



Planning  
Assessment  
Commission

# Watermark Coal Project

## Review Report

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August 2014

The Watermark Coal Project PAC Report©  
State of New South Wales through the NSW Planning Assessment Commission, August 2014.

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## EXECUTIVE SUMMARY

The Planning Assessment Commission has been directed to review the Watermark Coal Project and its supporting studies; particularly assessing the agricultural, water, health and amenity and long term land use impacts and recommend any further measures to avoid, minimise or offset the impacts of the project.

The Commission to undertake the review was constituted by Gabrielle Kibble AO, Garry Payne AM and Brian Gilligan.

The proposal is for a new open cut mine on the slopes adjoining the Liverpool Plains. The mine would consist of three pits, to be mined sequentially over 30 years. The Commission visited the proposed mine site with the applicant. At the request of some local landowners the Commission made a separate inspection of the surrounding agricultural area accompanied by the NSW Land and Water Commissioner.

The Commission held public hearings on the project on 26 June 2014, which continued on 27 June 2014. The Commission heard arguments both for and against the proposal.

Speakers in support of the mine included a number of local business people, as well as other organisations that have received support from the mining industry and/or the applicant in particular. The employment and growth opportunities the mine would create and the importance of supporting a diversity of employment opportunities for the region were emphasised by supporters. Others spoke in support of the mine, but only if the impacts on agriculture and water resources could be controlled and suitably contained to prevent impacts on the agricultural sector as a whole.

Significant concerns and objections to the project came from the agricultural sector, with particular importance attributed to the productivity of the black soils of the Liverpool Plains, which are in relatively close proximity to the proposed mine pits and covered by the applicant's exploration licence area. In addition to the significant concerns about mining on the black soil plains, there is grave concern for the security of the region's water resources which are critical to the agricultural sector's high productivity in this area. The Commission also heard concerns for the region's koala population, which has suffered from the extremes of drought and temperature in recent years, as well as potential longer term declines associated with loss of habitat. Concerns about social displacement of local families around the mine site and impacts on people who are unwilling to leave properties that have been occupied by one family for many generations were also raised. Dust, noise, blasting and lighting impacts along with questions about the economic justification for the project were also heard. The key recurring issues of concern were impacts to the agricultural sector which accounts for significant food and fibre production and associated impacts on the water resources the agricultural industry requires to maintain its high productivity.

The Commission has carefully considered the application. The Commission notes that the mine would not intrude onto the black soils of the Liverpool Plains, but is planned to mine an area on the less fertile slopes above the plains. In considering this issue in consultation with the NSW Land and Water Commissioner and the Office of Agricultural Sustainability and Food Security the Commission found that the black soil plains are rare, highly fertile and important for agriculture. The applicant's exploration licence covers significant areas of the black soil plains and the Commission recommends that the lease should be amended to remove those areas on the black soil plains. The Commission also recommended that following on from the work undertaken in the New England North West Regional Land Use Plan, the NSW Government should undertake some more detailed work or refinements to identify and protect those highly valuable, fertile black soil plains where mining should be prohibited.

Acknowledging the community's significant concerns about water the Commission engaged Dr Colin Mackie to review the water impacts of the project. The Commission also met with the NSW Office of Water who advised the Commission that the water impacts of the project would be able to be contained with adaptive management of the mine as it progresses through each mining pit. Nonetheless Dr Mackie identified a number of questions with the modelling work undertaken by the applicant and has recommended that some additional modelling should be undertaken to resolve the uncertainties. Given the critical importance of the region's water resources to maintaining strong agricultural production, the Commission is convinced that the uncertainties identified by Dr Mackie need to be resolved prior to any determination of this application.

The Commission has discussed the health and amenity impacts associated with dust, noise and blasting with the NSW EPA. The Commission agrees with the EPA, that the applicant has generally adopted the reasonable and feasible mitigation options available. The Commission found that the draft conditions could be strengthened to provide additional options for those impacted residents who may not be able to contemplate selling their property, for example if it has been within a family for many generations. The Commission also recommends that the noise and dust limits that would apply to the mine should also be strengthened.

In relation to the long term land use impacts, the applicant is seeking a 30 year mining operation. It is difficult to assess the impacts of an activity over such an extended period, when standards and community expectations may change considerably in this time. Further, the information on the rehabilitation and final landform are not particularly detailed, the Commission has recommended that some additional work on the design of the eastern pit and associated landform should be undertaken now, prior to any mining in that pit. The Commission considers that additional work on each subsequent pit, including consideration of the contemporary standards of the day should be required to be provided prior to the commencement of mining in that pit. This issue is important; areas of the Hunter Valley provide testimony of the need for greater attention to be paid to rehabilitation of mine sites and it would be inappropriate to single out this mine alone. Consequently, the Commission recommends that options to keep up with changing standards over the long term life of a mine, the permanent landforms outcomes and legacy issues produced by mining warrant some further consideration and scrutiny from government.

The community raised some concerns about the impacts on the koala population and the Commission saw a koala near the project site. The Commission has found that more work needs to be done to adequately monitor the koala population and the establishment of feed and shelter trees should commence as soon as possible. The Commission also considers that the issues associated with managing koalas warrant the establishment of a Koala Technical Working Group which would provide valuable input and expert oversight to assist in managing the koalas, including any work to translocate koalas from the site.

In conclusion, the Commission is generally satisfied that the site of this proposal, on the less fertile higher ground above the Liverpool Plains, should be able to be mined without significant impacts to the agricultural productivity of the Liverpool Plains. Nonetheless the management of water impacts will be critically important, to ensure the groundwater aquifers which support the agricultural sector are sustained into the long term. The Commission considers that the mine is approvable, subject to some further water modelling to corroborate the predicted level of impact on water. The Commission has made some recommendations relating to conditions that must be applied to any consent for this mine, but the suitability of the Department's draft conditions will need to be further considered in finalising the assessment of the project. Nonetheless, the Commission has found that there are other parts of the applicant's exploration licence (EL 7223) area that are not suitable for mining (on the Liverpool Plains) and the boundary of the exploration licence should be amended to remove those areas that extend onto the black soil plains.

# CONTENTS

<b>FIGURES</b> .....	<b>IV</b>
<b>TABLES</b> .....	<b>IV</b>
<b>GLOSSARY</b> .....	<b>V</b>
<b>1. INTRODUCTION AND TERMS OF REFERENCE</b> .....	<b>1</b>
<b>2. PROJECT DESCRIPTION</b> .....	<b>2</b>
<b>3. COMMISSION ACTIVITIES</b> .....	<b>4</b>
3.1. PUBLIC HEARINGS AND SUBMISSIONS.....	4
3.2. DOCUMENTS, MEETINGS & SITE INSPECTIONS.....	4
<b>4. AGRICULTURE</b> .....	<b>6</b>
4.1. BLACK SOILS OF THE LIVERPOOL PLAINS.....	7
4.2. STRATEGIC AGRICULTURAL LAND.....	9
4.3. POTENTIAL IMPACTS ON THE PRODUCTIVITY OF SURROUNDING AGRICULTURAL LAND.....	10
4.4. IMPACTS OF THE MINE ON EXISTING AGRICULTURAL LAND USES SURROUNDING THE SITE.....	11
<b>5. WATER RESOURCE IMPACTS</b> .....	<b>13</b>
<b>6. HEALTH AND AMENITY</b> .....	<b>16</b>
6.1. DUST.....	17
6.2. NOISE.....	20
6.3. NOISE AND/OR AIR QUALITY IMPACTS OVER 25 PERCENT OF LAND.....	22
6.4. BLASTING.....	24
<b>7. LONG TERM LAND USE IMPACTS</b> .....	<b>25</b>
7.1. FINAL LANDFORM.....	26
7.2. FINAL VOID.....	27
7.3. REHABILITATION STRATEGY.....	27
7.4. CONCLUSIONS ON THE LONG TERM LAND USE IMPACTS OF THE PROJECT.....	29
<b>8. OTHER ISSUES</b> .....	<b>32</b>
8.1. BIODIVERSITY.....	32
8.2. ECONOMIC.....	35
8.3. LIGHTING.....	36
8.4. LOCAL GOVERNMENT ISSUES RAISED WITH THE COMMISSION.....	36
<b>CONCLUSION</b> .....	<b>38</b>
<b>RECOMMENDATIONS</b> .....	<b>39</b>
<b>REFERENCES</b> .....	<b>43</b>
<b>LIST OF APPENDICES</b> .....	<b>45</b>
<b>APPENDIX 1</b> .....	<b>46</b>
<b>APPENDIX 2</b> .....	<b>48</b>
<b>APPENDIX 3</b> .....	<b>52</b>
<b>APPENDIX 4</b> .....	<b>58</b>
<b>APPENDIX 5</b> .....	<b>71</b>

## Figures

Figure 1: Applicant’s Proposed Layout (Hansen Bailey, 2013b) .....	3
Figure 2 - Proposed mine site and surrounding Liverpool Plains .....	7
Figure 3: Extract from Mine Plan year 1 (left) and year 5 (right) .....	28

## Tables

Table 1 - Current NEPM Standards and Goal for particulates .....	17
Table 2 - Number of days the cumulative PM <sub>10</sub> dust levels are predicted to exceed 50 µg/m <sup>3</sup> .....	18
Table 3 – Noise impacts at surrounding residential receivers .....	20
Table 4 - Properties where 25% of land would be impacted by noise levels above 35dBA, LA <sub>eq, 15 min</sub> .....	22
Table 5 - Cumulative PM <sub>10</sub> levels predicted to exceed 50 µg/m <sup>3</sup> on more than 25% of a property .....	23

## Glossary

- BSAL:** Biophysical Strategic Agricultural Land
- Commission:** Planning Assessment Commission
- dB:** Decibels
- Department:** Department of Planning and Environment, formerly known as the Department of Planning and Infrastructure
- EIS:** Environmental Impact Statement.
- EP&A:** Environmental Planning and Assessment.
- LGA:** Local Government Area.
- mm/s:** millimetres per second (a measure of ground vibration)
- NEPM:** National Environment Protection Measures
- NOW:** NSW Office of Water.
- OEH:** Office of Environment and Heritage
- PAC:** Planning Assessment Commission.
- PM<sub>10</sub>:** Particulate matter with an aerodynamic diameter smaller than 10 micrometres.
- PM<sub>2.5</sub>:** Particulate matter with an aerodynamic diameter smaller than 2.5 micrometres
- The applicant:** The applicant under Part 4 of the EP&A Act 1979, in this report being Shenhua Watermark Pty Ltd. 'Applicant' includes the applicant's consultants.
- The proposal:** The subject of the application under Part 4 of the EP&A Act 1979, in this report being the Watermark Coal Project.
- Riparian Zone:** The area of land adjacent to a river or stream. It includes the riverbanks and land immediately adjacent to riverbanks.
- TOR:** Terms of Reference.
- TSC:** Threatened Species Conservation.
- TSP:** Total suspended particulate matter

# 1. Introduction and Terms of Reference

On 8 May 2013 the then Minister for Planning and Infrastructure, the Honourable Brad Hazzard MP issued a request to the NSW Planning Assessment Commission in relation to the Watermark Coal Project. The Minister's request was made under section 23D of the *Environmental Planning and Assessment Act 1979* and Clauses 268R and 268V of the *Environmental Planning and Assessment Regulation 2000*. The Minister's request is provided in Appendix 1 of this report.

On 15 November 2013 the then Minister issued a revised request to the Planning Assessment Commission for the review, as follows (and included in full in Appendix 1):

1. Carry out a review of the Watermark Coal Project, and:
  - a) consider the EIS for the project, the issues raised in submissions, the formal response to submissions, any advice from the Gateway Panel on the project and any other relevant information provided on the project during the course of the review;
  - b) consider the Department of Planning and Infrastructure's preliminary assessment report;
  - c) assess the merits of the project as a whole, paying particular attention to the:
    - impacts of the project on strategic agricultural land, as identified in the *New England North West Strategic Regional Land Use Plan*, including the impacts on existing agricultural land use in the areas surrounding the project;
    - water resource impacts of the project, including direct and indirect impacts on the Upper Namoi alluvial aquifer and downstream surface water resources;
    - health and amenity impacts of the project, with a specific focus on whether all reasonable and feasible noise and dust mitigation measures are being employed to avoid and/or minimise these impacts;
    - long term land use impacts of the project and the suitability and feasibility of the proposed rehabilitation strategy, including the final landform, final void and the proposed rehabilitation of agricultural land; and, if necessary
  - d) recommend further measures to avoid, minimise and/or offset the potential impacts of the project.
2. Conduct public hearings during the review as soon as practicable after the Department of Planning and Infrastructure provides a copy of its preliminary assessment report for the project to the Planning Assessment Commission.
3. Submit its final report on the review to the Department of Planning and Infrastructure within 6 weeks of the public hearings, unless the Director-General of the Department of Planning and Infrastructure agrees otherwise.

The Department's preliminary assessment report was received by the Commission on 13 May 2014. Ms Gabrielle Kibble AO, Chair of the NSW Planning Assessment Commission constituted the Commission to review this application, with Mr Garry Payne AM and Mr Brian Gilligan.

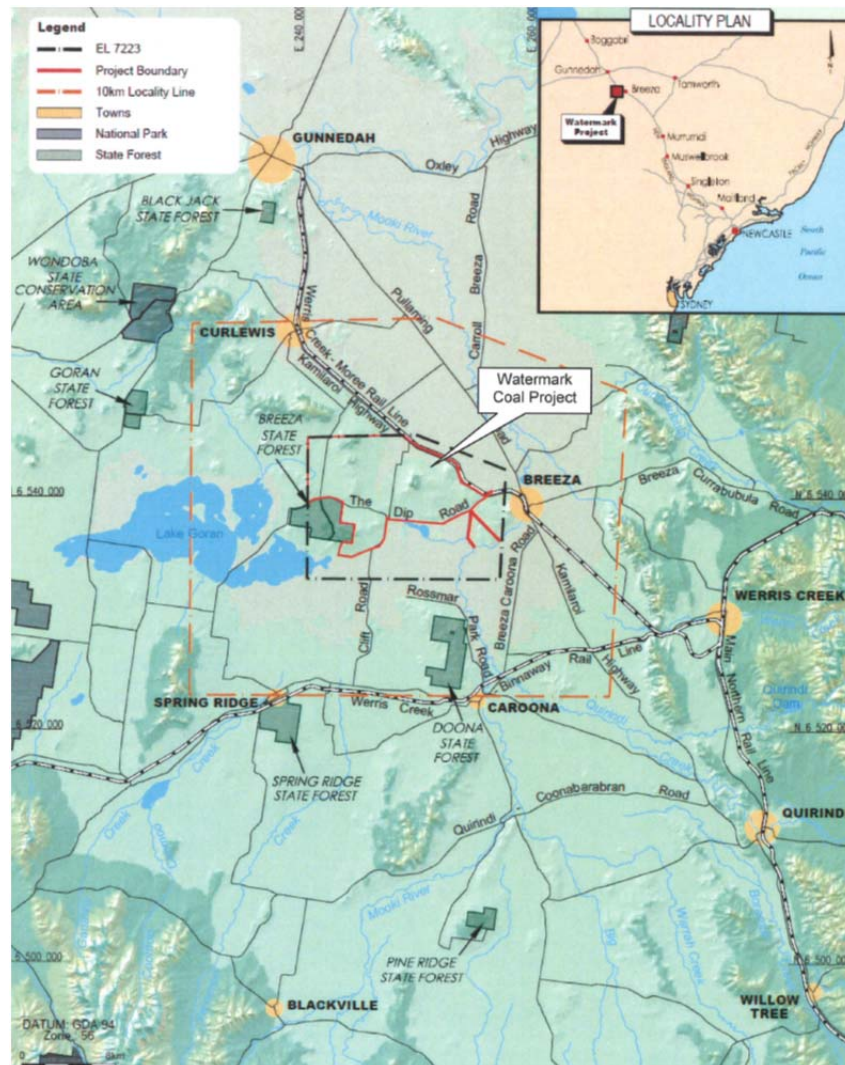
The Commission engaged Dr Colin Mackie to provide expert advice to the Commission on water. Dr Mackie's advice is attached in Appendix 4.

A short extension from the original timeframe, of 6 weeks from the public hearings, was agreed.



## 2. Project Description

The applicant, Shenhua Watermark Coal Pty Limited, proposes to develop an open cut coal mine west of Breeza in Gunnedah Local Government Area.



**Figure 1 - Location Map** Source: (Department of Planning and Environment, 2014a)

The proposed mine site is within exploration licence area 7223, which includes most of the Breeza State Forest; some prime black soil cropping land on the Liverpool Plains; and Mount Watermark and the surrounding hills. Significant concern about mining on the black soils of the Liverpool Plains has been raised, both to the Commission and in the media. Although the exploration licence includes parts of the Liverpool Plains, this open cut coal mine application does not intrude onto the black soils of the Liverpool Plains. The three open cut pits and associated out of pit overburden dumps, along with an infrastructure area and rail spur, are all proposed to be located on the hills, or red soils, above the plains (see Figure 2).

The mine would involve the extraction of coal from 3 open cut pits, to be mined sequentially. Two coal seams would be targeted, the Hoskisson and Melville Seams, the deeper Maules Creek seams sit 210 – 600 m below the surface and the application suggests these deeper seams are considered unsuitable for open cut mining (Hansen Bailey, 2013a). The coal quality of the target seams is said to be a “high quality thermal coal”, however two different products would be produced, a semi soft coking coal and a thermal coal (Hansen Bailey, 2013a, p. C9). The Department of Planning and Environment (2014a, p. 6) has indicated that 85% of the product coal would be metallurgical (semi soft coking) coal, and the remaining 15% would be thermal coal used for power generation.

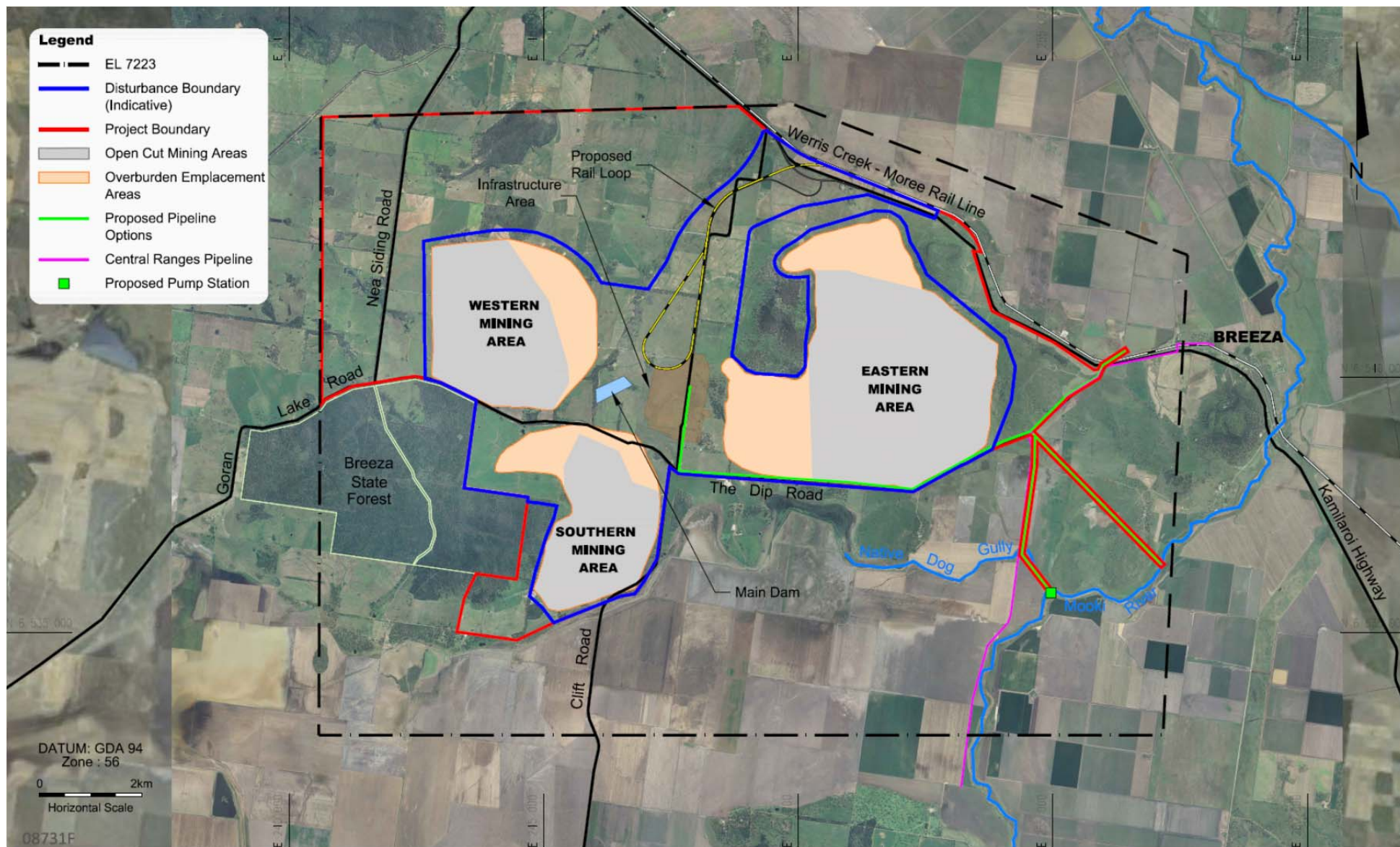


Figure 2: Applicant's Proposed Layout (Hansen Bailey, 2013b)



## **3. Commission Activities**

### **3.1. Public Hearings and Submissions**

In accordance with the Commission's terms of reference, public hearings were held on the 26 June 2014 and continued on 27 June 2014 at the Gunnedah Services and Bowling Club 313 Conadilly St Gunnedah. A total of 63 verbal submissions were made to the Commission at the hearings, including from 2 local councils, 19 special interest groups and many interested individuals. A short summary of the issues raised at the hearing is included in Appendix 2. An additional 26 written submissions were also made to the Commission. The submissions that are publicly available can be accessed from the Commission's website [www.pac.nsw.gov.au](http://www.pac.nsw.gov.au), along with the speech notes and presentations that were provided to the Commission.

133 submissions to the Department of Planning and Environment, and other correspondence received by the Department, were provided to the Commission for consideration.

### **3.2. Documents, Meetings & Site Inspections**

Through the course of the review the Commission accessed a wide range of documents including:

- The applicant's Environmental Impact Statement (Hansen Bailey, 2013a) and Response to Submissions (Hansen Bailey, 2013b);
- Submissions from government agencies and the public;
- The NSW Mining and Petroleum Gateway Panel Shenhua Watermark Coal Project Advisory Report (Mining and Petroleum Gateway Panel, 2014);
- The Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development Advice (EPBC 2011/6201) (IESC, 2013);
- The Merit Review of Surface Water Issues commissioned by the Department of Planning and Environment and undertaken by Evans & Peck, dated March 2014 (Evans & Peck, 2014);
- New England North West Strategic Regional Land Use Plan (Department of Planning and Infrastructure, 2012);
- The Department of Planning and Environment's Preliminary Environmental Assessment Report (Department of Planning and Environment, 2014a);

#### Meetings

During the review, the Commission met with the Department of Planning and Environment (6 June 2014), the Office of Agricultural Sustainability and Food Security (3 July 2014), the Office of Environment and Heritage (15 July 2014), the Environment Protection Authority (15 July 2014), the NSW Office of Water (15 July 2014), Gunnedah Shire Council (26 June 2014) and Liverpool Plains Shire Council (26 June 2014).

#### Site and Regional Inspections

The Commission visited the site on 25 June 2014 with the applicant. Following the site visit the applicant also provided a briefing on the project.

Six interest groups made a joint invitation to the Commission to inspect the region more broadly, particularly in relation to agriculture. The Commission agreed that a wider inspection of the area around the project site was within the terms of reference which includes specific reference to the potential impacts on surrounding agricultural land uses. Given his role in advising government on applications for resource exploration and production activities on Strategic Agricultural Land, the Commission decided that it would be appropriate to inspect the area with the NSW Land and Water Commissioner. The Commission requested that the NSW Land and Water Commissioner facilitate an inspection of the agricultural land uses around the site. This occurred, with Mr Jock Laurie

accompanying the Commission on an inspection of the agricultural land uses around the site on 7 July 2014.

A summary of the Commission's meetings is at Appendix 3 and discussed in relevant sections of this report.

## 4. Agriculture

The Gunnedah region is a significant area for agricultural production with a combination of intensive irrigated cropping on the Liverpool Plains and dry land cropping and grazing on the slopes and hills. Even some of the earliest European explorers (including John Oxley (Oxley, 1819) and Allan Cunningham (Cunningham A. , 1825)) and settlers could see the area's valuable agricultural potential. But it was Peter Cunningham who perhaps described it best noting the Liverpool Plains for both the fine rich soil and that they were well watered, in particular he wrote:

*“all fine rich grassy soil without a tree, except where a small woody hill occasionally rises from the bosom of the plain to vary and beautify the prospect. In looking down upon this extensive tract from the summit of one of the overhanging ridges, the country appears to be spread out like a green ocean, of unbounded extent, with clusters of woody islands bespangling its surface.”* (Cunningham, 1828, p. 150)

The Commission has heard significant representation from the agricultural sector, both at the public hearing and in submissions. These representations stressed the significance and productivity of the fertile black soils of the Liverpool Plains. Speakers highlighted the area's importance for food security, as well as its capacity to produce high margin cash crops. The region's relatively reliable rainfall, moderate climate and access to good surface and groundwater resources were nominated as the other crucial elements that have allowed (and should continue to allow) the area to sustain its important contributions to primary food and fibre production.

In 2012, in response to calls for growing mining and coal seam gas industries to be balanced with protection for important agricultural land and water resources, the NSW Government released a regional land use plan for the New England and North West, which includes the Liverpool Plains (NSW Government, 2012). In considering 2006 census data, this broader New England North West Regional Land Use Plan found:

*“agriculture and agribusiness is worth an annual \$1.8 billion to the regional economy, which represents approximately 20 per cent of the gross value of agriculture and agribusiness for the entire state. Sheep and cattle grazing, broad acre cereal crops, irrigated cotton, intensive livestock and plant agriculture and poultry production are the main contributors.”*  
(Department of Planning and Infrastructure, 2012, p. 12)

The New England North West region is not only rich in agricultural assets. The Gunnedah coal basin contains 12 percent of NSW's coal resources and the region is also said to be a prime location for the future generation of wind and solar power (Department of Planning and Infrastructure, 2012). The New England North West Regional Land Use Plan acknowledges that development pressures from mining and coal seam gas exploration are building rapidly in this region (p. 12). It defines the region's existing agricultural sector and acknowledges its importance, but in providing for the growing mining and coal seam gas industries, it does not provide detailed planning to delineate the necessary boundaries to protect our most valuable agricultural areas.

In identifying the New England North West region's existing agricultural capabilities the Strategic Regional Land Use Plan (Department of Planning and Infrastructure, 2012) separates the region into four areas based on the physical geographic features relevant to agricultural production. The Gunnedah and Liverpool Plains are classified as the southern plains and are said to be the most productive.

*The Southern Plains area has the highest agricultural productivity in NSW, with an exclusive combination of volcanic soils, rainfall reliability, climate (sunshine hours, moderate temperature and protection from hot westerly weather) and availability of surface and groundwater.*

*The black earth and chernozem soils found in the Liverpool Plains are classified as some of the most fertile in Australia. These fertile soil types are rare in Australia, making up less than 1 per cent of the nation's surface area (0.7%). The major concentrations are found in the Liverpool Plains and the Darling Downs and central highlands of Queensland.*  
(2012, p. 16)

The potential for mining to impact on this area of critical food and fibre production is a recurring concern in the submissions to the Commission. The local and regional farming community are particularly concerned about the potential for mining to impact on water resources and encroach onto the highly productive plains.

#### 4.1. Black soils of the Liverpool Plains

Submissions to the Commission indicate that the black soils found on the Liverpool Plains are highly productive and are classified as some of the most fertile in Australia. Representatives for the NSW Office of Agricultural Sustainability and Food Security agreed that these black soils are amongst the best in Australia. The NSW Land and Water Commissioner also emphasised the significance of these highly productive soils. As noted previously, the New England North West Strategic Regional Land Use Plan confirms that the *"black earth and chernozem soils found in the Liverpool Plains are classified as some of the most fertile in Australia"* and that they are also rare in Australia (Department of Planning and Infrastructure, 2012, p. 16).

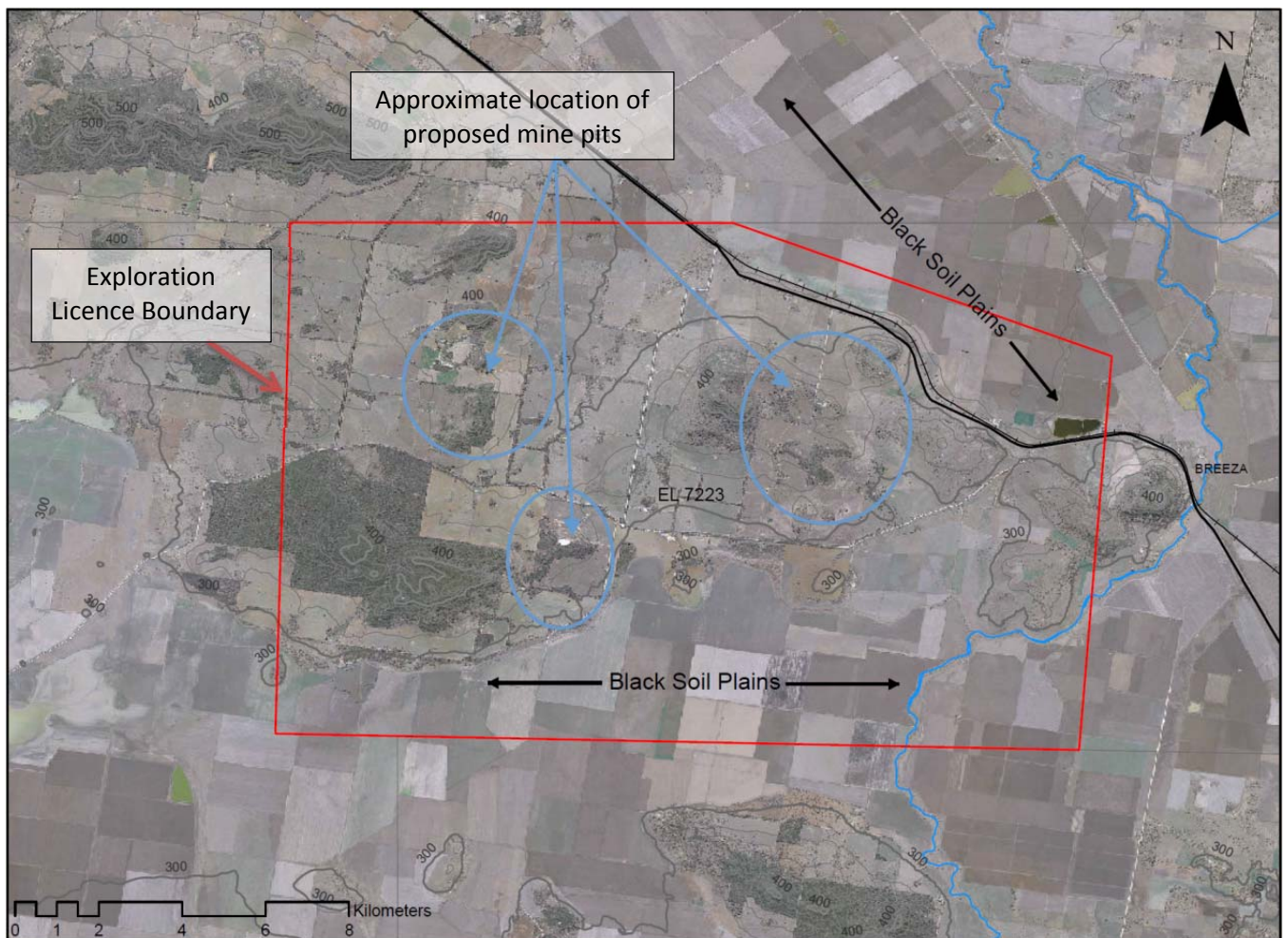


Figure 3 - Proposed mine site, exploration licence boundary and surrounding Liverpool Plains

The Commission has visited the Liverpool Plains and acknowledges the significance of the incredibly fertile black soil plains, so rare in the Australian landscape. These black soils around the project site support significant irrigated cropping enterprises, producing cereals, oilseeds, cotton and legumes. Submitters and speakers at the public hearing emphasised the substantial contribution of this agricultural land, which is said to be capable of supporting two crops a year due to a combination of the excellent soils, climate (including relatively reliable rainfall) and good access to surface and groundwater resources. Many speakers and submissions expressed the view that the highly productive fertile black soils on the Liverpool Plains should be protected from the impacts of mining.

Both the NSW Land and Water Commissioner and the Office of Agricultural Sustainability and Food Security agreed that the fertility and productivity of the black soil plains and associated groundwater aquifers are highly significant and warrant protection. As shown in Figure 3 above the proposed mine site is not on the black soils of the Liverpool Plains. Instead, it sits on the slopes above the plains, with highly productive cropping on the black soil plains both to the north and the south of the site. Breeza lies to the east of the site, while the slopes and ranges continue to the west of the project site.

Nonetheless the applicant's exploration licence extends over a much larger area than the proposed mine the subject of this application. In fact the lease, EL7223, covers a substantial area of the plains, see Figure 3 above. The Commission acknowledges the significance and productivity of the black soil plains and agrees with the view that the plains should be preserved for agricultural production.

The Commission understands that the NSW Government has already gone some way to acknowledging this, by applying conditions to the applicant's exploration licence which require:

- *"The retention of a minimum 150m horizontal barrier of natural material between mining and the Gunnedah Formation/Namoi Groundwater System in any future mine plan; and*
- *Any potential development approval shall not include longwall mining underneath the deep alluvial irrigation aquifers or floodplain or open cut mining anywhere on the floodplain."*

(Minister for Resources and Energy, 2011)

There is real concern that these conditions on the exploration licence could be changed or removed in future. . To address the community's concerns and to avoid any potential confusion about the future mining prospects in the area, the Commission recommends that the NSW Government should amend the boundary of the exploration licence to remove those areas that intrude into the black soil plains.

Further the Commission considers it has heard sufficient evidence of the value and importance to the black soils of the Liverpool Plains to recommend that the NSW Government should follow on from the broader Regional Land Use Plan prepared to date, with some more detailed work or refinements to identify and protect those highly valuable, fertile, black soils plains, where mining should be prohibited.

### **Recommendations**

1. The Commission recommends that the NSW Government should amend the boundary of exploration licence EL7223 to remove those areas that intrude into the black soil plains.
2. The Commission recommends that the NSW Government should follow on from the broader Regional Land Use Plan prepared in 2012, with some more detailed work or refinements to identify and protect those highly valuable, fertile, black soil plains, where mining should be prohibited.

## 4.2. Strategic Agricultural Land

This application does not include any mining on the black soils plains nonetheless the black soils on the Liverpool Plains are not the only valuable soils in NSW. In fact the NSW government has created a new category of land, namely Strategic Agricultural Land which is to be identified and considered when assessing the impacts of new coal mining and coal seam gas applications (NSW Government, 2012). As required in the terms of reference for the Review, the Commission has considered the potential impacts on Strategic Agricultural Land.

The NSW Government's New England North West Regional Land Use Plan states that *"to help address the challenge of achieving balanced land use outcomes in the region, areas with particularly high agricultural values have been identified and mapped in consultation with key industry representatives and industry experts. These areas are referred to as strategic agricultural land* (Department of Planning and Infrastructure, 2012, p. 19).

Two categories of Strategic Agricultural Land have been defined in the New England North West Strategic Regional Land Use Plan (NENWSRLU Plan), these are: Critical Industry Clusters; and Biophysical Strategic Agricultural Land (Department of Planning and Infrastructure, 2012). No Critical Industry Clusters have been identified in the NENWSRLU Plan, although grazing, cotton, irrigated cropping, dryland cropping and intensive animal industries are acknowledged to be important industries (Department of Planning and Infrastructure, 2012, p. 21). Significant areas of Biophysical Strategic Agricultural Land have been mapped in the NENWSRLU Plan and cover approximately 15% of the entire region (p. 21). The NENWSRLU Plan indicates that the mapping is at a broad, regional scale and is not intended to replace site specific verification of BSAL on individual properties (p. 21).

The applicant has provided an Agricultural Impact Statement which considers biophysical strategic agricultural land on the site as well as on the proposed offsite biodiversity offset areas (Hansen Bailey, 2013a, p. Volume Z). 96.1 ha of mapped biophysical strategic agricultural land (BSAL) was identified within the proposed disturbance boundary of the mine and would be destroyed as a result of the project (Hansen Bailey, 2013a, p. Z95). It is mapped on three different portions of the site, the main area to be removed stretches along the eastern part of the eastern mining and out of pit emplacement areas. It is largely mapped as class III agricultural land (Hansen Bailey, 2013a, p. AA27).

In addition to the land that would be disturbed by mining, a further 696 ha of biophysical strategic agricultural land on the site was initially proposed to be set aside for biodiversity conservation, as an offset for the biodiversity impacts of the project (Hansen Bailey, 2013a, p. Z92). The Commission understands this area is no longer intended to be included in the biodiversity offset package and notes that the Department has not included it in the table of offset areas listed in the draft recommended conditions (2014b, p. 16).

Some questions have been raised about the reliability of the BSAL mapping of the site, including by the Office of Agricultural Sustainability and Food Security (2013) and the Mining and Petroleum Gateway Panel. The Mining and Petroleum Gateway Panel (2014, p. 16) indicated the information provided did not comply with BSAL verification requirements and is likely an underestimate of the BSAL which may be affected by the project. In considering these concerns the Commission notes that BSAL is not the only measure of agricultural productivity. Having visited the site and surrounds it is clear to the Commission that the site is not within the highly productive black soil plains that occur beyond the northern and southern boundaries of the site (although, as noted previously, some parts of the applicant's exploration licence intrude into this highly productive land).

The Commission met with the NSW Office of Agricultural Sustainability and Food Security to discuss this project, including its original concerns about the BSAL verification that had been undertaken on



site. Representatives for the Office of Agricultural Sustainability and Food Security confirmed that they had also visited the site. The officers noted that BSAL is only one of a wider spectrum of measures to consider in assessing the site's soils and agricultural value. The timing of this application, relevant to the development of the New England North West Strategic Regional Land Use Plan and associated guidelines and technical notes was also highlighted. In particular the Commission understands that the BSAL verification requirements had not been finalised at the time the applicant was undertaking its assessment and as noted by the Department (2014a, p. 35) the gateway process does not technically apply to the project.

In light of these factors, the Commission agrees with the approach adopted by the Department of Planning and Environment, and the Office of Agricultural Sustainability and Food Security, to accept that the BSAL figures provided by the applicant represent a low estimate of the strategic agricultural land that would be removed, rather than a precise figure.

While the land proposed to be mined is not the highly fertile rich soil of the surrounding Liverpool Plains, it is clearly productive grazing land, with some capacity for cropping in certain areas. As acknowledged in the applicant's Environmental Impact Statement the proposed project area covers 9,500 ha of land, the majority of which is grazing country, with some varying capacity for rotational or occasional dryland cropping (Hansen Bailey, 2013a, p. 50). The applicant's EIS valued this production in market terms, indicating the net value of agricultural production on the proposed mine site could reach almost \$5 million a year (Hansen Bailey, 2013a, p. Z64), although it actually produced a net value of approximately \$2 million for the 2011/12 financial year (p. Z56).

The mine would remove some of this agricultural land from production (i.e. that land within the mine footprint), perhaps permanently, or at least for a number of years while mining and rehabilitation are occurring on the site. The Commission accepts that the loss of the relatively small area that would be mined would not represent a significant impact to the agricultural productivity of the region. Nonetheless the Commission considers that any loss of productive agricultural land must be minimised. Consequently the Commission is supportive of the applicant's proposal to attempt to rehabilitate parts of the mine site to an agricultural land use. The proposed rehabilitation of the site is discussed in further detail in section 7, later in this report.

#### **4.3. Potential impacts on the productivity of surrounding agricultural land**

In purchasing the site and some of the neighbouring impacted properties the applicant now owns a reasonably large area of agricultural land including some land within the black soil plains. The Commission understands that through conditions on its exploration licence the applicant is required to maintain agricultural activities on the land it purchases (Minister for Resources and Energy, 2011). The applicant's Agricultural Impact Statement indicates that the land owned by the applicant comprises 2,226 ha of irrigated cropping land, 1,674 ha of dryland cropping and rotational pasture land, 7,612 ha of grazing land (capable of supporting occasional cropping) and a further 3,000 ha of grazing land (Hansen Bailey, 2013a).

The Commission notes that should this project proceed, additional land will likely be acquired by the applicant as a result of its impacts on residential dwellings around the mine site. Many of the properties which would qualify for acquisition rights are on the black soils of the Liverpool Plains, while other properties are in the hills where grazing is more common.

There are two potential concerns with the applicant becoming a major landholder in the region. The first is that these properties may not be appropriately managed to maintain the agricultural productivity of the land. Secondly, the community is concerned that the applicant may seek to extend its mining operations into these fertile plains, which are so rare in the Australian landscape.

The loss or disturbance of the valuable rich productive soils and associated water aquifers on the level plains is of considerable concern to the community.

The community also raised other concerns about the mine's ownership of the surrounding agricultural land however the Commission did not find these other arguments compelling. As one example, concerns were raised about the mine gaining access to water licences through land ownership. The Commission raised this with the NSW Office of Water and the NSW Office of Water indicated that mining uses a relatively small portion of the total share of licenced water.

In regards to the concern that the applicant may seek to extend its mining operations onto the Liverpool Plains at a later date, the Commission's view that the black soil plains need to be protected from mining is clearly set out in section 4.1 above. The Commission notes that the applicant has suggested it may seek to extend its mining operations underground from the end of mining in the western pit and that this would not necessarily require any intrusion onto the black soil plains. In NSW expansions of coal mines, through a modification to the application, is extremely common practice. The Commission does not support this method of expansion through incremental modification of previous planning approvals. There should be no expansion of this mining operation through a modification to any approval.

In relation to the community's concern that productive lands acquired by the Proponent may not be maintained in full agricultural production, the applicant has advised the Commission it does not have an interest in these properties and would lease or sell them. It is critically important that productive agricultural land is not allowed to become derelict, but is retained in full agricultural production. The Commission considers that conditions could be imposed to ensure the land remains available for full agricultural production, for example the applicant could lease or on sell the land outside the disturbance boundary.

The Department's proposed condition states:

*"The Applicant shall use its best endeavours to ensure that the agricultural productivity and production of non-operational project related land is maintained or enhanced. (Department of Planning and Environment, 2014b)*

The Commission does not support the use of the term 'best endeavours' in this condition.

#### **Recommendation**

3. The Commission recommends that the draft condition relating to the agricultural productivity of non-operational land around the project site must be strengthened.

#### **4.4. Impacts of the mine on existing agricultural land uses surrounding the site**

In addition to the concerns about the loss of productive agricultural land to the applicant and/or to mining, local agricultural enterprises have also raised concerns about impacts of the mine on neighbouring agricultural activities. Potential impacts of concern to surrounding agricultural enterprises particularly related to the potential for loss of water resources as a result of the mine, the impact of dust on crops and the risk of soil and water contamination as a result of mine water discharges.

The Commission understands that the groundwater aquifers in the area are a significant water resource and are particularly important for irrigators in the region. In its meeting with the Commission the Office of Agricultural Sustainability and Food Security indicated that its main concern was that these water resources may be impacted by the mine. The Commission accepts that protection of these water resources will be critical and has engaged Dr Col Mackie to provide

independent advice to the Commission on this issue. The potential water impacts and Dr Mackie's advice to the Commission are discussed in the following section, section 5.

#### Potential impacts of dust on agricultural production

The Commission has considered the concerns that have been raised about the potential for dust to impact on crops in the surrounding area. The Commission understands there are two potential pathways for impacts on the crops. Firstly dust may inhibit growth of a crop by settling on the leaves of the crop, or by intercepting light which would otherwise be used for photosynthesis; secondly dust may contaminate agricultural products. The Commission understands the potential for cotton to become discoloured is a particular concern for local producers.

The Commission acknowledges that high levels of dust can impact on plant growth. There is limited information available to the Commission on this issue, however one study of impacts on cotton in Queensland found impacts can occur – but at dust deposition rates significantly higher than those predicted to occur as a result of this mine. The study (Doley, 2010) noted that new leaves are added to the cotton plant relatively frequently (with new layers generated every week or two) and while leaves may live for 60 days, the older leaves become shaded by newer leaves at the plants' extremities over this period. The study estimated that for cotton *"a net rate of coarse coal overburden dust deposition of  $0.5 \text{ g m}^{-2} \text{ d}^{-1}$  may reduce canopy photosynthesis by about 11% and cotton fibre yield by about 3%"* (Doley, 2010), however these calculations do not appear to have accounted for any dislodgment of dust by wind or rain. The authors also noted that *"acceptable dust burdens may vary between species and their positions in the plant community"* (Doley, 2010).

The Commission notes that the rate of dust deposition modelled in the study ( $0.5 \text{ g/m}^2$  per day) is significantly higher than that predicted to occur on properties neighbouring this proposed mine (where deposition rates are not expected to exceed  $0.5 \text{ g/m}^2$  per month (Hansen Bailey, 2013a)). The Commission is satisfied the dust levels predicted to be produced are not high enough have a discernable impact on crop growth.

The potential for deposited dust to contaminate crops also seems unlikely. While the Commission acknowledges that discoloration of cotton fibres could impact on the value of the product, the Commission expects that the dust generated when harvesting the cotton would be more likely to have an impact than the relatively low levels of dust deposition associated with the proposed mining activity. Nonetheless the Commission considers that conditions could be imposed to ensure that nearby producers could seek recompense in the unlikely event that impacts on production are found to have occurred.

In conclusion, the Commission does not expect that dust would impact on cropping activities, but considers a condition should be added to provide for the resolution of any dispute about impacts on agricultural production.

#### **Recommendation**

4. The Commission recommends that a condition should be included to allow the NSW Land and Water Commissioner to nominate an independent party to resolve the matter, in the event of a disputed impact on agricultural production.

## 5. Water Resource Impacts

Concern about the potential water impacts of the project was one of the key issues raised in the submissions to the Commission. Many emphasised the importance of a secure water resource to the agricultural productivity of the area and concerns about contamination and/or depletion of the groundwater aquifers was a recurring issue in the public hearing. The Commission also heard concerns about the potential for mine water discharges to contaminate agricultural land as well as concerns about the potential impacts of the final void.

The Commission understands that the groundwater aquifers in the area are a significant water resource and are particularly important for irrigated cropping in the region. The NSW Office of Agricultural Sustainability and Food Security indicated that its main concern was that these water resources may be impacted by the mine. The Commission shares these views about the importance of protecting the long term viability of water resources supplying the agricultural sector.

The Department of Planning and Environment has dedicated considerable effort to assessing the water issues and sought expert advice on both the groundwater and surface water issues. The NSW Government also recognised the significant concerns about potential groundwater issues when renewing the exploration licence for this area, adding provisions for *“3D groundwater modelling of the project to be subjected to a peer review by the highly regarded groundwater expert, Dr Noel Merrick”* (Minister for Resources and Energy, 2011).

Given the significance of the region’s water resources for the surrounding agricultural sector the Commission also engaged Dr Colin Mackie to undertake an independent review of the groundwater model and provide advice to the Commission on this issue. In the meantime, while Dr Mackie was conducting his review, the Commission met with representatives from the NSW Office of Water.

The NSW Office of Water representatives assured the Commission that the water impacts of the project are expected to be manageable. The Office of Water acknowledged there is always some level of uncertainty in any modelling undertaken, but emphasised that the model is not a static piece of work, rather that it would be refined over time as monitoring results become available. In this regard there are said to be some advantages to the sequence of mining proposed. The Office of Water explained that the eastern and western pits are expected to have lower levels of water impacts. As mining would commence in the eastern pit, before moving to the southern pit, the Office of Water considered that the mine could be adaptively managed in response to any unexpected monitoring results. The Commission was advised that the water monitoring regime and mine response mechanisms would be a critically important aspect of the mine’s operation.

The Commission also noted that the NSW Irrigator’s Council had raised a number of concerns about the information provided on water impacts. The NSW Office of Water considered the concerns raised and advised that it did not consider these issues to be of consequence at this stage, reiterating that monitoring information and adaptive management would be available as mining progressed.

While the Commission acknowledges that adaptive management is an important component of any mining operation, the Commission is keenly aware of the significance to the region’s water resources, particularly for the highly productive agricultural sector. With this in mind Dr Mackie has thoroughly examined the detail contained in the applicant’s water model. Dr Mackie raised a number of questions about the model used and the results produced and the Commission agreed to seek some response from the applicant on these questions. Dr Mackie’s questions and the applicant’s response are provided in Appendix 5. From its meetings with Dr Mackie it is apparent to

the Commission that he has given the applicant's response careful consideration and also undertook some further inspection of the model which raised additional questions on issues not originally identified in his questions to the applicant. Ultimately, his expert scrutiny of the model and the response provided by the applicant have not allayed Dr Mackie's concerns.

Dr Mackie's advice to the Commission is provided in full Appendix 4. Dr Mackie has raised four key concerns with the modelling undertaken. The concerns relate to:

- certain parameters used to represent the pre-mining system;
- the method used to represent the drainage of groundwater that would occur within each pit during mining (the Commission understands the applicant's method may have overestimated the impact – but this needs to be verified);
- unexplained water table (pore pressure) response in the model;
- unexplained behaviour in the pit inflows for a worst case model (where water levels do not recover in any of the pits over the 30 year life of the mine).

As provided in full in Appendix 4, Dr Mackie concluded that he is *“unable to accept that the reported groundwater head equipotentials, drawdowns, pit inflows and water table recovery estimates calculated by the proponent's models, properly represent the impacts on the groundwater systems that would arise from the project”*. Three changes to the model and a steady state run are recommended to resolve the uncertainties.

Mindful of the advice provided by the NSW Office of Water (that the mine can be adaptively managed), the Commission has discussed Dr Mackie's concerns at length. Given the critical importance of this region's water resources to maintaining strong agricultural production, the Commission is convinced that the uncertainties identified by Dr Mackie need to be resolved prior to any determination of the application.

The Commission considered seeking a resolution to the uncertainties identified prior to finalising its review. However, the Commission understands that it will take some time to make the changes and run the model as recommended by Dr Mackie. The Commission is already beyond the original deadline for the completion of the review, which was imposed by the then Minister in the terms of reference. While a short extension has been accepted the Commission determined it would not be possible to resolve the uncertainties identified within the expected timeframe for the Review. Nonetheless the Review is only one step in the assessment process and so the Commission is able to recommend that this further work must be completed to inform the Department's assessment of the water impacts of the project and to provide the decision maker with a higher level of certainty regarding the potential water impacts of the project.

The Commission recommends that Dr Mackie's recommendations must be addressed and any differences in the reported outcomes will need to be assessed prior to any determination of the application.

Based on the advice from the NSW Office of Water, the Commission is otherwise generally satisfied that the applicant's predicted impacts on water are of a relatively small scale compared to the water take for agriculture and that with detailed monitoring and adaptive management these predicted impacts would not have a significant impact on the agricultural productivity of the region. However, as Dr Mackie has advised, if the outcomes of the revised modelling are significantly different to the outcomes in the applicant's Environmental Impact Statement (Hansen Bailey, 2013a) then it will be necessary to reconsider the potential regional drawdown impact, pit inflows and implications for the mine water balance and management system. The Commission acknowledges that the impacts may in fact be smaller than have currently been predicted, but is firm in its view that the uncertainties

must be resolved. For example either a smaller or a greater water take would have implications for the water management system, the acceptability of which needs to be considered in any determination of the application.

### **Recommendations**

5. The additional modelling recommended by Dr Mackie must be completed and considered against the impacts predicted to date, prior to any determination of the application. That is:
  - a. The WST (Watermark Staged Transient) model is to be run with drain reference elevations set at or just above the base of the respective drain cells;
  - b. The WST model is to be run using the variably saturated 'pseudo soil' option available within Modflow Surfact thereby negating the need for vadose zone parameters (drain reference elevations unchanged);
  - c. The WST model is to be run using both the pseudo soil option and the adjustments to drain reference elevations; and
  - d. A steady state recovery model is to be run to assess long term impacts.
  
6. Any differences between the outcomes reported so far and those predicted under the revised modelling required in recommendation 5 will need to be assessed (and should be publicly exhibited if the impacts prove greater those currently predicted by the applicant), prior to determination of the application.

## 6. Health and Amenity

In the terms of reference for this review, the Commission has been asked to specifically focus on whether all reasonable and feasible noise and dust mitigation measures are proposed to be employed. The applicants mine plan proposes to mine one pit at a time (rather than extracting coal from multiple pits concurrently, as is required in some other areas for blending). This means it should be possible to contain the areas of exposure and rehabilitate each pit progressively, so that a large part of the pit is protected with vegetation cover before mining commences in the next pit.

The Commission notes that the applicant has improved its air and noise impacts with the commitment to use larger (and consequently fewer) vehicles in its equipment fleet e.g. (Pacific Environment Limited, 2014). In its meeting with the NSW EPA, the EPA confirmed that it was satisfied that the applicant has explored those options that are likely to be reasonable and feasible on the site, with enclosure of certain components, consideration of noise bunds and the optimisation of the equipment fleet. The EPA noted that the expected water requirements for dust suppression do not match the water balance provided by the applicant, but indicated that alternatives such as chemical dust suppressants are available. Water has been considered in more detail in section 5, nonetheless the Commission understands that alternatives such as surfactants are available in the event of a water shortage.

The Department of Planning and Environment's draft development consent (2014b) includes standard conditions requiring the applicant to:

- implement best practice to minimise noise, ensure mobile plant is attenuated, operate a comprehensive noise management system; and
- implement best practice dust management, minimise the surface disturbance of the site, operate a comprehensive air quality management system and carry out regular monitoring.

In addition to this, the Department has also specified that a number of noisy activities are not to occur at night. In particular, during the night time period mobile plant is not to be used in sensitive areas (including on elevated and exposed sections of the overburden dump) and drilling at high elevations is to be avoided (Department of Planning and Environment, 2014b, p. 8 condition 4). The Commission agrees that these extra requirements are worthwhile additions to the standard conditions. The Commission also considers that it is important to clarify that the predictive and reactive noise and air quality management systems will trigger the scaling back and shut down of mining activities in certain weather conditions, to ensure that dust and noise limits are not exceeded. The Commission recommends that this is added to the operating conditions for both noise and dust.

With these extra requirements in place the Commission is satisfied that the reasonable and feasible options currently available to minimise noise and dust emissions from mining have been appropriately explored and adopted. Nonetheless the Commission notes that over the proposed 30 year life of this mine, technologies, standards and best practice measures are likely to evolve and improve. With this in mind the Commission considers there is scope to require the noise, air and blasting impacts to be reconsidered against the standards and best practices of the day, prior to commencing mining in each new pit. The health and amenity impacts of these dust and noise emissions are considered in the following sections.

## Recommendations

7. The Commission recommends that the operating conditions for noise and dust should be updated to clarify that scaling back and shut down of operations will be required at certain times to ensure compliance with the noise and air quality limits.
8. The Commission recommends that the conditions should include a requirement that prior to the commencement of mining in each new pit, updated consideration of the impacts of mining is to be provided, to demonstrate that the performance of the mine will comply with the standards of the day and ensure best practice (taking into account the more restricted options available compared to those for a new mine).

### 6.1. Dust

Despite the proposed dust suppression measures the mine is predicted to produce dust impacts on a number of surrounding properties, including residential dwellings.

Health impacts of dust have been subject to some debate, including whether different particle sizes or sources (and resulting chemical compositions) have different health impacts (World Health Organisation, 2006). Nonetheless, the World Health Organisation has indicated that *“For various health outcomes there has not been any indication of a threshold below which adverse effects would not be anticipated”* (World Health Organisation, 2006, p. 274). More recently the WHO has indicated that *“there is not enough evidence to identify differences in the effects of particles with different chemical compositions or emanating from various sources. It should be noted, however, that the evidence for the hazardous nature of combustion-related PM (from both mobile and stationary sources) is more consistent than that for PM from other sources.”* (World Health Organisation, 2013, p. 6). Consequently, assessing the health impacts of open cut mining is not easy.

#### Health Standards for dust

The World Health Organisation has established air quality guidelines for both PM<sub>10</sub> and PM<sub>2.5</sub> levels (World Health Organisation, 2006). Australia has adopted ambient air quality standards as a National Environmental Protection Measure (NEPM), as set out in Table 1.

**Table 1 - Current NEPM Standards and Goal for particulates**

Pollutant	Averaging period	Maximum (ambient) concentration	Notes
Particles as PM <sub>10</sub>	1 day	50 µg/m <sup>3</sup>	maximum allowable exceedances, 5 days a year
Particles as PM <sub>2.5</sub>	1 day	25 µg/m <sup>3</sup>	Goal is to gather sufficient data nationally to facilitate a review of the standard as part of the review of this Measure scheduled to commence in 2005.
	1 year	8 µg/m <sup>3</sup>	

As seen in Table 1 the NEPM does not currently include a standard for PM<sub>2.5</sub>, only a monitoring goal. Nor does it include an annual average standard for PM<sub>10</sub>. A 2011 review (National Environment Protection Council Service Corporation, 2011) recommended that standards are introduced for both these particulate sizes. In relation to the maximum allowable exceedances for PM<sub>10</sub> the review found that *“5 exceedances for the PM<sub>10</sub> standard were introduced to account for the impact of bushfires, dust storms and fuel reduction burning for fire management purposes. These exceedances are often misused and have been applied to urban air pollution and, in some cases, individual sources”* (National Environment Protection Council Service Corporation, 2011, p. 30). A notice of intention to vary the NEPM standards for particles was published in May this year (<http://www.environment.gov.au/news/2014/05/14/notice-intention-vary-ambient-air-quality->



[nepm](#)). Draft variations to the Air Quality NEPM are now on public exhibition which would strengthen the goals to criteria and include some consideration of annual average PM<sub>10</sub> levels as well (Department of Environment, 2014).

Assessment against the standards

The applicant and the Department have considered the dust emissions of the project (Hansen Bailey, 2013a) (Pacific Environment Limited, 2014) and (Department of Planning and Environment, 2014a). The applicant’s modelling indicates that the project, combined with background dust levels in the air, could cause the 24 hour average criteria for PM<sub>10</sub> dust levels to be exceeded at 20 different residences during the life of the project, see Table 2 . The table sets out the number of days the criterion is predicted to be exceeded during the year when impacts are expected to be worst. Some properties are expected to be affected by exceedances of the criterion over a number of years, not just the worst case year listed in the Table 2. For example the residence identified as number 125 is expected to be impacted by mining activities in both the eastern and southern pits, and exceedances are predicted to occur at various times as mining progresses through each of these two pits.

**Table 2 - Number of days the cumulative PM<sub>10</sub> dust levels are predicted to exceed 50 µg/m<sup>3</sup>**

Residence	Year when cumulative level was modelled (expected worst case)				DP&E recommendation
	Year 10	Year 15	Year 21	Year 25	
16b				1 day	-
22a				1 day	-
24b	1 day				-
25b	2 days				Mitigation
32b	1 day				Acquisition
32c	20 days				Acquisition
60			12 days		Acquisition
62a			46 days		Acquisition
62b			37 days		Acquisition
86	1 day				-
98a	1 day				-
99		3 days			-
103				7 days	Acquisition
104				1 day	-
105				2 days	-
106				1 day	-
113			1 day		-
115			3 days		-
122a/b			1 day		-
125			25 days		Acquisition

**Source:** Adapted from (Pacific Environment Limited, 2014), (Hansen Bailey, 2013a) and (Department of Planning and Environment, 2014b)

In addition to the 20 impacted properties identified in Table 2, five others could have air quality criteria exceeded over 25% of the land parcel (rather than at a house on the site). These properties are discussed in section 6.3 and are shown in Table 5 **Error! Reference source not found.** on page 23. It is standard practice for open cut mines to have adaptive management programs and strategies in place which would require the mine to monitor conditions on site and combine this with weather predictions to ensure both dust and noise emissions are minimised to within the emission limits for the project. This might require additional water spraying to reduce dust levels during certain windy conditions, or in more severe conditions it may be necessary for the mine to shut down all operations to prevent dust and noise criteria from being exceeded.

Predictive and reactive management does have limitations however, so the Department of Planning and Infrastructure has prepared draft conditions (2014b) which would give certain landholders the

right to request the mine acquire their property. The Department has not included all the 25 properties that are predicted to be impacted at levels above the 24 hour average PM<sub>10</sub> dust criteria in the acquisition table however (Department of Planning and Environment, 2014b, pp. 7, Table 1).

As noted in Table 1, up to 5 exceedances of the PM<sub>10</sub> 24 hour average criteria are allowed each year and the Commission understands those properties that have not been included in the acquisition table are predicted to be impacted by exceedances on less than 5 days in any one year. The Commission does not accept this approach. The 2011 NEPM Review noted that, “5 exceedances for the PM<sub>10</sub> standard were introduced to account for the impact of bushfires, dust storms and fuel reduction burning for fire management purposes. These exceedances are often misused and have been applied to urban air pollution and, in some cases, individual sources” (National Environment Protection Council Service Corporation, 2011, p. 30). The Commission recommends that all 25 properties identified to be impacted by cumulative PM<sub>10</sub> dust levels in excess of 50 µg/m<sup>3</sup> should be given the option to be acquired by the mine.

A number of speakers at the public hearing noted that some families have lived in the area for many generations. The Commission understands that not all impacted residence will wish to sell their homes and properties. Consequently the Commission considers that other options to assist these impacted residents should also be available. In some cases a negotiated arrangement can be made between the applicant and the landowner. The scope of such arrangements are only limited by the imaginations of the two parties, but could include provision of alternative accommodation during certain periods and adaptations to a dwelling to enclose living and entertaining spaces and improve indoor air quality. The Commission acknowledges that negotiated outcomes cannot always be agreed upon. In addition to the options for acquisition and the ability to negotiate some mutually acceptable alternative, the Commission recommends that mitigation, alternative accommodation and impact criteria should all be applied to protect residents who choose not to sell their residence.

The Commission notes that the Department has currently recommended either acquisition, or mitigation and an emissions limit, depending on the level of impact predicted. This does not provide any assistance to those residents who are unwilling to sell their properties.

### **Recommendations**

9. The Commission recommends that all residences predicted to be impacted by an exceedance of the air quality criteria should be given the following options:
  - i. to sell their property to the mine and move elsewhere;
  - ii. to negotiate a mutually agreeable outcome;
  - iii. to have the applicant provide mitigation measures at the dwelling including enclosure of outdoor entertaining spaces such as decks and installation and upkeep of air conditioning and first flush devices for rainwater tanks;
  - iv. to have alternative accommodation provided.
  
10. In addition to this the Commission recommends that limits should be included in the conditions to ensure the applicant does not exceed the predicted impacts. This should include limits that vary over the life of the mine in response to the modelled predictions. I.e. if a residence is predicted to receive higher dust levels in year 10, but not year 5 or year 15, then the higher limit should not apply during those other stages of mining when the impact is not predicted to occur.

The Commission acknowledges that this more generous allocation of acquisition (compared to that recommended by the Department of Planning and Environment) would mean the applicant may be required to purchase additional agricultural land, including properties with Biophysical Strategic

Agricultural Land and some land on the black soils of the Liverpool Plains. As discussed previously in section 4.3, the Commission considers that conditions could be imposed to ensure that land acquired by the applicant remains available for full agricultural production, for example the applicant could lease or on sell the land outside the disturbance boundary.

## 6.2. Noise

The impacts of noise have been assessed against the Industrial Noise Policy. In this instance the intrusive noise criteria is 35 dBA LAeq(15 min). Noise impacts have been assessed at each surrounding residence and the highest predicted noise impacts (usually in the evening and night time periods during prevailing/inversion conditions) are summarised in Table 3.

**Table 3 – Noise impacts at surrounding residential receivers**

House #	Year 1	Year 2	Year 5	Year 10	Year 15	Year 21	Year 25	Year 30	DP&E
25W	28.8	32.0	<b>36.3</b>	<b>38.1</b>	34.5	23.7	24.7	21.5	M&C
32W	30.9	34.4	<b>38.6</b>	<b>41.0</b>	<b>39.7</b>	26.1	26.4	22.7	A&M
35	25.9	28.9	31.1	<b>35.5</b>	30.9	21.7	21.1	18.4	M&C
39	28.6	31.7	34.4	<b>38.6</b>	34.5	23.3	23.4	20.2	M&C
40	27.0	29.9	32.0	<b>36.0</b>	32.0	22.1	21.7	18.8	M&C
41	28.0	31.1	33.6	<b>37.3</b>	33.7	22.9	22.9	19.8	M&C
43	26.9	29.8	31.8	<b>35.7</b>	32.0	22.1	21.6	18.8	M&C
44	26.0	28.9	30.8	34.9	31.2	21.8	21.2	18.4	-
60	28.1	29.4	29.1	27.8	28.8	<b>38.3</b>	<b>37.2</b>	29.1	A,M&C
62E	29.7	30.9	30.7	29.6	30.4	<b>40.6</b>	<b>39.7</b>	30.0	A&M
62W	29.5	30.8	30.4	29.4	30.1	<b>39.1</b>	<b>39.1</b>	29.9	A&M
99	27.4	29.9	31.2	32.0	35.0	28.7	25.2	21.0	-
104	22.3	23.4	23.7	22.7	23.1	29.2	34.9	32.5	-
125	<b>43.4</b>	<b>45.5</b>	<b>42.1</b>	<b>39.8</b>	<b>45.6</b>	<b>47.9</b>	<b>44.3</b>	<b>38.0</b>	A&M

A= Acquisition, M= Mitigation, C = Criteria

Source: Adapted from (Hansen Bailey, 2013b) and (Department of Planning and Environment, 2014b)

As with other mining applications in this region the Commission considers that the intrusive noise criteria is the suitable level at which noise impacts should be assessed. The Department has recommended that impacted residences are either given the right to be acquired by the mine, or the right to request mitigation measures (such as double glazing) are installed on the house, depending on level of exceedance predicted. The Commission does not agree with this approach. Background noise levels in the area can be significantly lower than the standard 30dBA level adopted for the assessment (Hansen Bailey, 2013a). For other relatively recent mining approvals granted in the region the Commission has given the impacted resident the choice of either acquisition or mitigation. This acknowledges that not all residents will want to leave their properties, so provides the resident with some alternative options, should they choose to stay.

### Recommendations

11. As with the Commission's recommendations for dust, the Commission recommends that all residences predicted to be impacted by an exceedance of the intrusive noise criteria should be given the following options:
  - i. to sell their property to the mine and move elsewhere;
  - ii. to negotiate a mutually agreeable outcome;
  - iii. to have the applicant provide mitigation measures at the dwelling including the provision of double glazing.
  
12. In addition to this the Commission recommends that limits should be included in the conditions to ensure the applicant does not exceed the predicted impacts. This should include limits that vary over the life of the mine in response to the modelled predictions. I.e. if a residence is predicted to receive higher noise levels in year 10, but not year 5 or year 15,

then the higher limit should not apply during those other stages of mining when the impact is not predicted to occur.

#### Temperature Inversions, Gradient Winds and Rain

As noted in the NSW Industrial Noise Policy, “*Certain meteorological conditions may increase noise levels by focusing sound-wave propagation paths at a single point. Such refraction of sound waves will occur during temperature inversions (atmospheric conditions where temperatures increase with height above ground level) and where there is a wind gradient (that is, wind velocities increasing with height) with wind direction from the source to the receiver.*” (Environment Protection Authority, 2000, p. 31)

The Commission understands that temperature inversions are a feature of the area. The applicant has indicated that moderate (Class-F stability category) inversions occur more than 30% of the time and consequently need to be included in the assessment of noise, while strong (G-Class stability category) inversions occur less than 10% of the time and so do not need to be included in the noise assessment (Hansen Bailey, 2013a, p. H23). The applicant has also indicated the assessment takes noise enhancing winds into account as these winds potentially occur for more than 30% of the time.

The Commission notes that the draft conditions for the mine includes an appendix which indicates that the noise criteria do not apply in certain circumstances, including during rain and hail, certain wind speeds and temperature inversion conditions greater than 3°C/100m (Department of Planning and Environment, 2014b, p. 51). The Commission to review the Stratford Extension Project considered these conditions (as they were also proposed to apply to that mine) in detail. In general that Review (NSW Planning Assessment Commission, 2014) found that exemptions during periods of rain or hail were unnecessary. Instead it was recommended (NSW Planning Assessment Commission, 2014) that in general, where stability category F inversions are a feature of the area the noise limits should apply, except during:

- i. Wind speeds greater than 3 metres/second at 10 metres above ground level in the direction from the source to the receiver; or
- ii. Stability category G temperature inversion conditions.

The wind speed of 3 m/s at 10 m above ground level is the default measure for assessing noise impacts caused by gradient winds (Environment Protection Authority, 2000) (the NSW Industrial Noise Policy describes gradient wind as “*the regional wind determined by synoptic factors (high and low-pressure systems), and may originate from any direction*” p.34). In this instance the Commission understands that gradient winds are a feature of the area (Hansen Bailey, 2013a, pp. H23-24), so it seems an exemption during these conditions (i.e. dot point i.) is not applicable in this instance.

In relation to strong temperature inversions, the applicant for the Stratford mine sought to use a different measure of inversions (temperature inversions greater than 3°C/100m) and this was found to be acceptable subject to it undertaking additional monitoring of the temperature lapse rate over a height of 60 m (NSW Planning Assessment Commission, 2014). The Commission considers the applicant for this mine should be given the same choice, for monitoring of the strong category G temperature inversion.

#### **Recommendation**

13. The Commission recommends that the Applicable Meteorological Conditions and Compliance Monitoring requirements in Appendix 5 of the draft conditions should be updated to reflect contemporary capabilities in monitoring during rain and hail conditions as well as the gradient wind and temperature inversion features of the area.

### Identification of residences

The conditions refer to property numbers, annotated with a letter to distinguish between different houses on the one property, however the receiver location plans in Appendix 4 of the conditions do not identify which residence corresponds to which letter.

### Recommendation

14. The Commission recommends that the final conditions clearly identify or map each residence that is listed as having a higher noise or dust criteria.

### 6.3. Noise and/or air quality impacts over 25 percent of land

In addition to the recommended acquisition of certain dwellings, the Department of Planning and Environment has recommended that seven additional properties are granted acquisition rights as noise levels would exceed 40dBA LAeq(15 min) over more than 25% of the property at certain times during the life of the mine (2014a, p. 66). These properties nominated to receive acquisition rights in the Department's draft conditions (Department of Planning and Environment, 2014b) are shown in *blue italics* in Table 4. Properties where air quality health criteria are predicted to be exceeded on more than 25% of the land are shown in Table 5.

**Table 4 - Properties where 25% of land would be impacted by noise levels above 35dBA, LA<sub>eq, 15 min</sub>**

YEAR PROPERTY #	1	2	5	10	15	21	25	30	DP&E
<i>20</i>	<i>36.1</i>	<i>39.9</i>	<i>42.0</i>	<i>38.3</i>	<i>37.7</i>	<i>28.4</i>	<i>33.7</i>	<i>29.6</i>	<i>Acquisition</i>
<b>025W *</b>	31.5	34.9	39.7	<b>42.3</b>	37.5	25.1	26.3	23.3	M&C
<i>026W</i>	<i>40.8</i>	<i>45.3</i>	<i>45.8</i>	<i>41.3</i>	<i>40.4</i>	<i>30.3</i>	<i>33.7</i>	<i>30.5</i>	<i>Acquisition</i>
<b>27</b>	<b>36.4</b>	<b>40.9</b>	<b>43.2</b>	<b>45.7</b>	38.4	27.8	29.6	26.9	<i>Acquisition</i>
<b>28</b>	<b>33.6</b>	<b>38.0</b>	<b>41.6</b>	<b>44.1</b>	38.6	26.7	28.4	25.5	<i>Acquisition</i>
<b>32 *</b>	<b>31.0</b>	<b>34.1</b>	<b>37.7</b>	<b>41.7</b>	36.9	24.9	25.0	22.1	<i>A&amp;M</i>
<b>61</b>	<b>27.5</b>	<b>29.2</b>	<b>29.4</b>	<b>27.8</b>	31.0	<b>40.2</b>	35.9	27.6	<i>Acquisition</i>
<b>62 *</b>	<b>28.5</b>	<b>30.1</b>	<b>30.2</b>	<b>28.7</b>	30.7	<b>42.2</b>	38.5	28.8	<i>A&amp;M</i>
<i>065N</i>	<i>39.6</i>	<i>43.9</i>	<i>43.4</i>	36.2	39.2	29.0	35.4	31.4	<i>Acquisition</i>
<b>103</b>	<b>25.8</b>	<b>26.9</b>	<b>27.2</b>	<b>25.9</b>	<b>26.6</b>	<b>28.9</b>	<b>42.2</b>	<b>38.6</b>	<i>A&amp;M</i>
<b>115</b>	30.8	33.3	32.8	31.2	36.3	<b>42.4</b>	36.4	28.3	-
<b>125 *</b>	<b>43.2</b>	<b>45.0</b>	<b>41.6</b>	<b>40.1</b>	<b>49.2</b>	<b>46.8</b>	<b>42.6</b>	<b>37.6</b>	<i>A&amp;M</i>
<b>016W</b>	28.4	29.6	30.2	27.7	29.3	27.6	<b>35.6</b>	32.0	-
<b>22</b>	32.1	<b>35.5</b>	<b>36.7</b>	32.9	33.8	26.4	33.0	28.8	-
<b>24</b>	31.8	<b>35.2</b>	<b>38.1</b>	<b>37.1</b>	34.8	25.3	27.9	24.9	-
<b>025E</b>	27.1	30.1	33.8	<b>35.6</b>	32.3	22.6	23.6	20.3	-
<b>31</b>	25.0	28.3	30.8	<b>35.2</b>	30.5	21.2	20.3	17.9	-
<b>35 *</b>	25.8	28.9	31.0	<b>35.3</b>	30.8	21.7	21.0	18.4	M&C
<b>39 *</b>	28.6	31.7	34.5	<b>38.7</b>	34.5	23.4	23.5	20.3	M&C
<b>40 *</b>	26.9	29.8	31.9	<b>35.9</b>	31.9	22.1	21.6	18.8	M&C
<b>41 *</b>	27.8	30.6	33.2	<b>37.1</b>	34.2	22.7	22.6	19.5	M&C
<b>42</b>	27.8	30.8	33.2	<b>36.7</b>	33.4	22.7	22.6	19.3	-
<b>43 *</b>	27.1	29.9	31.9	<b>35.8</b>	32.2	22.1	21.7	18.8	M&C
<b>44</b>	26.2	29.0	30.9	<b>35.0</b>	31.4	21.9	21.2	18.4	-
<b>60 *</b>	24.5	25.9	26.4	24.8	26.8	<b>37.1</b>	33.6	28.4	M&C
<b>114</b>	25.3	27.3	27.8	26.0	29.3	<b>35.8</b>	31.9	25.8	-
<b>116</b>	31.3	33.8	33.3	31.5	<b>38.4</b>	<b>39.1</b>	32.6	27.1	-
<b>119</b>	31.2	33.5	33.3	33.1	<b>38.3</b>	<b>35.1</b>	30.0	25.2	-

\* =property where house would be impacted by +35dBA, A= Acquisition, M&C= Mitigation and Criteria apply at a residence on the property

Source: Adapted from (Hansen Bailey, 2013b) and (Department of Planning and Environment, 2014b)

**Table 5 - Cumulative PM<sub>10</sub> levels predicted to exceed 50 µg/m<sup>3</sup> on more than 25% of a property**

Property	Year 2	Year 5	Year 10	Year 15	Year 21	Year 25	DP&E Recommendation
25	N	N	Y<6days	N	N	N	-
26+	N	Y	Y<6days	Y<6days	N	N	Acquisition
27+	N	Y<6 days	Y	Y<6days	N	N	Acquisition
28+	N	N	Y	Y<6days	N	N	Acquisition
61+	N	N	N	N	Y<6days	N	Acquisition (due to noise)
62	N	N	N	N	Y	N	Acquisition
103	N	N	N	N	N	Y<6days	Acquisition (for house)
115	N	N	N	N	Y<6days	N	-
116+	N	N	N	N	Y<6days	N	-
125	Y<6days	Y<6days	Y	Y	Y	Y	Acquisition

+ = those properties not listed in Table 2 (i.e. those where the dwelling is not predicted to be impacted by an exceedance of the criteria)

**Source:** Adapted from (Pacific Environment Limited, 2014), (Hansen Bailey, 2013a) and (Department of Planning and Environment, 2014b)

The Commission has considered the predicted impacts and the arrangements recommended by the Department of Planning and Infrastructure. As shown in Table 4 and Table 5 the Department has recommended acquisition of some of the properties predicted to be impacted by exceedances of the noise and dust criteria. The Commission understands the Department has recommended (as has been its practice historically) to provide landowners with acquisition rights where more than 25 percent of the land is predicted to be impacted by:

- noise levels 5dBA above the noise criteria; and/or
- exceedance of PM<sub>10</sub> dust criteria for more than 5 days per year.

The applicant sought to have this requirement removed, suggesting that much of the land in question would be flood prone, so is not suitable for future development. The Commission has considered this argument but understands that many of the properties listed in Table 4 and Table 5 are not entirely flood prone and dwelling houses are permitted with consent. The Commission also notes that for some properties the portion that is not mapped as a flood planning area, in the *Gunnedah Local Environmental Plan 2012*, is the portion closest to the proposed mine.

The applicant also noted that acquisition of land had not been required of recent mines near Boggabri. The Department acknowledged the relatively recent decisions where this additional acquisition right has not been provided but is seeking to maintain its standard practice to include this option for certain land to be subject to acquisition if requested by the landowner (Department of Planning and Environment, 2014a). The Department's reason (2014a, p. 68) for recommending acquisition of these landholdings is that "some" of the landholdings are "very close to the project disturbance area" and "would likely experience considerable amenity impacts" and so there is likely to be a significant impact on the development and or subdivision potential of these landholdings, which ought to be compensated for. The Department also notes that the acquisition right does not have to be acted on or taken up and the owner may choose not to sell the property (2014a, p. 68).

The two properties discussed by the Department in its assessment of this issue (numbered 26 and 27) would be impacted by noise levels in excess of 45 dBA during certain periods (see Table 4). Exceedances of health criteria for dust are also predicted to occur at these properties on some days in most years of mining in the eastern pit. The Commission notes however that the Department has not proposed to give acquisition rights to all impacted properties identified in Table 4 and Table 5.

The Commission acknowledges the previous decisions in the Boggabri area, but notes that in those cases the impact on land was a predicted noise impact. In this instance the issue is more complex. There are a combination of both properties that would be impacted solely by an exceedance of the noise criteria and others that would be impacted by noise and an exceedance of the 24 hour average

PM<sub>10</sub> health criteria. The properties in Table 4 and Table 5 also cover a range of lot sizes and different land use zones. This is complicated further by the Department's recommendation to grant acquisition rights where 'amenity' impacts are said to be 'considerable', rather than in every instance where an exceedance is predicted.

The Commission is not convinced the Department's position is adequately justified and is particularly concerned by any exceedance of the PM<sub>10</sub> health criteria on any part of a property, whether it is more or less than 25% of that property and regardless of the number of days. Ultimately the Commission recommends that the Government needs to develop a clear policy on this issue. In the absence of any definitive policy, the Commission notes the Department's practice historically but suggests that the recommendation not to include all those properties identified in Table 4 and Table 5 has not been adequately justified.

### **Recommendations**

15. The Commission recommends that the NSW Government needs to develop a clear policy on the management of health and amenity impacts on land that is not occupied by a dwelling.
16. In the absence of a definitive policy or clear, specific justification, the Commission considers that acquisition rights should be available to those properties identified in Table 4 and Table 5.

### **6.4. Blasting**

The applicant has indicated that 5 blasts a week would be required during mining (Hansen Bailey, 2013a). This is consistent with the ANZEC Guidelines (1990) and the Department of Planning and Environment has included a draft condition generally allowing a maximum of 1 blast a day and 5 blasts a week (2014b).

Blasting can generate gas emissions and has the potential to produce localised high concentrations of oxides of nitrogen. These gas emissions generally dissipate quickly so air quality impacts are generally short lived and limited to the immediate area of the mine site. There are a number of mitigation or control measures that can be implemented to minimise NO<sub>x</sub> emissions. The Department of Planning and Environment has drafted conditions which specify operating conditions relating to blasting and requiring a Blast Management Plan to be prepared. The Commission is satisfied that gas emissions from blasting can be minimised through an appropriate blasting protocol and management plan.

The mine is not predicted to exceed ground vibration or overpressure noise criteria at any offsite receivers (Hansen Bailey, 2013a). The Department of Planning and Environment has included standard blasting conditions in its draft consent (Department of Planning and Environment, 2014b). Given the applicant has indicated it will be able to achieve a lower ground vibration criteria of 2 mm/s at Breeza Cemetery (Hansen Bailey, 2013a), the Commission considers this should be added to the table of blasting criteria.

The Commission is satisfied that the impacts of blasting would be within the standard criteria for blasting at all offsite receivers. The applicant has indicated it will be able to meet a lower ground vibration level of 2 mm/s at Breeza Cemetery and given this, the Commission recommends that this lower level should be included in the conditions table of blasting criteria.

### **Recommendation**

17. The Commission recommends that the blasting criteria in the conditions should include the applicant's nominated ground vibration criteria of 2mm/s for the Breeza Cemetery.

## 7. Long Term Land Use Impacts

The rehabilitation and long term land use of a mine site is influenced by a number of factors including physical features, such as topography, soils, availability of water, the mine plan design and scheduling and the design and implementation of the rehabilitation itself.

This site has some advantages in terms of the quality of the top soil and subsoil available for reuse over overburden. The availability of water is still the subject of some debate, nonetheless with careful scheduling of sowing and/or planting and replanting where necessary, reestablishment of some vegetation cover across the disturbed areas of the site is considered achievable. Whether the rehabilitation could achieve the agricultural and biodiversity values claimed by the applicant is another question and this is addressed in section 7.3, below.

The mine plan and mine scheduling influence certain aspects of the rehabilitation of the site, particularly the final landform and the overall disturbance area to be rehabilitated. This application is to extract coal from three open cut pits, to be mined sequentially over 30 years. This sequential mining of pits has a number of advantages. For example:

- it means the areas of the site that are exposed at any one time can be minimised with progressive rehabilitation of each pit;
- it should allow the disturbance associated with out of pit emplacement of overburden to be avoided for the second and third pit, as overburden can be used to backfill the previous pit; and
- it also provides opportunities for top soil and subsoil to be reused on existing disturbed areas at the time it is stripped (rather than requiring extensive long-term stockpiling of soil, which can destroy the soils microorganisms).

Despite the advantages of the site and associated mine plan, successful rehabilitation to either a predominantly grazing land use or for biodiversity values and functions are by no means assured. Successful rehabilitation takes many years to establish and perhaps because of this effective restoration to a long term stable ecosystem or agricultural land use has yet to be demonstrated. With this in mind the Commission considers that it is important to minimise the area of disturbance as far as possible. The Commission accepts that disturbance of the mine pits is a necessary part of open cut mining, but considers there may be some scope to reduce the disturbance of areas outside the pit boundaries.

The applicant's mine plan justification report (Hansen Bailey, 2013a, p. C21) provides a brief overview of the mine scheduling to occur on the site and indicates that overburden from the southern and western mining areas will initially be used to backfill the void remaining in the previously mined pit. That is, the overburden from the creation and mining of the southern pit, will initially be directed to the eastern pit, to backfill the void left in the eastern pit, the EIS (Hansen Bailey, 2013a, p. C22) then suggests that once backfilling in the eastern pit is completed the overburden would be placed behind active mining in the southern pit. A similar strategy would be used in opening up the western pit, with overburden initially being directed to the void left in the southern pit and once that was full it would then be placed behind active mining in the western pit (Hansen Bailey, 2013a, p. C22).

The text in the applicant's Environmental Impact Statement suggests that no out of pit emplacement of overburden would be required for the second and third pits (the southern and western pits). However the project layout plans show out of pit emplacement areas adjoining each pit (Hansen Bailey, 2013a, p. 26). Mining activities are scheduled to move from the eastern to the southern pit in



year 17 and from the southern to the western pit in year 24 (Hansen Bailey, 2013a, p. C22), no drawings of either of these years were available to the Commission. Based on the conceptual mine plan drawing for year 25 (Hansen Bailey, 2013a, p. AA18) it appears that overburden emplacement will be occurring in the southern pit and in the western pit concurrently, with out of pit emplacement adjoining the western pit already completed.

The Commission has not been able to find any justification for these out of pit emplacement areas adjoining the southern and western pits. Some shaping around the pit edges may be necessary to provide a final landform that is not only safe and stable, but also in keeping with the surrounding topography. Nonetheless, the extent of the out of pit emplacement areas proposed across the site is considered excessive and should be reviewed with a view to minimising the area disturbed due to the out of pit emplacements, particularly avoiding class II agricultural land and minimising impacts on class III agricultural land and Endangered Ecological Communities in these areas of the site.

### **7.1. Final Landform**

The application does not appear to include any one final landform assessment or design report. Some details of the final landform can be found within other reports within the EIS (Hansen Bailey, 2013a), including the Rehabilitation and Mine Closure Strategy (Appendix AA), Mine Plan Justification Report (Appendix C) and Visual Impact Assessment (Appendix J). The applicant has not provided any clear explanation or justification of the proposed final landform across the site.

The plans available to the Commission show contour lines without height markings, in some places these are so closely spaced it is virtually impossible to tell the direction of the slope. The landform appears to have been designed to suit the schedule of mining, with small concessions to achieve stable grades. Little, if any, consideration appears to have been given to how the landform might fit within the landscape, both onsite or from further afield. The visual assessment focuses on visual impacts during mining, generally from relatively distant vantage points (Hansen Bailey, 2013a). The visual assessment does not give any indication or consideration to how the landform will fit with the existing landscape on site, only showing that from offsite vantage points and roads the overburden dumps will sit below the level of Mt Watermark and will be treed (Hansen Bailey, 2013a, p. appendix J).

The Commission considers that there may be some scope to reduce the impact of the mine plan and final landform, although it is difficult to tell given the lack of clear, detailed contours or landform plans. From the plans available to the Commission it appears that the out of pit overburden emplacement, which would intrude into vegetated areas to the north of Mount Watermark, may be able to be rationalised or refined to reduce this intrusion. With relocation of the haul road it may also be possible to improve the final landform to the south of Mount Watermark. These options need to be explored.

The Commission accepts that mining of the first pit is not expected to be concluded for some 17 years, and that there will be plenty of time to refine the landform design in the intervening period. Nonetheless relatively little information is available on how or why the general land form is designed in its current form and placement of overburden from the commencement of mining will have long term implications for the final landform.

There is a significant discrepancy between the level of information and assessment that goes into the mining and post mine landforms compared to the long term relatively permanent legacy issues that are produced. The Commission considers that government should be requiring a much greater level of consideration and explanation of the long term land use and landform, from the mining companies, both at the application stage and throughout the life of the mine.

The Commission recommends that some more detailed consideration of the options to improve the final landform and minimise out of pit disturbance associated with the eastern pit must be considered prior to determination of the application. Refinements to the design of the southern and western pits must be submitted in plenty of time to ensure they can be considered and ultimately approved, prior to the commencement of activities within those pits.

## **7.2. Final Void**

Submissions have raised various concerns about the final void. The NSW Mining and Petroleum Gateway Panel indicated that *“predicted saline water qualities in backfilled areas and the final void pit lake is a significant long-term risk to water quality in surrounding creeks and the alluvial aquifers”* (Mining and Petroleum Gateway Panel, 2014, p. 16) and sought further modelling to justify the salinity predictions, or changes to the mine plan to eliminate the final void. The Australian Government’s Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mine Development also raised concerns about the water in the final void and indicated *“The Committee considers that voids are a long-term environmental legacy and backfilling of voids and pit lakes represents best environmental practice”* (IESC, 2013).

The Commission shares the Committee’s concern about the retention of permanent pit void lakes on mine sites. The Commission considers best practice is to avoid the creation of a final pit void lake in the initial mine planning for the site. This requires careful consideration from the earliest mine planning and sequencing designs, having regard to the inter-relationships between the locations of the coal seams, the surface topography and the drainage patterns. On some sites it is possible to schedule mining activities to end at a point where a pit void lake would not be produced, ideally where the surface topography of the ‘pit’ is above the predicted groundwater recovery levels and is also free draining (for surface water).

The Commission acknowledges that in this instance the applicant has made some concessions to ensure that no voids are left in the eastern and southern mining pits. There may be further scope to refine the design of the western pit to minimise the size and impact of the final void over the next 20 years, prior to the commencement of mining in that pit. This would need to be further explored at that stage to ensure that the mine complies with the standards and requirements of the day.

In the meantime the potential water impacts of retaining a final pit void may need to be assessed once the revised groundwater modelling is available (see the recommendations in section 5).

## **7.3. Rehabilitation Strategy**

Rehabilitation is proposed to occur progressively across the site as mining and dumping activities are concluded in each area. It is not possible to confirm whether this will be undertaken in the most sensible and efficient way possible as plans for the various stages are limited to broad whole of site diagrams, which only show the mining (and rehabilitation) progress at approximate 5 year intervals. Even with these limited drawings some details suggest that there may be ways to improve the dumping patterns to allow rehabilitation of some areas to commence earlier than currently proposed. To give one example of this, it is not clear why overburden dumping commences on the northern of the two Dip Road dumps and then moves to the southern dump, before the first dump is completed and able to be rehabilitated (see Figure 4, below).



Figure 4: Extract from Mine Plan year 1 (left) and year 5 (right) Source: (Hansen Bailey, 2013a, p. AA13 & 14)

While the Commission acknowledges that this is one fairly small area of the overall mine site and there may be a reason why the dumping must alternate across both sides of the haul road, these are not immediately apparent to the Commission.

It will be important to minimise the disturbance outside the pit boundaries and to ensure that rehabilitation is progressed in a timely and efficient manner. For those areas that are disturbed, the handling and placement of subsoil and topsoil profiles will be critical to the success of the rehabilitation and long-term stockpiling should be avoided as far as possible. Particular priority should then be given to restoring cover over exposed areas. The early establishment of koala feed and shelter habitat should also be prioritised to offset the clearing that would occur in subsequent stages of mining.

The Commission considers that a more detailed strategy will need to be developed to demonstrate that disturbance areas have been minimised and to ensure that rehabilitation meets best practice standards. As with many other aspects of the project there are opportunities to ensure that lessons learnt in implementing rehabilitation are used to inform ongoing improvements as mining progresses into the second and third pits on the site. The Department of Planning and Environment has drafted conditions requiring a Rehabilitation Management Plan is prepared in consultation with a number of government agencies and for the approval of the Executive Director Minerals Resources. As discussed in more detail below, the rehabilitation on site is proposed to establish both biodiversity and agricultural functions. Given this the Commission does not consider the Minerals Resources agency is the appropriate agency to determine the suitability of the detailed rehabilitation plan for the site.

#### **Rehabilitation of Agricultural Land**

Rehabilitation of agricultural land is an issue the Commission has been asked to pay particular attention to. The applicant is proposing to reinstate 3,233 ha of land to a class III rural land capability, including 1,000 ha which would be dedicated to agricultural use, with the aim of maintaining the ability to sustain rotational cropping on the site (Hansen Bailey, 2013a, p. Z29). 100 ha is proposed to be reinstated to meet the more stringent biophysical criteria for BSAL (biophysical strategic agricultural land). The Commission understands that examples of rehabilitation to a sustainable, productive agricultural land use are limited and have not been in place for sufficient time to demonstrate any long term success. This was corroborated by the NSW Office of Agricultural

Sustainability and Food Security during its meeting with the Commission. The Commission is nonetheless supportive of attempts to restore the agricultural capabilities of the land. This site potentially has some advantages given the reasonable soils currently on the site. As with any rehabilitation, the management, handling and resspreading of this soil will need to be carefully managed.

The applicant is proposing to rehabilitate an area over the eastern pit to an agricultural land use. This plan, to commence this component relatively early in the life of the mine, has some advantages, particularly that it would allow the rehabilitation of the site to be adapted in response to experience rehabilitating the eastern pit. It also provides an opportunity to include conditions that require certain milestones to have been achieved as the mine progresses through each pit. As currently planned, the area of the eastern pit to be restored to an agricultural land use would not be completed until late in the life of this pit (with mining activities still underway in year 15). The Commission considers that it would be preferable to commence trials for rehabilitation to an agricultural land use earlier in the life of this first pit, so that this early experience can inform an adaptive rehabilitation strategy and program.

The Commission considers that a final decision on how much of the site should be rehabilitated to an agricultural land use should be informed by the successes or failures in rehabilitating the eastern pit. For example if the applicant manages to successfully reinstate a sustainable agricultural land use on the rehabilitated eastern pit, then it may be appropriate to consider returning additional areas on the southern and western mining areas to this land use as well. Equally if the rehabilitation on the eastern pit does not meet the requirements needed to qualify as Biophysical Strategic Agricultural Land, then it will be necessary to consider the results of the rehabilitation undertaken to date and the experience on other mine sites to determine whether lessons learnt might be able to ensure a more satisfactory outcome on the southern rehabilitation area, or whether some biodiversity function could be established to produce a better outcome.

#### **7.4. Conclusions on the long term land use impacts of the project**

The terms of reference to the Commission require it to pay particular attention to the *“long term land use impacts of the project and the suitability and feasibility of the proposed rehabilitation strategy, including the final landform, final void and the proposed rehabilitation of agricultural land”* in assessing the merits of the application. The Commission notes that despite this direction, the Department does not appear to have given these issues any particular weight in its preliminary assessment (Department of Planning and Environment, 2014a). While the Department has touched on some of the issues associated with agricultural land use impacts and water impacts associated with the final void, other components of this issue, such as the final landform, are barely mentioned in the report (Department of Planning and Environment, 2014a).

The Commission has considered the long term land use impacts and each of the components specified in the terms of reference. The lack of detailed plans or information on the proposed mine plan and landform have made it difficult for the Commission to come to any definitive position on the suitability of what is being proposed. The Commission acknowledges however that this broad mapping of the likely landform and land use is consistent with the level of detail that is provided on many of the mining applications that the Commission has seen.

The Commission agrees with the terms of reference which suggest that the long term land use and rehabilitation issues warrant some additional consideration. Some of the mining operations in the Hunter provide some unfortunate examples of the permanent legacy outcomes left for future generations. High standards can be expected in the future as technology and our expectations of best practice evolve over time. Nonetheless, the Commission considers it would be unfair to significantly delay this particular application when equally vague plans have been accepted on other

recent mining applications. The Commission might come to a different conclusion on a site where neighbouring land uses were more sensitive to the visual impacts or if disturbance of the highly fertile black soils on the Liverpool Plains was proposed. In this location outside the highly fertile black soil plains, the Commission accepts that the mine will have an impact on the long term land use, functions and landform of the site, but that these impacts are comparable to those of other coal mines in NSW. The Commission considers that the land use and landform impacts can be adequately contained through some more detailed design and planning to be undertaken prior to the commencement of mining and then with adaptive management work to be undertaken throughout the life of the mine.

In considering this issue, the wide disparity between the level of effort and scrutiny given to this issue compared to the long term nature of the impacts and relatively permanent landform outcomes is unavoidably apparent to the Commission. Given the Minister has asked the Commission to look at this issue, the Commission recommends that government needs to address this discrepancy between the level of scrutiny and effort given to the design of a mine plan, final landform, land use and rehabilitation strategy compared to the relatively permanent legacy issues and outcomes produced.

The Commission believes that community expectations and accepted standards will change over time and that this issue will need to be further addressed as any mine operation progresses across the site. This mining application can be easily divided into stages, linked to each pit and the Commission recommends that the performance of the mine should be reviewed and refined to meet best practice and the standards of the day, prior to commencing any work in each new pit. It would be unfair to single out this mine alone however as this is a common issue for mining applications, which are usually seeking to mine a resource over a number of decades. While this mine plan offers useful barriers and opportunities to review the operation before proceeding to the next pit, other mines are less clearly segmented and might require a more arbitrary trigger for review of the mine, for example every ten years. Ultimately this will need to be considered in the development of some broader government policy or guidelines.

### **Recommendations**

18. Prior to the determination of this application, the Commission recommends that further details of the activities associated with mining the eastern pit should be required. In particular further detail of the dumping patterns, landform and rehabilitation are needed to demonstrate that out of pit disturbance would be minimised; dumping would be scheduled to minimise the size of the active/exposed areas of the site at all times; and rehabilitation would prioritise the establishment of koala feed and shelter habitat corridors and the replacement of agricultural land to meet the criteria for Biophysical Strategic Agricultural Land.
19. Prior to allowing any works in each subsequent pit, the applicant should be required to submit a review of the performance of the project against the predictions and best practice; and revised management plans and strategies for the approval of the Secretary of the Department of Planning and Infrastructure. While this is partially covered by the auditing requirements that apply to all mining operations, the Commission considers that a more detailed and comprehensive audit (along with a review of the suitability of the mine plan, management plans and limits in place – against best practice) is warranted, prior to the commencement of each new pit. This staged review work and updated plans would need to address the landform and rehabilitation outcomes for each pit, but should also address other key impacts including the:
  - water impacts and water balance;

- air quality, noise and blasting impacts; and
- biodiversity management outcomes (see section 8.1 for discussion of impacts on the koala).

In relation to the mine plan, landform and land use, the plans would need to demonstrate that:

- best practice mine planning has been implemented to minimise the impacts of the project, including avoiding out of pit emplacement;
- the landform would meet best practice standards; and
- the rehabilitation strategy and land use goals are consistent with best practice and build on the experience both on this mine site and at other mines in the region.

20. More broadly, the Commission recommends the government should consider ways to address the long-term nature of proposed mining operations and the options available to ensure the standards of the day are able to be applied to these operations. The level of scrutiny and effort given to the design of a mine plan, final landform, land use and rehabilitation strategy, compared to the permanent landscape outcome and legacy issues produced also warrants some further policy work or guidelines.

## 8. Other Issues

### 8.1. Biodiversity

The Department of Planning and Environment has assessed the biodiversity impacts of the project (2014a), noting that the site is largely comprised of low diversity grassland and pasture. Nonetheless, the assessment found that 789 ha of Endangered Ecological Communities would be cleared during the life of the mine (Department of Planning and Environment, 2014a).

147 fauna species have been identified on the project site, 11 of which are listed as threatened (vulnerable) species (Department of Planning and Environment, 2014a). A further 28 threatened fauna species have the potential to occur on the site (2014a). The majority of these threatened fauna species are birds. Two mammals, the Koala and the Yellow-bellied Sheathtail Bat, were recorded on the site. During the Commission's general inspections of the area the Commission also saw a koala on a property near the site.

The Department's preliminary assessment indicates that the site has potential to support four threatened plants (Bluegrass (*Dichanthium setosum*), Finger Panic Grass (*Digitaria porrecta*), Slender darling pea (*Swainsona murrayana*) and Ooline (*Cadellia pentastylis*) (2014a). The Department indicated that one threatened flora species (Lobed Blue Grass, *Bothriochloa bilboa*) has been identified on the site. The Commission notes that while this species was listed as a vulnerable under the *Threatened Species Conservation Act 1995*, it was found to be more abundant and widely distributed than previously thought and in 2004 the NSW Scientific Committee determined the species should be removed from the vulnerable species list (NSW Scientific Committee, 2004). The species is not currently listed in either the *Threatened Species Conservation Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999*.

In considering the biodiversity impacts of the proposal the Commission met with a representative for the Office of Environment and Heritage. Representative advised that OEH is now largely satisfied that most of the biodiversity impacts of the mine can be adequately offset with the proposed biodiversity offset package. The Office of Environment and Heritage has previously indicated there are a number of issues in the Watermark Revised Koala Plan of Management which will need to be resolved (in its submission to the Department of Planning and Infrastructure of 6 December 2013). In its meeting with the Commission, the OEH advised the management of impacts on koalas is its key residual issue with the project.

#### Koalas

The impacts on koalas have been raised in a number of the submissions received, in its meeting with Gunnedah Council and in the presentations made at the public hearing. These suggest that the koala population in the Gunnedah area had been considered a relatively healthy population in the past, but is thought to have suffered from recent droughts and disease outbreaks. The Nature Conservation Council suggested that the Gunnedah koala population is significant at both a state and national level, but that it is under severe stress and is not recovering from an estimated 25% population decline that occurred in 2009. The Australian Koala Foundation also raised concerns suggesting the population is far smaller than claimed by the applicant and that the proposal could impact on 25% of this remaining population. The Commission understands that drought compounded by extreme heat days in 2008 or 2009 are thought to have caused significant losses to the koala population at that time.

The currently available population estimates vary widely and the OEH submission of December 2013 raised concerns about the population uncertainties, recommending more detailed baseline information would be needed. Nonetheless in meeting with the Commission the OEH confirmed that

the management responses and actions will generally be the same, whether the koala population is at the lower or upper end of the population range. The Commission understands that if the population is smaller, then fewer koalas would be likely to be intercepted in and around the project site.

The applicant has prepared a lengthy Koala Plan of Management, with a revised version included in the Response to Submissions (Hansen Bailey, 2013b). It appears the applicant has invested considerable effort into the development of the plan and proposes significant work to manage the impacts on koalas. Nonetheless, the Office of Environment and Heritage has indicated that a number of components require further attention prior to any endorsement of the plan (Office of Environment and Heritage, 2013), these include:

- further characterisation of the population;
- identification and mitigation for high risk road and rail collisions;
- a design phase plan to be prepared in consultation with OEH;
- consideration of wider vegetation corridors;
- establishment of shelter sites;
- a response plan should the Koala population either on site and at any translocation sites change in a way that is inconsistent with the expectations of the translocation program; and
- contingencies in the event the translocation program is not successful.

The Commission generally agrees with these concerns raised by the Office of Environment and Heritage.

The Department of Planning and Environment has drafted condition requiring a Koala Plan of Management to be prepared and implemented to the satisfaction of the Secretary (Department of Planning and Environment, 2014b). While this draft condition for the Koala Plan of Management includes a fairly comprehensive list of requirements the plan would need to address, it defers the requirement for the plan until after an approval is given. The Commission considers that the applicant should be undertaking some of this further work now, prior to any determination of the application.

There are two key areas where further work now would assist in progressing the Koala Plan of Management once any approval of the mine was given. In particular additional monitoring to characterise the koala population would be useful, and should continue throughout the next stages of the assessment process to ensure the baseline data collected prior to any mining is of the best possible standard.

Based on its current population estimates, the applicant has indicated it would take 10 years to establish suitable feed trees and that approximately 90 koalas would be translocated during the first 10 years of the project (Hansen Bailey, 2013b). The Commission considers that these figures may be optimistic. Nonetheless the Commission has heard anecdotal evidence of the success of other programs to plant tree corridors in the region. In light of this apparent success and regardless of the growth period necessary to establish useful feed and shelter trees it would seem the sooner the applicant is able to commence plantings the better.

The Commission notes that the monitoring of koalas and planting of feed and shelter corridors are not contingent on any approval, be it of the mine or the Koala Plan of Management, and should be progressed immediately. The Commission has recommended elsewhere in this report that the land owned by the applicant should generally remain in productive agricultural use. Nonetheless, the Commission considers that there is scope for some corridor plantings, particularly along paddock fence lines, to improve connectivity of koala feed and shelter habitat, without compromising



agricultural production within the paddocks. The Commission recommends that planting of koala feed and shelter trees should commence as soon as possible.

Even if early tree planting is successful, managing and minimising the risks to the local koala population and implementing a successful translocation program will be a complex task that will require significant monitoring and adaptation to ensure fatalities are minimised. With this in mind the Commission considers that a working group of koala experts should be established to provide oversight and ongoing input into the monitoring, mitigation measures, management and any translocation of koalas. The applicant has already established a Koala Community Reference Group with representatives from the local council and local land management and wildlife rescue groups (Hansen Bailey, 2013b). The Commission considers that this group could be supported by, or expanded to include, appropriate expertise from government, the broader scientific community and local veterinary practice/s experienced with Koalas. The Commission considers this expert oversight from a Technical Working Group will be critical to ensuring that the koala population is adequately monitored and managed and to ensure any unexpected changes are identified and appropriately responded to.

The Technical Working Group would need to include representation from those with local knowledge as well as some with wider expertise and experience in other areas. The group should be formed as soon as possible as it would be able to provide useful input into the tree planting program, the additional/ongoing koala monitoring program to be established and the further development of the Koala Plan of Management. The Technical Working Group would also have a useful role in overseeing the results of the monitoring, management and any translocation of koalas and so an ongoing requirement for the Technical Working Group should be included in the conditions of any consent for the mine.

It will also be important to have a transparent process for managing koalas, especially given the local interest in this issue and the potential for information sharing to improve management of the wider population. Consequently the Commission considers that information on the management, monitoring and any incidents involving Koalas should be made publicly available. The Commission considers that koala management and the input and advice of the Koala Technical Working Group would need to be made publicly available on a suitable website that is updated regularly, i.e. within a week of any new information, results or incidents.

The December 2013 submission from the Office of Environment and Heritage suggests that road and rail collision may be the most serious threat to the local Koala population. The Commission notes that some other mines have indicated they would provide shuttle bus services to reduce the traffic impacts of the mine. Shuttle buses would reduce the number of vehicles on the roads around the mine and may also reduce the likelihood of vehicles intercepting koalas as they cross various roads around the site. In addition to the speed limit, fencing and underpass measures recommended by the Office of Environment and Heritage (Office of Environment and Heritage, 2013), the Commission considers that options should be explored to transport the majority of the workforce to and from the site by shuttle bus, to reduce koala injuries and fatalities resulting from vehicle collisions.

### Conclusion

The Commission acknowledges the project would impact on the biodiversity on the project site. These biodiversity impacts are proposed to be offset by securing both onsite and offsite areas of biodiversity value. In addition to this, the applicant has acknowledged that impacts on the local koala population are a significant local issue and is proposing a management approach that would include establishment of replacement feed trees (over the longer term) and translocation of some individuals while mining operations are occurring.

A number of submissions raised particular concerns about the impacts on the local koala population. The Commission acknowledges the significance of the Gunnedah koala population and considers that more work will need to be done to characterise the population and its movements throughout the region. Nonetheless previous regional tree planting efforts are said to have been successful in providing useful corridors for koalas. This, combined with the knowledge that the population has managed to survive the significant landscape changes that have occurred over the last two centuries gives the Commission some confidence this mine will not have an irreversible impact on Gunnedah's koala population. Nonetheless early planting; expert advice and oversight; and minimisation of vehicle strike risks will be important in minimising the impacts on koalas. The Commission also notes that the mine plan design, which is to mine 3 separate pits sequentially, provides opportunities for useful milestones to be tied to the advancement of mining into each new pit (see recommendation 19).

### **Recommendations**

21. The Commission recommends that monitoring of the koala population should be ongoing and planting of koala feed and shelter trees should be progressed as soon as possible.
22. The Commission recommends that a technical working group of koala experts from government, the scientific community and the local wildlife and veterinary practices must be established to oversee the management of koalas issues associated with the project. This working group must:
  - a. be established in consultation with the NSW Office of Environment and Heritage, and include appropriate expertise as required by the Office of Environment and Heritage;
  - b. be formed as soon as possible;
  - c. provide input and comment on the tree planting program, its progress and future planting priorities;
  - d. review the koala monitoring program being implemented and provide input and guidance on the development of this monitoring program;
  - e. provide input into the development of the Koala Plan of Management;
  - f. have an ongoing monitoring and advisory role in the management of koalas during any mining, which should be included in conditions of any consent for mining.
23. Information on koala management, monitoring, incidents and advice of the Koala Technical Working Group should be made publicly available in a timely and efficient manner.
24. In addition to the speed limit, fencing and underpass measures recommended by the Office of Environment and Heritage, the Commission recommended that shuttle bus services should be provided to reduce the traffic numbers and the associated risks of koala fatalities and injuries from collisions with vehicles around the site.

## **8.2. Economic**

The Commission heard various views about the economic impacts of the project. A number of local businesses and the Councils generally supported the proposal suggesting it would bring more employment and population growth opportunities to the region. The need for a diverse economy was highlighted with stories of the impacts of drought on the agricultural sector in the 1990s which in turn led to a decline in Gunnedah's population, township and business community at that time. On the other hand many objectors raised concerns that the mine could impact on the viability of the agricultural sector. Others have criticised the applicant's economic analysis.

The Commission understands the proposal is to extract coal of a relatively high quality, much of which is classed as semi-soft coking coal, suitable for use in the production of steel. The Commission acknowledges concerns that the mine could impact on the agricultural sector and the uncertainties regarding water modelling will need to be resolved prior to any determination of the application. Nonetheless, should the water impacts prove to be manageable, as has been suggested by the NSW Office of Water and various independent experts to date, the Commission expects the impacts to the agricultural sector could be contained and that the mine would provide growth and diversification to the local economy.

With the population and economic growth that has come from the mining activities currently occurring in the Boggabri area it is not surprising that some objectors might advance an argument for delaying the commencement of this mine until those mines are completed. This would allow the mining sector's contribution to the regional economy to be shared over a longer period and provide opportunities for mining jobs to be transferred from one mine to the next as extraction of each resource is completed. Ultimately the Commission accepts this is a matter for consideration when granting exploration licences and is outside the terms of reference of this review.

At some point growth in the mining sector has the capacity to outcompete other industries, particularly in demand for labour. While Gunnedah appears to have benefited from other mining occurring in the region, particularly around Boggabri, the Commission does not expect the addition of this mine would cause this balance between mining and other industries to be significantly impacted. Nonetheless the housing capacity of smaller regional centres can easily be filled when mining increases both the temporary and permanent populations in relatively short timeframes. The Commission is not in a position to predict where employees may wish to reside, but suggests it will be important for Tamworth, Gunnedah and Liverpool Plains Shire Councils to ensure planning is in place to provide for the development of extra housing, should the demand arise.

### **8.3. Lighting**

The Siding Springs and Australian Astronomical Observatory raised concerns about the light impacts on the clear night skies necessary for the observatory to remain a viable scientific resource capable of attracting ongoing investment. The Department of Planning and Environment has drafted conditions requiring the applicant to minimise the lighting impacts, particularly on the Siding Springs Observatory (Department of Planning and Environment, 2014b). The conditions also require the applicant to consult with the Australian Astronomical Observatory regarding the monitoring of light levels (Department of Planning and Environment, 2014b). The Commission is satisfied that with these requirements to minimise lighting impacts and consult with the Observatory regarding the monitored light levels the mine's lighting levels should be able to be controlled to prevent unacceptable impacts on the Observatory.

### **8.4. Local Government Issues raised with the Commission**

Both Gunnedah and Liverpool Plains Shire Councils' are generally supportive of the mine, but raised some concerns with the process and the management of local issues such as traffic.

Gunnedah Council was generally satisfied with the proposal, but noted that it is essential the water resources in the area are maintained for the long term and suggested the use of words like 'negligible' in the conditions relating to water did not seem satisfactory. The Commission acknowledges the Council's concerns about the use of the word negligible. Nonetheless, the Commission does not have a suitable alternative, nor did the Council suggest one. The term is defined in the draft conditions and the Commission notes that it is applied to mines across the state.

Gunnedah Shire Council also sought a regional air quality monitoring network, as has been provided in the Hunter. Monitoring of dust emissions from all mining is important. In this instance this mine would be relatively isolated from other existing open cut mines and the Commission does not consider that this mine alone would warrant the provision of a regional air quality monitoring network. Nonetheless this may need to be considered as a result of other mining occurring across the region and if a network was to be established it would be sensible to include the area for this mine in that network.

Following the Commission's meeting with Liverpool Plains Shire Council the Council wrote to the Commission to formalise its requests. These requests are:

- to be included in the Community Consultative Committee;
- to recoup administrative costs to Council that are associated with handling and responding to enquires related to the mine;
- to have Bulunbulun Road widened and sealed; and
- that Voluntary Planning Agreement payments from the mine are indexed to CPI (the consumer price index).

The Commission has considered the Council's requests. The Commission agrees that it would be appropriate for Liverpool Plains Shire Council to be represented on the Community Consultative Committee, should it wish to have a representative on the committee. The Commission recommends that the conditions relating to the Community Consultative Committee are amended to clarify that a Liverpool Plains Shire Council representative can be included on the Committee if Council wishes to nominate one.

The Commission notes the Liverpool Plains Shire Council's concerns about the financial costs it might incur as a result of enquiries and or complaints about the mine. In the current system the Voluntary Planning Agreement negotiations should cover potential costs to local government associated with the application. In this instance the Commission understands the Council has agreed to enter into a Voluntary Planning Agreement with the mine. Any changes to the Voluntary Planning Agreement are a matter for the Council to negotiate with the applicant.

In relation to the need for road upgrades, the Commission is satisfied that the conditions drafted by the Department of Planning and Environment provide a suitable mechanism for traffic levels to be monitored and appropriate maintenance contributions to be provided by the applicant.

### **Recommendation**

25. The Commission recommends that the conditions relating to the Community Consultative Committee are amended to clarify that a Liverpool Plains Shire Council representative can be included on the Committee if Council wishes to nominate one.

## Conclusion

The Commission has carefully considered the application for the Watermark Coal Mine. The Commission has also considered the submissions made to the Commission and to the Department of Planning and Environment, the issues raised at the public hearing and in meetings with government agencies, the advice from the Gateway Panel and other documents referred to throughout this report.

The Commission notes that the proposed mine pits would not intrude onto the black soils of the Liverpool Plains, but would be on the less fertile slopes above the plains. Nonetheless, the applicant's exploration licence covers significant areas of the black soil plains and the Commission heard numerous submissions supporting the significance of the fertile black soils on the Liverpool Plains. The Commission recommends that the lease area should be amended to remove those areas on the black soil plains, as they should not be mined.

Submissions to the Commission indicate that water is critical to the agricultural productivity on the Liverpool Plains and the agricultural sector has real concern that there could be significant impacts on water resources from this mine. The Commission engaged Dr Colin Mackie who undertook a detailed review of the groundwater modelling provided by the applicant. Dr Mackie identified a number of questions with the modelling work undertaken by the applicant's consultants and has recommended that some additional modelling should be undertaken to resolve the uncertainties. Given the critical importance of the region's water resources to maintaining strong agricultural production, these uncertainties identified by Dr Mackie must be resolved prior to any determination of this application.

Health and amenity impacts were found to be consistent with those of other open cut coal mines and would need to be managed with tight limits, regular review and update and additional options for those properties that are predicted to be impacted by exceedance of air quality or noise criteria. The long term land use impacts will require some further work which can be considered separately for each of the three pits. Some additional work on the first pit, the eastern pit should be undertaken now, prior to any approval. The Commission considers that additional work on each subsequent pit, including consideration of the contemporary standards of the day should be required to be provided prior to the commencement of mining in that pit.

Impacts on koalas will also need to be minimised through careful management. The Commission found that monitoring of the koala population and planting of koala feed and shelter trees should commence as soon as possible. A Koala Technical Working Group should also be established to provide input and expert oversight of koala management and any translocation.

The Commission has considered the other issues raised in submissions and at the public hearing, such as impacts on heritage, and is satisfied these can be adequately managed through conditions.

In conclusion, the Commission is generally satisfied that the site of this proposal, on the less fertile higher ground above the Liverpool Plains, should be able to be mined without significant impacts to the agricultural productivity of the Liverpool Plains. Nonetheless the management of water impacts will be critically important, to ensure the groundwater aquifers which support the agricultural sector are sustained into the long term. The Commission considers that the mine is approvable, subject to some further water modelling to corroborate the predicted level of impact on water. The Commission has made some recommendations relating to conditions that must be applied to any consent for this mine, but the suitability of the Department's draft conditions will need to be further considered in finalising the assessment of the project. Nonetheless, the Commission has found that

there are other parts of the applicant's exploration licence (EL 7223) area that are not suitable for mining (on the Liverpool Plains) and the boundary of the exploration licence should be amended to remove those areas that extend onto the black soil plains.

## **Recommendations**

### **Agriculture**

1. The Commission recommends that the NSW Government should amend the boundary of exploration licence EL7223 to remove those areas that intrude into the black soil plains.
2. The Commission recommends that the NSW Government should follow on from the broader Regional Land Use Plan prepared in 2012, with some more detailed work or refinements to identify and protect those highly valuable, fertile, black soil plains, where mining should be prohibited.
3. The Commission recommends that the draft condition relating to the agricultural productivity of non-operational land around the project site must be strengthened.
4. The Commission recommends that a condition should be included to allow the NSW Land and Water Commissioner to nominate an independent party to resolve the matter, in the event of a disputed impact on agricultural production.

### **Water**

5. The additional modelling recommended by Dr Mackie must be completed and considered against the impacts predicted to date, prior to any determination of the application. That is:
  - a. The WST (Watermark Staged Transient) model is to be run with drain reference elevations set at or just above the base of the respective drain cells;
  - b. The WST model is to be run using the variably saturated 'pseudo soil' option available within Modflow Surfact thereby negating the need for vadose zone parameters (drain reference elevations unchanged);
  - c. The WST model is to be run using both the pseudo soil option and the adjustments to drain reference elevations; and
  - d. A steady state recovery model is to be run to assess long term impacts.
6. Any differences between the outcomes reported so far and those predicted under the revised modelling required in recommendation 5 will need to be assessed (and should be publicly exhibited if the impacts prove greater those currently predicted by the applicant), prior to determination of the application.

### **Air, Noise and Blasting**

#### Operations to scale back and/or shut down to ensure compliance with noise and dust limits

7. The Commission recommends that the operating conditions for noise and dust should be updated to clarify that scaling back and shut down of operations will be required at certain times to ensure compliance with the noise and air quality limits.
8. The Commission recommends that the conditions should include a requirement that prior to the commencement of mining in each new pit, updated consideration of the impacts of mining is to be provided, to demonstrate that the performance of the mine will comply with the standards of the day and ensure best practice (taking into account the more restricted options available compared to those for a new mine).

#### Options available for residents predicted to be impacted by exceedances of dust criteria

9. The Commission recommends that all residences predicted to be impacted by an exceedance of the air quality criteria should be given the following options:
  - i. to sell their property to the mine and move elsewhere;
  - ii. to negotiate a mutually agreeable outcome;
  - iii. to have the applicant provide mitigation measures at the dwelling including enclosure of outdoor entertaining spaces such as decks and installation and upkeep of air conditioning and first flush devices for rainwater tanks;
  - iv. to have alternative accommodation provided.

#### Air quality limits should apply at properties where exceedances are predicted

10. In addition to this the Commission recommends that limits should be included in the conditions to ensure the applicant does not exceed the predicted impacts. This should include limits that vary over the life of the mine in response to the modelled predictions. I.e. if a residence is predicted to receive higher dust levels in year 10, but not year 5 or year 15, then the higher limit should not apply during those other stages of mining when the impact is not predicted to occur.

#### Options available for residents predicted to be impacted by exceedances of the noise criteria

11. The Commission recommends that all residences predicted to be impacted by an exceedance of the intrusive noise criteria should be given the following options:
  - i. to sell their property to the mine and move elsewhere;
  - ii. to negotiate a mutually agreeable outcome;
  - iii. to have the applicant provide mitigation measures at the dwelling including the provision of double glazing.

#### Noise limits should apply at properties where exceedances are predicted

12. The Commission recommends that limits should be included in the conditions to ensure the applicant does not exceed the predicted impacts. This should include limits that vary over the life of the mine in response to the modelled predictions. I.e. if a residence is predicted to receive higher noise levels in year 10, but not year 5 or year 15, then the higher limit should not apply during those other stages of mining when the impact is not predicted to occur.

#### Meteorological Conditions and Compliance Monitoring

13. The Commission recommends that the Applicable Meteorological Conditions and Compliance Monitoring requirements in Appendix 5 of the draft conditions should be updated to reflect contemporary capabilities in monitoring during rain and hail conditions as well as the gradient wind and temperature inversion features of the area.

#### Identification of residences

14. The Commission recommends that the final conditions clearly identify or map each residence that is listed as having a higher noise or dust criteria.

#### Impacted land

15. The Commission recommends that the NSW Government needs to develop a clear policy on the management of health and amenity impacts on land that is not occupied by a dwelling.
16. In the absence of a definitive policy or clear, specific justification, the Commission considers that acquisition rights should be available to those properties identified in Table 4 and Table 5.

### Ground vibration criteria

17. The Commission recommends that the blasting criteria in the conditions should include the applicant's nominated ground vibration criteria of 2mm/s for the Breeza Cemetery.

### **Long Term Land Use, rehabilitation, landform and final void**

18. Prior to the determination of this application, the Commission recommends that further details of the activities associated with mining the eastern pit should be required. In particular further detail of the dumping patterns, landform and rehabilitation are needed to demonstrate that out of pit disturbance would be minimised; dumping would be scheduled to minimise the size of the active/exposed areas of the site at all times; and rehabilitation would prioritise the establishment of koala feed and shelter habitat corridors and the replacement of agricultural land to meet the criteria for Biophysical Strategic Agricultural Land.
19. Prior to allowing any works in each subsequent pit, the applicant should be required to submit a review of the performance of the project against the predictions and best practice; and revised management plans and strategies for the approval of the Secretary of the Department of Planning and Infrastructure. While this is partially covered by the auditing requirements that apply to all mining operations, the Commission considers that a more detailed and comprehensive audit (along with a review of the suitability of the mine plan, management plans and limits in place – against best practice) is warranted, prior to the commencement of each new pit. This staged review work and updated plans would need to address the landform and rehabilitation outcomes for each pit, but should also address other key impacts including the:
  - water impacts and water balance;
  - air quality, noise and blasting impacts; and
  - biodiversity management outcomes (see section 8.1 for discussion of impacts on the koala).In relation to the mine plan, landform and land use, the plans would need to demonstrate that:
  - best practice mine planning has been implemented to minimise the impacts of the project, including avoiding out of pit emplacement;
  - the landform would meet best practice standards; and
  - the rehabilitation strategy and land use goals are consistent with best practice and build on the experience both on this mine site and at other mines in the region.
20. The Commission recommends the government should consider ways to address the long-term nature of proposed mining operations and the options available to ensure the standards of the day are able to be applied to these operations. The level of scrutiny and effort given to the design of a mine plan, final landform, land use and rehabilitation strategy, compared to the relatively permanent landscape outcome and legacy issues produced also warrants some further policy work or guidelines.

### **Other**

#### Biodiversity

21. The Commission recommends that monitoring of the koala population should be ongoing and planting of koala feed and shelter trees should be progressed as soon as possible.
22. The Commission recommends that a technical working group of koala experts from government, the scientific community and the local wildlife and veterinary practices must be



established to oversee the management of koalas issues associated with the project. This working group must:

- a. be established in consultation with the NSW Office of Environment and Heritage, and include appropriate expertise as required by the Office of Environment and Heritage;
- b. be formed as soon as possible;
- c. provide input and comment on the tree planting program, its progress and future planting priorities;
- d. review the koala monitoring program being implemented and provide input and guidance on the development of this monitoring program;
- e. provide input into the development of the Koala Plan of Management;
- f. have an ongoing monitoring and advisory role in the management of koalas during any mining, which should be included in conditions of any consent for mining.

23. Information on koala management, monitoring, incidents and advice of the Koala Technical Working Group should be made publicly available in a timely and efficient manner.

24. In addition to the speed limit, fencing and underpass measures recommended by the Office of Environment and Heritage, the Commission recommended that shuttle bus services should be provided to reduce the traffic numbers and the associated risks of koala fatalities and injuries from collisions with vehicles around the site.

#### Community Consultative Committee

25. The Commission recommends that the conditions relating to the Community Consultative Committee are amended to clarify that a Liverpool Plains Shire Council representative can be included on the Committee if Council wishes to nominate one.

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## **List of Appendices**

1. Minister's Terms of Reference
2. Summary of Issues raised at the Public Hearing
3. Summary of Meetings
4. Independent expert advice from Dr Colin Mackie
5. Dr Mackie's questions to the applicant and the applicant's response