ATTACHMENT 1 - Biodiversity

OEH has reviewed the Moolarben Coal Project Stage 1 Optimisation Modification (Modification 9) Environmental Assessment (EA) against the:

- Draft *'Threatened Species Survey and Assessment: Guidelines for developments and activities'* (2004);
- *NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects* (OEH Interim Offset Policy); and
- *OEH Principles for Biodiversity Offsets in NSW* (OEH Offset Principles).

PROJECT OVERVIEW

The modification involves the extension of the currently approved Stage 1 Open Cuts 1 and 2, additional water management infrastructure and changes to rehabilitation sequencing and final landform.

OEH understands that the impacts of these additional works include:

- Disturbance to 178ha of land in total.
- Removal of 171ha of native forest and woodland habitat including 17.2ha of the White Box, Yellow Box, Blakely's Red Gum Endangered Ecological Community (EEC) (predicted to be a significant impact).
- Impacts to known or potential habitat for 43 threatened species with 8 threatened fauna species confirmed within the study area.
- Removal of 3km of cliff line habitat. A reported Eastern Cave Bat maternity site will be removed, along with at least 25 rock shelters (as identified within the Aboriginal Cultural Heritage assessment).
- Predicted significant impacts on the threatened Brown Treecreeper and Eastern Cave Bat (high risk of extinction of the local population, Appendix E, page 77).
- Indirect impacts associated with noise, vibration, dust, light spill and other edge effects.

ENVIRONMENTAL ASSESSMENT

1. Identification of Cannon's (Capertee) Stringybark *Eucalyptus cannonii* needs to be clarified.

Nineteen individuals of suspected *E. cannonii* were found in the proposed Open Cut 1 extension area. Samples were collected and reviewed by identification botanists at the Royal Botanic Gardens in Sydney. It was concluded that the samples collected were a hybrid of *E. cannonii* and *E. macrorhyncha*. The hybrid is not recognised in the approved Commonwealth conservation advice for the species or the NSW Environmental Impact Assessment Guidelines and therefore is not assessed further in the Ecological Impact Assessment. Hybrids of *E. cannonii* and *E. macrorhyncha* commonly occur however they are generally found with examples of both parent species.

Recommendation:

1. Given the strong likelihood that pure *E. cannonii* occur on the site this species should be assessed accordingly unless the proponent has confirmed its absence.

2. Threatened species assessments must be justified, supported by adequate data and clearly presented.

It is important that the information collected and presented is sufficient for drawing reasonable conclusions regarding the likely impacts of the proposal on threatened species.

a) The proposal does not justify the survey effort employed for the flora and fauna surveys undertaken. The likelihood of detection of the target species is also an important consideration in the adequacy of surveys.

b) It appears that the flora surveys were not undertaken at the optimum time for at least two species – *Diuris tricolor* and *Swainsona sericea.* In the case of *Diuris tricolor,* the fact that this species was not recorded in the proposed extension area has however been used as partial justification for the conclusion that the proposal will not significantly impact these species.

c) The level of impact and habitat preferences for a range of threatened species are inconsistently presented throughout the EA. For example in the case of the Eastern Cave Bat, the EA reports:

   - That this species is only associated with open forests on hillsides and ridges, of which 153.5ha to be cleared (Appendix E, page 73, Table 6.2);
   - Removal of approximately 90ha of breeding habitat and 90ha of foraging habitat (Appendix E page 76, Table 6.3); and
   - That potential foraging habitat for this species is available in open forests, footslope woodlands and riparian woodlands (Appendix E, page B.24), indicating impacts to 171ha of foraging habitat.

d) Whilst inconsistently reported, the EA indicates impacts to breeding habitat for the Eastern Cave Bat. Any impacts to breeding and roosting habitat for this species should generate species credits within the BioBanking Calculator. Nevertheless the Biodiversity Offset Strategy (BOS) reports that no species credits were required (Page 8).

e) The EA does not identify the location of cave bat breeding and roosting habitat within the impact site.

Recommendations:

2. The proponent provide comparison information in table format to compare flora and fauna survey effort at the proposed project area with the survey effort requirements as prescribed in DEC (2004) and provide justification for reduced survey effort in the cases where it does not meet the prescribed effort.
3. That the proponent undertake flora surveys in the appropriate flowering periods this year for those species unlikely to have been detected by the previous surveys, or else assume the presence of these species.
4. That the proponent presents a clear summary of expected impacts to threatened species and their habitats, based on adequate assessment of habitat on the development site. This should be reflected in the calculation of the required biodiversity credits.

3. Clarification is sought regarding the assessment of impacts on Groundwater Dependant Ecosystems (GDEs).

The Appendix J Groundwater Impact Assessment states that *'A detailed ecological assessment report, which includes discussion of the occurrence and distribution of GDEs within the project area, has been prepared by EMM (2013).*

'The occurrence of GDEs was assessed by EMM in accordance with relevant NSW policies. 'The Drip' (see Section 6.1), represents the only significant seep/spring GDE within the locality…'. The EA concludes that the proposed modification will not impact on 'The Drip' or River Red Gums along Moolarben Creek known for their groundwater dependence.

Whilst not completely clear, Appendix J infers that other GDEs were detected via 'extensive groundwater investigations' through out stages 1 and 2 of the Moolarben Coal Project. No further information is provided regarding the outcome of these investigations. The EA does not report whether there are other seeps or springs in the area which may be impacted, regardless of their regional or local significance.

Recommendation:

5. OEH recommends that the EA clarify whether there are other GDEs which may be impacted via the cumulative impact of mining operations in the area.

4. The EA does not adequately consider cumulative impacts. OEH is of the view that the significance of impacts on threatened species may have been underestimated.

The EA advises that:

- *'The proposed modification is a standalone proposal that will not affect Stage 2. However, if both Stage 2 and the proposed modification are approved, Stage 1 (including the proposed modification) and Stage 2 will operate concurrently. To enable probable worst case environmental impacts to be considered, this EA is based on assessment of Stage 1, Stage 2 and the proposed modification'* (Main Report, page ES.3); and
- *'This terrestrial ecology impact assessment is based on the assumption that Stage 2 of the MCP will be approved, enabling potential worst case impacts to be assessed'* (Appendix E, page 3).

However apart from reporting a cumulative impact of 148ha for Box Gum EEC and referring to subsidence impacts, the cumulative impact on biodiversity values as a result of the direct and indirect impacts assessed for the approved and proposed stages of the Moolarben mine (and those of surrounding mines such as Wilpinjong and Ulan) is not presented by the proponent due to difficulties in quantifying the impacts of each project. This is not sufficient justification for failing to present appropriate data to allow proper consideration of cumulative impacts. In the absence of this data OEH also assumes that the cumulative impact of these adjacent proposals has not been taken into account in the assessment of impacts on threatened species and their habitats.

Woodland birds

The Moolarben Coal Project is located within the Mudgee – Wollar Important Bird Area (IBA). The area has been identified by BirdLife International as an IBA because it regularly supports the critically endangered Regent Honeyeater. The IBA includes Goulburn River National Park, Munghorn Gap Nature Reserve and private land west to Gulgong and Mudgee, being defined by a number of woodland remnants used by Regent Honeyeaters around Mudgee, Buckeroo, Home Rule, Meroo, Ulan, Wollar, Windemere Dam and Murrumbo.

Clearing of the valley floors has resulted in an increased dependence on remnant woodland and open forests of the valley footslopes by Regent Honeyeaters and other woodland birds. The further loss of vegetation types containing key nectar-bearing species such as White Box, Yellow Box, Mugga Ironbark and Grey Gum both increases habitat fragmentation, potentially to the point where the movement patterns of Regent Honeyeaters are disrupted, and contributes to the loss of foraging resources which, at times, supports significant breeding events of the Regent Honeyeater. Habitat fragmentation, and the resulting restriction of movement by Regent Honeyeaters, is regarded as a major contributing factor in the continued decline of this species.

The removal of native vegetation including footslope woodland and open forest within the proposed extension areas adds considerably to the cumulative impacts of the existing Moolarben Stage 1, the Ulan and Wilpinjong Coal Mines and the proposed Moolarben Stage 2. These impacts are especially applicable to the Regent Honeyeater but also to other threatened, and declining, woodland birds, particularly those species such as Brown Treecreepers and Grey-crowned Babblers where the dispersal of females is crucial to the long term sustainability of local populations. The EA argues that any cumulative impacts will be mitigated through investment in biodiversity offsets and rehabilitation. OEH regards these measures as incapable of mitigating the immediate and medium-term impact of the development.

Table 6.2 (Appendix E, Page 73) provides an assessment of fauna habitats that will be removed. It should be noted that the Regent Honeyeater is known to utilise the Ridge-top Broad-leaved Ironbark Grey Gum Forest and thus should be included as a species associated with *'Open forests on hillsides and ridges'*. A number of the species listed in Table 6.2 are attributed to particular habitat types but are also likely to occur in habitats to which they have not been attributed in that Table.

OEH holds a contrary view to that offered in the EA that '*while some impacts are expected for other threatened fauna species including diurnal birds … from the loss of potential habitat, these impacts are not considered to be significant*' (page 77).

Bats

OEH is aware that Long-eared Pied Bats are known to breed locally with a lactating female captured near Ulan. Maternity colonies of this species are established in roof domes of sandstone caves, remaining loyal to the same cave over many years. This, in combination with the suspected Eastern Cave Bat maternity site referred to in the EA, suggests that the extent of cave-roosting microbat habitat on the site and the predicted level of impact on these species may be understated.

Appendix F (Aboriginal Heritage Impact Assessment), provides documentation and photographs of a number of overhangs, crevices and caves that OEH considers likely to contain roosts of a number of bat species. As such the value of the site for cave-roosting bats is likely to be high.

Alteration of flow regimes

An assessment of the cumulative impact to biodiversity values in the area as a result of mining should include discussion of any cumulative impacts to flow regimes in the context of the Key Threatening Process *'Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands'.*

Recommendations:

6. That the proponent be required to present the cumulative impact (including both direct and indirect impacts) on the vegetation communities, threatened species habitat and connectivity.
7. That the EA be revised to include further assessment of the extent of cave-roosting microbat habitat on the site and the predicted level of impact on these species.

8. The revised cumulative impact assessment and any additional assessment of cave roosting microbat habitat is taken into account in the threatened species assessments, including conclusions regarding the likely significance of impacts on these species.
9. That the revised cumulative impact assessment specifically presents conclusions regarding water quality and flow regime impacts on biodiversity as a result of the combined mining projects in the locality.

AVOIDANCE

5. Insufficient information has been presented to justify the level of avoidance proposed.

There are several reasons why impact avoidance should be given priority as far as possible, with any residual unavoidable impacts mitigated and offset to a high standard.

The Stage 1 environmental impact assessment was undertaken on the basis of the native vegetation immediately to the east of Open Cuts 1 and 2 remaining intact. In fact the original Stage 1 proposal (as approved in 2007) committed to the on-title protection of these areas. Similarly, assessment of Stage 2 was also undertaken in the context of this same area of native vegetation bordering the Stage 2 disturbance areas remaining. A Stage 1 modification approval (Mod 7 and revised offset strategy) granted in 2011 removed the surety that these areas of biodiversity value would not be directly impacted by Stage 1 operations and would be retained as part of a corridor. Previous avoidance of this area is not discussed within the EA.

The removal of the vegetation communities and habitat within the proposed extension areas is largely justified on the grounds that *'habitat resources do occur outside the disturbance footprint, with abundant similar habitat available in wooded areas to the east, and in the connected corridor'* with Goulburn River National Park and Munghorn Gap Nature Reserve (Main Report, page 109).

However Appendix E also notes (for example):

- *'The local population of Brown Treecreepers is considered to be those individuals present in the study area, given their highly sedentary nature'.* Habitat in the study area is considered important to this local population and *'… a reduction in breeding habitat and foraging resources may cause the local population to decline…'* (Page B.16-B.17);
- Removal of breeding habitat for the Eastern Cave Bat *'may affect breeding success, limit recruitment and decrease the local population size in the long-term as breeding habitat and caves are a limiting factor in the locality'* (Page B.25); and
- Tree roosting bats (6 species) – *'The study area contains potential foraging and breeding habitat, in the form of hollow-bearing trees, for these microbat species. Hollow bearing trees are considered a limiting resource in the study area (mainly restricted to Ridgetop Blue-leaved Ironbark Grey Gum Forest) and the removal of this resource could impact these species given the likely competition for such resources in the landscape'* (Page B.27).

OEH's views on the significance of the area to woodland birds particularly the Regent Honeyeater, is outlined under item 4 above. The EA understates this significance, as well as the likelihood of significant impacts for other threatened bird species in addition to the Brown Treecreeper. Similarly, the EA may understate the extent and potential significance of cave-roosting microbat habitat on the site and the predicted level of impact on these species.

Given the impacts predicted, the likely level of cumulative impact to habitat in the area and current deficiencies the environmental assessment and the biodiversity offset strategy (see item 8 below), OEH believes that a precautionary approach is warranted. Accordingly, further attention must be paid to avoiding impacts to the highest degree possible in the first instance. The EA does not contain sufficient evidence that avoidance has been adequately considered.

Clarity of current avoidance measures

Regarding avoidance, the EA states (Main Report, page 35) that a number of configurations and extents were considered for the proposed extension areas, including:

- *Option 1* – extending Open Cuts 1 and 2 towards the eastern extent of the Stage 1 project approval boundary, and the Open Cut 2 extension area further to the west. This option was dismissed based on collective environmental risks associated with encroachment on Moolarben creek, vegetation connectivity and habitat disturbance, noise, dust, visual and Aboriginal cultural heritage impacts.
- *Option 2* – extending the Open Cut 3 to the west and east. This option was rejected due to high overburden to coal strip ratio and the indicative timeframe for mining.
- *Option 3* – the currently proposed extension areas. This option was preferred as it enables efficient extraction of a relatively low strip ratio coal resource and was considered to minimise potential adverse environmental impacts.

The EA does not depict these options on maps.

The EA also notes that avoidance measures considered in the design of the Stage 1 expansion project included (Main Report, page 96):

- *'Exclusion of Moolarben Creek from the proposed modification boundary to protect riparian zones and the habitats that these areas provide*
- *Modification of the proposed extension area footprints to maintain connectivity between forested areas to the north and south of MCP and to ensure substantial vegetation is retained to the east.*
- *Adoption of a two-stage gradual clearing protocol where non-habitat trees are cleared 24 hours prior to any habitat trees being cleared, to encourage fauna to move out of an area prior to impact.*

These avoidance measures are considered to provide a substantial reduction in potential worst case ecological impacts'.

Firstly, dot point three is considered to be a mitigation, rather than avoidance, measure.

Without further information it is assumed that the first two avoidance measures listed refer to the rejection of 'Option 1' set out above. It is not clear how under 'Option 1' Open Cuts 1 and 2 could be extended further towards the eastern extent of the Stage 1 project approval boundary than the currently proposed expansion, given the current proposal already abuts the proposed Stage 2 underground area. It is assumed that further expansion east would have necessitated the redesign of the Stage 2 proposal.

No further details are supplied to demonstrate the degree to which consideration of alternatives, or modifications made to the project, have avoided impacts. It is assumed that this assessment exists, as the EA states that *'Numerous ecological studies have been undertaken within the study area and surrounds. These studies have enabled ecological risks to be incorporated into the mine design for the proposed modification, limiting its potential adverse impacts'* (Main Report, page 108).

The proponent also has not justified why these avoidance measures are considered to be the maximum that can be achieved.

Recommendations:

10. That the proponent removes dot point three above from the list of avoidance measures.

11. That the proponent be required to demonstrate the degree to which modifications have avoided impacts by:
    a) Including maps of the additional two options that were considered in the development of the proposed expansion project.
    b) Including maps of the original and refined extension area footprints, which indicate those areas avoided.
    c) Quantifying (hectares, communities and habitat) the area of impact avoided through both the chosen option compared with the other two options considered and any further modifications made to the proposed extension area footprints.
    d) Presenting a more detailed assessment of the mine site identifying cave bat breeding and roosting sites and related habitat. This assessment should also identify the extent to which cliff line habitat with features suited to bat roost sites has been avoided and will be protected on the site in-perpetuity.
12. Justify the level of avoidance adopted in the context of the level of significance of the impacts associated with the proposal and the cumulative impact of all mining operations in the area.

MITIGATION

6. Mitigation measures for flora and fauna species require clarification

In determining the significance of impacts on *Diuris tricolor* (see comments under item 2 above) the proponent states that surveys to detect the species in the proposed extension areas will be undertaken prior to clearing, with appropriate management actions taken if detected. The EA does not suggest what these management actions may include.

Within the mitigation measures proposed, the EA proposes to investigate artificial roosting structures for microbats to compensate for the loss of rocky outcrops (Appendix E, page 86, Table 7.1). Investigating a mitigation measure is not considered to be a mitigation measure in itself. A more detailed assessment of the mine site identifying roosting sites and related habitat would be required to determine feasible compensatory measures.

Recommendations:

13. That the proponent be required to present sufficient detail regarding all proposed mitigation measures, including type, location, and justification for their selection (eg purpose and likely efficacy).
14. That the proponent be required to undertake the proposed surveys for *Diuris tricolor* in the appropriate flowering period this year and prior to any approval being granted, or assume the presence of this species and adjust assessments and mitigation measures accordingly.

BIODIVERSITY OFFSET STRATEGY (BOS)

The credit results quoted by the proponent in the EA have been taken at face value at this stage. Insufficient data has been supplied to allow OEH to verify the accuracy of the vegetation community classifications or the suitability of condition assessments and conclusions.

The proponent has partially applied the BioBanking Assessment Methodology (BBAM) and has estimated that the quantum of the offset required is 10,171 credits, which in turn has been estimated as 1,094ha.

The proposed offset strategy will consist of:

- 629 hectares of remnant and regenerating 'like for like' vegetation types and threatened fauna habitat' (EcoLogical Australia BOS, page 1) including:
    - 330ha of Box Gum EEC
    - 299ha of dry sclerophyll forests, forests wetland and rainforest.
    - up to 250ha of derived native grassland (DNG)

  The proportion of DNG within the offset for the Box Gum EEC and other vegetation types is not clear. However from comparisons of Table 2 (EcoLogical Australia BOS) and the vegetation mapping provided, it appears that at least 195ha or more of the 330ha Box Gum Woodland EEC offset consists of DNG.
- Approximately 145ha of future mine rehabilitation which the proponent reports will generate 1,345 credits.

Considering the proponent's results, OEH highlights the following:

- Potential for the offset to have exceeded the full credit requirement for Box Gum Woodland EEC.
- A shortfall in offset quantum for four out of five vegetation communities using BBAM. Even when matches are considered based on formation (as per the OEH Offset Policy Tier 3 variation criteria), a shortfall in quantum remains for these four vegetation communities (a total of 690.48ha).
- A total shortfall in offset quantum (all vegetation communities combined) of 464.89ha, meaning only approximately 57% of the required quantum is estimated to be achieved by the offset properties.
- If the proponent's mine rehabilitation calculations are included, there remains a shortfall in quantum for two communities and a total shortfall of 320.27ha.
- The deficiencies in the offset quantum relate primarily to dry sclerophyll forests (shrubby, and shrub/grass subformations) and their associated fauna assemblages.
- Impacts to Eastern Cave Bat breeding and roosting habitat would generate species credits within the BioBanking calculator. Nevertheless, no requirement for species credits is reported by the proponent.

7. Condition of vegetation in offsets requires clarification

The proposed offset package provides vegetation maps of each of the properties and a table demonstrating areas of matching vegetation types but provides only brief descriptions and photos of the proposed offset sites.

The OEH Offset Principles require offsets to be based on sound ecological principles. OEH maintains the view that reconstruction of ecological communities involves high risks and uncertainties for biodiversity outcomes and is generally less preferable than other management strategies, such as enhancing existing habitat. It is important that the proponent fully justify any inclusion of restoration of DNG to higher state communities within their offset strategy. This should include demonstration that they have exhausted all other options and that the success of the restoration proposed is supported by relevant published/peer reviewed research.

From comparisons of Table 2 (EcoLogical Australia BOS) and the vegetation mapping provided, it appears that at least 195ha or more of the 250ha of DNG reported may have been included as offsets for impacts to the Box Gum Woodland EEC. If so, this would mean that approximately 59% or more of the offset for this EEC would consist of restoration of DNG. OEH prefers that EECs should firstly be offset be existing EEC woodland vegetation. If a

proportion of DNG is included, OEH would prefer only areas defined as State 1 and State 2 of the Box Gum Grassy Woodland State and Transition Model (Rawlings *et al.* 2010[1]) to be targeted for revegetation activities.

The proponent states that:

- *'It is noted that areas of highly disturbed or poor quality vegetation, including areas of DNG have been excluded from the offset areas calculations due to the risks and time delays associated with enhancing these areas'.* (Appendix E, page 90)
- *'Of the 629ha of mapped vegetation, it is all in moderate to good biometric condition, including approximately 250ha of DNG and all but 4.17ha provides 'matching/like for like' or 'better' conservation values'*. (Appendix E, page 90)
- *'250ha (mostly on the Bobadeen property) has been mapped as derived native grasslands (DNG)… The quality of this DNG…was found to be mostly in moderate to good condition with a high species richness including grazing sensitive species and although it had been grazed, it had not been subject to cultivation or pasture improvement practices. Some areas of DNG in poorer condition have been included in the areas calculations in Table 2 but where significant enhancement in biodiversity values has been assessed as not likely, excluded from the proposed offset areas (e.g. parts of the Clifford property)'* (EcoLogical Australia BOS, page 9).

The EA therefore first states that all poorer quality areas are excluded from the proposed offset areas, however the ELA report then states that some areas of DNG in poorer condition have been included in the offset calculations.

It is not clear whether those parts of 'Clifford' not included in the vegetation mapping are the only areas of 'poor condition' DNG which have been excluded from offset calculations. Similarly it is not known where the other poor condition DNG areas are located. Furthermore, 'poor condition' has not been defined in the EA with the relevant plot data not presented.

In regard to 'Property 5', comparison with a 2009 SPOT image indicates that areas mapped in the EA as *'Blakely's Red Gum – Yellow Box grassy open forest or woodland (DNG)'* may have been subject to cropping or pasture improvement in the past (Figure 1 attached). It is not known if these areas have been included in offset calculations.

It is particularly important that the condition and land use history of all areas proposed for restoration is clearly understood. Other than very small scale projects there is little scientific evidence to support the view that large scale areas of Box-Gum Woodland EECs can be successfully revegetated on land where there is a long history of cultivation or fertilizer application and high exotic plant cover. In fact, the contrary is the case as there are many studies showing that it is very difficult to achieve under those circumstances.

More detailed descriptions of each offset property would assist in determining the condition of vegetation on the properties as well as providing a better understanding of their suitability and likely success as offsets. These descriptions should also include information on the land use history of the properties.

Recommendations:

OEH recommends that the proponent be required to:

15. That the Proponent be required to provide more detailed descriptions of each offset property, including clear identification of the condition of the DNG present as well as the condition and area of the DNG included within the offset calculations.

[1] Rawlings, K., Freudenberger, D. and Carr, D. (2010) *A Guide to Managing Box Gum Grassy Woodlands*. Department of Environment, Water, Heritage and the Arts, Canberra.

Mapping and area calculations should be supplied for the following:

a) Low condition vegetation/grasslands;

b) Non-EEC listed native grasslands;

c) Derived native grasslands that correspond to an EEC (EPBC Act or TSC Act); and

d) Native vegetation in moderate-good condition.

The data and assumptions used to determine these classifications should also be supplied.

16. That the Proponent be required to provide detailed justification for the inclusion of restoration of DNG in the proposed offsets, including:

    a) Demonstration that they have exhausted all other options and the success of the proposed restoration considering the site conditions is supported by relevant published/peer reviewed research

    b) Details on the land use history of any areas of DNG proposed as offsets, including cultivation history, fertilizer application and groundcover species present (native and exotic), along with information relating to elevated soil nutrients (such as with nitrate, ammonium, available phosphorus and total carbon) in order to inform the suitability of the sites for inclusion in the offset and understand the capacity of the system to respond to management.

17. That the Proponent be required to increase the proportion of the offset that involves protection, management and enhancement of existing remnant vegetation relative to rehabilitation/restoration works, unless adequate justification for this can be supplied (as per recommendations a) and b) above).

8. The proposed offset strategy has not met the requirements of the OEH Interim Offset Policy or the OEH Offset Principles.

a) The EA contains the following incorrect statements regarding the outcome of the offset under the OEH Interim Offset Policy

The EA states:

- *'The biodiversity offset package accords with both NSW and Commonwealth offsetting principles and achieves a maintain or improve outcome'* (Appendix E, page E.4)

  The proponent has not provided justification under the OEH Offset Principles as to why they believe a 'maintain or improve' outcome has been achieved. Under the OEH Interim Offset Policy, given that 'red-flagged' vegetation communities are proposed to be cleared the proponent cannot achieve a Tier 1 'maintain or improve' outcome.

- Offset areas *'have been determined using quantitative methods to exceed a mitigated loss outcome'* (EcoLogical Australia BOS, Page 26).

  The current offset may have achieved Tier 2 'No net loss' for the Box Gum Woodland EEC because it is estimated that the offset will provide the required number of credits for this community using BBAM.

  If an offset does not match credits for individual vegetation types according to the BBAM requirements, it cannot meet Tier 2 'No net loss'. Accordingly the proponent has not achieved Tier 2 for the remaining vegetation communities. Therefore the remaining offsets are currently classified as a Tier 3 'mitigated net loss' outcome.

If Tier 2 has not been met, an offset cannot be claimed to *'exceed a mitigated net loss outcome'* under the OEH Interim Offset Policy just because it provides in excess of a 2:1 offset to impact ratio.

- *'Collectively, these properties significantly exceed a Tier 3 'mitigated loss' outcome (almost double) and meet 66% of a Tier 2 'no net loss' outcome'* (EcoLogical Australia BOS, page 1).

  Under the OEH Interim Offset Policy it is not possible to exceed Tier 3, unless an offset has actually achieved Tier 2. Similarly, if the requirements for a Tier 2 outcome have not been fully met, the outcome falls to Tier 3, not a percentage of Tier 2.

- *'The proposed avoidance, mitigation and compensation measures will provide a net positive biodiversity outcome'* .

  This statement is unsubstantiated within the EA and conflicts with the fact that the proponent has only achieved a 'mitigated net loss' outcome under the OEH Interim Offset Policy for the majority of the vegetation communities impacted.

b) The EA includes mine rehabilitation within the offset calculations

The proponent contends that mine rehabilitation will contribute 1,345 credits to the biodiversity offsets for the proposal. The BOS (page 8) states that these credits were calculated using an informal Biobanking Assessment using Section 3.6.2 of the BioBanking Operational Manual (assessing site value following rehabilitation/restoration of a development site), although this assessment is not provided. Contrary to this, Table 1 of the BOS indicates that these credits have been generated assuming an average of 9.3 credits per hectare. If the latter is the case OEH would be of the view that the potential future credits generated by the mine rehabilitation were significantly overestimated.

The proponent proposes to re-establish the five impacted vegetation communities via mine rehabilitation including Box-Gum Woodland EEC. Mine rehabilitation is used to reduce the offset requirement for this community by 130 credits.

In line with principles 5 and 12 of the OEH Offset Principles, OEH will only consider areas subject to mine rehabilitation as an up-front biodiversity offset as a last resort. The proponent would need to provide comprehensive justification supporting why this type of land should be included in the up-front proposal.

It is likely that the proponent will find it difficult to re-establish good quality Box Gum woodland EEC on the mine site. It may be more appropriate for mine rehabilitation to focus on future fauna habitat re-establishment.

c) The proponent has not yet justified the use of Tier 3 'mitigated net loss' under the OEH Offset Policy for the outstanding ecosystem credits.

As set out in the OEH Interim Offset Policy, in considering whether the mitigated net loss standard is appropriate, consideration should be given to:

- whether the credits required are available on the market.
- whether alternative offset sites (other than credits) are available on the market.
- the overall cost of the offsets and whether these costs are reasonable given the circumstances.

The EA sets out the process and criteria used to investigate the availability and suitability of potential offset sites. Nevertheless, the proponent has not provided satisfactory justification for proceeding to Tier 3 on the grounds of credit availability or reasonableness of costs. OEH's view is that satisfactory justification must be provided for proceeding to Tier 3.

d) The proponent has not properly used the Tier 3 variation criteria under the OEH Interim Offset Policy.

The required BioBanking credits should be provided, with any reductions related to offset availability and reasonableness of costs fully justified. Any credit reduction should be only to the minimum extent justifiable.

To address a demonstrated lack of available matching ecosystem credits, the Tier 3 the variation criteria will allow (in priority order):

a) When no matching ecosystem credits are available, conversion of ecosystem credits for one vegetation type to another of the same formation and bioregion.

b) Conversion of ecosystem credits to an identified regional conservation priority, when no matching credits are available and variation a) above is not feasible.

To date, it appears the proponent has only considered matching vegetation types and formations within the local area. Whilst this is an important first step, a lack of available matches within that local area cannot be used as justification for not proceeding further with offsetting to the fullest extent possible. If the required matches are not available locally, systematic progression through the Tier 3 variation criteria provides the option of sourcing matches within the IBRA bioregion and if this is not feasible converting credits to regional conservation priorities.

There is no evidence provided to date that the proponent has exhausted all options available for adequately offsetting the biodiversity losses associated with the proposal. It has not been demonstrated that after applying the variation criteria, the currently proposed level of offsetting is all that can be achieved.

e) Offsets should aim to result in a net improvement in biodiversity over time and be appropriately targeted and located.

Under the OEH Offset Principles, enhancement of biodiversity in offset areas should be equal to or greater than the loss in biodiversity from the impact site, aiming to result in a net improvement in biodiversity over time. Offsets must also be targeted to biodiversity priorities, including being based on the presence of threatened species or their habitat, and located in areas that have the same or similar ecological characteristics as the area affected by the development.

The proposed offset currently falls short of these principles. Based on the information provided the overall quantum of the proposed offsets is deficient, without suitable justification. The provision of an offset which achieves the required quantum as far as possible is of particular importance in light of the significance of the impacts of the proposal on threatened species.

The EA itself recognises that the vegetation type with the largest offset requirement at the development site, Grey Gum – Narrow-leaved Ironbark woodland (Dry Sclerophyll Forest, Shrubby subformation), has only 162ha of matching offset vegetation types within the proposed offsets (or an offset ratio of 1.45:1).

The proponent has so far predicted impacts to known and potential habitat for 43 threatened species (of these, eight species were recorded within the development site). The proponent predicts that at least two of these species will be significantly impacted.

With the exception of Eastern Cave Bat breeding and roosting habitat (see further comments under item 8(f) below), none of the remaining subject threatened species are 'species credit' species, meaning habitat for these species is represented in the ecosystem credits generated. A shortfall in ecosystem credits means a likely shortfall in the offset as it relates to habitat for these threatened species. Hence the offsets are likely to be inadequate for threatened species primarily associated with the dry sclerophyll forest shrubby habitats. No adequate information to the contrary is presented in the EA.

The EA reports that a preliminary fauna assessment of the offset properties confirmed records or potential habitat for the threatened fauna species to be impacted and concludes that *'Each property investigated has the appropriate vegetation types, area, threatened species habitats and also contribute to regional conservation priorities and landscape connectivity'* (EcoLogical Australia, page 18). Little information is provided regarding habitat for threatened flora species and records within the offset sites.

Some descriptions of habitat within the offsets are provided in the BOS (Appendix B) and summarised in Table 3 of the BOS by identifying the threatened fauna species recorded on each of the offset properties to date, or rating the likelihood of occurrence of the species.

Nevertheless there is insufficient information regarding the quality or extent of the habitat attributes present within all of the currently proposed offsets for the subject threatened species compared to the impact site, to demonstrate why the proponent views the offset as adequate despite the credit shortfall.

f) Offsets must be quantifiable – the impacts and benefits must be reliably estimated

As set out in the OEH Offset Principles, offsets should be based on quantitative assessment of the loss in biodiversity from the impact site and the gain in biodiversity from the offset. The methodology must be based on the best available science, be reliable and used for calculative both the loss from the development and the gain from the offset.

The BBAM was used to inform the quantum of the biodiversity offsets required. An informal BioBanking Assessment of the impact site has been undertaken using a stratified biometric vegetation map of the impact area and 8 biometric plots (which did not strictly meet the requirements of BBAM). This assessment is not supplied within the EA. Resulting credits were converted to hectares required on the assumption that an average of 9.3 credits per hectare will be generated at a biobank site.

The EA reports that no species credits are required. However the EA also reports impacts to Eastern Cave Bat breeding habitat which would normally generate species credits within the BioBanking calculator. It is not clear why no such credits have been generated at the impact site. The EA predicts significant impacts on this species yet does not supply sufficient analysis of the adequacy of the proposed offset strategy for this species.

g) Offset design, tenure and security require further consideration.

In accordance with the OEH Offset Principles and the OEH Interim Offset Policy, offsets will be of greater value where the offset areas are not isolated or fragmented.

The conservation value of some portions of the currently proposed offsets cannot be clearly evaluated by OEH on the basis of the information supplied to date. Please refer to further comments under item 7 above.

OEH notes that the proponent has endeavoured to locate the Stage 1 Modification 9 offsets adjacent to offsets already approved under Stage 1 and proposed under Stage 2 of the Moolarben Coal Project. However the Stage 2 offsets have not yet been approved, with negotiations over these continuing. If the Stage 2 offsets do not proceed, some of the Stage 1 offsets (as altered previously by Modification 7) will be disjunct from other offset areas. There is also potential for some of the proposed offsets to be impacted by the proposed Liverpool Range Wind Farm powerline and access by Xstrata to sites and infrastructure associated with the Ulan Coal Mine.

With regard to security for biodiversity offsets, the OEH preferred mechanisms (in priority order) are:

- Dedication of land under the *National Parks and Wildlife Act 1974* (NPW Act);
- Establishment of biobanking sites with BioBanking Agreements under the *Threatened Species Conservation Act 1995;*
- Conservation Agreements under the NPW Act;

- Trust Agreements under the Nature Conservation Trust Act 2001; or
- A planning agreement under s93F of the Environmental Planning and Assessment Act.

The EA proposes to *'prepare and register a conservation covenant under Section 69B of the NPW Act (or equivalent conservation protection measure including the option to transfer land to the Minister for the Environment with agreement)'*. Whilst more information about the proposed offset properties is required, we caution the proponent that the offsets would only be considered for Conservation Agreements if they were deemed to meet the established criteria for such agreements under the *NPW Act*. Similarly, at this stage there is only one of the proposed offset properties which may have potential as an OEH Estate addition, although OEH is not in a position to confirm interest at this point.

Recommendations:

18. The proponent be required to provide comprehensive justification supporting why mine rehabilitation should be used to reduce the quantum of the offset required by:
    a) Demonstrating that they have exhausted all other options;
    b) That the rehabilitation is not already required by another approval body (such as usual mine rehabilitation requirements). Any environmental benefit claimed must be above that already required by other obligations.
    c) That the success of the rehabilitation proposed is supported by relevant published/peer reviewed research.

19. The proponent be required to supply to OEH all credit assessments undertaken to inform the quantum of the offset. This should include:
    a) Copy of the vegetation mapping (ArcGIS shapefiles);
    b) Location of vegetation plots (ArcGIS shapefiles); and
    c) Plot data including species lists and abundance rankings.

20. The proponent be required to examine further the need for species credits for cave roosting bats.

21. The proponent be required to present a summary of the quantum of ecosystem credits supplied by the offset strategy against the associated ecosystem credit fauna assemblages.

22. The proponent be required to present detailed information to support any claims that the required credits are not able to be secured for all entities to meet Tier 2 of the OEH Interim Offset Policy. Satisfactory justification for proceeding to Tier 3 on credit availability grounds would at a minimum include the following information for in the first instance, for the subject IBRA sub-region and then broader bioregion:
    a) Documented evidence of a search of the credit register including the date on which the search occurred: http://www.environment.nsw.gov.au/bimsprapp/SearchBiodiversityCredit.aspx
    b) Documented evidence of listing on the public list of wanted credits: http://www.environment.nsw.gov.au/biobanking/listwantedcredits.htm
    c) Documented evidence of expressions of interest made to the market and/or a search of the BioBanking site Expression of Interest (EOI Register): http://www.environment.nsw.gov.au/bimsprapp/AgreementEOISummary.aspx

d) Documented evidence of searches of real estate, including the date(s) of the search(es);

e) Documented evidence that a proponent has approached local landholders with suitable land with credit matches, or other potential native vegetation communities; and the outcome of subsequent on-site investigations.

Please note that in addition to the BioBanking registers, potential offset properties may also be sourced from other publicly available registers, including:

- Bush Heritage Australia, www.bushheritage.org.au
- Nature Conservation Trust, www.nct.org.au
- Bio Lands, www.biodiversitylands.com

23. The proponent be required to present a strong case for any requested reduction in the required credits on economic grounds. At a minimum, this should include:

a) Review of costings for offset purchase and management by a suitably qualified and experienced person.

b) Documentation of current land valuation in offsetting area from the Department of Finance and Services, Land and Property Information.

c) A cost benefit analysis for the project which includes the estimated offsetting costs associated with the provision of the full quantum of required credits and taking into account any offset lands which were not purchased exclusively for the purpose of providing an offset (ie land which required acquisition for other reasons, such as noise etc, regardless of the offset requirements).

d) Consideration of the predicted level of impact on high conservation value vegetation communities threatened species and their habitats.

24. For any vegetation communities and threatened species habitat for which proceeding to Tier 3 is justified (based on a) and b) above), development of the final offset strategy should include systematic application of the Tier 3 criteria in consultation with OEH.

25. That the proponent be required to present an assessment of all external factors (eg existing access arrangements for other parties, potential future infrastructure proposals and connectivity with other lands managed for conservation) which may impinge on the value of proposed offsets, the ability of the subject properties to provide the proposed offsets, and/or present management difficulties.

26. The proponent be required to demonstrate their ability to provide an offset strategy which is appropriately located, designed, and can be secured via a method which meets the OEH Offset Principles and the requirements of the OEH Interim Offset Policy.

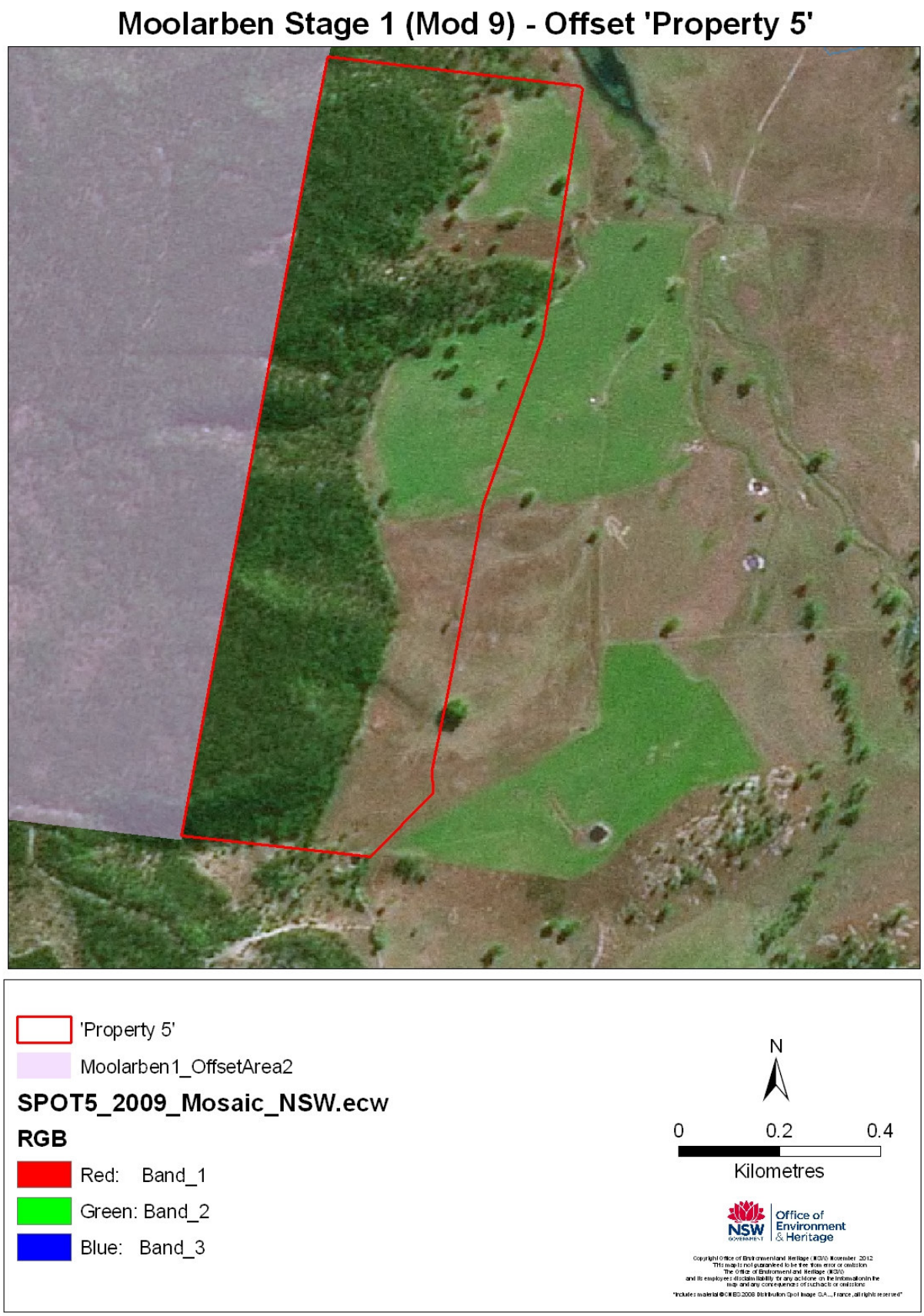

Figure 1 Proposed Offset Property 5 compared with 2009 SPOT image.