large industrial complex which would have an adverse impact on a range of existing agricultural, lifestyle and tourism land uses in the area, and on the social fabric of the local community – particularly in the Ulan village;

- *Aboriginal heritage* (36%);
- *traffic* (36%), particularly on Ulan Road during peak periods which would increase the safety risks for children in the area travelling to and from school on the local bus service; and
- *flora and fauna* (33%), as the project would clear at least 416 hectares of treed vegetation, including 65 hectares of the White Box Yellow Box Blakely's Redgum endangered ecological community, and further reduce the biodiversity of the region.

However, these objections were particularly concerned about the potential cumulative impacts associated with the concurrent operation of the Ulan, Wilpinjong and Moolarben coal mines, and argued that these cumulative impacts would have a significant impact on both the natural and heritage values of the area, as well as the amenity, health and prosperity of the local community.

A number of other concerns were also raised in these submissions, including visual amenity (21% - particularly the impact of night lighting on amateur star gazing); health and safety (11%); and non-indigenous heritage (3%).

Submissions in support of the proposal generally cited employment and socio-economic benefits as reasons why the proposal should be approved.

Moolarben has provided a detailed response to the issues raised in these submissions (see **Appendix E**).

In June 2007, the Minister met with representatives from Moolarben, Council and the local community to get a better understanding of the key issues associated with the project.

The Department has considered the issues raised in these submissions, Moolarben's response to these issues, and the concerns raised by the Council and local community representatives at the Minister's meeting in detail in this report.

## 4. ASSESSMENT

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### 4.1 Subsidence

#### *Issue*

The project would cause surface and sub-surface subsidence impacts, which would affect a range of man-made and natural features both overlying and in close proximity to the proposed underground mining operations.

#### *Consideration*

There are several man-made and natural features located above or in close proximity to the proposed underground mining operations. These features include (see Figure 7):

- the Goulburn River National Park;
- the Drip, which is an extremely significant local heritage item and groundwater dependent ecosystem (see picture on front cover of this report), and popular tourist destination;
- the Goulburn River and associated tributaries and gorges, including the Corner Gorge in the north-eastern corner of the site;
- a number of aquifers, including the Triassic aquifer;
- several cliff lines, including Cliff Line 3;
- several Aboriginal heritage items, including a significant collection of grinding grooves to the north west of the proposed underground mining operations;
- a range of public infrastructure, such as the Ulan-Cassilis Road (MR 214), Ulan-Wollar Road, Sandy Hollow-Gulgong railway line, and proposed 330Kv Wellington-Wollar transmission line; and
- a range of private infrastructure, such as the CHPP, rail loop and coal loader at the adjoining Ulan coal mine, a private access road to the Imrie property, a few groundwater bores, a few farm dams, several walking tracks, a residence and associated sheds (owned by Moolarben), and clay/gravel quarry.

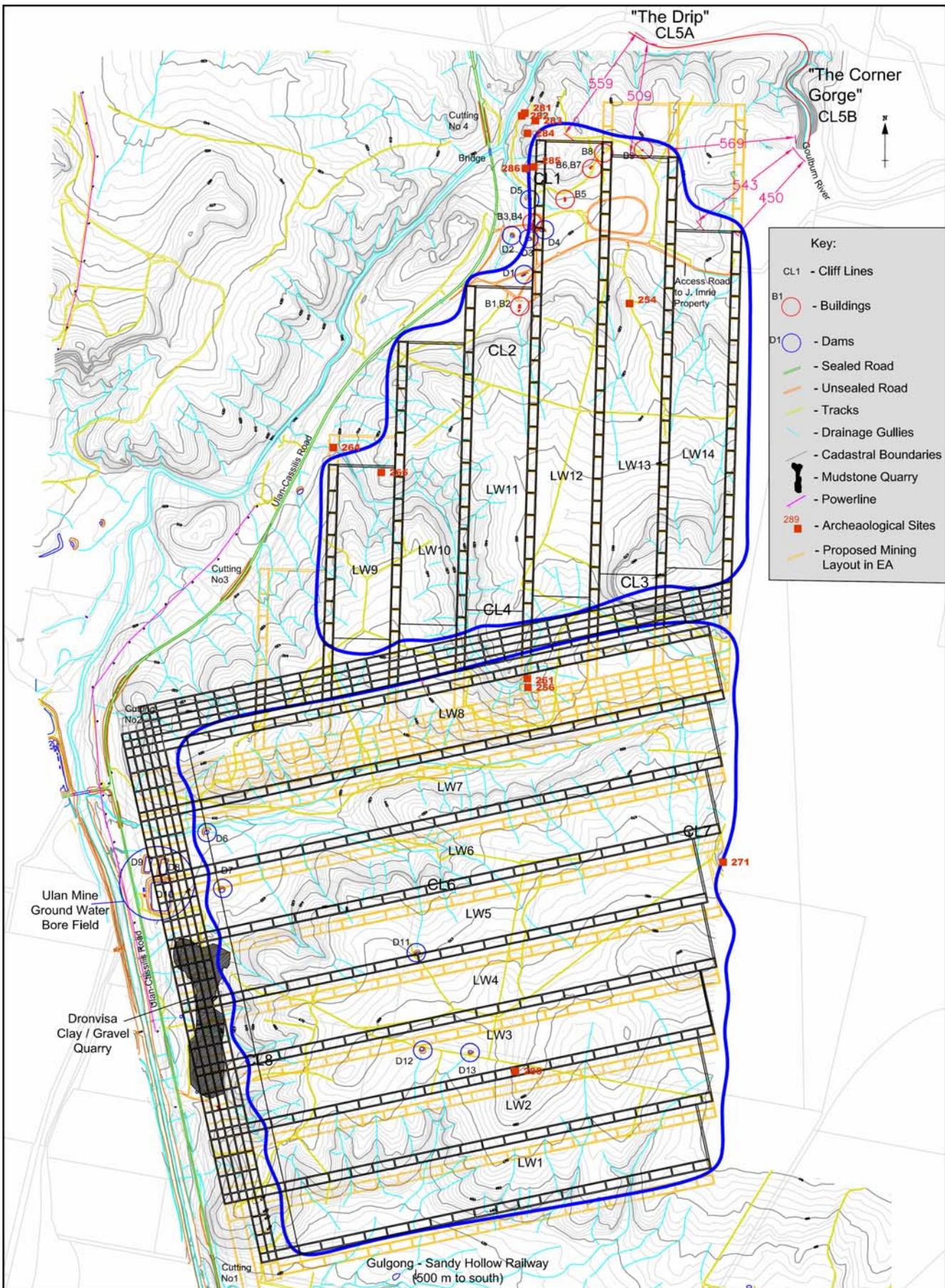


Figure 7: Proposed and Modified Underground Mine Layouts

The EA contains a detailed assessment of the potential subsidence impacts of the project on these features undertaken by Strata Engineering (Australia) Pty Ltd (see **Appendix G**).

This assessment predicted that, given the thickness of cover (85 to 215 metres) and proposed coal seam extraction height and panel width (4.2 to 4.5 metres and 260 metres respectively), the land surface overlying the proposed underground mining operations would subside by a maximum of 2.44 metres above the longwall panels and up to 0.5 metres above the chain pillars.

The vertical displacement of the surface and associated tilts and strains are expected to affect a range of man-made and natural features over and in close proximity to the proposed underground mining operations to varying degrees. However, the assessment concluded that the subsidence impacts of the project were unlikely to be significant, and that most of these impacts could be adequately managed through the current subsidence management plan process. It also concluded that the project would not have any adverse impacts on significant natural features, such as the Drip, Goulburn River, Corner Gorge (see Figure 7), and Triassic aquifer.

Several submissions, including a submission by Dr Phillip Pells on behalf of a local resident, were critical of the subsidence assessment in the EA, and were particularly concerned about the potential for the near and far-field components of subsidence to affect the Drip, a range of public and private infrastructure, and other significant natural features in the area.

During the public hearings, the Panel questioned the reliability and accuracy of the subsidence predictions in the EA, and particularly the height of sub-surface fracturing. It was also critical of the proposed mine plan in the EA, and indicated that the predicted impacts of the project on several significant natural features could either be avoided and/or minimised through better mine design.

Following these hearings, Moolarben decided to modify the mine plan for the proposed underground mining operations, and submitted a preferred project report to the Department (see **Appendix E**).

The preferred project report contained the revised mine plan (see Figure 7), and a revised assessment of the potential subsidence impacts of the project which was prepared primarily by Mine Subsidence Engineering Consultants Pty Ltd.

The revised mine plan includes substantial changes to the layout of the proposed longwall panels (see Figure 7), such as:

- increasing the set back distances of the long wall panels from the Drip (500 metres), Corner Gorge (450 metres), Goulburn River, Aboriginal grinding grooves (see red dot marked 264 on Figure 6), and Ulan-Cassilis Road;
- relocating the mine's first workings (drives, headings, and chain pillars) to provide additional support to several sensitive natural features overlying the proposed underground mining operations, such as Cliff Line 3, and several Aboriginal heritage sites; and
- reducing the height of coal seam extraction from 4.2m to 3.0m.

The Panel carried out a detailed technical appraisal of the revised mine plan and subsidence assessment (see **Appendix C**), and concluded that:

- the revised mine plan incorporates important mitigation measures that significantly reduce the level of risk of subsidence related damage to several important features, with the Drip, Corner Gorge and Goulburn River now being "well outside the recorded subsidence damage from longwall mining";
- any residual subsidence impacts on both man-made and surface features could be adequately managed through the current subsidence management plan process;
- despite the significant modifications to the mine plan, there is still some uncertainty about the accuracy of the subsidence predictions, particularly in relation to the height of continuous and discontinuous fracturing of the rock strata surrounding the longwall panels and associated impacts on the Triassic aquifer;
- these uncertainties should be addressed by comprehensive monitoring of the surface and sub-surface subsidence impacts of the project, particularly in the early years of mining when the longwall panels are in the less sensitive locations,
- this monitoring data should be used to calibrate and validate the subsidence and groundwater predictions for the project, reviewed by independent experts at the end of each longwall panel,

and if necessary, trigger changes to the mine plan to address any adverse impacts detected during monitoring;

- suitable control measures exist (such as reducing the width of subsequent longwall panels and or the height of extraction) which could be implemented if necessary to reduce any adverse impacts of the mining operations; and
- the subsidence and groundwater impacts of the proposed underground mining operations should be comprehensively audited by independent experts at the end of longwall panels 4 and 8, with the results of these audits to be feed into the design and layout of any subsequent longwall panels.

### **Conclusion**

Both the Department and DPI concur with the Panel's findings, and are satisfied that the revised mine plan has reduced the residual subsidence impacts of the project to an acceptable level, and that these impacts can be suitably managed through the current subsidence management plan process.

Nevertheless, the Department believes that Moolarben should be required to:

- ensure that the Drip, Corner Gorge and bed of the Goulburn River remain outside the zone of recorded subsidence for longwall mining in NSW;
- minimise the likelihood of subsidence damage to a range of surface and natural features both over and in close proximity to the proposed underground mining operations;
- prepare and implement a detailed subsidence management plan for any underground mining operations that could cause subsidence;
- carry out extensive monitoring of the surface and sub-surface subsidence impacts of these operations;
- use this information to calibrate and validate the subsidence prediction methodology for subsequent underground mining operations;
- prepare a detailed report at the end of each longwall panel that analyses the subsidence, surface water, and groundwater impacts of the panel, and any cumulative impacts of this panel with any other longwall panels;
- commission suitably qualified and independent experts, whose appointment has been approved by the Director-General, to review each end of panel report, and conduct a comprehensive audit of the subsidence, surface water, and groundwater impacts of underground mining operations at the end of longwall panels 4 and 8, with the result of these audits being used to refine, and if necessary revise, the design and layout of any subsequent longwall panels.

## **4.2 Water Resources**

### **Issue**

The project would affect surface water and groundwater resources in the area in a number of ways, principally by:

- disturbing parts of Moolarben and Bora Creek catchments, and capturing surface water runoff on these disturbed areas in the mine's proposed "dirty water" system;
- affecting surface water flows in the Goulburn River and associated tributaries, which flow ultimately into the Hunter River, and consequently reducing the amount of water available to downstream water users and the environment;
- affecting groundwater flows and levels in subsurface aquifers, including the Triassic aquifer, and the associated flows to dams, soaks, and seeps on nearby rural properties as well as groundwater dependent ecosystems;
- affecting water quality in downstream surface water and groundwater resources; and
- influencing flood behaviour.

### **Consideration**

The project is located in the upper Goulburn River catchment, which drains an area of about 24,550 hectares and feeds the Hunter River (see Figure 8).

Moolarben Creek is the primary creek in this catchment. It flows in a northerly direction and is fed by Spring, Logans and Ryans Creek before it reports to Moolarben Dam and then joins Sportmans Hollows Creek to form the headwaters of the Goulburn River.

**Patterson Britton & Partners Pty Ltd**  
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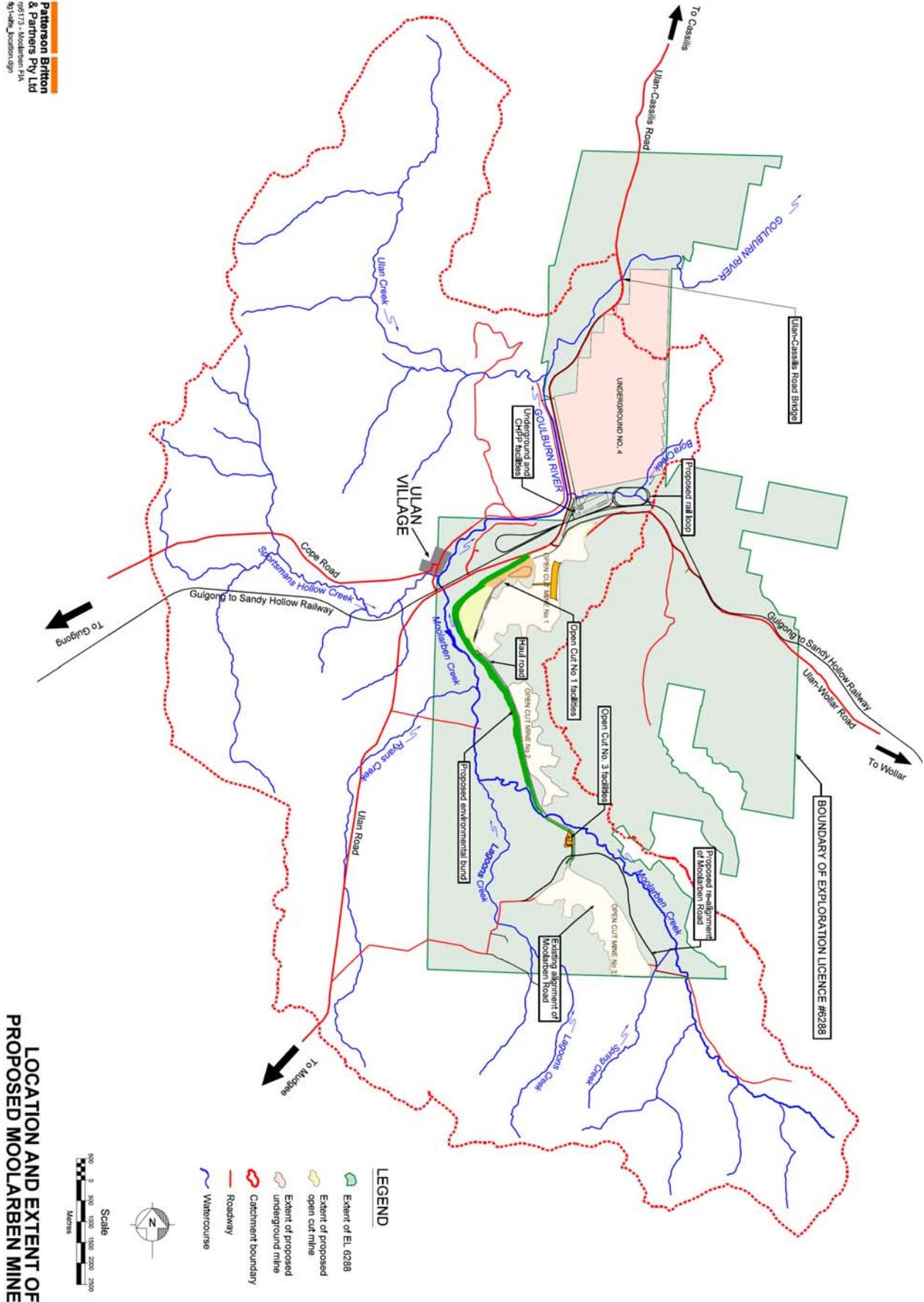


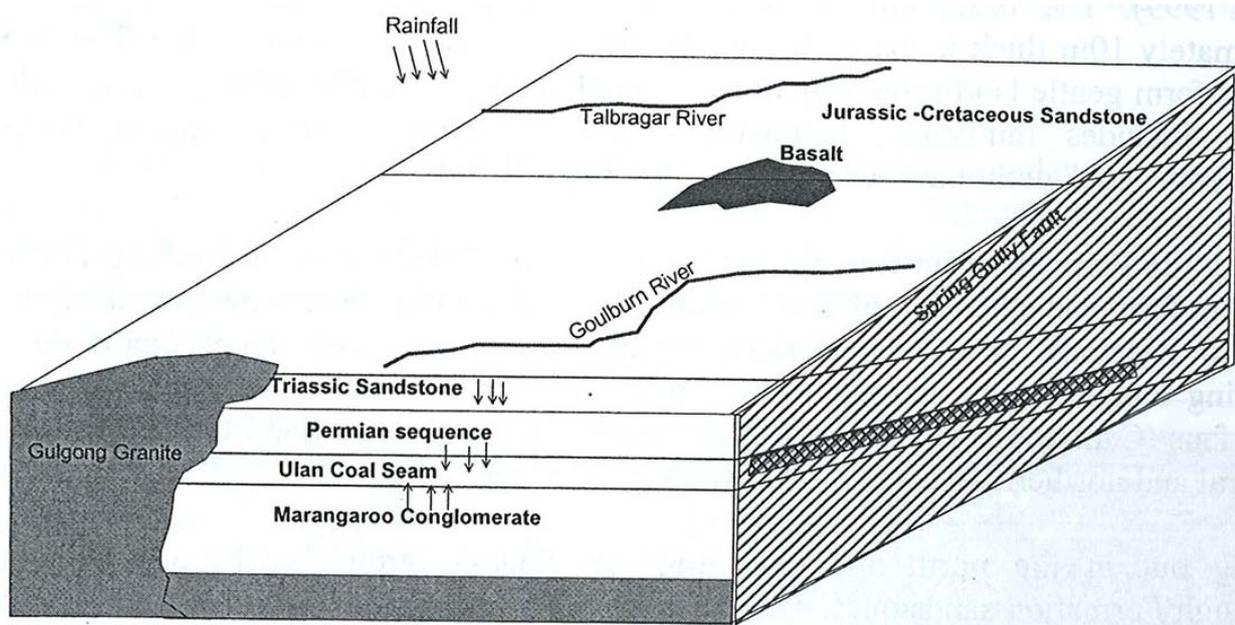
Figure 8: Surface Catchments

Bora Creek is an ephemeral creek to the north of the Sandy Hollow-Gulgong railway line that drains a small sub-catchment before feeding into the Goulburn River.

The regional rock strata are shown conceptually in Figure 9 below. They comprise Triassic and more recent sedimentary rocks overlying older Permian coal measures that contain the Ulan seam that Moolarben proposes to mine. These strata, in turn, overly much older granites that subcrop in the south of the project area. The Goulburn River and its tributaries have eroded and shaped these strata into a relatively subdued landscape in Permian areas (towards the southern parts of the project area), and more dramatic landscape in some Triassic areas, especially around the Drip and Corner Gorge along the Goulburn River (in the northern parts of the project area). Unconsolidated alluvial materials have been deposited within and along the various drainage lines.

The rock strata contain groundwater that has been recharged by rainfall infiltration over geologic time. This water is exploited via boreholes throughout the region, as well as via numerous seeps and springs which feed several local dams and groundwater dependent ecosystems such as the Drip.

Operations at the Ulan coal mine have resulted in regional scale groundwater depressurisation within the coal seam, and induced groundwater flows from the overlying Permian and Triassic strata which have, in turn, been variably depressed.



**Figure 9:** Conceptual Representation of the Hydrogeological Units in the Ulan Region<sup>2</sup>

The proposed open cut and underground mining operations at Moolarben would have a range of impacts on both the surface water catchment of the project area as well as the underlying rock strata which could, in turn, affect both surface and groundwater flows and quality.

The EA includes a comprehensive assessment of these potential impacts, which was undertaken by Patterson Britton & Partners Pty Ltd and Peter Dundon and Associates Pty Ltd (see **Appendix F**).

#### Water Balance

Water balance modelling indicates that the project would require between 0.5 and 6.8 megalitres of water a day – or up to 2,500 megalitres of water a year, primarily for coal processing and dust suppression (see Tables 2 & 3).

<sup>2</sup> This figure is copied from a paper by Katarina David, titled "Overview of the Hydrogeology of the Western Coalfield – Ulan Coal Mine Case Study", which is included in the proceedings of the 36<sup>th</sup> Sydney Basin Symposium, University of Wollongong, November 2006.

This water would come from several sources, including the:

- surface water runoff on the disturbed parts of the site, which would be collected in the mine's proposed dirty water system;
- groundwater inflows to both the open cut and underground mining operations;
- groundwater extraction from the proposed groundwater borefield (see Figure 5); and, if necessary,
- water imported from other water sources off-site, such as the Ulan coal mine (although Moolarben does not consider this to be necessary at this stage).

**Table 2:** Estimated water make and additional requirements

MINING YEAR	PREDICTED MINE WATER DEMAND (ML/day)
1	0.5
2	2.7
3 - 4	4.0
4	4.1
5	6.3
6 - 12	6.8
13	2.6
14 - 15	2.2

**Table 3:** Estimated maximum water demand

AREA OF USE	MAXIMUM DEMAND (ML/year)
Coal Handling and Preparation	1000
Dust Suppression	600
Potable	35
Underground Mine	425
Evaporation	440
<b>Total Maximum Demand</b>	<b>2500</b>

Several submissions were concerned about the potential impacts of this water extraction and use on the water resources of the region, particularly if these impacts are combined with the existing impacts of the adjoining Ulan and Wilpinjong mining operations.

While Moolarben anticipates that it will have more than enough water available on site to cater for its predicted water demand, and is therefore unlikely to be required to import water from off-site, the groundwater modelling carried out after the public hearings (see **Appendix E**) casts some doubt on these claims.

Simulation of the borefield in Model MC 1.6, for instance, indicates that mine water demand could be met from the groundwater borefield with a surplus in years 1 to 16 (with large surpluses in years 1 and 13 to 15). However, Model MC 1.9 predicts variable surpluses in years 1 to 4, large deficits in years 5 to 12, and large surpluses in years 13 to 16.

According to the Panel, the marked reduction in surplus years (and increase in deficit years) indicated by Model MC 1.9 is attributable to the reduction in the permeability of certain strata in that model.

While the Panel notes that Moolarben favours the predictions from Model MC 1.6, it acknowledges that "it is quite possible that strata permeabilities are indeed lower than predicted, and as a result there may be insufficient available from the borefield over the planned mine life." However, this is a matter that cannot be settled now, and is only likely to become clearer once better, and more site-specific, groundwater data becomes available.

Nevertheless, the potential deficit poses significant commercial risks for Moolarben, which would need to secure additional water supply from other sources in the region or curtail its mining operations to match its available water supply, should the deficits eventuate.

The Department has discussed this matter in some detail with a range of Government authorities, including DWE, DECC and DPI.

Among these authorities, there is general agreement that:

- the Ulan coal mine has had a long history of water surpluses;
- these surpluses have created operational difficulties at the mine, and resulted in the imposition of several pollution reduction programs, including the Bobadeen Irrigation Scheme and associated salinity offset program; and
- there are potentially significant environmental benefits to be gained through increased water sharing between the three mines in the region (Ulan, Wilpinjong, and Moolarben).

Consequently, the Department believes Moolarben should be required to commission suitably qualified and independent experts to carry out a regional water supply/monitoring investigation in the area in consultation with DWE, DECC, DPI, and the owners of the adjoining Ulan and Wilpinjong coal mines.

This investigation should:

- assess the feasibility and potential environmental benefits of increased water sharing between the three mining operations in the region;
- consider the potential for developing regional surface water and groundwater monitoring programs to
  - rationalise the surface and groundwater monitoring programs of the three mining operations in the region; and
  - improve the monitoring of the individual and cumulative surface water and groundwater impacts of these mining operations; and
- recommend measures to reduce the surface water and groundwater impacts of mining in the region, and any potential changes to existing licences and/or approvals that could facilitate the implementation of these measures.

This investigation could also include a detailed review of any existing water pollution reduction programs, which may result in the adjustment or refinement of these programs.

Finally, the Department believes that Moolarben should also be required to keep an accurate water balance for the project, review this water balance regularly, and continually investigate ways to minimise water use on site.

### Groundwater

The proposed mining operations would result in regional scale groundwater depressurisation within the underlying rock strata, which would be similar to the depressurisation impacts already observed at the Ulan coal mine.

This would result in:

- the loss of water supply from springs and bores across the region;
- leakage and flow losses from the Goulburn River and tributary systems; and
- dewatering of the Triassic aquifer systems that host the Drip and other groundwater dependent ecosystems.

The Panel has undertaken a detailed technical appraisal of the magnitude and extent of these predicted impacts (see **Appendix C**).

After the public hearings, the Panel advised that the impacts of the proposed open cut mining operation on the aquifer systems were likely to be limited, generally due to the fact that the coal seams in open cuts 2 & 3 and parts of open cut 1 are generally above the water table. Notwithstanding this, it acknowledged that several bores, springs and seeps in proximity to the open cut pits may dry up; and while Moolarben has agreed to suitably compensate these landowners for any loss of water, it indicated that it would be important to get accurate baseline data of these water resources prior to any

mining, monitor the impacts of any mining closely, and ensure that there are suitable measures in place to respond quickly to any adverse impacts on these resources.

However, the Panel was extremely critical of the assessment of the potential groundwater impacts of the proposed underground mining operations.

It concluded that it “was unable to comprehend with sufficient certainty, the magnitude and extent of impacts likely to prevail upon aquifer systems as a result of longwall mining operations”; and had “serious reservations concerning the development of an underground mine until such impacts were predicted with increased certainty and were found to be acceptable.” This was primarily because the Panel lacked confidence in the computer numerical models used to predict impacts, and some of the assumptions and data used in these models.

Moolarben has subsequently provided a range of additional information to address these criticisms, included revised groundwater modelling results.

After reviewing this additional information, the Panel has concluded that:

- the revised models are more representative of the longwall mining process than earlier models;
- the predicted groundwater impacts are now considered to be plausible;
- impacts on the Triassic aquifers will be governed largely by the geometry of the subsidence failure regime and connected regional jointing;
- the Drip is unlikely to be adversely affected by the underground mining operations, partly because the revised predictions suggest the depressurisation in the Triassic strata that feeds the Drip would be relatively minor (around 0.5 metres), and could reasonably be replenished by rainfall; and partly because the river gorge that hosts the Drip effectively isolates the strata on the northern side from the strata on the southern side, with groundwater from both sides flowing to the Goulburn River;
- the bores on the Imrie and Elward properties, which extract water from the Triassic aquifer, are likely to be yield affected;
- the combined operations of the three mining operations in the region is likely to result in losses to base flow in the Goulburn River of up to 0.75 megalitres a day (although there is still some uncertainty about the accuracy of this prediction);
- these losses are not significant (around 6% of base flow), but should be offset as there is an embargo on any new surface water extraction in the Goulburn River catchment;
- the mine should have sufficient water supply to meet demand if the “strata hydraulic properties at the regional scale are consistent with expectation”; and
- there were no longer any outstanding groundwater related issues that might impede the proposed development of the underground mine.

The Department agrees with the Panel’s conclusions, and has incorporated its detailed recommendations into the proposed conditions of approval. Under these conditions, Moolarben would be required to:

- offset any loss to the base flow of the Goulburn River and associated creeks caused by the project;
- provide suitable compensation or compensatory measures to the owners of any privately-owned land whose water supply is adversely affected by the project;
- prepare a detailed water management plan for the project that includes a comprehensive groundwater monitoring plan and groundwater response plan;
- use the monitoring data to calibrate and validate the groundwater model to site specific conditions;
- commission a suitably qualified and independent expert whose appointment has been approved by the Director-General to review the groundwater monitoring data at the end of each longwall panel, and comprehensively audit the groundwater impact of the project at the end of longwall panels 4 and 8.

#### Surface Water Runoff

The proposed open cut mining operations and associated surface infrastructure, located to the north of the Ulan-Wollar Road, would reduce the surface water runoff going to both Moolarben and Bora Creek, and consequently the amount of surface runoff going to the Goulburn River.

This is because it would capture, store and use the rainfall falling on the disturbed parts of the site in the mine's dirty water system, and therefore reduce the size of the surrounding catchment.

While the impact of this loss is poorly quantified in the EA, it is not expected to be significant on a regional scale as only a small part (around 1,100 hectares) of the relatively large catchment (24,500 hectares) would be disturbed by mining operations, and Bora Creek is generally an ephemeral creek with a small catchment. In addition, the loss of surface water would only be temporary provided the drainage systems on the rehabilitated mine are designed and constructed appropriately, and do not facilitate leakage into the underlying spoils.

Nevertheless, the loss of this runoff may result in localise impacts on both water quality and riparian vegetation in the upper reaches of the catchment. Consequently, the Department believes Moolarben should be required to regularly monitor these reaches and to take corrective action should any adverse impacts be detected.

Secondly, Moolarben proposes to discharge up to 0.8 megalitres of water a day from the site to the Goulburn River via Bora Creek. These discharges would result in an increase in water flows in the section of the Goulburn River that has already been diverted, and is highly susceptible to erosion, and could in turn reduce the stability of the bed and banks of both Bora Creek and the Goulburn River. While these discharges are likely, on average, to comprise about 5% of flows in this reach of the river, and therefore unlikely to have a significant effect of surface water flows or velocities, the Department believes Moolarben should be required to design the discharge point carefully, and if necessary stabilise the creek and river bed in this section of the catchment.

Finally, most of the mining operation would be located in the floodplain to the west of the escarpment. However, the EA indicates that all components of the project would be above the predicted 100 year recurrence flood event, and are therefore not expected to be inundated with water during floods or have an adverse impact on the existing flood behaviour of Spring, Moolarben, Lagoon, Ryans and Bora Creeks, and the Goulburn River.

#### Water Quality

Water quality varies considerably across the catchment, with saline soils contributing to increased salinity levels in upper catchment, and agricultural practices contributing nutrients (nitrogen and phosphorous) to the creek system. However, this poorer quality water tends to be diluted by the higher quality water coming from Ryans and Sportsman's Hollow Creeks before it gets to the Goulburn River. Consequently, only marginally increased salinity and nutrient levels are recorded downstream from the project area.

The project could essentially cause water pollution in two ways: either by directly discharging polluted water from the site, or indirectly reducing surface water flows in downstream waters.

With regards to direct impacts, the major sources of pollution are likely to be:

- contaminated surface runoff from the roads, hardstand areas, CHPP, ROM and product coal stockpiles, emergency tailings dam, and other infrastructure on site with the most likely contaminants being sediment, salts, hydrocarbons and acids;
- seepage from the overburden dumps, waste emplacement areas, tailings dams, final voids, etc to groundwater; and
- surplus water discharges from the underground mining operation.

Moolarben proposes to implement a range of standard mitigation measures to minimise the risks of any water pollution occurring, including:

- diverting clean water around the mine;
- collecting, storing, treating and using the mine's "dirty" water on site;
- ensuring all storages, waste emplacements, final voids, etc. are suitably designed to minimise the potential for contaminated water to leach into the surrounding groundwater aquifers;
- and ensuring that all water discharges from the site comply with the relevant ANZECC water quality criteria for the protection of aquatic ecosystems.

While the Department supports the implementation of these standard measures, it notes that the actual design of this water management system is only at the conceptual stage. Consequently, several important elements of this system were not adequately covered or assessed in the EA.

For instance:

- the geochemical characterisation of the leachate likely to be generated through the re-saturation of waste rock overburden has not been undertaken yet, and would obviously need to be carried out prior to any mining operations so that suitable measures can be put in place to manage any adverse impacts to groundwater resources in the area;
- the soils on site are highly erodible, and in many instances are not suitable for dam construction, so it is not clear how Moolarben proposes to ensure that the various storages on site would have suitably impermeable linings; and
- Moolarben canvases the idea of using biosolids to facilitate the rehabilitation of the site, and effluent from the on site sewerage plant to irrigate the rehabilitated areas of open cut 1, but has not assessed the potential impacts of either of these ideas in accordance with the relevant DECC guidelines.

Nevertheless, the Department is satisfied that these omissions can be adequately addressed in any subsequent water management plan for the project or by the imposition of suitable conditions.

With respect to water discharges from the site to the Goulburn River, the Department notes that Moolarben is only proposing to discharge up to 0.8 megalitres a year in years 1 to 12 of the project (when the open cut mining operations are being carried out), or up to 150 megalitres a year. Based on estimates in the EA of the current quality of groundwater resources in the region, it appears as though the project should be able to comply with the relevant ANZECC water quality criteria for discharges, as average salinity levels are around 720  $\mu\text{S}/\text{cm}$  which is consistent with the salinity levels in the Goulburn River downstream of the proposed discharge point.

Nevertheless, certain residual risks remain:

- the actual salinity levels of the groundwater extracted from the borefield and underground workings may be higher than the predicted salinity levels; in fact, Moolarben predicts that salinity levels are likely to rise by as much as 25% over the life of the project as the mining operations draw more water from the southern areas; and
- water surpluses may be greater than predicted, thus increasing the volume of water that needs to be discharged; and
- Moolarben may find it difficult to dispose of its water surpluses during years 13 to 16 of the mining operations when these surpluses are likely to be 500 and 1,500 megalitres a year.

While there are clearly a range of measures that could be implemented to minimize and/or manage these risks – such as treat the water prior to disposal with a reverse osmosis plant; use the water to irrigate other parts of the exploration licence area, transfer the water to other mining operations or landowners in the area; and even build larger storages on site – the Department believes that Moolarben's water surpluses and discharges should be monitored closely throughout the life of the project, and that Moolarben should be required to put detailed measures in place to respond quickly to any problems with the proposed water discharge system.

Finally, open cut 1 would be located on land that Ulan coal mine has set aside to offset the salinity impacts of its adjoining mining operations under a pollution reduction program which is administered by the DECC. It argues that the loss of this offset would compromise its ability to meet its regulatory obligations under the pollution reduction program for the Bobadeen Irrigation Scheme, and that Moolarben should be required to compensate it for any consequential impacts associated with this loss.

The Department has consulted with DECC on this matter, and DECC has advised that:

- the salinity offset program is just one of a suite of measures currently being implemented by the Ulan coal mine to address its ongoing problems with handling of the excess water from its underground mining operations;
- these measures have not been prescribed by DECC, but are rather the company's response to the environmental outcomes established by DECC;
- these outcomes could be achieved through the implementation of a range of other measures;
- the implementation of the salinity offset program is still in its infancy, and that the planting that was scheduled to occur on site to keep the salts from dispersing into the surface waters of the Goulburn River catchment has not occurred yet;

- there are unlikely to be any major impediments to establishing a similar salinity offset program on other land with salinity problems; and
- the pollution reduction program governing the salinity offset program could be revised at any time to accommodate an alternative program or even alternative measures to achieve DECC's ultimate outcome, which is to reduce the salinity impacts on the river.

Given this, and the fact that Moolarben;

- has made a commitment to either take from the Ulan coal mine the volume of water that would have been used in the Bobadeen Irrigation Scheme or provide an area of land with equivalent salt removal capacity; and
- is required to obtain a mining lease over this land under the *Mining Act 1992* before mining operations could begin,

the Department does not believe that it is desirable or necessary to include specific measures in the conditions of approval to address Ulan's demands.

As mentioned above, the Department believes that the suitably qualified and independent expert who is appointed to carry out the regional water supply/monitoring investigation should review this matter in detail in consultation with all three mining operations in the region, and identify the best measures to reduce the surface water and groundwater impacts of mining in the region

### **Conclusion**

After considering the Panel's advice, and assessing the EA and Moolarben's various responses to the issues raised in submissions, the Department is satisfied that the potential surface and ground water impacts of the project can be suitably managed to ensure an appropriate level of environmental performance.

However, given the uncertainty associated with some of the predictions, the paucity of site-specific data on certain matters, and the shortcomings in some of the assessment, the Department agrees with the Panel's recommendation that a precautionary approach be adopted to any development on site.

Consequently, the Department believes that Moolarben should be required to:

- ensure that there is sufficient water available on site during all stages of the project, and if necessary, adjust the scale of mining operations on site to match the available water supply;
- ensure that any surface water discharges comply with the relevant ANZECC criteria for the protection of aquatic ecosystems;
- provide suitable compensation or compensatory measures to the owners of privately owned land whose water supply has been adversely affected by the project;
- offset the loss of any base flow to the Goulburn River and associated tributaries caused by the project;
- ensure that all storages on site are suitably lined to comply with a permeability standard of  $< 1 \times 10^{-9}$  m/s;
- commission an independent expert to carry out a regional water supply/monitoring program investigation in consultation with DWE, DECC, DPI and the owners of the Ulan and Wilpinjong coal mines to examine the feasibility and potential environmental benefits of increased water sharing between the three mining companies in the region;
- prepare and implement a detailed Water Management Plan for the project, which includes an erosion and sediment control plan, surface and ground water monitoring programs, and a surface and ground water response plan;
- commission independent experts to review the surface and ground water monitoring data at the end of each longwall panel, and carry out a comprehensive audit of the subsidence, and surface and ground water impacts of the project at the end of longwall panels 4 & 8; and
- review and update the various management plans and monitoring plans after each independent audit.

## 4.3 Noise

### **Issue**

The project would generate construction, mining, traffic, and rail related noise.

### **Consideration**

The EA includes a detailed assessment of the noise impacts of the project. This assessment was carried out by Spectrum Acoustics Pty Ltd in accordance with the DECC's *Industrial Noise Policy (INP)*, and includes consideration of construction, operation, road and rail noise of the project.

The assessment is based on the implementation of a number of mitigation measures to control noise emissions from the site, including:

- installing acoustic barriers:
  - a 15 m high bund between open-cut 1 and Ulan village;
  - a 3.5 m high barrier around the western side of the ROM hopper at open-cut 1;
  - a 10 m high bund along the western side of open-cut 2;
  - a 7 m high bund along the western side of the coal haulage route between open-cuts 2 and 3; and
  - a 6 m high bund around the western and southern sides of open-cut 3 facilities;
- reducing ROM coal production from 8 Mtpa to 7 Mtpa in open-cut 1 in years 1 to 3 when operations are in close proximity to the Ulan village, and progressively mining away from the village;
- restricting dumping to behind out of pit emplacements under adverse conditions, and
- using road trucks to haul coal between open-cuts 2 and 3 and the ROM hopper.

### Construction Noise

Construction activities would be carried out over an 18 month period. While the INP provides for an increase in noise criteria during construction periods of up to 26 weeks, this is generally not applied to mining projects unless they have construction works that are required to reduce the long term impacts of the project, such as the construction of a noise bund.

During the first 6 months of the project, Moolarben proposes to construct a 15 m high noise bund around the western perimeter of open cut 1 to shield the Ulan Village from mining noise.

While Moolarben recently acquired all the remaining private residences in the Ulan Village, and has to some extent reduced the need for this bund, the bund is still require to shield the Ulan public school from the project's noise impacts. Consequently, the Department is satisfied that Moolarben should be allowed to use construction noise criteria during the construction of the bund.

With these criteria in place two properties (26 & 49) would experience greater noise impacts than normal, however the Department is satisfied that these short term impacts would be justified by the long term benefits that these residents would receive with the environmental bund in place.

Nevertheless, the Department believes Moolarben should be required to prepare and implement a construction management plan for these works to ensure that any construction impacts are kept to a minimum; and more importantly the construction works are scheduled during school holidays or outside regular school hours to minimise any disruption to the children at the Ulan public school.

### Operational Noise

24 hour mining operations would commence after completion of the initial 12 month construction period. The majority of noise impacts are predicted to occur during mining years 1 to 6 when open-cut 1 would be operating. As mining progresses to open-cuts 2 and 3, the number of noise affected private properties would decrease.

Moolarben has determined project specific noise levels (PSNLs) for the project and has assessed the number of privately-owned residences are predicted to exceed these noise levels over the life of the project. The EA predicts 8 privately-owned residences would be significantly impacted by noise emissions from the project, not including night-time noise impacts that would be experienced at privately-owned residences in the Ulan Village. A further 5 privately-owned residences would experience moderate or marginal noise exceedances at some time over the life of the project (see Table 4).

In its submission on the project, the DECC considered noise impacts to be one of the more significant environmental issues of the project, particularly because of the proximity of the proposed operations to the Ulan Village and existing night-time noise in the village from the Ulan coal mine. At the time the EA was prepared the village comprised 13 privately-owned residences. As noted above, all these have since been acquired by Moolarben.

The Panel has reviewed Moolarben's noise impact assessment, proposed PSNLs, and noise control measures. The Panel expressed a number of concerns, particularly over the likely night-time noise impacts on the village. Many of these concerns have since been addressed through Moolarben's ongoing acquisition program.

At the date of this report, 14 private properties, including 7 privately-owned residences, would be significantly impacted by noise emissions from the project. A further 6 privately-owned residences would be impacted by moderate or marginal noise exceedances (see Table 4). The Department considers a significance exceedance to be greater than 5 dB(A) above PSNLs, a marginal exceedance to be between 3dB(A) to 5 dB(A) above PSNLs, and a minor exceedance to be up to 2 dB(A) above PSNLs.

**Table 4: Summary of Operational Noise Impacts**

Noise Exceedance	Management generally required at this level of exceedance	Predicted no. of private properties impacted by noise exceedances*		
		EA	response to submissions report**	at date of this report
Marginally Affected Residences (1-2 dB exceedance)	Noise mitigation, if possible	2 (30, 41A)	2 (22, 30)	2 (22, 30)
Moderately Affected Residences (3-5 dB exceedance)	Noise mitigation, including mitigation at residence	3* (12, 36, 169)	4 (26, 49, 169, 173)	4 (26, 49, 169, 173)
Significantly Affected Residences (>5 dB exceedance)	Acquisition	8* (5, 13, 20, 25, 26, 29A, 29B, 49 + 13 in village)	21 (5, 6, 12, 20, 24, 25, 26, 29A, 29B, 36 + 11 in village)	7 (5, 6, 20, 25, 29A, 29B, 36)
Significantly Affected Vacant Land (>5 dB exceedance)	Acquisition	(undetermined)	7 (4, 33, 134, 163, 164, 166, 50)	7 (4, 33, 134, 163, 164, 166, 50)
<b>Subtotal - Significantly Affected Properties</b>		<b>21</b>	<b>28</b>	<b>14</b>
<b>Total Properties Exceeding Noise Criteria</b>	-	<b>21</b>	<b>34</b>	<b>20</b>

Note: \* numbers in brackets identify property identification numbering used by Moolarben in the EA

\*\* not all properties identified in the EA, therefore this number could be higher

\*\*\* based on modified mine design, additional mitigation measures, re-evaluated noise criteria, and property acquisitions

The Department would require significantly impacted private properties to be acquired by Moolarben, if requested by the land owner. Further, all significantly and moderately affected residences would be able to request architectural noise mitigation treatments on their properties. The Department also believes Moolarben should be required to make improvements to the Ulan school and to manage its operations to minimise its short term noise impacts on the school.

#### Road Noise

The EA includes a detailed traffic impact assessment undertaken by Sinclair Knight Mertz (SKM), in accordance with the DECC's *Environmental Criteria for Road Traffic Noise (ECRTN)*. The assessment assumed mine workers would travel to and from Mudgee (along Ulan Road) and Gulgong (along Cope

Road), with an approximate 75-25 % split between the two, respectively. Both Ulan and Cope Roads are regional roads and the applicable traffic noise criteria are 60 dB(A)  $L_{Aeq(1 \text{ hour})}$  during the day time and 55 dB(A)  $L_{Aeq(1 \text{ hour})}$  during the night time.

Moolarben predicts that at peak production the project would contribute an additional 192 vehicles to the road network between the hours of 6:30am and 7:30am. Moolarben assessed the noise impact of 25% of this traffic passing the Ulan Village during these hours as the worst case traffic noise generating scenario, and predicts traffic noise levels associated with increased traffic at shift change passing the village would be below 55 dB(A),  $L_{Aeq(1 \text{ hr})}$ , at 20 m from the centre of the road. The Department accepts this is a conservative assumption.

The Panel considered that the traffic noise assessment should account for existing traffic on the road network. Moolarben extended its assessment to account for a potential 200 vehicles already travelling through the village between 5:30 am and 6:30 am. Based on measured pass-by noise levels existing road traffic already exceeds recommended ECRTN noise level criteria. The additional noise attributed to an extra 48 vehicles would be below the 2 dB maximum increase allowed under the ECRTN. Moolarben believes project related traffic noise would not exceed the relevant ECRTN noise criteria. As an additional traffic management measure Moolarben has committed to offset its mine shift changes from those at the Ulan and Wilpinjong coal mines. The Department is supportive of this shift change offset as a traffic noise mitigation measure.

#### Rail Noise and Vibration

Moolarben predicts that up to 4 (1500 m) trains a day would be required to transport product coal from the site, 3 during the day (6 movements) and 1 during the night (2 movements). Loading of product coal would be available 24 hours a day, 7 days a week.

Coal would be transported via the Gulgong-Sandy Hollow and Main Northern railway line through Muswellbrook to Newcastle. If market opportunities exist some coal would also be transported west via the Gwabegar Railway through Gulgong and Mudgee to the Wallerawang Power Station near Lithgow.

The Gulgong-Sandy Hollow and Main Northern railways are operated by the Australian Rail Track Corporation (ARTC) under a DECC Environment Protection Licence (EPL). Moolarben believes the ARTC is responsible for managing noise from off-site train movements on this line.

A number of submissions raised concerns about the potential for significant rail related noise through the town of Mudgee as a result of increased freight train movements associated with the project. The Gwabegar Railway is currently closed and would require substantial upgrading prior to transport of any coal on this line.

The EA predicts the project would cause an increase in cumulative daytime train noise levels on the Gulgong-Sandy Hollow railway of 1 dB(A) above that predicted for the Wilpinjong Coal Project with no increase in night time noise levels. The Wilpinjong assessment predicted increased noise levels of about 1 or 2 dB(A) as a result of additional coal train movements.

Up to 16 residences east of the site have been identified within 70 m of the Gulgong-Sandy Hollow railway, this being the determined set back distance to achieve ARTC's EPL noise goals. Moolarben predicts that rail related noise may be expected to exceed ARTC noise design goals at some of these residences.

Moolarben's assessment of train vibration levels indicates there would be no exceedence in rail vibration at any receiver.

The Panel has reviewed Moolarben's assessment and considers it a reasonable approach. Both the Panel and the Department are satisfied that the project would not result in a significant rail traffic noise impact. However, the Department believes Moolarben should liaise with the ARTC to maximise opportunities for minimising off-site train noise.

#### Cumulative Noise

The EA includes an assessment of the cumulative noise from the project combined with existing noise from the Ulan and Wilpinjong mines. The assessment shows that the cumulative noise levels of the project, combined with the noise generated by the Wilpinjong coal mine, comply with the relevant

amenity criteria, including under worst case meteorological conditions. Existing noise from the Ulan mine has been considered in establishing project specific noise goals for the project.

The Panel has considered Moolarben's cumulative noise assessment and believes that this issue has been adequately assessed. However, the Department believes it is appropriate to include cumulative noise assessment and acquisition criteria for the project to protect the amenity of the wider community should further mining developments proceed in the area

### **Conclusion**

The Department and the Panel are generally satisfied that Moolarben has assessed the potential noise impacts of the project in accordance with relevant NSW guidelines, and that the proposed noise control measures are an appropriate response to noise mitigation at the project.

However, even after the implementation of these mitigation measures, the project would result in significant exceedances of NSW noise criteria at up to 14 privately-owned properties (7 residences and 7 properties) during adverse weather conditions. The Department believes these landowners should be entitled to have their properties purchased by Moolarben should they wish to do so. A further 6 private residences would experience moderate (4) or marginal (2) noise exceedances at some time over the life of the project.

Further, the Department believes that Moolarben should be required to ensure that the amenity of any person residing in the vicinity of the project be protected from excessive noise emissions. The Department's usual practice is to require Moolarbens to offer architectural noise treatments (such as double glazing, insulation and/or air conditioning) to affected properties where the project noise criteria are exceeded by 3dB(A) or more.

With regards Ulan Public School, the Department believes Moolarben should be required to undertake architectural noise treatments on the school buildings to ensure that internal noise amenity criteria are met. Further that Moolarben should be required to modify its operations in response to real-time noise monitoring to reduce its short-term noise impacts on the school.

The Department believes that Moolarben's noise mitigation and compensation measures would appropriately compensate for the noise impact associated with the project. Nevertheless, to minimise and manage the residual noise impacts of the project, the Department believes Moolarben should be required to:

- comply with stringent noise and amenity criteria, and strive to continually improve the noise performance of the project;
- establish an ongoing noise monitoring program, to assess compliance with the noise criteria;
- notify potentially affected landowners about their rights under the project approval;
- implement additional noise mitigation measures (at the request of the landowner) at residences in the acquisition zone, at residences with the noise management zone, and for all other properties outside the Ulan Village where subsequent noise monitoring shows the noise generated by the project is greater than 38 dB(A) (except where a negotiated noise agreement is in place);
- acquire affected properties if the subsequent noise monitoring demonstrates that the project is exceeding the operational noise criteria by more than 5 dB(A), unless there is a valid noise agreement between Moolarben and the affected landowner; and
- minimise the construction noise impacts of the project during the first 6 months of construction, with particular emphasis on minimising the impacts on Ulan School and its pupils.

The Department concludes there is no significant reason relating to noise impacts that can not be adequately managed to withhold approval for the project.

## **4.4 Blasting**

### **Issue**

The project has the potential to result in blasting impacts on nearby residences, infrastructure (including road and rail infrastructure, the Ulan Airstrip, Moolarben Dam, a 330kV electricity transmission line, the Ulan Coal Mine's rail loading facilities, and other mine associated infrastructure), rock shelters of Aboriginal cultural heritage significance, and items of non-indigenous heritage significance.

Blasting would also require the temporary closure of local roads and the Gulgong-Sandy Hollow railway.

### **Consideration**

The EA includes an assessment of the likely impacts of overpressure and vibration levels from blasting. This includes consideration of a range of maximum instantaneous charge (MIC) values and the likely impacts on surrounding residences, public and private infrastructure, and Aboriginal rock shelters.

The EA identifies 14 residences within 2 km of the proposed open-cuts. 5 of these are predicted to experience exceedances in relevant ANZECC blasting criteria for a range of MIC values, and would be significantly damaged:

- 1 from open-cut 1 – residence 26 (Tuck-Lee);
- 1 from open-cut 2 – residence 5 (Swords); and
- 3 from open-cut 3 – residences 29A and 29B (Mayberry), and 36 (Rayner).

All 5 residences are within noise and dust affectation zones and would be required to be acquired by Moolarben, if requested by the landowner. Residences numbered 29A and 29B are within the proposed mining lease area. Blasting would be managed to minimise the impacts on all other privately-owned residences.

2 Aboriginal rock shelters (referred to in the archaeological report as S1MC55 and S1MC56) are located within the escarpment in close proximity to open-cut 2 and may be impacted by blasting. Both shelters contain artwork and some artefact scatters and have been assessed as having conservation significance. The EA predicts blasting would result in ground vibration levels of less than 80 mm/s at the shelters. This criterion is based on a German Standard for evaluating vibration impacts on structures and was applied to the Wilpinjong coal project in lieu of specific impact criteria for structures of this nature.

The issue of ground vibration damage thresholds for Aboriginal rock shelters was explored in more detail by the Panel for the Anvil Hill coal project. An independently commissioned geotechnical expert for that project advised that vibration criteria should be based on a precautionary approach, and suggested the following criteria be applied, based on the vulnerability of the shelters:

<i>Highly vulnerable (fragile) shelters:</i>	<i>&lt; 5 mm/sec;</i>
<i>Vulnerable shelters:</i>	<i>10 to 40 mm/sec; and</i>
<i>Robust structures:</i>	<i>~ 100mm/sec.</i>

The Department agrees with this approach, particularly considering that a collapse of an Aboriginal rock shelter would be an irreversible impact. The EA gives no indication of the vulnerability of the rock shelters near open-cut 2. In the absence of further information, the Department believes a vibration criterion of 40 mm/s should be applied to protect the 2 rock shelters, unless it can be demonstrated that the formations are robust and a higher criterion is applicable.

Blasting has the potential to generate flyrock which could impact on public safety and on private and public infrastructure, including Ulan road, the Gulgong-Sandy Hollow rail line, power line transmission towers, and various infrastructure associated with the Ulan mine.

The Ulan Coal Mine raised concerns about the proximity of blasting to some of its infrastructure, including Moolarben dam, air strip, communication tower, two lined potable water dams and a reverse osmosis plant. Moolarben predicts that use of these facilities by the Ulan mine will not be impeded by the project, and would modify its blast design to protect these structures from blast related damage.

Moolarben proposes to implement appropriate blast design to limit the potential for flyrock damage and to protect public safety. These measures include temporarily closing any public road, the railway or Ulan airstrip, when blasting occurs within 500 metres of these features. Moolarben has also committed to liaise with Council, RTA, ARTC, TransGrid, and other relevant authorities and landowners when designing blasting mitigation measures to protect these features.

Moolarben is also proposing to commence blasting away from sensitive structures, which would provide adequate opportunity to refine its blasting practices based on site conditions to protect these

structures from blasting at closer distances. This would also include the use of small charge weights where blasting is required in close proximity to sensitive structures.

### **Conclusion**

The Department is generally satisfied with Moolarben's blast assessment and proposed mitigation and management measures. The Department believes that with the implementation of best practice the blasting impacts of the project can comply with the relevant overpressure and ground vibration criteria at the majority of privately owned residences, and at Moolarben Dam, Ulan airstrip, the Gulgong-Sandy Hollow railway, Ulan Road, the 330kV Transmission line and other private and public assets.

To ensure that blasting impacts of the project are appropriately managed, the Department believes Moolarben should be required to:

- comply with appropriate blasting criteria at residences, public infrastructure, and other significant features;
- implement best practice blast management procedures to protect the safety of people and livestock, and public and private infrastructure and property, and sensitive Aboriginal rock shelters in areas surrounding blasting operations;
- minimise the dust and fume emissions from blasting at the project;
- restrict blasting to the day time, and avoid blasting on Sundays and public holidays;
- obtain appropriate approvals and liaise with relevant authorities or landowners prior to blasting within 500 metres of public or private infrastructure;
- establish a blast notification procedure to ensure local residents are appropriately informed about planned blasts and road closures;
- develop a comprehensive blast monitoring program;
- conduct inspections of the Ulan Public School, Ulan Catholic Church, Ulan Anglican Church, and any residence within 2 kilometres of blasting operations; and
- coordinate scheduling of blasts with the other mines to minimise adverse amenity impacts on the community.

The Department believes these measures would provide adequate protection to residences, infrastructure and other features from the impacts of blasting, and concludes there is no significant reason relating to blasting that would withhold approval for the project.

## **4.5 Air Quality**

### **Issue**

The project would generate dust from mining, processing, and transportation activities. Operational dust emissions would adversely impact 4 privately-owned residences, and potentially 4 vacant land holdings in the long-term.

Under worst case conditions, short-term dust impacts would occur at an additional 17 privately-owned residences and at community facilities within the Ulan Village, including the Ulan school, at some time over the life of the project.

### **Consideration**

The EA includes a detailed assessment of the air quality impacts of the project. The assessment was carried out by Holmes Air Sciences Pty Ltd, and included an assessment of total suspended particulates (TSP), fine particulate matter (PM<sub>10</sub>), and dust deposition for the project, in addition to consideration of cumulative dust impacts from adjacent mines.

The assessment is based on a number of mitigation measures that would be implemented to control dust generation at the site, including:

- minimising the area of disturbance;
- reducing ROM coal production from 8 Mtpa to 7 Mtpa in open-cut 1 in years 1 to 3 when operations are in close proximity to the Ulan village, and progressively mining away from the village;
- dust suppression on haul roads;
- water sprays on stockpiles and coal transfer points;
- re-vegetation of long-term stockpiles and environmental bunds; and
- employing best practice blast design for dust minimisation.

The EA indicates that dust impacts in excess of established NSW air quality goals would occur at a number of privately-owned properties, at some time throughout the life of the project (see Figure 10). The majority of impacts would occur during years 1 to 6 as a result of construction activities, and mining of open-cut 1. The number of affected properties would significantly reduce, as mining progresses to open-cuts 2 and 3.

In its submission, the DECC indicated the potential for long term dust impacts on an additional 15 non-mine owned properties, 14<sup>3</sup> of which were identified to be within the Ulan village, including the school. Moolarben has identified that these premises would exceed 24-hour PM<sub>10</sub> air quality criteria (50 µg/m<sup>3</sup>), at some stage, but would not exceed long-term dust impacts due to a reduced mining rate of 7 Mtpa in years 1 to 3. The DECC's assessment assumed a production rate of 8 Mtpa over this same period.

The DECC also questioned the performance of the model used to predict dust impacts for the project. Moolarben acknowledges that although the modified model resulted in predicted levels less than the 30 µg/m<sup>3</sup> annual PM<sub>10</sub> assessment criterion, the levels are not sufficiently lower than this to conclude they would remain so with a high degree of confidence.

In total, the EA predicts 36 privately owned residences would experience 24-hour PM<sub>10</sub> (short term) air quality impacts in excess of established goals (ie > 50 µg/m<sup>3</sup>) at some time over the life of the project. 6 of these would experience long term dust impacts above NSW air quality goals (annual average PM<sub>10</sub> > 30 µg/m<sup>3</sup>, TSP > 90 µg/m<sup>3</sup>, or deposited dust > 4 µg/m<sup>2</sup>/month), while 4 would experience 24-hour PM<sub>10</sub> above 150 µg/m<sup>3</sup>. The EA also predicts that 24-hour PM<sub>10</sub> air quality criteria would be exceeded at the school, at some stage during the first 6 years of the project.

Moolarben's acquisition program has since reduced the number of privately-owned properties in the village. As previously noted (section 4.3), Moolarben has acquired all remaining private residences in the village. However, a small number of private vacant land holdings and various community facilities still remain in the village, including the school, 2 churches, and an RFS premises. At the date of this report dust emissions from the project would have significant short and long-term dust impacts on 4 privately owned residences. These 4 residences are also predicted to have significant noise impacts, and would be required to be acquired by Moolarben, if requested by the landowner. A further 17 privately owned residences would experience short term dust impacts at some time over the life of the project (see Table 5). Moolarben also predicts 24-hour PM<sub>10</sub> air quality criteria would be exceeded at the school, at some stage during the first 6 years of the project.

**Table 5: Air Quality Impacts**

Short Term Dust Impacts*		Long Term Dust Impacts		
> 50 µg/m <sup>3</sup> (24-hour PM <sub>10</sub> )	> 150 µg/m <sup>3</sup> (24-hour PM <sub>10</sub> )	> 30 µg/m <sup>3</sup> (annual PM <sub>10</sub> )	> 90 µg/m <sup>3</sup> (TSP)	> 4 µg/m <sup>2</sup> /month (DD)
<b>Residences</b>				
6, 8, 15, 20, 22, 23, 26, 30, 31, 36, 41A, 49, 63, 64, 169, 170, 172	25, 29A, 29B**	5, 25, 29A, 29B**	25, 29B**	29A, 29B**
<b>Other Premises</b>				
149(RFS), 151(church), 160A(school), 162(hotel), 168(church)	-	-	-	-
<b>Land Holdings</b> (dust impacts on 25% or more of property, and not including a residence)				
N/A			4, 26, 30, 33	

\* Not including long term dust impacted properties – see Figure 5

\*\* Residence would be within open-cut 3

<sup>3</sup> DECC's assessment did not include properties R149, R165 and R162 - the reason for this omission is unclear.



A number of submissions raised concerns over the effect of mine related dust on the health of the community, particularly on children attending the Ulan school, and on elderly citizens.

The EA includes an assessment of predicted PM<sub>2.5</sub> concentrations. This assessment indicates a maximum 24-hour PM<sub>2.5</sub> concentration at the school of less than 10 µg/m<sup>3</sup>, during years 1 to 6 of mining (ie worst case years). This is well below the accepted National advisory reporting goal<sup>4</sup> of 25 µg/m<sup>3</sup> for 24-hour PM<sub>2.5</sub>.

In its submission, NSW Health recommends there be no exceedance in PM<sub>10</sub> goals from a mine. The Department does not support this view, but would require Moolarben in conjunction with NSW Health to make information pertaining to the health and amenity impacts of mine related dust publicly available.

Moolarben would also be required to monitor dust impacts at the school, and make arrangements to satisfactorily mitigate any exceedance in air quality goals at the school. Moolarben has committed to undertake such ameliorative measures as required to ensure that the health and wellbeing of children at the school is protected.

### **Conclusion**

The Department is satisfied that the air quality assessment in the EA provides an adequate indication of the air quality impacts associated with the project.

However, even after the implementation of all feasible and reasonable mitigation measures, the project would have significant short and long-term dust impacts on 4 privately-owned residences. The Department believes that Moolarben should be required to acquire these properties (at the request of the landowner) in accordance with the Department's land acquisition procedures, as well as any other properties where subsequent monitoring indicates that long term air quality criteria are being exceeded.

A further 17 private residences would experience short term dust impacts at some time over the life of the project, 3 of which are in the acquisition zone for noise. In addition, the project would have short term dust impacts on community facilities in the Ulan Village, including the Ulan Public School.

On previous mining projects, the Department has developed a land acquisition framework for short term air quality impacts which acknowledges the complexities of regulating 24-hour average PM<sub>10</sub>, but also seeks to protect the health and equity of the community.

Under this framework, Moolarben would be required to acquire any property, at the owner's request, if it can be demonstrated that the 24-hour average PM<sub>10</sub> 50 µg/m<sup>3</sup> criteria cannot be met at that property. However, this framework allows the criteria to be exceeded on up to five occasions a year because there may be occasions where it may be impossible to meet the criteria that have nothing to do with Moolarben, such as bushfires, the contribution of other mines or dust generating agricultural practices, and adverse weather conditions, which could all cause the criteria to be exceeded.

Nevertheless, the Department believes that Moolarben should be required to manage and mitigate dust emissions during all years of the project to protect the health and amenity of all community members.

To minimise and manage the residual air quality impacts of the project, the Department believes Moolarben should be required to:

- comply with strict air quality criteria;
- undertake all reasonable and feasible measures to minimise dust and odour emissions from the project;
- establish a comprehensive air quality monitoring program, including real-time monitoring at the Ulan school; and
- establish appropriate measures to mitigate adverse dust impacts at the Ulan school and at any other affected residence or premises if requested, including adjustments to operating procedures based on a real time response to monitoring results to mitigate short term dust impacts at these premises.

<sup>4</sup> Currently the NSW Government does not have a PM<sub>2.5</sub> air quality goal. In the interim an Ambient Air Quality National Environmental Protection Measure is used as an advisory reporting standard.

The Department concludes there is no significant reason relating to air quality impacts that can not be adequately managed to withhold approval for the project.

## 4.6 Flora and Fauna

### Issue

The project would disturb a total of 2,100 hectares of land, including 417 hectares of good quality native vegetation, 65 hectares of which has conservation significance.

Without any impact offsetting, the project would significantly affect 3 threatened flora species/populations and 29 threatened fauna species

### Consideration

The EA includes a detailed assessment of the flora and fauna values of the project area. This assessment was carried out by Moolarben Biota, and comprised literature and State and Federal agency database record searches, and seasonally based detailed and targeted site surveys over more than 2 years.

Some concerns were raised in public submissions concerning the adequacy of Moolarbens detailed flora and fauna impact assessment for the project. However, the DECC has indicated it is satisfied with the assessment, and believes it provides a sound basis for assessing the flora and fauna impacts of the project.

### Vegetation Communities

The EA identifies 6 broad vegetation units comprising 34 distinct vegetation associations across the project area. 6 of these are consistent with the definition of *White Box, Yellow Box, Blakely's Red Gum Woodland (WBYYBRW)* endangered ecological community (EEC), listed in the *Threatened Species Conservation (TSC) Act 1995*. *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* is also listed as a critically endangered ecological community in the Commonwealth *Environment Protection and Biodiversity (EPBC) Act 1999*. 259.7 ha of WBYYBRW EEC has been identified on the site.

The project area comprises 2,124 ha of native vegetation. The project would require 417 ha of good quality remnant native vegetation to be cleared (see Table 6), including almost 65 ha of WBYYBRW EEC from the site, about 25% of that identified in the study the area. A further 488 ha of disturbed vegetation and 215 ha of unimproved grasslands would also be disturbed.

**Table 6:** Vegetation occurrence and extent

Broad Vegetation Mapping Unit	Occurrence	Extent (ha)	Area to be cleared	
			(ha)	(%)
Alluvial Apple Forests	Narrow strips along creek line corridors	93	14	15
Box Woodlands	Remnant stands on valley floors and adjacent lower slopes	338	139	41
Tablelands Red Gum Woodlands	Remnant stands on valley floors and adjacent lower slopes	144	29	20
Sedimentary Scribbly Gum Woodlands	Ridgelines and upper slopes, in the north of the project area (north of Ulan-Wollar Road)	983	15	2
Sedimentary Ironbark Forests	Ridgelines and upper slopes, in the south of the project area (south of Ulan-Wollar Road)	566	219	39
Disturbed Vegetation (including unimproved grasslands)	Valley floors and flood plain areas, disturbed (488 ha) or cleared (215 ha) for agricultural landuse	1354	703	52
Total		3478	1119	32

Surface subsidence would potentially disturb a further 95 ha of remnant vegetation, 49 ha of already disturbed vegetation and 18 ha of unimproved grasslands. This includes an additional 40 ha of WBYBBRW EEC. However, Moolarben predicts that the biodiversity values in this area would remain largely unaffected by mining.

### Flora

Detailed flora studies identified 502 plant species within the project area, including 4 threatened species, 3 of which would be impacted by the project:

- Narrow Goodenia (*Goodenia macbarronii*) – listed as vulnerable under TSC Act and EPBC Act;
- Tricolor Diuris (*Diuris tricolour*) – listed as vulnerable under TSC Act and EPBC Act;
- Capertee Stringybark (*Eucalyptus cannonii*) – listed as vulnerable under TSC Act and EPBC Act; and
- Hoary Sunray (*Leucochrysum albicans* var *tricolour*) – listed as endangered under the EPBC Act.

The EA estimates that about 1000 individuals of Narrow Goodenia (about 10% of the identified local population), 1 individual of Tricolor Diuris (50% of the identified local population), and 1 stand of 7 individuals of Capertee Stringybark (about 88% of the identified local population) would be lost as a result of open-cut 1 pit development. This represents a significant loss to the local populations of Tricolor Diuris and Capertee Stringybark, resulting in all but 1 of each species being destroyed. The project would not impact any of the known occurrences of Hoary Sunray.

### Fauna

Detailed fauna studies identified 256 fauna species either occurring or having the potential to occur in the area, comprising 170 birds, 37 mammals, 32 reptiles and 7 amphibians. Of these, 29 threatened fauna species and 14 declining woodland birds were identified or considered likely to occur within the project area. The threatened species included 18 birds, 9 micro-bats, 1 other mammal (squirrel glider) and 1 amphibian.

Vegetation clearing would result in a direct loss of habitat and consequently impact on the diversity and value of fauna in the area. The EA has assessed this loss of habitat through site clearing as a temporary impact, which would not result in a significant impact on fauna species in the area.

However, the Department believes that habitat availability and biodiversity values would be significantly affected in the short term through the loss of vegetation on site, and that some individual fauna species and or some local populations would be expected to be lost in the short term.

To minimise its impact on fauna, Moolarben proposes to implement a range of strategies to avoid and or mitigate impacts on habitat and fauna by such measures as pre-clearance fauna surveys, trapping and relocation where possible, collection and re-use of tree hollows, pest control, detailed fauna monitoring and habitat augmentation. However, Moolarben's key mitigation and compensatory measure is the protection, conservation and enhancement of vegetation and habitat through implementation of its biodiversity and rehabilitation offset and strategy (as discussed below).

### Aquatic Ecosystems

Surface drainage across the project area is either poor or intermittent. On site habitat potential for aquatic species is therefore generally poor. Apart from 1 pest fish species found in the main creeks, native fish are recorded as being confined to the Goulburn River. No aquatic mammals were found, or expected in the project area.

Moolarben Creek, which is the dominant drainage line in the project area, would not be physically altered by open-cut mining. Reduced groundwater discharge would reduce salt loads and generally improve water quality in the creek, but would locally reduce the surface flows in the creeks. Mining would not be expected to significantly impact existing aquatic habitat or biota within or downstream of the project area. Riparian habitat along this creek system is not predicted to be impacted.

### Groundwater Dependent Ecosystems

The EA has identified some Groundwater Dependent Ecosystem (GDE) plant assemblages in association with local groundwater discharge points. These are not considered to be locally or regionally significant. Apart for the regionally significant Drip, there are no GDEs of significance within the project area.

Despite significant dewatering of the Permian aquifers and some loss of groundwater discharge through aquifer depressurisation, the EA predicts there will be no significant impact on locally occurring GDEs as a result of the project. Further, the EA predicts that these changes to the groundwater flow regime would not impact on species within the adjacent Goulburn River National Park.

#### Biodiversity Offset, Mitigation and Rehabilitation Strategy

Moolarben is proposing to implement a biodiversity offset, mitigation and rehabilitation strategy to compensate for the loss of vegetation and associated habitat that would be cleared as a result of the project. The key components of the strategy are shown in Table 7.

The strategy has been designed to protect and enhance existing remnant vegetation in areas surrounding the mining operations, and through progressive rehabilitation create habitat corridors between the Goulburn River National Park, Munghorn Gap Nature Reserve and surrounding wooded areas in the long term.

The strategy requires securing and protecting 130 ha of WBYBBRW EEC as a 2:1 “like for like” compensatory measure for the loss of 65 ha of WBYBBRW EEC that would result from the project.

In addition, the strategy would result in progressive establishment and enhancement of a further 1957 ha of native vegetation to replace 905 ha of vegetation (including remnant and disturbed vegetation areas) to be cleared from the site. Included in these measures would be the protection of 195 ha of existing WBYBBRW EEC, and a further 38 ha of the WBYBBRW EEC to be re-established through natural regeneration and selective planting. This represents an increase of 1052 ha of native vegetation in the medium to long term (see Table 8).

The strategy also includes establishing 508 ha of grasslands for agricultural use, an increase of 365 ha.

Moolarben has purchased an off-site area of remnant native woodland within 3 km and to the east of the project area. This land, the “Red Hills” property, was a private in-holding within the Goulburn River National Park and comprises about 62 ha of WBYBBRW EEC. It is understood that Moolarben has reached agreement with the DECC to include the Red Hills property in the Goulburn River National Park. The Department and the DECC are satisfied with this outcome, and believe the addition of this area to the National Estate will provide an important regional conservation outcome for the WBYBBRW community. Nevertheless, a further 68 ha of WBYBBRW EEC is required to be secured by Moolarben to complement this offset measure, and to compensate for the proposed total loss of 65 ha of the EEC.

**Table 7: Biodiversity Offset, Mitigation and Rehabilitation Strategy**

Proposed Measures	Area (ha)	Key Attributes
2:1 offset - WBYBBRW EEC	130	<ul style="list-style-type: none"> <li>dedication of WBYBBRW EEC to National Estate for long-term protection, to offset clearing of 65 ha of WBYBBRW EEC, includes 62 ha of EEC on neighbouring “Red Hills” property</li> </ul>
Revegetation of WBYBBRW EEC (not included in EEC offset)	38	<ul style="list-style-type: none"> <li>revegetation of disturbed land on “Red Hills” property to enhance the value of initial EEC offset area</li> </ul>
Offsite conservation of existing native vegetation	143	<ul style="list-style-type: none"> <li>non-EEC remnant native vegetation on “Red Hills” property to be dedicated to the National Estate</li> </ul>
Onsite conservation of existing native vegetation	1262	<ul style="list-style-type: none"> <li>existing remnant native vegetation, including 195 ha of WBYBBRW EEC, to be included in voluntary conservation areas</li> </ul>
Revegetation of cleared areas outside mine footprint	144	<ul style="list-style-type: none"> <li>currently cleared areas to be revegetated, via natural regeneration and plantings, to enhance local biodiversity value of WBYBBRW and improve wildlife corridor linkages, to be included in voluntary conservation areas</li> </ul>
Rehabilitation of mined areas to woodlands	370	<ul style="list-style-type: none"> <li>rehabilitation of open-cut 1 and surrounding agricultural land to provide additional Box-Gum Woodlands, to be included in voluntary conservation areas</li> <li>areas to be progressively rehabilitated to minimise disturbance and reduce time for establishment of habitat</li> </ul>
Rehabilitation of mined areas to grasslands	580	<ul style="list-style-type: none"> <li>rehabilitation of open-cuts 1 &amp; 2 to grasslands for agricultural use</li> <li>areas to be progressively rehabilitated</li> </ul>
<i>Total</i>	<b>2667</b>	

**Table 8: Long-term Rehabilitation Objectives**

Rehabilitation Strategy (not including EEC offset)	Area Cleared (ha)	Area Rehabilitated (ha)	Change (ha)
Trees	905*	1957	+1052
Grassland	215	580	+365
<b>Total</b>	<b>1120</b>	<b>2537</b>	<b>+1417</b>

\* includes 488 ha of disturbed vegetation

### Conclusion

The DECC and the Department are satisfied Moolarben has adequately considered the potential flora and fauna impacts of the project, and are of the opinion that the detailed impact assessment provides a sound basis to assess these impacts. The DECC and the Department are also satisfied with Moolarben's proposed offset and rehabilitation strategy, and believe it is an adequate response to mitigate the effects of the project on the biodiversity values of the area.

This assessment indicates the project would:

- clear 417 ha of good quality native treed vegetation, including vegetation communities of conservation significance;
- clear 488 ha of disturbed native vegetation and 215 ha of grassland that provides habitat for fauna species of conservation significance; and
- in the absence of any offset and mitigation strategy, significantly impact 2 threatened flora species, up to 29 threatened fauna species, and up to 14 declining woodland bird species.

The Department is satisfied these impacts are able to be mitigated and/or offset to an extent such that there would be no net loss of flora and fauna values in the area as a result of the project, over the medium to long term. To ensure that these goals are achieved, the Department believes Moolarben should be required to:

- develop a comprehensive Landscape Management Plan, including a Rehabilitation and Offset Management Plan, Final Void Management Plan and Mine Closure Plan;
- ensure that the offset strategy contains adequate provisions to offset the project's net impact on significant vegetation communities and threatened species;
- lodge a substantial Vegetation Offset Bond to ensure that those elements of the offset and rehabilitation strategy that are situated outside the Mining Lease are established to the satisfaction of the Director-General; and
- progressively rehabilitate the site.

The implementation of the proposed offset strategy and the recommended rehabilitation of the project disturbance area would ultimately provide for the establishment and long term conservation of over 2,080 ha of trees to compensate for the 970 ha removed by the project. The Department considers that this would provide a net biodiversity benefit at both the local and regional level in the medium to long term. However, the Department believes Moolarben should be required to develop a management plan to protect all remaining occurrences of threatened flora species on the site, and to instigate recovery measures to enhance local populations and to conserve the value of these species in the area.

The Department concludes there is no significant reason relating to fauna and flora impacts that can not be adequately managed to withhold approval for the project.

## 4.7 Aboriginal Heritage

### Issue

The project would directly impact on a number of known Aboriginal sites, and has the potential to affect other sites of Aboriginal cultural heritage significance.

In its submission, the DECC noted that a substantial number of sites in different landscape settings would be at threat from the project, including:

- 105 sites within open-cut pit development areas (not including potential archaeological deposits);
- 43 sites within the subsidence disturbance area of the underground mine; and
- 22 sites within the surface infrastructure area.

### **Consideration**

The EA includes a detailed assessment of the Aboriginal cultural heritage of the project area. This assessment was carried out by Archaeological Risk Assessment Services in accordance with DECC guidelines and in consultation with local Aboriginal groups.

The detailed assessment identified 225 Aboriginal sites within the project disturbance footprint, with a further 77 outside the disturbance area. Identified sites include isolated finds and artefact scatters, scarred trees, rock shelters with archaeological deposits and rock art, potential archaeological deposits, and reported places of Aboriginal cultural significance. Of these, 4 rock shelter sites (S1MC: 280, 283, 286, 287), 4 open artefact scatter sites (S1MC: 103, 165, 230, 282), 1 grinding groove site (S1MC 264) and 1 scarred tree site (S1MC 1) are in fair to good condition. 8 sites (S1MC: 103, 230, 264, 280, 282, 283, 286, 287) have been identified as having high archaeological significance. The remainder of the sites are in poor condition.

Over 50% of the sites within the project area would be directly impacted by the project; 107 sites within the open-cut pits, and 22 sites within the infrastructure area. The majority of these are isolated finds and artefact scatters and would be destroyed.

A further 12 sites are within the subsidence footprint of the underground mine. Of these, only 1 site of high scientific (archaeological) significance (S1MC 280) would have a moderate risk of impact from subsidence. Moolarben has committed to undertake further intensive archaeological recordings at each of these sites.

The DECC supports Moolarben's commitment. Further it believes that a precautionary approach should be implemented and that detailed recordings made of all sites that could potentially be impacted by subsidence.

Nonetheless, the Panel considered that Moolarben should make its best efforts to reduce the risk of subsidence impacts on at least 6 sites considered to have Aboriginal heritage value in the underground area (S1MC: 264, 280, 282, 283, 286, and 287).

A number of submissions, particularly those from the Aboriginal community, emphasised the significance of the Drip and the Goulburn River area as a place of significant historical and contemporary Aboriginal cultural value, including it being a sacred Aboriginal Women's Place. The Department notes the clear indication within this correspondence of the significant Aboriginal cultural value of the Drip and a number of other sites within the project area.

To mitigate the impacts of the project on Aboriginal sites, Moolarben has committed to a range of measures, including, in consultation with local Aboriginal groups for the ongoing study, conservation, and management of Aboriginal cultural heritage sites across the project area.

### **Conclusion**

Both the Department and the DECC are satisfied that Moolarben has assessed the Aboriginal cultural heritage impacts of the project in detail, and has consulted with the local Aboriginal community.

The Department acknowledges that the establishment of an open cut and underground mining operation with its associated surface infrastructure would impact on a significant number of Aboriginal cultural heritage sites, many of which would be destroyed by the project. The Department accepts that due to the shallow depth of the coal resource there are no viable alternatives to open cut mining methods in the southern part of the project area. It is also notes that the vast majority of sites within the open-cut areas comprise either isolated finds or artefact scatters, and that these sites have been assessed as not having a high level of cultural heritage significance. However, the Department does acknowledge that the Aboriginal community consider all sites (identified and potential) to be of value.

Further, the Department is of the opinion that the Drip, its immediate environs, and the Goulburn River in that vicinity, is a place of significant historical and contemporary Aboriginal cultural value, and there should be no impact from mining that would decrease the value and significance of this area, to the detriment of the indigenous community and its future generations. The Department is satisfied that

Moolarben's revised underground mine plan, proposed conditions of approval, and the measures that would be put in place through the inter-agency SMP review process, would adequately reduce the risk of impact to significant sites and features (cliff lines) within and adjacent to the subsidence footprint of the underground mine area, including the Drip.

The Department is also satisfied with Moolarben's commitment for ongoing conservation and management of Aboriginal Cultural Heritage across the project site. However, the Department believes that Moolarben should undertake the detailed site investigations proposed in the EA to increase the understanding of the Aboriginal cultural heritage value of the sites, prior to any mine disturbance or impact on the sites.

In addition, the Department is of the opinion that Moolarben should be required to investigate and implement measures to conserve, protect and manage the Aboriginal cultural heritage values of the area. These measures should include, in addition to those listed above:

- intensive insitu recording of Aboriginal sites likely to be impacted by the project;
- archaeological salvage and test excavations of Aboriginal sites and Aboriginal objects;
- a keeping place to document and temporarily store salvaged Aboriginal objects;
- a program to further assess and document the Aboriginal heritage values of the area;
- further identification, management and monitoring of Aboriginal rock art sites;
- monitoring of earthworks in areas where there is the potential for Aboriginal burials to exist;
- measures to protect Aboriginal sites outside the project disturbance areas; and
- a protocol for the ongoing involvement of the local Aboriginal community in the conservation and management of Aboriginal cultural heritage on the site.

The Department believes these measures would provide adequate protection to sites of Aboriginal heritage significance, and concludes that there is no significant reason relating to Aboriginal heritage value that can not be adequately mitigated or managed to withhold approval for the project.

## 4.8 Transport

### ***Issue***

The project would increase the level of traffic on the local road network, and increase coal train movements on the Gulgong-Sandy Hollow railway line.

Increased traffic would increase the potential for traffic incidents and could jeopardise the safety of school children and the general public travelling along these routes.

All product coal would be transported via rail to domestic power stations or to the port of Newcastle for export.

### ***Consideration***

#### ***Road Traffic***

The EA includes a detailed traffic study of key transport routes to be used during construction and operation of the project. The assessment was carried out by Sinclair Knight Mertz Pty Ltd (SKM) and includes road safety audits on these roads. Project related traffic would travel to and from the site along the Mudgee-Ulan (Ulan Road) or Gulgong-Ulan (Cope Road) Roads.

The EA predicts the project would require a construction workforce of about 220 people and an operational workforce at peak production of about 317. This is predicted to generate up to an additional 190 vehicles during peak morning periods. Heavy vehicle movements would also increase during the construction period.

Moolarben is proposing two separate site access points, one for underground operations and the other for open-cut operations and general site facilities. Site access to these areas would be via the Ulan Road and Ulan-Wollar Road respectively, and would require construction of appropriately designed intersections. The intersection between the Ulan and Ulan-Wollar Roads would also require upgrading. Apart from the temporary closure of Moolarben and Carrs Gap Roads, and minor diversions to the Ulan-Wollar and Moolarben Roads, no other local roads are predicted to be impacted by the project.

A number of submissions raised concerns about the impact of increased traffic on the Ulan Road and other local roads as a result of the mine, and in particular the increased risk to local children boarding and alighting, and travelling on school buses along the same roads.

The EA identifies that the Ulan and Cope Roads are classified regional roads, and that both roads have a design capacity that is capable of adequately accommodating increased traffic expected as a result of the project. However, Moolarben's safety audit identifies road delineation, edge formation, shoulder provisions, and sight distances as being areas of concern on both these roads.

Moolarben has recognised that these modifications would greatly improve the safety of these roads, and has committed to the improvements recommended in the road safety audits. To further improve road safety, Moolarben has also committed to a number of other traffic management measures including:

- offsetting its early morning and evening shift changes from that existing at the Ulan and Wilpinjong mines, and ensuring that these shift changes occur outside school bus service times;
- where feasible, arranging for delivery of fuel, stores and explosives outside of school bus service and peak traffic times;
- entering into a Voluntary Planning Agreement with Council to contribute monies toward road servicing – however, the allocation and spending of this money would be the responsibility of Council; and
- working with Council and Ulan and Wilpinjong mines to generally improve road safety and traffic management on the local road network.

#### Rail Traffic

Train loading at the site would be made available 24 hours a day and 7 days a week. Up to 4 (1500 m) trains a day would be required to transport product coal from the site – 3 during the day (6 movements) and 1 during the night (2 movements). Product coal would only be transported via rail from the site.

As discussed previously, coal would be transported via the Gulgong-Sandy Hollow and Main Northern railway line through Muswellbrook to Newcastle, and if market opportunities exist via the Gwabegar Railway through Gulgong and Mudgee to the Wallerawang Power Station near Lithgow. However, as discussed previously the Gwabegar Railway line is currently inoperable and would require a substantial upgrade prior to accepting coal freight trains. The RIC (Rail Infrastructure Corporation) has responsibility over this line.

Up to 10 Mtpa of product coal would be transported east, to domestic and export markets. Moolarben believes that planned upgrade works on the Gulgong-Sandy Hollow and Main Northern lines would be sufficient to adequately accommodate increased rail traffic generated by the project. The ARTC which operates the Gulgong-Sandy Hollow and Main Northern Railway does not object to the project.

#### **Conclusion**

The Department is satisfied that the road and rail network is capable of accommodating the traffic associated with the project, subject to the implementation of certain upgrade works and traffic management controls.

The Department is also satisfied the project would not reduce the current level of road safety on the road network, provided that the measures and commitments proposed by Moolarben are carried out.

Finally the Department has recommended conditions that require Moolarben to:

- transport all coal via rail, and keep accurate records of coal and rail movements;
- prior to commencing works at the site construct the two mine site entrance intersections, and the intersection between Ulan Road and Ulan-Wollar Road to the appropriate road standards;
- in consultation with the RTA, Council, and the Wilpinjong coal mine, prepare a program for the staged upgrade of the Ulan Road, and allocate funding in its Voluntary Planning Agreement for works identified to upgrade this road; and
- schedule site shift changes to occur outside school bus hours and co-ordinate these shift changes with shift changes at Ulan and Wilpinjong coal mines to minimise the potential cumulative traffic impacts of the three mines.

The Department concludes there is no significant reason relating to traffic and transport that would withhold approval for the project.

## 4.9 Greenhouse Gas Emissions

### **Issue**

The project would generate direct and indirect greenhouse gas (GHG) emissions that would contribute to global warming and climate change.

### **Consideration**

#### Direct GHG Emissions

The EA provides an assessment of the GHG emissions (Scope 1 and 2) that would result from operation of the project. This assessment was prepared by Holmes Air Sciences and provides estimates of direct GHG emissions (as CO<sub>2</sub>-equivalent emissions - CO<sub>2</sub>-e) that would result from electrical energy requirements, diesel fuel consumption, and the liberation of methane from mining of the coal. A total of 384,620 tonnes a year CO<sub>2</sub>-e has been estimated for the project, based on standard emission factors derived from the Australian Greenhouse Office (AGO) workbook (2005).

The Department has determined that this assessment incorrectly calculates the likely project emissions. Correct application of the AGO workbook factors results in the substantially higher estimate of 521,420 tonnes of CO<sub>2</sub>-e a year. The predominant source being methane gas entrained in the coal resource (409,200 tonnes a year CO<sub>2</sub>-e).

Moolarben has reviewed its likely direct GHG emissions for the project in its response to submissions. Its revised estimate adopts a methane gas emission factor of 0.23 kg CO<sub>2</sub>-e/tonne of raw coal, and a slightly reduced CO<sub>2</sub>-e emission factor for electrical energy consumption. The adopted factor for methane liberation is substantially lower than the factors provided in the AGO workbook, but has been based on drill sample data from the project site<sup>5</sup>. Moolarben's revised estimate of total direct GHG emissions for the project is 111,650 tonnes of CO<sub>2</sub>-e a year. This is significantly less than previous estimates. However, despite these variations, the direct GHG emissions for the project would be less than 0.1%<sup>6</sup> of all annual net Australian GHG emissions (CO<sub>2</sub>-e across all sectors), or about 0.5% (using the revised estimate) of annual net fugitive emissions<sup>7</sup> across the Australian black coal mining sector, based on current national estimates.

#### Indirect GHG Emissions

Moolarben has estimated the indirect GHG emissions (Scope 3) that would result from the transport of product coal to market, and the burning of that coal for energy purposes, and its effect on climate change in the context of global warming and climate change as well as in the context of ESD principles.

At maximum production (10 Mtpa product coal), offsite transport of the coal is expected to result in some 34,440 tonnes of CO<sub>2</sub>-e, annually. Moolarben has estimated that approximately 25 Mt CO<sub>2</sub>-e of GHG emissions would result from the mining, transport and burning of coal from the project, annually. As expected, emissions associated with burning of the coal would be far greater than those associated with either mining or transport. This assumes that mining and processing of coal progresses at the maximum proposed rate of production (12 Mtpa ROM coal to produce 10 Mtpa product coal), all coal is transported to the port of Newcastle for export (the only case considered), the specific energy of the coal is 27.6 GJ/t, and that all product coal would be burnt in a power station similar to one in NSW for power generation purposes. 25 Mtpa CO<sub>2</sub>-e GHG emissions for the project would be less than 0.1% of estimated annual global emissions from fuel burning<sup>8</sup> (26,583.3 Mtpa), based on current estimates and not including future global trends.

The Department believes that this is a conservative assessment and that for at least half of the 16 years of predicted coal production, less than 6 Mt would be produced annually, with less than 4 Mt for 6 of these years. The Department believes that on average the project could result in the downstream generation of 16 Mtpa CO<sub>2</sub>-e of Scope 3 GHG emissions.

Adopted convention is that these "downstream" emissions are attributed to the user of the coal rather than the producer. The convention of not including these emissions avoids double counting. Leaving the accounting of the emissions from the use of the coal to the end user is also desirable as emissions

<sup>5</sup> Methane gas emission factor from testing of four coal drill core samples, and data from the adjacent Wilpinjong Coal Mine.

<sup>6</sup> Australia's net greenhouse gas emissions across all sectors totaled 564.7 million tonnes of carbon dioxide equivalent in 2004 (Department of Environment and Heritage).

<sup>7</sup> Based on the 2004 National GHG emission inventory.

<sup>8</sup> Derived from a 2006 International Energy Agency report on CO<sub>2</sub> emissions from fuel consumption.

due to the end use depend on the method by which the coal is used to produce energy and any control measures that might be in place. However, Moolarben has provided the estimates to address the recent judgment in *Gray v The Minister for Planning*.

The Department must consider the emissions in the light of the principles of ecologically sustainable development (ESD), as indeed it must in regard to all other potential impacts. It notes that, if coal is not produced at Moolarben project, this will not reduce international demand for coal, the burning of coal, or greenhouse gas emissions. Indeed, it can be expected that if coal is not mined at Moolarben, it will be extracted some place else (including at existing Australian and/or NSW mines, even Hunter Valley mines).

The production of coal and the need for new coal mine proposals is a market-driven phenomenon. The Department is of the opinion that current global demand for energy supply will continue to provide market pressure for supply of coal, which would continue to remain (even increase) in the absence of production and export from Moolarben project. Consequently, there can be no substantive argument on ESD grounds relating to greenhouse gas emissions to prevent coal production at Moolarben.

### **Conclusion**

The project would generate significant GHG emissions, both directly through extraction, processing and transport of the coal resource, and indirectly through electricity use and downstream burning of the product coal. The indirect downstream burning of the coal is by far the biggest contributor, generating some 99% of the GHG emissions associated with the project.

On a comparative basis, the total GHG emissions from the project represent a very small proportion of the current national (less than 0.1%) and global (less than 0.1%) annual GHG emissions, and when considered in isolation, the project would have an insignificant contribution to global warming/climate change.

The Department is satisfied that there is a clear need for the development of new coal mines such as Moolarben project to meet basic domestic and international energy needs over at least the next 20 years.

Further, the department believes that refusal of the project is unlikely to result in any reduction in global GHG emissions, as the gap in supply would almost certainly be filled by another mine in Australia or overseas. Notwithstanding, the Department expects that Moolarben should be required to investigate and implement methods to mitigate, manage or offset direct and indirect GHG emissions throughout the life of the project. Such methods should include:

- developing and implementing a comprehensive Energy Savings Action Plan, which includes quantified energy efficiency targets and actions;
- identifying options for minimising greenhouse gas emissions from underground mining operations, with a particular focus on capturing and/or using these emissions;
- investigating the feasibility of implementing these options;
- measures that would be implemented in the short to medium term on site; and
- include a research program to inform the continuous improvement of the greenhouse gas minimisation measures on site.

The Department concludes that there is no significant reason relating to greenhouse gas emissions (either relating to the mining process or the burning of product coal) to withhold approval for the project.

## **4.10 Socio-Economic**

### **Issue**

The project would generate a large number of jobs and inject considerable capital investment into the Mid-Western Region local government area and broader Central West region. However, it would also generate a range of environmental impacts that would affect the general amenity of the area, transform a long-standing rural area backing onto the National Park into part of a large mining complex, and potentially disrupt a reasonably tight-knit local community that currently lies in and around the proposed project area.

### **Consideration**

As with all large mining proposals, the project would have social and economic benefits, and social and economic costs.

The EA includes a socio-economic assessment of the project which was carried out by the Hunter Valley Research Foundation (see **Appendix F**).

### State and Regional Benefits

The project area contains a significant coal resource of at least 127 million tonnes that is conservatively worth about \$8 billion. The development of this resource would provide a broad array of social and economic benefits. These benefits include the generation of up to:

- 910 direct and indirect jobs, including:
  - 220 direct jobs during construction;
  - 317 direct jobs during operations;
- \$405 million in initial capital investment;
- \$664 million in annual direct and indirect regional output; and
- \$340 million in total production royalties.

Moolarben has also negotiated a comprehensive voluntary planning agreement for the project, which provides for a direct contribution of \$4.55 million to fund community projects. The relevant elements of the planning agreement are shown in the following table.

**Table 9: Voluntary Planning Agreement Contributions**

Funding Area	Minimum Moolarben Contribution	Funding Time Frame
<b>Monetary Contribution – open cut product coal</b>	\$1,000,000	Three equal instalments to be paid over a three year period, with the first annual instalment to be paid within seven days of the first loading and dispatch of coal produced from the open cut operations from the Project.
<b>Monetary Contribution – underground product coal</b>	\$300,000	One instalment to be paid within seven days of the first loading and dispatch of coal produced from the underground operations of the Project.
<b>Road Maintenance Contribution – Cope Road and Ulan Road</b>	\$1,000,000	Three equal instalments to be paid over a three year period, with the first instalment to be paid within seven days of the commencement of construction
<b>Road Maintenance Contribution – General</b>	\$1,250,000	\$62,500 each year for a period of 20 years with the first instalment to be paid on the first anniversary of the first loading and dispatch of coal produced from the operations of the Project.
<b>Total</b>	<b>\$4,550,000</b>	

### Local and Regional Impacts

However, these benefits need to be considered against some of the adverse impacts the project would have on the local community in its various shapes and forms.

Firstly, the proposed open cut mining operations would be located on some of the last traditional farming properties in the area, which are still used for grazing. These farming properties are owned by three families that have a long historical association with the area. For these owners (the Swords, Mayberry and Rayner families), the issue is simple: if the mine goes ahead, then the farms would need to be sacrificed, as it is unlikely that farming on the remainder of these properties would be viable. These farmers have all indicated that the rehabilitated mine “would not be the same” again. Consequently, there is a good chance that these families would need to permanently sever their links with this particular part of the Moolarben Valley.

These three families have joined with Xstrata (the owner of the Ulan coal mine), which owns the rural property where open cut 1 would be located, in objecting to the granting of a mining lease for Moolarben’s proposed open cut operations under the provisions of the *Mining Act 1992*. These objections are currently before the Mining Warden and Supreme Court, and may result in mining being vetoed in certain parts of the project area.

Nevertheless, the Department has examined the broader land use planning conflict (ie mining versus farming) carefully, and has concluded that, from a State and regional planning perspective at least, there is no doubt that mining is the highest and best use for this land.

Secondly, the project would have significant impacts on at least 16 privately owned properties in and around the project area (see Table 10).

Nine of these properties are associated with the families referred to above and are located around open cuts 2 and 3. A further three properties are owned by the Keys family, and are essentially small vacant blocks in the Ulan village. These blocks could technically be built on, but this unlikely now that Moolarben has acquired all of the other previous privately owned properties in the village.

Three of the remaining four properties (Tuck-Lee, Thompson and Williamson) are predicted to be affected by significant noise, blasting and dust impacts, with Tuck-Lee's property being located right on the doorstep of open cut 1.

The last of these properties (Green) is located west of the project area, and is the last remaining privately owned property in this area. While this property is not predicted to be affected by any significant noise or dust impacts, it would be extremely isolated if the project is approved. Essentially it would be trapped in the middle of a large mining complex.

**Table 10:** Private Properties Predicted to be Significantly Affected

4 – M. Swords	5 – M & P Swords
6 – Thompson	15 – Green
20 – Williamson	25 – Tuck-Lee
29a – E. Mayberry	29b – E. Mayberry
29 – E. Mayberry	33 – K. & R. Mayberry
36 – Rayner	50 – C. Mayberry
134 – M.J. & H. Swords	163 – C.M. & J.J. Key
164 – J.J. Key	166 – C.M. Key

To minimise, manage or at least compensate for the residual impacts of the project on these significantly affected properties, the Department believes that Moolarben should be required to:

- acquire affected properties upon request, including payment of reasonable compensation and relocation costs, in accordance with the Department's land acquisition procedures;
- upon request, undertake architectural treatments on affected residences whilst they remain in private ownership;
- notify and inform affected residents about their acquisition rights, and the potential health and amenity impacts associated with the project; and
- provide for independent assessments of environmental impacts, and provide for a transparent dispute resolution process.

Thirdly, the project would have a range of minor to moderate impacts on the amenity of a number of other private properties and community facilities in the local and wider area. These impacts would be realised through changes to the areas existing noise, dust, traffic and visual amenity.

Moolarben's property acquisition program has further fragmented the rural character of the locality, and has completely changed the ownership of properties within the Ulan village. The loss of people and families from the area, as a consequence of these acquisitions, and likely further exodus of residents from mine owned properties in the village and surrounding areas, is likely to have important social implications on those remaining. In particular, on the 'sense of community', which is typical in rural areas. The loss of families and transformation of the social fabric of the area may also affect the viability of community facilities in the Ulan village, and the school and two churches. Although, the Department notes that both the school and churches serve a wider catchment than the village.

Fourthly, if the project is approved, and the farming land in the Moolarben Valley is lost, then the loss of the three long-standing farming families from this area would serve to completely isolate the one remaining farm in the vicinity of the site (that owned by Cox). While this farm is not predicted to be

significantly affected by noise, blasting or dust impacts, the Cox family and its farming enterprise would be adversely affected by the loss of support and 'sense of community' that presently exists between the Swords, Mayberry, Rayner and Cox farming families.

Finally, the project is likely to impact on at least two other aspects that contribute to the social and economic well-being of local land owners. The project would impact on the water resources of the area, including causing a reduction in the availability or the loss of local farm dam and bore water supplies, as well as the likely reduction in surface water availability for downstream riparian users. Moolarben has committed to compensate or replace this loss, and predicts only minor reductions in flows in the Goulburn River downstream of the project; however Moolarben would be required to offset this loss. The project is also likely to adversely affect the number of tourists visiting the local area, which would in turn impact on local farm stay, bed and breakfast and eco-tourist businesses. However, lost earnings from reduced visitor numbers may be offset in the short term by an initial influx of workers requiring temporary accommodation.

### **Conclusion**

This socio-economic assessment, together with the other environmental assessments that comprise the EA, indicate that the project would have a significant impact on at least 8 private properties whose owners may not wish to sell or enter into an agreement with Moolarben. The project would also affect the amenity and 'sense of place' of a number of other residents surrounding the mine.

On a broader level, Moolarben's economic assessment, indicates that the project would have a considerable net benefit to the region and to the State. The Department acknowledges the validity of this conclusion, and in broad planning terms, agrees that coal mining is by far the highest and best use for the land that Moolarben propose to develop.

Nevertheless, to mitigate and/or compensate for the adverse socio-economic impacts of the project on the local area, the Department believes that Moolarben should be required to:

- acquire significantly affected properties (upon request);
- minimise, mitigate, offset and/or compensate the range of environmental impacts associated with the project;
- enter into a planning agreement with Council, providing a minimum community contribution of \$4.55 million toward local projects, including upgrading the Ulan Road;
- establish and maintain a community consultation committee for the project; and
- make environmental monitoring and reporting data publicly available on its website.

Further, the Department believes that the noise, blasting, dust and traffic impacts of the project can be adequately managed and/or controlled to protect the amenity of the remaining private properties in the area and has proposed a number of conditions to provide safeguards for these people.

Finally, the Department is satisfied that Moolarben has adequately assessed the social and economic impacts of the project, and that the social and economic benefits that would accrue from approval of the project outweigh the social and environmental impacts that are likely to occur if the project is approved.

## **4.11 Cumulative Impacts**

### **Issue**

The project would be the third mine established in the vicinity and would lead to cumulative impacts.

### **Consideration**

Moolarben has considered the cumulative impacts of the project in conjunction with the existing Ulan and Wilpinjong mines. These have been discussed in the various preceding sections of this report.

### **Conclusion**

The Department is satisfied Moolarben has satisfactorily considered and assessed the cumulative impacts of the project on surface and groundwater, noise and dust, flora and fauna, and traffic impacts. Notwithstanding, the Department has recommended a range of conditions to ensure the amenity of the environment and community would be protected from increased mining in the area.

The Department concludes that there is no significant reason relating to cumulative impacts of mining to withhold approval for the project.

## 4.12 Other Impacts

The project is likely to generate a range of other environmental impacts – including visual amenity, and non-indigenous heritage impacts. However, these impacts are not predicted to be significant, and the Department is satisfied that they can be controlled, mitigated or managed through appropriate conditions of approval.

**Table 11: Other Impacts**

<b>Issue</b>	<b>Features/Impacts</b>	<b>Mitigating Factors</b>
<b>Visual Amenity</b>	Altered site topography, sections of the sound bunds, tailings storage facilities, processing plant and other infrastructure, would be visible from certain vantage points, and from some residences.	Moolarben has committed to: <ul style="list-style-type: none"> <li>establish a number of environmental bunds which will ameliorate noise and visual impacts.</li> <li>undertake progressive rehabilitation works on disturbed areas and to establish vegetation screens to lessen the visual impact of the project.</li> <li>prepare and implement a Visual Management Plan which will detail the measures to be undertaken to minimise the visual impact of the project.</li> </ul> <p>Final site rehabilitation will enhance the surrounding landscape from a visual perspective.</p>
<b>Lighting</b>	Inappropriately designed and directed lighting has the potential to: <ul style="list-style-type: none"> <li>impact on residential amenity; and</li> <li>increase night glow and adversely effect the areas star gazing potential.</li> </ul>	Lighting and light spill from buildings and operational areas would be designed, with regard to safety requirements, so as to minimise stray light affecting residents in the Ridge Road and surrounding areas
<b>Non-Indigenous Heritage</b>	The EA identified 54 heritage items/sites within or near the project area: <ul style="list-style-type: none"> <li>35 of these have been assessed as having at least moderate or greater local heritage significance.</li> <li>7 sites would be impacted by the project.</li> </ul> <p>The Register of National Estate lists 2 sites which border the project area:</p> <ul style="list-style-type: none"> <li>Goulburn River National Park; and</li> <li>Munghorn Gap Nature Reserve.</li> </ul> <p>There are no items of National or State Heritage within the project area.</p>	Moolarben has committed to undertake archival recordings of identified items in accordance with the NSW Heritage Office guidelines, prior to any disturbance, including sites which would not be impacted by the project but would continue to deteriorate. <p>Items which would not be impacted by mining operations but are within the project boundary would be conserved in-situ.</p> <p>Exhumation of grave sites would be in accordance with relevant Heritage Office and health guidelines and would only be undertaken in consultation with related families.</p> <p>Public access would be maintained to the Drip Reserve.</p>
<b>Erosion and Sediment Soils</b>	Soils would need to be carefully managed when disturbed because of the potential for loss of seed stock, or contamination due to potential dispersion of high pH and saline soils.	Moolarben has committed to prepare and implement a comprehensive Erosion and Sediment Control Plan prior to any works being undertaken, which would detail the measures to be carried out to avoid further landscape degradation.
<b>Construction Management</b>	Improperly managed construction operations have the potential to cause noise and dust emissions, sediment and erosion problems, and traffic impacts.	Moolarben has committed to prepare and implement a raft of Construction Management Plans prior to any works being undertaken, which will detail environmental protection, management and monitoring measures and responses to be undertaken during construction of the Project. This will include erosion and sediment control, flora and fauna, traffic, water, noise, dust, waste and bushfire impacts
<b>Waste Management</b>	Inadequate management of industrial wastes may lead to contamination of surface water and groundwater, bushfires, injury to wildlife, and aesthetic and local amenity impacts.	Moolarben has committed to prepare and implement a Waste Management Plan which will detail management of general refuse, waste oils and greases, used tyres and equipment, scrap metal and drums, etc.

## 5. RECOMMENDED CONDITIONS

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The Department has prepared recommended conditions of approval for the project. These conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the project;
- set standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

The Department has provided the draft conditions of approval for the project to relevant government authorities for comment, and has incorporated these comments into the conditions of approval where appropriate.

Moolarben has reviewed and accepts the recommended conditions.

## 6. CONCLUSION

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The Department has assessed the project application, EA, submissions on the project, Moolarben's preferred project report, and the Independent Hearing and Assessment Panel's report, and is satisfied that there is sufficient information available to determine the application.

This assessment has found that the project would have a number of environmental impacts, most notably the noise, dust and vegetation clearing of the proposed open cut mining operations; the subsidence and associated water impacts of the proposed underground mining operations; and the potential cumulative impacts associated with the concurrent operation of Moolarben, Ulan and Wilpinjong coal mines.

The Department is satisfied that the residual environmental and socio-economic impacts of the project can be adequately mitigated, managed, offset and/or compensated for. In this regard, the Department has recommended a comprehensive range of environmental conditions to articulate these measures, including requirements to independently audit the environmental performance of the project, and to justify the ongoing operation of the project based on this performance.

In addition, the Department's assessment recognises the significance and need for the project in terms of securing domestic and international energy needs, bolstering the regional and NSW economies, and generating employment in the State.

On balance, the Department believes that the project's benefits sufficiently outweigh its costs.

## 7. RECOMMENDATION

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It is RECOMMENDED that the Minister:

- consider the findings and recommendations of this report;
- consider the Panel of Expert's report (see Appendix C);
- approve the project application, subject to conditions, under section 75J of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached project approval (see Appendix B).

Chris Wilson  
**Executive Director**  
**Major Project Assessment**

Sam Haddad  
**Director-General**

## **APPENDIX A - SUMMARY OF CONDITIONS OF APPROVAL**

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## **APPENDIX B – CONDITIONS OF APPROVAL**

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# **APPENDIX C – INDEPENDENT HEARING & ASSESSMENT PANEL REPORT**

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## APPENDIX D - ENVIRONMENTAL PLANNING INSTRUMENTS

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### 1 State Environmental Planning Policy (SEPP) No.11 – Traffic Generating Development

The project is affected by the provisions of SEPP 11, as an 'extractive industry or mining' (Schedule 1(m)). As such, in accordance with clause 7 of the SEPP the application was referred to the RTA, who subsequently confirmed that it does not object to the project, subject to certain conditions (see Section 5 of assessment report).

### 2 SEPP No.33 – Hazardous and Offensive Development

The Department considers that the project represents a 'potentially offensive industry' as defined under clause 3 of SEPP 33, but does not represent a 'potentially hazardous industry'.

Clause 4 of the SEPP provides a definition of 'offensive industry', namely:

*'offensive industry means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would emit a polluting discharge (including, for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality.'*

Clause 8 requires that consideration be given to the Department's guidelines (ie. *Applying SEPP 33, 1994*) in determining whether a development is an 'offensive industry'.

The guidelines state that compliance with DECC requirements should be sufficient to demonstrate that a proposal is not an offensive industry. The guidelines state that if the DECC considers that its EPL licence requirements can be met, then the proposal is not likely to be 'offensive industry'.

As detailed in Section 4.2 of the assessment report, the majority of the land to which the project application applies is zoned 1(a) (General Rural), with a small portion zoned 7(b) (Environment Protection – Nature Conservation), under the *Mudgee Local Environmental Plan 1998*. Under the development control table to the LEP, offensive industries are permissible with consent in the 1(a) zone, but are not permissible in the 7(b) zone. However, as the project is permissible with consent on the vast majority of the site, the Department is satisfied that the project is permissible with the approval of the Minister, and is therefore permissible in the 1(a) and 7(b) zones.

Clause 13 of the SEPP requires the Minister, in determining an application to carry out a potentially offensive (or hazardous) industry, to consider:

1. *current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, and*
2. *whether any public authority should be consulted concerning any environmental and land use safety requirements with which the development should comply, and*
3. *in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
4. *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application), and*
5. *any likely future use of the land surrounding the development.*

The Department has considered these matters, and is satisfied that:

- a. the project is not inconsistent with the relevant guidelines (ie. *Applying SEPP 33, 1994*);
- b. the relevant authorities have been consulted;
- c. the EA, and the Department's assessment, has considered feasible alternatives to carrying out the development;

- d. the EA, and the Department's assessment, encompasses likely future use of the land surrounding the development (which is likely to comprise rural and rural residential landuses); and
- e. the EA, and the Department's assessment, has adequately considered all reasonable and feasible measures to mitigate the offence produced by the project.

### **3 SEPP No.44 – Koala Habitat Protection**

The EA states that, koalas are not known from the study area, with only one distant record in the region within the last 20 years. Further, koalas are not likely to occur in the project area, nor likely to be affected by the proposal. The Department agrees with Moolarben that the project is unlikely to significantly affect koala habitat, and as such is satisfied that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 44.

### **4 SEPP No.55 – Remediation of Land**

The Department is satisfied that the land subject to the project application does not have a significant risk of contamination given its historical land use, and that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 55.

## **APPENDIX E – MOOLARBEN’S RESPONSE TO SUBMISSIONS**

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## **APPENDIX F – SUBMISSIONS**

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## **APPENDIX G – ENVIRONMENTAL ASSESSMENT**

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