Appendix 1

Air Quality Assessment

9 June 2009

Michael Moore
Coffey Natural Systems Pty Ltd
Level 1, 3 Rider Boulevard
Rhodes
NSW 2138

Air Quality Assessment – Moolarben Stage 1 revised location for coal dump hopper and associated facilities

Dear Michael,

1 INTRODUCTION

In your memorandum dated 22 May 2009 and sent to us by email, you outlined plans by the Moolarben Coal Mines Pty Ltd (MCM), to revise the arrangement made to receive coal at the Coal Handling and Preparation Plant (CHPP) for the Stage 1 of the MCM.

I understand that the need to revise the project is due to the fact that it can be developed more efficiently if the coal receiving hopper and associated facilities, that were planned to be built in Stage 2, are brought forward into Stage 1. This would eliminate the need to ever build the Stage 1 hopper. This of course changes the Stage 1 project and will change the air quality effects of Stage 1.

Your memorandum asks us to assess the effects that this change would have on air quality effects. Rather than repeat all the detailed analysis provided in the Stage 1 and 2 Environmental Assessment I have focussed on describing the main differences between the original Stage 1 air quality effects and new Stage 1 effects.

2 QUALITATIVE REVIEW OF ISSUES

The only significant effect that this change has on the project from an air quality perspective is to increase the length of the haul distance from the open cut pits to the coal dump hopper. In Year 2 the coal haul distance from Pit 1 to the coal dump hopper will increase from approximately 7 km to approximately 9.2 km. The increase haul distance will naturally increase dust emissions if all other factors remain unchanged. In addition, the new emission will occur in a different (albeit not very different) location and this would have some bearing on air quality effects, in particular on the place where these effects are experienced.

However the assessment for Stage 2 has resulted in some further changes which will

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now also be incorporated into the Stage 1 mine because these are environmentally beneficial. The relevant changes are as follows:

1. Haul roads will be treated to a higher level of control than previously assumed and MCM has committed to achieving 85% control on dust emissions on haul roads so that TSP emissions will be 0.6 kg/VKT[1]
2. Truck sizes for transporting coal from Pit 1 to the dump hopper will be 240 instead of 170 tonne thus resulting in a lower VKT count to transport a given quantity of coal (trucks used to haul coal from Pits 2 and 3 will not change in size and will still have a load capacity of 50 t or more. The assessment assumes 50 t.)
3. There are some minor changes in the locations and orientations of coal stockpiles and the layout of offices, workshops etc

These are significant changes from an air quality perspective and as will be seen later result in lower impacts from the mine in many areas, in particular in areas where private residences are located.

3 FURTHER DISCUSSION ON CHANGES IN EMISSIONS AND THE APPROACH TO THE ASSESSMENT

The approach taken in the assessment has been to recalculate the emissions inventory for Year 2 and re-allocate the sources of dust emission to match the extended haul road and changed location for the coal receiving facilities. The dispersion model has then been re-run using the same meteorological data and the same model setup parameters as used in the Stage 1 Environmental Assessment except of course for the location of the dust sources and the rate of dust emissions. The revised layout of dust sources assumed in the modelling is shown on **Figure 1**. The main difference is the relocation of the dump hopper from approximately at the red dot labelled "11" to the red dot labelled "21" (see **Figure 1**). Points 12 to 20 on **Figure 1** are additional dust sources that are caused by emissions from the increased length of the coal haul road. (Note: **Figure 1** also provides a description of some features that are not labelled on subsequent maps.)

In summary the original Year 2 emissions inventory was estimated to produce 2,612 tonnes of TSP emission. The revised TSP emissions are estimated to be 2,358 t. Thus the improved controls on the haul road and the larger trucks proposed for transporting coal from Pit 1 to the coal receiving facilities more than makes up for the increased haul distance. The most common winds over the year are from the east-southeast and these will tend to blow the dust from the new section of haul road to the east-northeast and onto land currently used for coal handling at the Ulan Mine.

4 RESULTS

Figures 2 to **5** show the predicted:

- Maximum 24-hour average PM_{10} concentrations due to emissions from the original and revised projects
- Annual average PM_{10} concentrations due to emissions from the original and revised projects
- Annual average TSP concentrations due to emissions from the original and revised projects
- Annual average dust (insoluble solids) deposition due to emissions from the original and revised projects.

[1] VKT refers to vehicle-kilometres-travelled.

Each figure shows the contours as originally shown (light grey contours) and as predicted taken account of the relocated coal receiving facilities (black contours). The differences illustrate the effects of improved haul road dust control and the larger truck sizes used.

The new arrangement results in lower impacts everywhere except for some areas to the north of the extended portion of haul road on land occupied by the Ulan Mine where there are minor increases in dust concentration and deposition rates.

No residence is predicted to experience an increase in short-term or long-term PM_{10}, TSP or dust deposition levels. The reduction in impacts is greater than one might expect based on a simple comparison of the reduction in emissions, which reduce from 2,612 to 2,358 tpa of TSP emissions. This is because the dust emissions are not only reduced but are redistributed to places where dust was not previously liberated and this area is within the Open Cut 1 and to a small extent on land used by Ulan.

5 CONCLUSIONS

This letter has examined the likely effects on air quality of modifications to Stage 1 mining at MCM. The effects are shown to be minor and when combined with more significant commitments made in Stage 2 to control dust emissions, result in a reduction in the dust levels compared with the levels predicted in the assessment for the Stage 1 project.

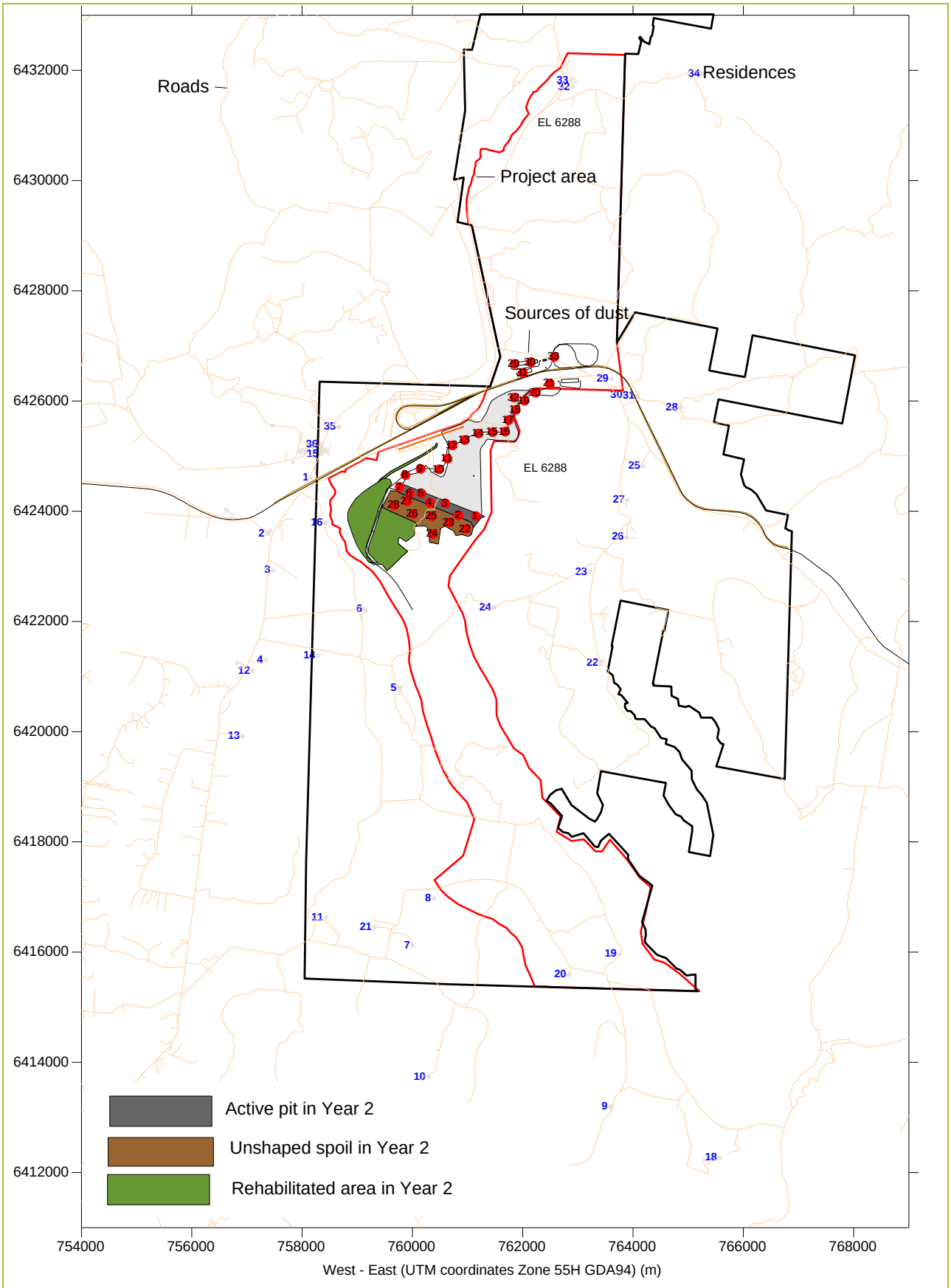
Yours faithfully
PAEHolmes

Nigel Holmes
Atmospheric Physicist

6 REFERENCES

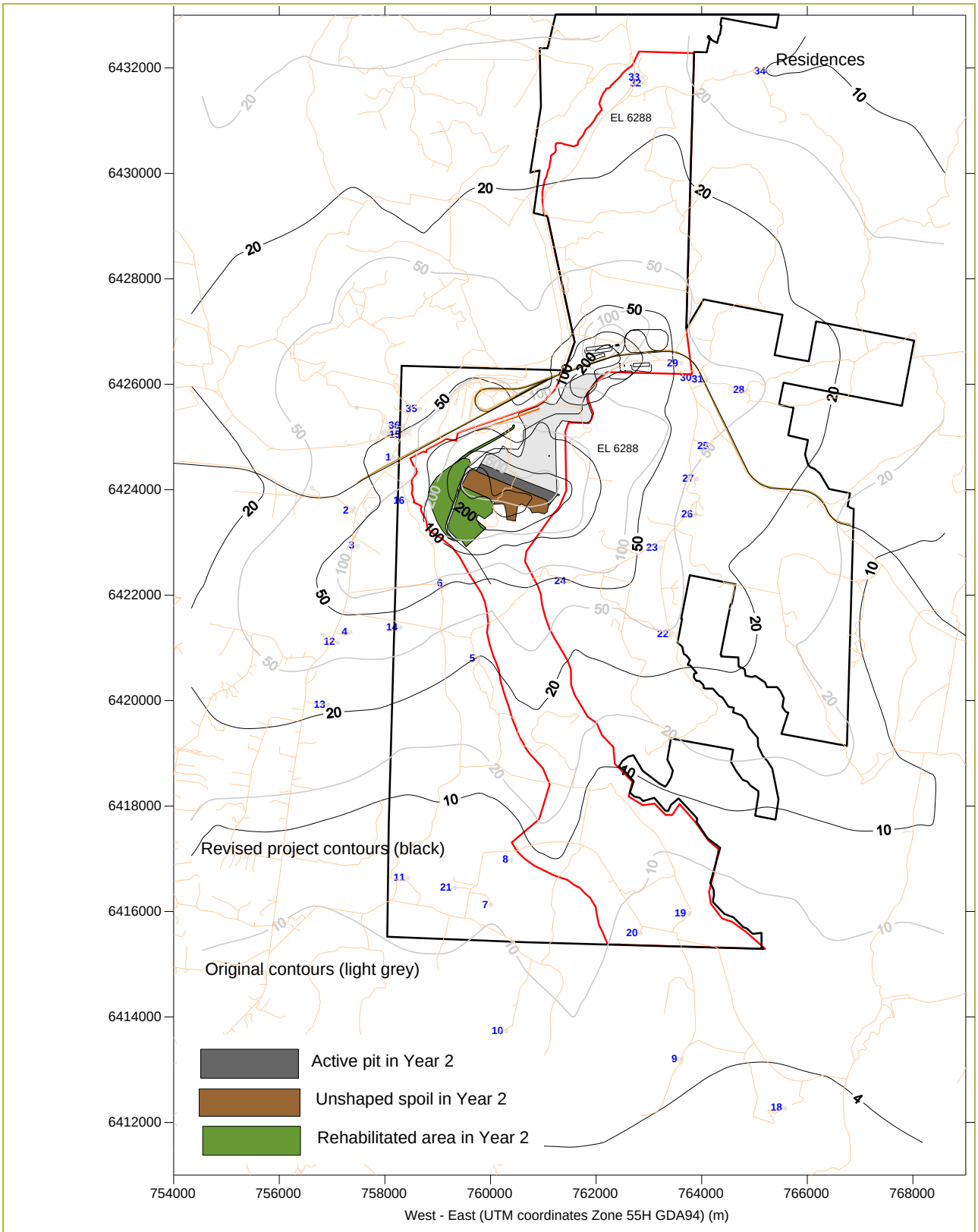
Holmes Air Sciences (2006) "Air Quality and Greenhouse Gas Assessment: Proposed Moolarben Open Cut Mine, Near Ulan NSW", Prepared by Holmes Air Sciences, Suite 2B, 14 Glen Street, Eastwood, NSW 2122.

Figures



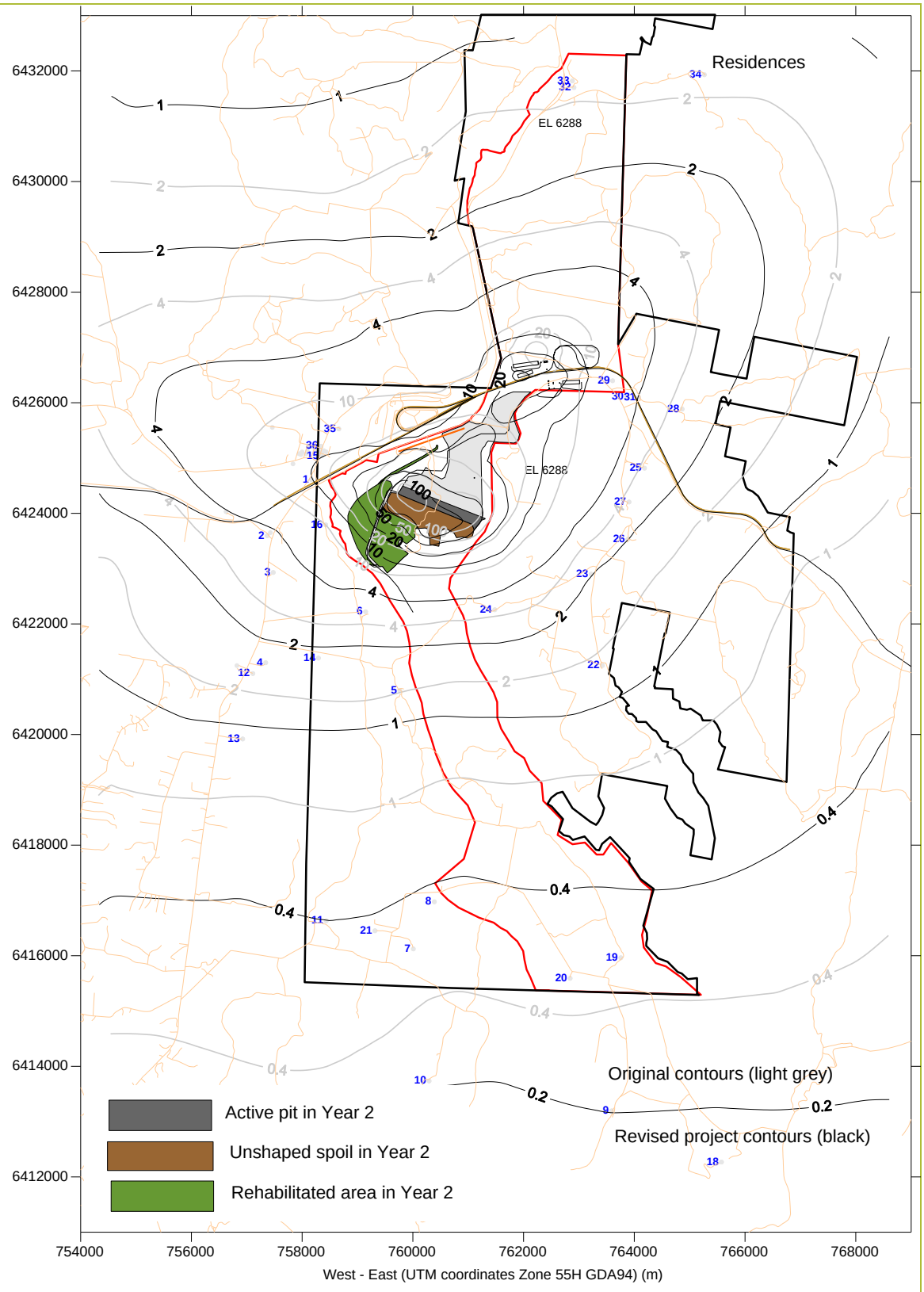
Location of dust sources as modelled for revised (June 2009) Moolarben mine in Year 2

Figure 1



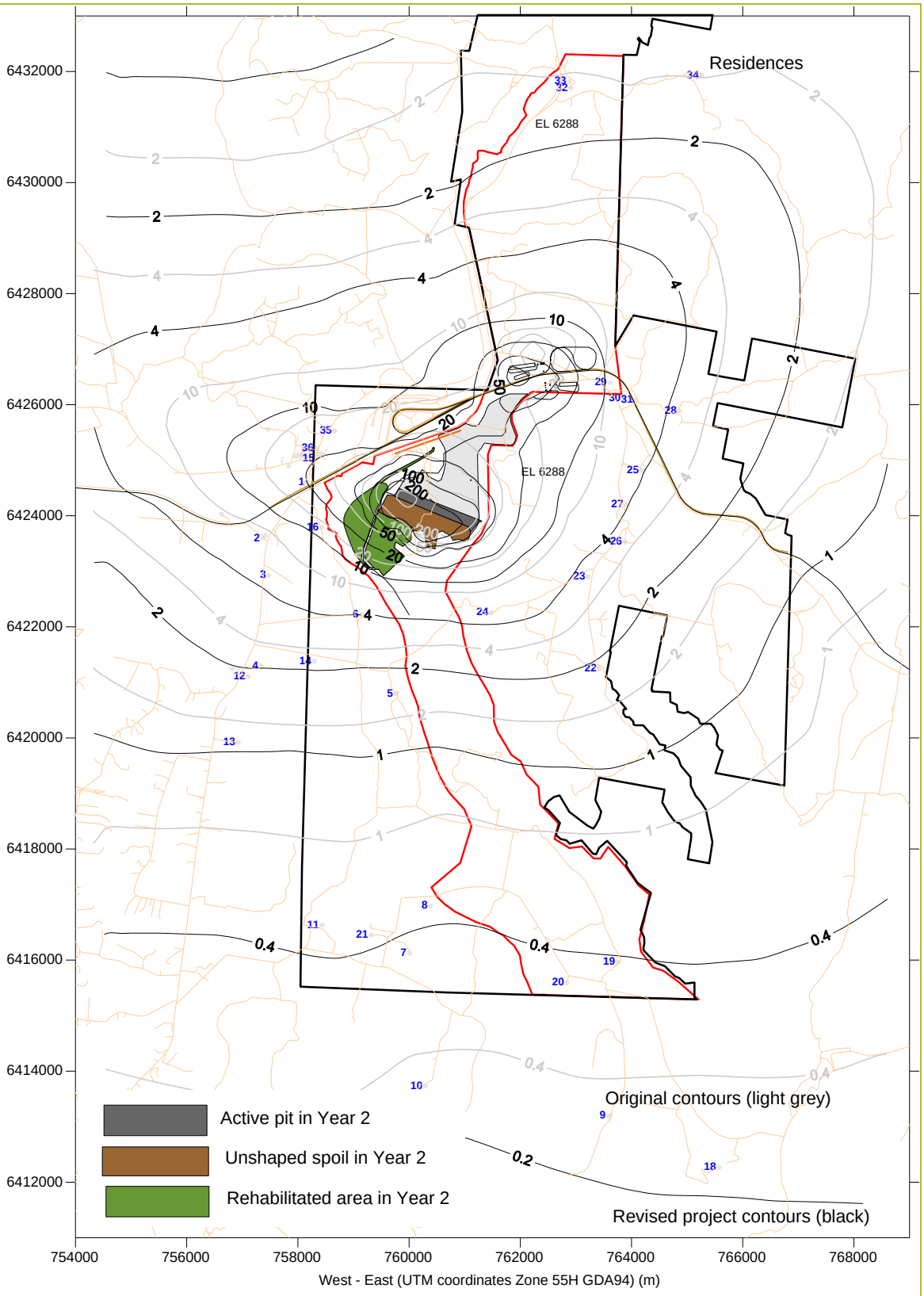
Comparison of predicted maximum 24-hour average PM_{10} concentrations due to emissions from original (grey) and revised (black) Moolarben mine in Year 2 - $\mu g/m^3$

Figure 2



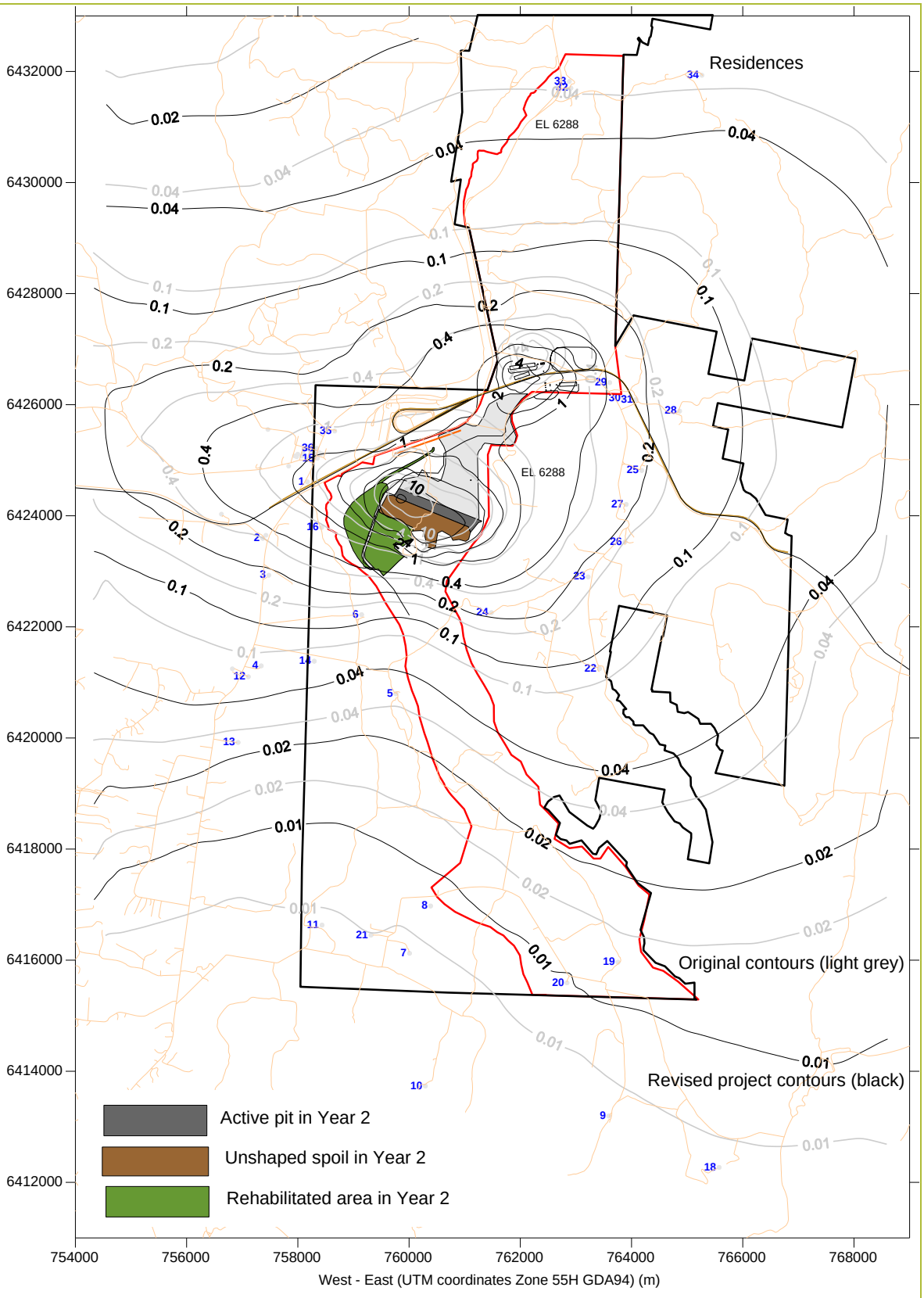
Comparison of predicted annual average PM_{10} concentrations due to emissions from original (grey) and revised (black) Moolarben mine in Year 2 - $\mu g/m^3$

Figure 3



Comparison of predicted annual average TSP concentrations due to emissions from original (grey) and revised (black) Moolarben mine in Year 2 - µg/m^3

Figure 4



Comparison of predicted annual average dust (insoluble soilds) deposition rate due to emissions from original (grey) and revised (black) Moolarben mine in Year 2 - g/m^2/month

Appendix 2

Noise Impact Assessment

7 July 2009

Ref: 07289/3125

Mr Michael Moore
Coffey Natural Systems Pty Ltd
Level 1, 3 Rider Boulevarde
Rhodes NSW 2138

MODIFICATION TO APPROVED MCP STAGE 1

Dear Sir,

This letter provides information relating to the potential noise impact from proposed changes to the approved Moolarben Coal Project (MCP). We understand this letter will be included with information to be sent to the Department of Planning for their consideration.

Noise modelling for the early stages of the approved MCP, conducted by Spectrum Acoustics, had mining occurring in Open Cut 1 (O/C1) and ROM coal being transported by trucks to a ROM hopper and primary breaker immediately north of O/C1. From there, coal is approved to be transferred via a conveyor network to the north of Ulan-Mudgee Road and the rail line and then to the northeast to the coal handling area. Coal rejects would return along the same conveyor network to a reject bin near the ROM hopper.

It is understood that MCM proposes to transport ROM coal by truck along a haul road south of Ulan-Mudgee Road to a ROM hopper to the south of the approved surface facilities, approximately at the site of a small unused quarry. This proposal would incorporate construction of the alternate ROM hopper and rejects bin, deletion of the O/C1 primary breaker and conveyor system and an extension of truck movements beyond the approved O/C1 ROM bin to reach the new ROM bin. Coal and rejects would also be transferred to and from the surface facilities via a relatively short conveyor that would pass under the existing infrastructure.

The proposal also includes an application to allow some construction activities to occur on a 24-hour basis. This is an extension of the approved daytime construction hours. Only relatively minor (in terms of noise generation) activities are proposed for the night time period. These include preparation of concrete formwork at the ROM hopper, train load-out bin and product reclaim tunnel and would require the use of small plant items such as a Franna crane, forklifts and light vehicle movements. No concrete pouring is proposed for the night time period and no metal fabrication works involving the use of rattle guns would occur.

The original noise model incorporated 170t capacity coal trucks terminating at the approved ROM hopper. A revised model was generated in which the trucks continued a further 2km to the northeast to arrive at the new ROM hopper. (The revised model assumed use of 240t capacity haul trucks fitted with grid box silencers and modified exhausts as modelled in the Stage 2 EA). A 15m high reject bin was also modelled, as was the new conveyor to the surface facilities, and the bulk of the approved overland conveyor was deleted.

The modelling confirmed the original predictions that noise from the ROM hopper/primary crusher in its approved location would be the dominant source. Of the total predicted 39 dB(A),$L_{eq(15minute)}$ in Ulan village, 37 dB(A) was from the ROM area. This value included the influence of a noise barrier to be constructed along the western side of the hopper.

Moving the ROM hopper to the proposed location, and removing any noise attenuation, resulted in a total predicted level of 37 dB(A) in the village, with 25 dB(A) contribution from the combined ROM hopper/reject bin and the bulk of the remaining noise from the extended coal haulage route. The net acoustic impact of the proposed modification at the nearest potentially affected receiver is therefore predicted to be negative.

Inspection of the ranking of noise sources also shows contributions of 29 dB(A) from the washery and 20 dB(A) from the new conveyor, received in Ulan village. The sound power levels of these sources are 116 dB(A) and 109 dB(A), respectively. The modelled sound power level of the ROM hopper/reject bin is 115 dB(A). These levels are significantly, ie at least 10 dB, greater than the sound power level of proposed night time construction of these items. The noise level from night time construction activities would therefore be less than 30 dB(A) in Ulan village, which is 8 dB below the night time operational noise criterion.

In summary, the proposed modification to the O/C1 coal transport route and ROM hopper is predicted to reduce predicted noise levels by 2 dB and night time construction activities are expected to produce noise levels 8 dB below the night time operational noise criterion at the nearest potentially affected receiver. In light of these findings, we advise that the proposed modifications could be approved without adversely impacting on the amenity of any residential receiver.

Please call our office on 4954 2276 if you require further information.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED

Neil Pennington
Principal/Director

Appendix 3

Ecological Impact Assessment

Ecological Impact Assessment

Stage 1 Modifications - Proposed Relocation of Various Open Cut 1 Infrastructure

Moolarben Coal Project

Ulan Wollar Road, Ulan

23 July 2009

Ecological Impact Assessment
Stage 1 Modification - Proposed Relocation of Various
Open Cut 1 Infrastructure
Moolarben Coal Project
Ulan Wollar Road, Ulan

23 July 2009

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Signature: Date:

23 July 2009

Mark Aitkens BSc (Env. Biol.)
Principal – Ecovision Consulting

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FIGURES

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DEFINITIONS AND ABBREVIATIONS

Terms used within this report are defined as follows:

DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DEWHA	Department of Environment, Water, Heritage and the Arts
Disturbed Vegetation	A mappable area containing a variable floristic assemblage of native and exotic plant species that is not reflective of naturally occurring described native vegetation communities.
CEEC	A critically endangered ecological community within the meaning of the definitions contained within the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
Core habitat	Land containing resources capable of supporting both breeding and foraging activity.
EEC	An endangered ecological community within the meaning of the definitions contained within the *NSW Threatened Species Conservation Act 1995* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
EIA	Ecological Impact Assessment
EP	An endangered population within the meaning of the definitions contained within the NSW Threatened Species Conservation Act 1995 or Commonwealth Environment Protection and Biodiversity Conservation Act 1999
GIS	Geographical Information System. Software enabling spatial database analysis.
Intact Vegetation	Refers to areas of native vegetation that are relatively continuous, relatively weed-free, contain natural habitat features, and which appear to function as a native ecological community. The term may be applied to areas of vegetation which have been previously disturbed and/or cleared, but have regenerated and recovered to the extent that natural functions have been restored, and the vegetation would be expected to progress unassisted towards a stable state.
Native Vegetation	A mappable area containing a structurally and floristically stable assemblage of plant species dominated by native flora species (i.e. greater than 50% native plant cover).
NES	National Environmental Significance
Patch	A mapped area of homogenous native vegetation cover that may form part of a larger remnant.
Potential subject species	Threatened flora and fauna species identified within the locality through database searches, literature reviews and GIS analysis.
Remnant	An area of continuous native vegetation cover that may contain more than one vegetation patch.
Secondary habitat	Land containing resources capable of supporting breeding or foraging activity but not both (refer to core habitat).
Locality	Land contained within a 10 km radius of the site, which has been used to analyse database and vegetation mapping. Results used as a basis for comparison with the sites ecological values to assess project impacts.
Site	Land being the subject of this Ecological Impact Assessment, which is marked with a blue outline on each figure.
Subject species	Species known to occur or having potential core or secondary habitat within the site, with development impacts potentially having an influence on these species.
Threatened Biodiversity	Species, population or communities listed as endangered or vulnerable within the meaning of the *NSW Threatened Species Conservation Act 1995* and/or the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*.

EXECUTIVE SUMMARY

The approved Stage 1 of the Moolarben Coal Project (MCP) is located at Ulan, NSW within the upper Goulburn River catchment. Proposed modifications to Stage 1 of the MCP include the following:

- Relocation of the Run of Mine (ROM) pad and dump hopper to the Mid-Western Regional Council roadbase borrow pit and waste transfer station,
- Part relocation of the Open Cut 1 infrastructure (e.g. bath house, offices and parking) to the approved Open Cut 1 ROM pad;
- Land clearing for Mine Lease (ML) boundary fencing; and
- Construction of a water sharing pipeline between Ulan Coal and Moolarben Coal Mines (MCMs).

This report has focused on assessing the impact of these proposed modifications on threatened species, endangered populations (EPs), endangered ecological communities (EECs) and their habitats (collectively referred to as *threatened biodiversity*) as listed on the *Threatened Species Conservation Act 1995* (TSC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Other considerations presented in this report include the State Environment Planning Policy – Koala Habitat (SEPP 44).

Data Sources

This assessment is based on desktop and field derived data collected from the site and locality. The ecological character of lands affected by these modifications has been defined by ecological studies for Stages 1 and 2 of the MCP. Other resources used include baseline ecological studies for Exploration License 6288 (EL6288) and prior impact assessment for other local projects. These resources form the basis for the preparation of this ecological impact assessment (EIA) report.

Baseline studies supporting this assessment have been completed in accordance with relevant survey methods specified in the Department of Environment Conservation's (DECs) working draft *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC, 2004). A radial database search of DECCs Wildlife Atlas database (DECC, 2008) and EPBC Act Protected Matters Search (DEWHA, 2008) was completed together with a spatial analysis of Wildlife Atlas database records against relevant Mitchell Landscapes/ vegetation types. Literature reviews included ecological impact assessments for the Ulan Coal Mine, Wollar to Wellington 33Kv Powerline Easement and Wilpingjong Coal Mine.

Results

The Wildlife Atlas database search identified 514 flora species within the locality consisting of 467 native and 47 exotic species. According to the same database there are 497 fauna species records within the locality (i.e. 474 natives and 23 exotics) (DECC, 2008).

The baseline seasonal field surveys for EL6288 identified at least 514 flora species of mostly native origin (i.e. 467 natives and 47 exotics) within the locality (Ecovision Consulting, 2008; DECC, 2008), with three listed threatened species (Ausfields Wattle, Scant Pomaderris, Painted Diuris). A total of 256 fauna species comprising 170 avian, 37 mammal, 32 reptile and 7 amphibian species have also been detected within this area during baseline studies of EL6288 (Ecovision Consulting, 2008).

Vegetation mapping for EL6288 has identified the following vegetation types within the site. Those highlighted by an asterisk are classified as belonging to the White Box Yellow Box Blakely's Redgum Woodland and Derived Grasslands (WBYBBRW) EEC/ CEEC.

- Blakely's Redgum - Rough-barked Apple Woodland*
- Broad-leaved Ironbark Grey Gum Forest
- Footslope Box - Gum - Ironbark
- Grey Box - Narrow-leaved Ironbark Forest
- Hardcap Scribbly Gum - Ironbark Woodland
- Lowland Box – Redgum*

Threatened Biodiversity

Identified from database searches, literature reviews and baseline field surveys were a total of 30 threatened plant species/ EPs that have known or potential occurrence within the locality (DECC, 2008; Ecovision Consulting, 2008). Whilst there are no known populations of threatened flora species within the lands to be affected by these proposed modifications, it is noteworthy that the ML fenceline alignment is encroaching on known habitat for the Hoary Sunray (*Leucochrysum albicans var tricolor*) and will pass through previously unaffected WBYBBRW EEC/ CEEC.

Analysis of spatial databases and relevant literature identified the potential for 36 threatened fauna and/or their habitats to occur within the locality (DECC, 2008; Ecovision Consulting, 2008). Potential threatened species habitat exists primarily throughout areas of native vegetation cover with intact structure and floristics. Threatened species capable of utilising the resources contained within the site are mostly restricted to woodland birds such as the Diamond Firetail, Hooded Robin, Grey-crowned babbler and Speckled Warbler. The potential threatened biodiversity values contained within areas of intact native vegetation are of moderate to high value due the presence of tree hollows and intact native vegetation cover (i.e. structure and floristics). The quantum of local threatened fauna records supports this view (Ecovision Consulting, 2008).

A preliminary ecological risk analysis identified 21 threatened biodiversity as 'Subject Species' for consideration in the impact assessment. Site survey confirmed that these areas of potential habitat would be impacted by the proposed development.

Site vegetation contains high potential habitat for locally occurring threatened biodiversity, particularly those of woodland areas such as the Diamond Firetail, Hooded Robin, Grey-crowned babbler and Speckled Warbler. Field investigations indicate use of the impact areas by threatened woodland birds, particularly along the boundary fencing. The assessment has assumed that these and other threatened species may utilise the habitats for various life cycle functions. EECs/ CEECs known to occur within the locality, namely WBYBBRW EEC/ CEEC, have also been considered in this assessment with elements of this community confirmed within the impact area.

Review of Impacts

The proposed location for the Open Cut 1 ROM pad and dump hopper will impact an estimated 2.7 ha, this consisting of native vegetation cover (2.4 ha) and cleared lands. The proposed relocation of various personnel related Open Cut 1 infrastructure (i.e. bath house, offices and car park) and removal of the Open Cut 1 ROM pad from its approved location will also impact native vegetation cover, with these impacts already accounted for in the Stage 1 approval. The fenceline constructed along the ML boundary will result in an additional 3.21 ha of native vegetation loss that was not assessed in Stage 1 of the MCP.

In terms of the impacts on native vegetation cover these proposed modifications to the Stage 1 approval will result in new impacts (e.g. fencing requirements and ROM hopper dump). These impacts are in addition to those calculated for Stage 1 of the MCP. The following table indicates the loss of native vegetation cover as a consequence of these works:

Vegetation Type	ROM Hopper (ha)	Fenceline (ha)
Blakely's Redgum - Rough-barked Apple Woodland		0.26
Broad-leaved Ironbark Grey Gum Forest	0.11	0.56
Footslope Box - Gum - Ironbark	0.50	0.09
Grey Box - Narrow-leaved Ironbark Forest	1.79	0.32
Hardcap Scribbly Gum - Ironbark Woodland		0.38
Lowland Box - Redgum		1.06
Lowland Ironbark Forest		0.43
Shrubby White Box Forest		0.27
Ridgetop Broad-leaved Ironbark - Black Cypress Pine on shallow sands		0.16
Total	2.40	3.21

The impact footprint arising from the proposed development includes the area directly impacted by the ROM dump hopper (i.e. clearing, fill and side roads). The alteration of soil conditions and availability of macro nutrients from these changed conditions, combined with a disturbed edge, could result in indirect impacts

such as the introduction of weeds in adjoining uncleared native vegetation. Altered surface water movements arising from the modification are likely to have indirect impacts downslope of the infrastructure emplacement (i.e. increased water interception and/or channelled water flows). These indirect impacts must also be considered when determining an impact management response. Quantification of this impact type has been defined by a 30m buffer.

Proposed Impact Management Actions

In response to the above impact scenario and threatened species issues the following impact management actions are recommended to offset the proposed developments impact on the natural environment:

- Avoid construction works during the breeding cycle of known and potential threatened woodland species that occur within the locality (i.e. construction during autumn – early winter months preferable);
- Implement a plan of management for the removal of hollow bearing trees. This is to include removal techniques, hollow salvage, compensatory measures and monitoring;
- Undertake local revegetation works to minimise the cumulative impact of vegetation loss from the locality, hence the retention/ maintenance of fauna habitats within the locality;
- Undertake weed and feral animal control programs throughout proximal areas of indirect impact. This is to be accompanied by monitoring works to assess the success of enhancement actions; and
- Establish a 'like for like' offset for vegetation directly impacted by the proposed development. The extent of this offset is to be determined by the Consent Authority and government agencies, with the extent of this offset to have regard for other actions such as offsite revegetation works.

In relation to predicted indirect impacts on offsite WBYBBRW and Derived Grasslands EEC/ CEEC, matters such as weed control and water/ erosion management represent important management themes for impact minimisation. These indirect impacts are to be managed within the framework of any approved management plans prepared in response to the conditions of consent for Stage 1 of the MCP where they apply, with additional management works including monitoring to be included in such approved actions.

EP&A Act

The impact assessment (i.e. Assessment of Significance) concluded that no significant impact on threatened species, EPs, EECs, CEECs or their habitats would occur should the proposed impact management actions be implemented.

SEPP 44 – Koala Habitat Protection

SEPP 44 applies to the Mid Western Regional Council local government area (LGA) and is therefore relevant to the site. Surveys identified the tree canopy to not constitute 'potential' koala habitat (i.e. preferred foraging species less than 15% total cover). No evidence of koalas or koala activity was detected within the site during the survey period. No further consideration of this matter is required under SEPP 44.

EPBC Act

Matters of national environmental significance (NES) occurring within the locality were considered in the review of impacts to determine whether further environmental investigation is warranted under this Act. Assuming the implementation of the proposed mitigation actions, it is considered that adequate measures will be taken to offset the developments impact on threatened biodiversity, native vegetation cover and fauna habitats. Accordingly, it is considered that a referral to the Department of Environment, Water, Heritage and the Arts (DEWHA) is not required, as the development of the site would have a low impact on relevant 'Protected Matters' of NES as listed on the EPBC Act.

Conclusions

This assessment report has considered the magnitude of the developments impact on the ecological values of the affected area primarily in terms of threatened biodiversity and their habitats. In light of the proposed mitigation actions and resultant impact avoidance it is concluded that the impacts of the proposed modifications will not greatly exceed the impact scenario assessed in the approved Stage 1 of the MCP.

Within the context of the locality there would be no significant impact on SEPP 44 habitats or native vegetation cover.

1.0 INTRODUCTION

This Ecological Impact Assessment (EIA) report was prepared to assess the impacts of proposed modifications to the approved Stage 1 of the Moolarben Coal Project (MCP), located at, via s75W of the *Environmental Planning and Assessment Act* 1979 (EP&A Act). The site is located adjacent to the Ulan Wollar Road, Ulan, as shown in **Figure 1**. An understanding of the project and assessment tasks, including a brief site description, is provided in the following sections.

1.1 The Project

1.1.1 Background

The proposed development is a permissible development activity under Part 3A of the EP&A Act. The consideration of matters of National Environmental Significance (NES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is also relevant.

As the proposed development is to occur within an area coinciding with native vegetation and fauna habitats, matters such as threatened biodiversity and their habitats requires consideration prior to the granting of an approval for this modification. The purpose of this report is to provide the determining authority with sufficient information to assess these environmental matters during the assessment of the proposed modification to Stage 1 of the MCP.

1.1.2 The Proposal

The proposed modifications will involve the clearing of native vegetation and habitats that are in addition to the impacts assessed for the approved Stage 1 and proposed Stage 2 of the MCP. Proposed modifications include:

- Relocation of the Run of Mine (ROM) pad and dump hopper to the Mid-Western Regional Council roadbase borrow pit and waste transfer station,
- Part relocation of the Open Cut 1 infrastructure (e.g. bath house, offices and parking) to the approved Open Cut 1 ROM pad;
- Land clearing for Mine Lease (ML) boundary fencing; and
- Construction of a water sharing pipeline between Ulan Coal and Moolarben Coal Mines (MCMs).

Native vegetation cover and associated habitat are to be permanently removed from these areas for the duration of mining activities.

1.2 Site Description

The site is located at Ulan in Mid Western Regional Council local government area. The site is located near the headwaters of an unnamed creek that drains into the Goulburn River. The Goulburn River National Park is located nearby the site to the northeast. Aerial photography, as shown in **Figure 1**, identifies treeless and treed land cover within this area, with the latter implying the presence of native vegetation. Much of the proposed ROM hopper is located on cleared lands that form part of the roadbase borrow pit and waste transfer station (WTS) operated by the Mid-Western Regional Council.

1.3 Legislative Framework

For the purposes of assessment the legislative framework used in this EIA report is Section 5A of the EP&A Act to assess threatened biodiversity listings under the *Threatened Species Conservation Act, 1995* (TSC Act). A review of impacts on EPBC Act listed threatened biodiversity has also been prepared to determine the requirement for a referral.

1.4 Project Tasks

The principal tasks undertaken as part of this assessment were:

- Undertake a background review of biodiversity values occurring within a 50km radius of the site;
- Identify the flora and fauna communities present within the site using systematic survey methods;

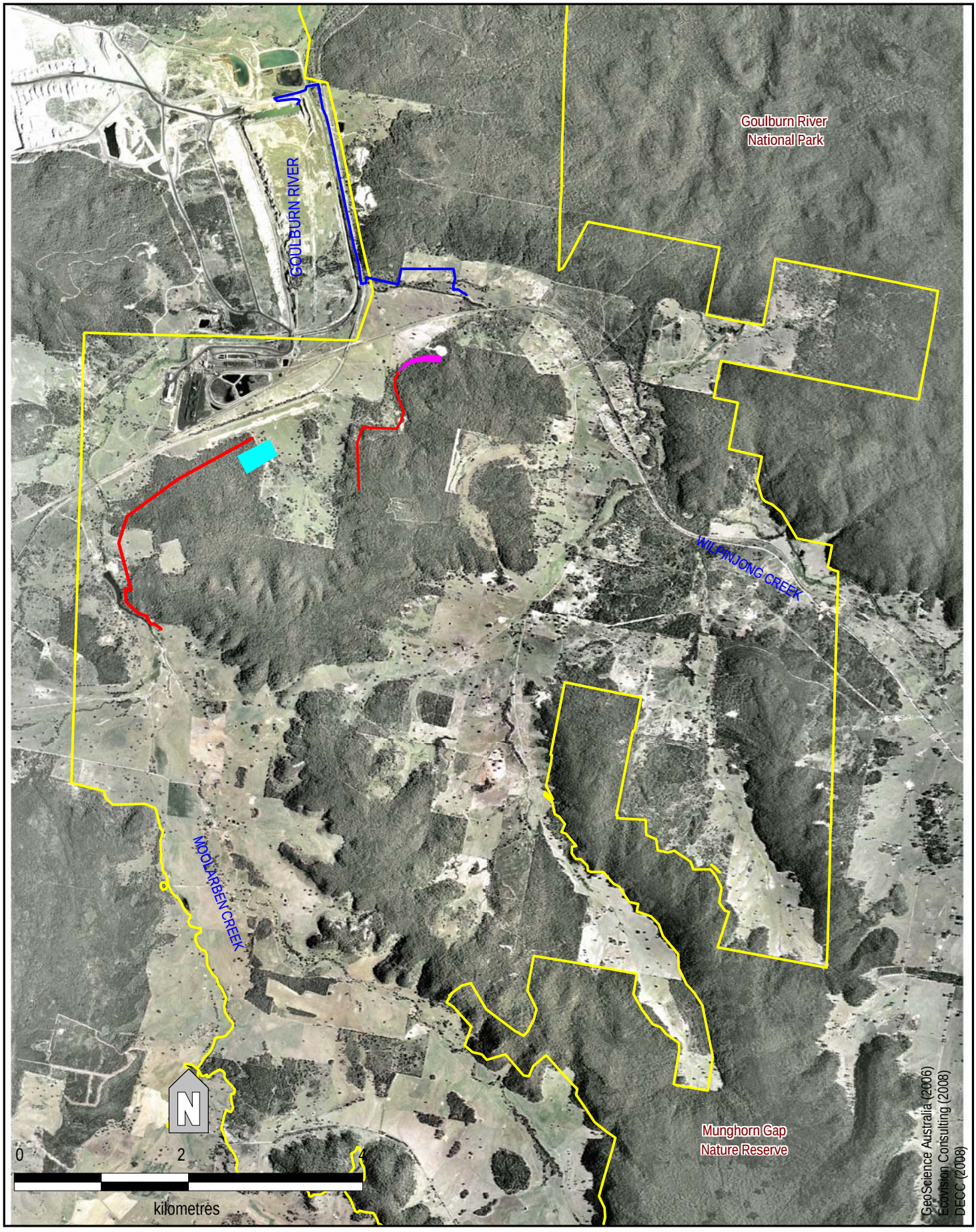


Figure 1 Location of the Proposed Modifications

Legend

- Boundary of EL6288
- Water Sharing Pipeline
- Mine Lease Fenceline
- Open Cut 1 Infrastructure
- ROM Dump Hopper

ECOVISION CONSULTING

- Complete targeted surveys and habitat assessments for threatened species, endangered populations (EPs) and endangered ecological communities (EECs) of the locality;
- Quantify the ecological values of the site;
- Consider the implications of development on the sites ecological values, including any consequential indirect impacts;
- Consider and recommend any relevant impact management actions;
- Prepare an impact assessment in accordance with Section 5A of the EP&A Act in light of the recommended impact management actions; and
- Review the impact of the development against matters of national environmental significance as listed on the EPBC Act in light of the recommended impact management actions.

1.5 Report Structure

The following table indicates the structure of this EIA.

Table 1: Report Structure

Section	Component	Content
2	Applicable Legislation	Relevant legislation
3	Survey Methodology	Details survey approach
4	Local Environment	Broad discussion of local environment and relevant threats
5	Impact Analysis	A review of the development and its impacts
6	Data Interpretation	A review of the sites biodiversity values against regional vegetation and wildlife data.
7	Ecological Significance	Discussion of threatened species, EPs, EECs and sites significance
8	Proposed Mitigation	Identifies extent of mitigation works to compensate for the developments impacts
9	Impact Assessment	Reviews the developments impact against relevant legislation and the proposed mitigation.
10	Conclusions	Summary
11	References	Resources used to prepare EIA

1.6 Limitations

Survey and Assessment

This EIA has quantified the biological character of the site through literature reviews, database searches, field survey, baseline biodiversity data for the locality (Ecovision Consulting, 2008) and data interpretation. Field surveys have focused on threatened species and their habitats, particularly those known to occur within the locality.

The field survey and assessment presented in this investigation have been undertaken in a manner reflecting the impacts of the proposed development in the context of the locality. Modifications to field survey design have been introduced, where necessary, to reflect the nature of the development impacts on the receiving environment. For instance, targeted orchid surveys were not undertaken due to the confidence placed in the baseline biodiversity dataset for the locality.

An appreciation of temporal variation resulting from seasonal change is based on the experience of the principal investigator and information from existing local databases. Irreconcilable limitations placed on this report by data gaps and/or inaccuracies in these databases/ vegetation maps have been identified and quantified where relevant for consideration by the determining authority. Targeted surveys for cryptic and/or seasonal species such as ground orchids may be recommended should field survey indicate the potential presence of these species. Similarly, projects with substantial impact envelopes that overlap sensitive environments may attract survey repetition to sample local seasonal variability.

Report Validity

The compilation of this report is limited by its focus this being impact assessment against current and relevant legislation, associated regulations and guidelines. Government and/ or government authorities periodically review this underlying planning framework and as such are subject to amendment and/ or alteration. Hence, amendments to the assessment framework that arise after the published date of this

report may potentially invalidate the stated conclusions. Accordingly, no warranty is placed on the contents of this report or its conclusions where it can be demonstrated that the planning framework has been sufficiently amended or altered subsequent to the reports' published date.

2.0 APPLICABLE LEGISLATION AND GUIDELINES

This section provides an overview of relevant State and Commonwealth legislation and guidelines concerning the assessment of flora and fauna matters.

2.1 State Legislative Framework

Development in NSW is subject to various planning instruments that regulate the use of lands containing vegetation and threatened species. The following are relevant to the development.

Environmental Planning and Assessment Act, 1979

The approved Stage 1 of the MCP was declared a Part 3A Major Project under the EP&A Act and thus is subject to the assessment protocols prescribed by this part of the Act. Approval for these projects the responsibility of the NSW Minister for Planning.

Matters pertaining to significant impacts on threatened species that arise from proposed development declared as a Major Project are no longer subject to the preparation of a Species Impact Statement (SIS) under the TSC Act or the *Fisheries Management Act 1994* (FM Act). Notwithstanding, both these Acts provide context for impact assessment of Part 3A Major Projects, as these Acts contain listings of threatened species, populations and ecological communities.

For the purposes of assessment Section 5A of the EP&A Act has been used as the test for deciding whether there is the likelihood of a significant impact on threatened species, EPs, EECs and their habitats. This assessment is referred to as the "Assessment of Significance" with the terms of reference for this assessment restricted exclusively to the developments impacts on sites biological values.

Threatened Species Conservation Act, 1995

In addition to prescribing the requirements for preparation of a SIS, the TSC Act contains schedules listing threatened species (i.e. endangered or vulnerable), EPs, EECs and key threatening processes. It also provides for the keeping of a critical habitat register, the granting of licences authorising actions leading to the harm of any threatened species, EP or EEC, the handling of a threatened species, EP or EEC or damage to critical habitat and/or habitat of a threatened species, EP or EEC.

State Environmental Planning Policy No. 44 – Koala Habitat Protection

This State Environmental Planning Policy (SEPP) encourages the conservation and management of koala habitats in certain local government areas. This policy applies to lands located within Mid Western Regional Council LGA.

2.2 Commonwealth Legislative Framework

Environment Protection and Biodiversity Conservation Act, 1999

The EPBC Act prohibits actions that are likely to have a significant impact on matters of national environmental significance (NES) in the absence of an approval for such actions. Matters of National Environmental Significance protected by the EPBC Act include, but are not restricted to:

- Declared World Heritage properties;
- Ramsar wetlands;
- Listed threatened species and communities;
- Listed migratory species;
- Nuclear actions; and
- Actions in a Commonwealth marine area.

It is an offence to carry out an action that will or is likely to have a significant impact on NES matters without first obtaining an approval from the Commonwealth Environment Minister except where an exemption in the EPBC Act applies or the action is assessed in accordance with an approved bilateral agreement. A person

who is proposing to carry out an action that may have a significant impact on one of the above NES matters (and which is not the subject of an exception) is required to refer the proposed action to the Commonwealth Environment Minister. The Minister will determine as to whether the project is a "controlled action" (i.e. an action that requires the approval of, or the environmental assessment nominated by, the Environment Minister).

2.3 Survey Guidelines

Survey design was structured around relevant industry standards, this currently being the Working Draft Guidelines *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities*' (DEC 2004). As it is a guideline, various modifications to the survey protocols were applied where justification permits.

2.4 Relevant Matters

This EIA report is to consider the direct and indirect impacts of the proposed modification to Stage 1 of the MCP through usage of site data collected from field survey and relevant databases. Impact assessment will follow Section 5A of the EP&A Act. Recommendations for further environment assessment under the EPBC Act (i.e. referral to DEWHA) will be provided in this report should it be predicted that the proposed development is likely to have a significant impact on matters of NES listed under this act.

3.0 SURVEY AND ASSESSMENT METHODOLOGY

3.1 Desktop Analysis

3.1.1 Database Searches

DECCs Wildlife Atlas database records contained within a 50 km radius of the site were analysed to identify the threatened biodiversity of the locality (DECC, 2008). Similarly, a 50 km point search of the EPBC Act online 'Protected Matters Database' (i.e. DEWHA, 2008) was also generated to identify relevant matters of NES. These searches have resulted in a list of threatened biodiversity collectively referred to as 'Potential Subject Species'.

3.1.2 Literature Review

A review of recent flora and fauna reports of the locality was completed to compliment the database searches, assist the classification of the sites biological values and 'Subject Species'. Data and literature reviewed in addition to standard biodiversity references include:

- Baseline biodiversity surveys and vegetation mapping for Exploration License 6288 (EL6288) (Ecovision Consulting, 2008);
- Ecological Impact Assessment – Stage 2 of the Moolarben Coal Project including citations of local studies referenced within this assessment (Ecovision Consulting, 2008);
- NSW ecosystems study: background and methodology (Mitchell, 2002); and
- Mitchell Landscapes with per cent cleared estimates, listed by CMA (http://www.nationalparks.nsw.gov.au/npws.nsf/Content/BioMetric_tool).

Threatened biodiversity identified from sources other than the above mentioned literature will also be considered 'Potential Subject Species' (e.g. species that do not have known database records within locality but are known to occur within landscapes and/or vegetation types that occur within locality).

3.2 Impact Analysis

The impacts arising from the proposed development were spatially and temporally quantified to assist the establishment of assessment assumptions, hence represent the foundation of the impact assessment. Impacts were quantified using area statements and terms such as 'direct', 'indirect', 'temporary' and 'permanent', with the overall classification of these impacts termed 'Impact Intensity'.

Impacts quantified in this manner have been translated into a 'Likelihood' and 'Consequence' scale to assist preliminary ecological risk analysis (Ecovision Consulting, 2008). The purpose of the 'Preliminary Ecological Risk Analysis' is to relate the threatened biodiversity identified during the desktop analysis against the sites general ecological values and expected development impact regime. A risk scale ranging from 'low' to 'extreme' assists the determination of the scope of field survey works, hence focusing survey and assessment resources on threatened biodiversity relevant to the development and its implied impacts (see Ecovision Consulting, 2008).

3.2.1 Preliminary Ecological Risk Analysis

The likely impacts attributable to the proposed development were used to identify/ refine the 'Subject Species' list, as required by DECC in the DGRs. Facilitating this was an ecological "risk" analysis, which conservatively evaluates the impact of the development by taking into consideration the intensity of the impact on a species habitat (i.e. likelihood – see also **Table 2**) and the effect on its occurrence (i.e. consequence – see also **Table 3**). This process of risk evaluation is based on the Australian Standard for risk management (AS/NZS 4360).

The ecological risk analysis was completed by attributing a 'Likelihood' and 'Consequence' label to each of the threatened biodiversity identified through database searches, spatial analysis, literature reviews and field survey. This analysis considered the extent of habitat values within the site, the extent of overlap between this habitat and the developments impacts and the legal status of the species. Threatened biodiversity having a preliminary ecological risk classification exceeding 'low' are considered 'Subject Species' for this assessment, with those classified as having low ecological risk regarded as

inconsequential in terms of the development. Note that this analysis also in part validates the extent of field surveys applied to relevant threatened biodiversity identified in this report.

Impact Likelihood

Impact Intensity attempts to define the temporal and spatial extent of direct and indirect impacts on the receiving environment as they relate to threatened biodiversity. For the purposes of the ecological risk analysis, Impact Intensity was translated into a 'Likelihood' label, as defined in **Table 2**.

Table 2: Likelihood Scale

Likelihood Label	Description
A	Impact on known core and/or source habitat (e.g. breeding and foraging habitat)
B	Impact on known secondary and/or sink habitat (e.g. breeding or foraging only)
C	Impact on potential core and/or source habitat (e.g. breeding and foraging habitat)
D	Impact on potential secondary and/or sink habitat (e.g. breeding or foraging only)
E	Impact on habitats other than core/ secondary and/or source/ sink habitat.

Likelihood was calculated by comparing the broad habitat values and landscape attributes of the impact area against those prescribed for relevant threatened biodiversity. Broad habitat types, as guided by the literature, were categorised as follows:

- Known natural distributions including survey results;
- Geological preferences;
- Specific habitat requirements (e.g. aquatic environs, seasonal nectar, tree hollows etc);
- Climatic considerations; and
- Topographical preferences (e.g. ridgetops, coastal headlands, midslopes etc).

Impact Consequence

'Impact Consequence' defines the predicted response of a threatened species to impacts arising from the development, this ranging from 'no impact' to 'local extinction'. In the context of this assessment, consequence is directly related to the legal status of a species and is defined as follows in **Table 3**.

Table 3: Consequence Scale

Consequence Label	Predicted Event	Description
5	Locally Extinct	Classification applies to species listed as 'extinct' within the meaning of the TSC Act.
4	Extinction imminent	Classification applies to species listed as 'Critically Endangered' within the meaning of the TSC Act.
3	Extinction within 10 years	Classification applies to species listed as 'Endangered' within the meaning of the TSC Act.
2	Extinction within 50 years	Classification applies to species listed as 'vulnerable' within the meaning of the TSC Act.
1	No foreseeable extinction	Classification applies to species not listed as threatened within the meaning of the TSC Act.

The last classification described as 'no foreseeable extinction' relates to all species not classified as threatened. This is particularly relevant to undescribed species where it is likely there is limited knowledge of the species conservation status.

Subject Species Evaluation

Using the ecological risk analysis to evaluate the likely impact of development on threatened biodiversity permitted for a distinction between threatened biodiversity relevant to the assessment from those that are not (i.e. identification of Subject Species). The ecological risk analysis matrix used for this purpose is shown as follows in **Table 4**.

Table 4: Ecological Risk Matrix

Likelihood Label	Consequence Label				
	1	2	3	4	5
A	High	Extreme	Extreme	Extreme	Extreme
B	Medium	High	Extreme	Extreme	Extreme
C	Low	Medium	High	Extreme	Extreme
D	Low	Low	Medium	High	Extreme
E	Low	Low	Low	Low	Low

From the above table it is clearly apparent that both vulnerable and endangered species are considered 'Subject Species' where known and/or potential habitat is identified. Threatened biodiversity classified as having a 'Low' ecological risk rating are species that are unlikely to be impacted by the development (i.e. no known and/or potential habitat within the impact area), and are hence deemed irrelevant to the assessment.

Extinct species listed on the TSC Act that have historical affiliation with the region are considered on the assumption that knowledge on habitat values is likely to have been limited by an absence of records and/or any targeted research. Similarly, undescribed species likely to be impacted by the development will also receive consideration (i.e. ecological risk classification of A1 – High').

3.3 Field Survey

The baseline field survey was conducted in accordance with DECs working draft *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004). The details of the survey are described in the Stage 2 Ecological Impact Assessment Report (Ecovision Consulting, 2008)

4.0 LOCAL ENVIRONMENT

4.1 Biological Characteristics

4.1.1 Mitchell Landscapes

The site transcends the Lees Pinch Foothills and Upper Goulburn Valleys and Escarpment Mitchell Landscapes (Mitchell, 2002) of the Hunter Central Rivers catchment area. Catchment Management Authorities (CMAs) consider Mitchell landscapes with existing vegetation cover of less than 30% pre-European conditions as being overcleared. Both these Mitchell Landscapes are not overcleared.

4.1.2 Vegetation

Keith Classes

Keith (2004) vegetation classes known to occur within the Mitchell Landscapes of the site include Western Slopes Grassy Woodlands and Western Slopes Dry Sclerophyll Forests. Details of these vegetation classes are provided in **Table 5**.

Table 5: Predominant Vegetation Classes within the Locality

Vegetation Classes (Keith, 2004)	Native plant species richness	Native overstory cover %	Native mid Story Cover %	Native Groundcover (grasses) %	Native Groundcover (shrubs) %	Number of Trees with Hollows/ ha
Western Slopes Dry Sclerophyll Forests	30	8-35	3-35	3-25	3-25	2
Western Slopes Grassy Woodlands	23	10-45	5-60	5-45	2-10	2

Local Vegetation Communities

Vegetation mapping of the Ulan locality, as defined by baseline studies for EL6288 (Ecovision Consulting, 2008), indicates the vegetation cover of the site and adjoining landscape as largely characterised by:

- Open woodland, shrublands and grassy woodland vegetation types on the valley floor,
- Shrub and/or grassy woodlands and open forest on the midslopes; and
- Shrubby woodlands and forests on the adjoining stepper slopes and ridgelines (Ecovision Consulting, 2008).

Transition shrubby/ grassy woodlands/ forests characterised by Ironbarks, Box and Gum generally occur at the Triassic – Permian interface (i.e. footslopes), this representing the main landscape context for the site. **Table 6** describes these vegetation types together with equivalent BioMetric vegetation types (see Ecovision Consulting, 2008).

Table 6: Vegetation Types of EL6288 (Ecovision Consulting, 2008) Relevant to the Site

Vegetation Type (Ecovision Consulting, 2008)	Geology	Characteristic Species	Related Keith (2004) Vegetation Class	Comparable BioMetric Vegetation Type
Blakely's Redgum - Rough-barked Apple Woodland on course sands	Permian (Illawarra Coal Measures)	12	Western Slopes Grassy Woodland	Blakely's Red Gum - Rough-Barked Apple flats woodland of the NSW western slopes (Benson 281)
Lowland Ironbark Forest	Permian (Illawarra Coal Measures)	18	Western Slopes Dry Sclerophyll Forest	Blue-leaved Ironbark heathy woodland of the southern part of the Brigalow Belt South Bioregion
Lowland Box – Redgum Woodland	Permian (Illawarra Coal Measures)	11	Western Slopes Grassy Woodland	Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin*
Footslope Ironbark – Gum –Box	Permian (Illawarra Coal Measures)	12	Western Slopes Dry Sclerophyll Forest	Slaty Box - Grey Gum shrubby woodland on footslopes of the upper Hunter Valley, Sydney Basin
Blakely's Redgum - Yellow Box – Rough-barked Apple Woodland	Permian (Illawarra Coal Measures)	19	Western Slopes Grassy Woodland	Blakely's Red Gum - Yellow Box - Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin*
Grey Box – Narrow-leaved Ironbark Forest	Permian (Illawarra Coal Measures)	12	Western Slopes Grassy Woodland*	Grey Box - Narrow-leaved Ironbark shrubby woodland on hills of the Hunter Valley, North Coast and Sydney Basin
Rough-barked Apple - Banksia Woodland	Tertiary Paleochannel	25	n/a	n/a
Secondary Grasslands and Shrublands	Permian (Illawarra Coal Measures)	11	n/a	n/a
Shrubby White Box Forest	Permian (Illawarra Coal Measures)	21	Western Slopes Dry Sclerophyll Forest	White Box shrubby open forest on fine grained sediments on steep slopes in the Mudgee region (Benson 273)
Grassy White Box Woodland	Tertiary Basalt	15	Western Slopes Grassy Woodland	White Box - Yellow Box grassy woodland on basalt slopes in the upper Hunter Valley, Brigalow Belt South*
Ridgetop Broad-leaved Ironbark - Black Cypress Pine on shallow sands	Narrabeen Group	19	Western Slopes Dry Sclerophyll Forest	Grey Gum - Narrow-leaved Stringybark - Ironbark woodland on ridges of the upper Hunter Valley, Sydney Basin
Broad-leaved Ironbark Grey Gum Forest	Narrabeen Group/ Illawarra Coal Measures	16	Western Slopes Dry Sclerophyll Forest	Grey Gum - Narrow-leaved Stringybark - Ironbark woodland on ridges of the upper Hunter Valley, Sydney Basin
Scribbly Gum Narrow-leaved Ironbark Woodland	Narrabeen Group	16	Western Slopes Dry Sclerophyll Forest	Scribbly Gum - Brown Bloodwood woodland of the southern Brigalow Belt South
Hardcap Scribbly Gum - Ironbark Woodland	Tertiary Paleochannel	18	n/a	Scribbly Gum - Brown Bloodwood woodland of the southern Brigalow Belt South
Crop/ Plantation	Permian (Illawarra Coal Measures)	n/a	n/a	n/a

Note: * denotes vegetation types classified as belonging wholly or in part to the WBYBBRW EEC/ CEEC.

Floristic Diversity

At least 514 flora species of mostly native origin (i.e. 467 natives and 47 exotics) have been identified within the locality (DECC, 2008), with three listed threatened species (Ausfields Wattle, Scant Pomaderris, Painted Diuris). Locally these threatened species have been observed in Lowland Ironbark Forest and Footslope Ironbark – Gum –Box Woodland (Ecovision Consulting, 2008; DEC, 2008).

4.1.3 Fauna

Wildlife Atlas Database records contains at least 497 fauna species observations within the locality (DECC, 2008). The baseline field survey identified 256 fauna species comprising 170 avian, 37 mammal, 32 reptile and 7 amphibian species (Ecovision Consulting, 2008). Thirty six of these species are currently listed as threatened. Lowland Ironbark Forest is known to contain 18 threatened species within EL6288 (Ecovision Consulting, 2008).

A range of broad fauna habitat classes occur throughout the locality that provide opportunity for a range of faunal activity such as seasonal foraging and breeding. These classes are listed as follows:

- Woodland and open forest tree canopy dominated by Eucalypt species of dry sclerophyll environs;
- Open to dense shrublands dominated mostly by species of dry to moist sclerophyll environs belonging to the families Myrtaceae (e.g. Eucalypts) and Mimosoidaceae (e.g. Wattles);
- Sparse to open groundcovers dominated by grasses and woody herbs of dry to moist environs;
- Semi-permanent to ephemeral open/closed depressions dominated by a mix of native and exotic sedges and herbs; and
- Exotic grasses and herbs of disturbed cleared environs.

Microhabitat features characterising these general habitat classes are listed as follows:

- Tree branches;
- Pollen and nectar producing plants, principally Wattles and Eucalypts;
- Sparse to moderate distribution of fallen timber and bark;
- Scattered hollow bearing trees; and
- Ephemeral drainage swales.

Notably absent from the locality are wet sclerophyll forests and surface rock formations, which represent important habitat values for specific fauna species such as reptiles.

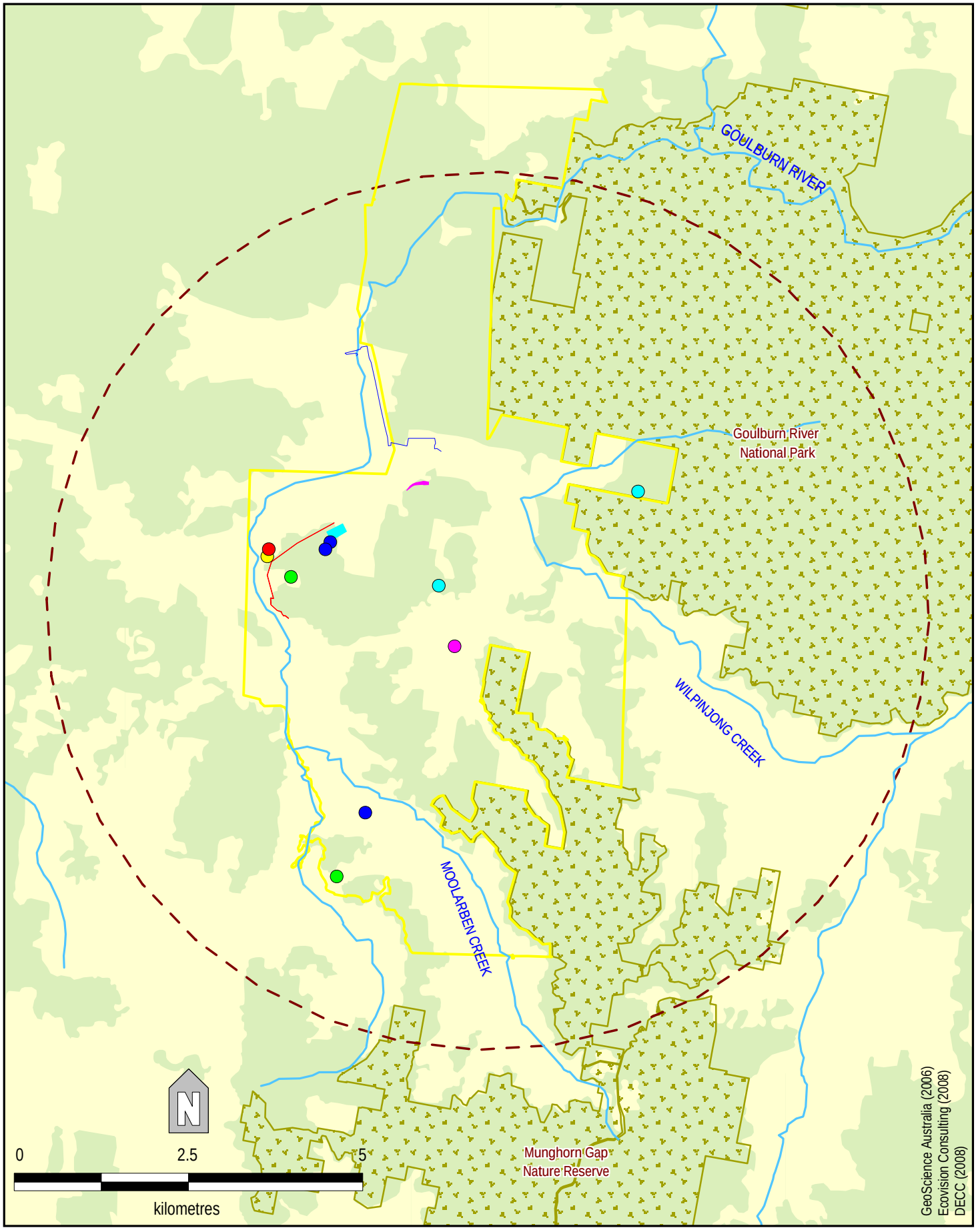
4.2 Potential Subject Species

4.2.1 Flora

Database searches identified numerous threatened flora species within the locality for consideration (DEC, 2008; DEWHA, 2008). A spatial analysis of database records contained within the Lees Pinch Foothills and Upper Goulburn Valley and Escarpments Mitchell Landscape and Lowland Ironbark Forest vegetation type (Ecovision Consulting, 2008) identified a further threatened flora species respectively for consideration as 'Potential Subject Species'. **Table 7** lists the results of relevant species identified by the database and spatial analysis, with the distribution of those that occur within the locality shown in **Figure 2**.

Table 7: Potential Subject Species – Flora

Common Name	Scientific Name	TSC Act	EPBC Act	Database Records			
				30 km	Mitchell	Geology	Total†
	Cynanchum elegans^	E	E	0	2	3	32
Hoary Sunray	*Leucochrysum albicans var tricolor*#		E	1	1	0	1
	Ozothamnus tessellatus^	V	V	8	8	9	9
Ausfield's Wattle	*Acacia ausfieldii*#	V	-	2	1	0	2
Flockton Wattle	*Acacia flocktoniae*	V	-	1	1	1	1



Legend

- Waterways
- Boundary of EL6288
- Conservation Reserves
- Native Vegetation
- "Treeless" Landcover
- 5 km radius
- Water Sharing Pipeline
- Mine Lease Fenceline
- Open Cut 1 Infrastructure
- ROM Dump Hopper
- *Acacia ausfeldii*
- *Diuris tricolor*
- *Eucalyptus cannonii*
- *Eucalyptus scoparia*
- *Leucochrysum albicans var. tricolor*
- *Pomaderris queenslandica*

Figure 2 Threatened Flora of the Locality

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Common Name	Scientific Name	TSC Act	EPBC Act	Database Records			
				30 km	Mitchell	Geology	Total†
Weeping Myall of the Hunter Catchment	*Acacia pendula*	E2	E	1	1	1	16
	Kennedia retrorsa^	V	V	0	17	17	17
	Swainsona recta^	E	-	0	0	0	0
Cannons Stringybark	*Eucalyptus cannonii*#	V	-	3	3	3	3
River Redgum of the Hunter Catchment	*Eucalyptus camaldulensis*	E2	-	2	0	0	68
	Eucalyptus scoparia	E1	V	1	0	0	1
	Eucalyptus pumila	V	V	0	1	9	12
	Homoranthus darwinioides^	V	-	4	4	4	4
Tiger Orchid of the Hunter Catchment	*Cymbidium canaliculatum*	E2	-	0	14	0	17
Painted Diuris	*Diuris tricolor (syn D. sheiffiana)*^#	V	V	3	5	4	23
	Diuris pedunculata	E1	E	0	2	0	4
	Digitaria porrecta^	V	V	0	0	0	0
Silky Pomaderris	*Pomaderris sericea**	V	-	1	0	1	1
Scant Pomaderris	*Pomaderris queenslandica*	E1	-	0	18	18	21
Denman Pomaderris	*Pomaderris reperta*	E1	CE	0	17	17	17
	Prostanthera discolour^	V	V	8	6	7	8
	Prostanthera cineolifera	V	V	0	1	1	1
	Prostanthera cryptandroides^	V	V	0	8	10	15
	Prostanthera stricta	V	V	0	8	8	8
	Philotheca ericifolia^	V	V	0	0	0	1
	Commersonia rosea	E1	-	0	5	5	5
	Lasiopetalum longistamineum	V	V	0	13	13	13
	Rulingia procumbens	V	V	0	2	2	2
Austral Toadflax	*Thesium australe*^	V	V	0	0	0	3
Wollemi Pine	*Wollemia nobilis*^	E1	E	n/a	n/a	n/a	n/a

^ Identified by EPBC Act Protected Matters Search

Known to occur locally

† DECC (2008)

4.2.2 Fauna

Database searches identified 36 threatened fauna species within the locality (DECC, 2008; DEWHA, 2008, Ecovision Consulting, 2008). **Table 8** lists the species the total number of database records within the HCR CMA (west of Cessnock), relevant Mitchell Landscapes and geological formations. Threatened species with occurrences of the locality are shown in **Figure 3**.

Table 8: Potential Subject Species - Fauna

Common Name	Scientific Name	TSC Act	EPBC Act	Database Records			
				30 km	Mitchell	Geology	Total†
Booroolong Frog*	*Litoria booroolongensis*	E1	E	0	0	0	6
Giant Barred Frog	*Mixophyes iteratus*	E1	E	1	0	15	24
Worm Skink	*Aprasia parapulchella*	V	V	1	0	1	1
Collared Whip Snake	*Suta flagellum*	V	-	1	0	0	1
Sydney Broad-headed Snake*	*Hoplocephalus bungarioides*	E1	V	0	0	0	0
Mallee Fowl*	*Leipoa ocellata*	E1	E	1	1	0	1
Square-tailed Kite	*Lophoictinia isura*	V	-	10	2	2	15
Bush Stone-curlew	*Burhinus grallarius*	E1	-	1	1	13	141
Australian Painted Snipe*	*Rostratula australis*	V	V	0	0	0	2
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	-	19	10	113	178
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	-	60	104	255	609

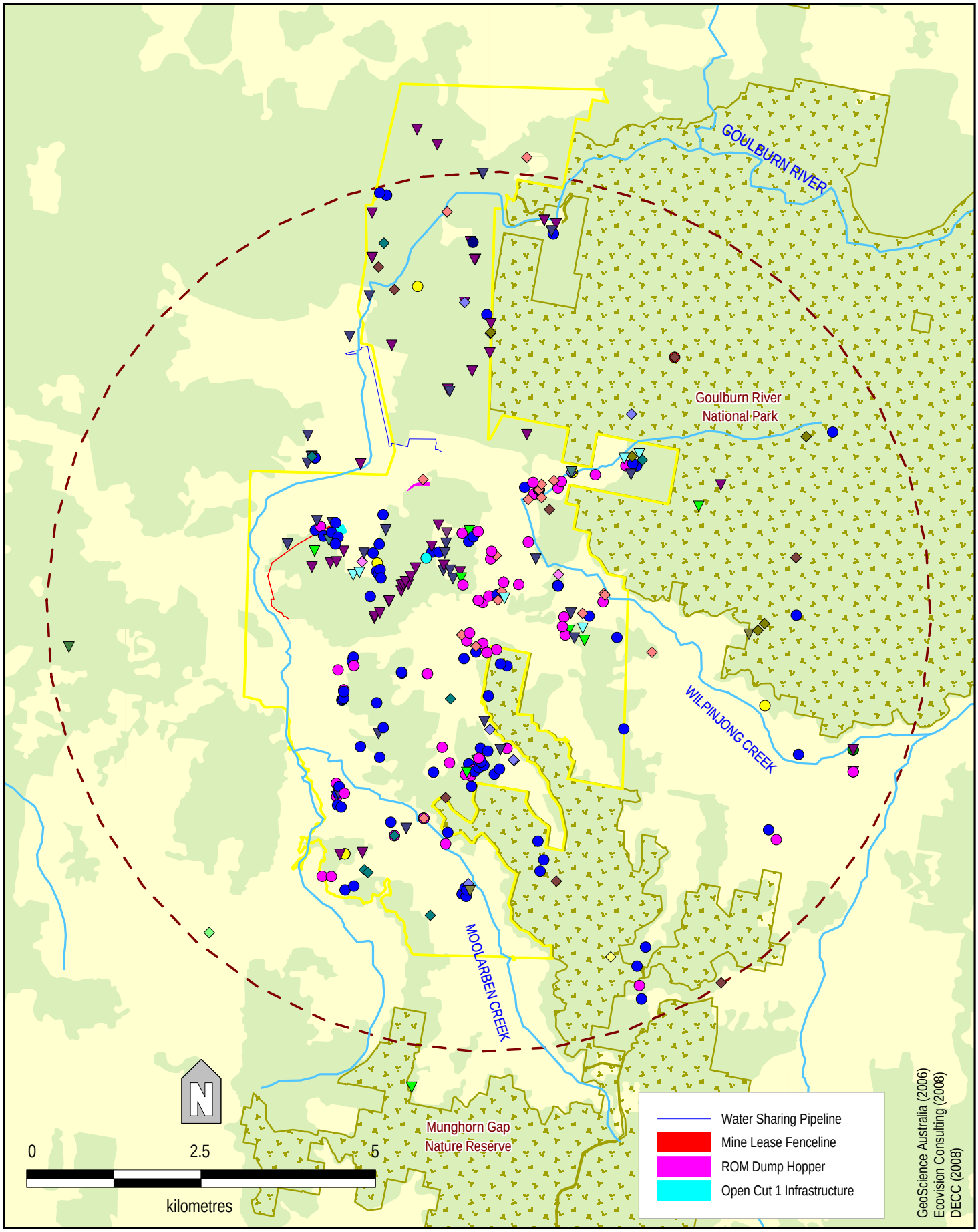

Figure 3 Threatened Fauna of the Locality

Legend

- Waterways
- Boundary of EL6288
- Conservation Reserve
- Native Vegetation
- "Treeless" Landcover
- 5km radius

- Barking Owl
- Brown Treecreeper
- Diamond Firetail
- Eastern Bentwing Bat
- Gang Gang Cockatoo
- Gang-gang Cockatoo
- Giant Barred Frog
- Gilbert's Whistler
- Greater Longeared Bat
- Grey-crowned Babbler
- Hooded Robin
- Koala
- Large-eared Pied Bat
- Little Pied Bat
- Masked Owl
- Powerful Owl
- Glossy Black Cockatoo
- Black-chinned Honeyeater
- Painted Honeyeater
- Regent Honeyeater
- Speckled Warbler
- Square-tailed Kite
- Squirrel Glider
- Yellow-bellied Sheathtail Bat

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Common Name	Scientific Name	TSC Act	EPBC Act	Database Records			
				30 km	Mitchell	Geology	Total†
Swift Parrot*	*Lathamus discolor*	E1	E	2	0	8	50
Superb Parrot*	*Polytelis swainsonii*	V	V	0	0	0	0
Turquoise Parrot	*Neophema pulchella*	V	-	55	16	47	102
Barking Owl	*Ninox connivens*	V	-	1	2	18	63
Powerful Owl	*Ninox strenua*	V	-	32	9	132	414
Masked Owl	*Tyto novaehollandiae*	V	-	1	0	0	0
Gilberts Whistler	*Pachycephala inornata*	V	-	1	0	0	0
Brown Treecreeper	*Climacteris picumnus*	V	-	147	164	60	323
Speckled Warbler	*Pyrrholaemus sagittatus*	V	-	79	86	86	240
Painted Honeyeater	*Grantiella picta*	V	-	15	9	4	17
Black-chinned Honeyeater	*Melithreptus gularis gularis*	V	-	37	13	39	120
Regent Honeyeater*	*Anthochaera phrygia*	E1	E	86	20	23	77
Hooded Robin	*Melanodryas cucullata*	V	-	33	39	13	45
Grey-crowned Babbler	*Pomatostomus temporalis*	V	-	9	34	25	319
Diamond Firetail	*Stagonopleura guttata*	V	-	54	59	23	91
Spotted-tailed Quoll*	*Dasyurus maculata*	E1	E	0	2	35	992
Koala	*Phascolarctos cinereus*	V	-	8	6	43	693
Squirrel Glider	*Petaurus norfolkensis*	V	-	1	6	150	460
Brush-tailed Rock-wallaby*	*Petrogale penicillata*	E1	V	1	12	80	139
Large-eared Pied Bat*	*Chalinolobus dwyeri*	V	V	8	18	66	109
Little Pied Bat	*Chalinolobus picatus*	V	-	1	4	4	4
Eastern Bentwing Bat	*Miniopterus schreibersii*	V	-	2	9	103	359
Eastern Long-eared Bat*	*Nyctophilus timoriensis*	V	-	6	8	25	30
Large-footed Myotis	*Myotis adversus*	V	V	1	0	0	0
Yellow-bellied Sheath-tailed Bat**	*Saccolaimus flaviventris*	V	-	0	2	4	26

* Identified by EPBC Act Protected Matters Search

** Known to occur locally from local studies (i.e. baseline studies).

† Birds Australia (2008) and DECC (2008) for the HCR CMA west of Cessnock (i.e. eastern extent of Narrabeen geology)

4.2.3 Ecological Communities

Vegetation communities listed as endangered that have known occurrences within the locality include White Box Yellow Box Blakely's Redgum Woodland EEC (i.e. TSC Act) or White Box Yellow Box Blakely's Redgum Woodland and Derived Grasslands CEEC (i.e. EPBC Act).

5.0 IMPACT ANALYSIS

The impact of development on the sites ecological values was initially considered at a biological level for species, populations and communities relevant to this assessment (i.e. threatened biodiversity: "Subject Species"). The key considerations, as listed in the "Assessment of Significance" (i.e. Section 5A of the EP&A Act), which apply in this assessment are as follows:

- The likelihood for a local extinction of a listed species or population;
- The change in local extent and composition for a listed community including the likelihood of a local extinction;
- The change in local habitat extent and composition for a listed species or population;
- The affects of habitat fragmentation;
- Any impact on mapped critical habitat;
- The relevance of any recovery plans; and
- The relationship between the proposed development and listed key threatening processes.

In this respect, the following impacts have been considered relative to the proposed modifications:

- Loss of core/ secondary habitat for local threatened biodiversity (i.e. 'impact likelihood');
- The duration of habitat modification and its extent relative to the local area (i.e. 'impact consequence'); and
- Reduction of wildlife connectivity.

Impacts on threatened biodiversity will initially arise during constructions works (i.e. direct impact), with site occupation resulting in a permanent impact.

5.1 Quantification of Impacts

The proposed location for the Open Cut 1 ROM pad and dump hopper will impact an estimated 2.7 ha, this consisting of native vegetation cover (2.4 ha) and cleared lands. The proposed relocation of various personnel related Open Cut 1 infrastructure (i.e. bath house, offices and car park) and removal of the Open Cut 1 ROM pad from its approved location will also impact native vegetation cover, with these impacts already accounted for in the Stage 1 approval. The fenceline constructed along the ML boundary will result in an additional 3.21 ha of native vegetation loss that was not assessed in Stage 1 of the MCP.

In terms of the impacts on native vegetation cover these proposed modifications to the Stage 1 approval will result in new impacts (e.g. fencing requirements and ROM hopper dump). These impacts are in addition to those calculated for Stage 1 of the MCP. The following table indicates the loss of native vegetation cover as a consequence of these works:

Vegetation Type	ROM Hopper (ha)	Fenceline (ha)
Blakely's Redgum - Rough-barked Apple Woodland		0.26
Broad-leaved Ironbark Grey Gum Forest	0.11	0.56
Footslope Box - Gum - Ironbark	0.50	0.09
Grey Box - Narrow-leaved Ironbark Forest	1.79	0.32
Hardcap Scribbly Gum - Ironbark Woodland		0.38
Lowland Box - Redgum		1.06
Lowland Ironbark Forest		0.43
Shrubby White Box Forest		0.27
Ridgetop Broad-leaved Ironbark - Black Cypress Pine on shallow sands		0.16
Total	2.40	3.21

The impact footprint arising from the proposed development includes the area directly impacted by the ROM dump hopper (i.e. clearing, fill and side roads). The alteration of soil conditions and availability of macro nutrients from these changed conditions, combined with a disturbed edge, could result in indirect impacts such as the introduction of weeds in adjoining uncleared native vegetation. Altered surface water movements arising from the modification are likely to have indirect impacts downslope of the infrastructure

emplacement (i.e. increased water interception and/or channelled water flows). These indirect impacts must also be considered when determining an impact management response. Quantification of this impact type has been defined by a 30m buffer.

The proposed development will result in the net removal of 5.61 ha intact native vegetation. Indirect impacts are estimated to be approximately 5 ha. This consists 1.32 ha of WBYBBRW and Derived Grasslands EEC/ CEEC.

Water Sharing Pipeline

The WSP is proposed within an existing utility easement located alongside the western side of the Ulan – Cassilis Road, indicating previous disturbance. Sections of this pipeline are also proposed to be located within close proximity to Bora Creek and the Goulburn River diversion.

The pipeline will be constructed of industrial grade 355 mm poly-pipe, typical of that used for water supply and conveyance at other NSW coal mines. Once in the road reserve the pipeline will be buried in a 1 m wide trench at a depth of about 1 m, and will only surface at the road and creek crossings and within the rail loop.

The pipeline trench will be excavated using a backhoe or trench digger. Excavated spoil will be placed alongside the trench and used to backfill the void once the pipeline is laid. The disturbance footprint is expected to be about 5 m wide, sufficient to allow excavation and temporary placement of spoil.

Once the pipe is laid, the trench will be backfilled to a depth of 0.5 m. Utility service tape will then be laid to mark the location of the pipeline. The remaining 0.5 m void will be backfilled and the entire length of the disturbance area rehabilitated.

The WSP will predominantly traverse areas already been impacted by prior vegetation removal, with only minor areas subject to new clearing events (i.e. near Bora Creek and Goulburn River diversion). The area impacted is estimated to be less than 750 m^2.

The Environment Officer for the MCP will be responsible for overseeing the installation and rehabilitation of this pipeline. The following criteria apply to the installation of this infrastructure:

1. No trees are to be removed;
2. Topsoil is to be salvaged and re-emplaced after trench refilling;
3. Rehabilitation works using native grasses, specifically seed mixes based on Kangaroo Grass; and
4. Monitoring for at least 2 years to identify and suppress any weed occurrences arising from the WSP excavation works.

The latter two criteria for the installation of the WSP is particularly important as there are stands of WBYBBRW within close proximity to this pipeline. The introduction/ increase of weed populations that may arise from these works would have long term indirect impacts on this EEC/ CEEC should weed suppression activities not occur.

Assuming the installation of the WSP in accordance with the above criteria it is considered that the impact of these works is minimal and requires no additional mitigation.

5.2 Preliminary Ecological Risk Analysis

An ecological risk analysis was completed to determine the likely level of threat posed by the proposed development against matters of ecological significance as defined in this EIA report. The results of this analysis were used to identify 'Subject Species' thus defining the scope for impact management. The preliminary ecological risk analysis is provided in **Table 9** and **Table 10**.

Table 9: Preliminary Ecological Risk Analysis - Flora

Common Name	Scientific Name	Site Occurrence (Level of Certainty)	Site Habitat Value	Likelihood	Consequence	Ecological Risk Analysis	Subject Species
	*Cynanchum elegans**	None (high)	Absent	E	3	Low	No
Hoary Sunray	*Leucochrysum albicans var tricolor***	None (low)	Moderate	E	3	Low	No
	*Ozothamnus tessellatus**	None (high)	Absent	E	2	Low	No
Ausfield's Wattle	*Acacia ausfieldii*	None (high)	Moderate	E	2	Low	No
Flockton Wattle	*Acacia flocktoniae*	None (high)	Absent	E	3	Low	No
Weeping Myall of the Hunter Catchment	*Acacia pendula*	None (high)	Absent	E	3	Low	No
	*Kennedia retrorsa**	None (high)	Absent	E	2	Low	No
	*Swainsona recta**	None (high)	Absent	E	3	Low	No
Cannons Stringybark	*Eucalyptus cannonii**	None (high)	High	E	2	Low	No
River Redgum of the Hunter Catchment	*Eucalyptus camaldulensis*	None (high)	Absent	E	3	Low	No
	Eucalyptus pumila	None (high)	Absent	E	2	Low	No
	Eucalyptus scoparia	None (high)	Absent	E	3	Low	No
	*Homoranthus darwinioides**	None (high)	Absent	E	2	Low	No
Tiger Orchid of the Hunter Catchment	*Cymbidium canaliculatum*	None (high)	Moderate	D	3	High	Yes
Painted Diuris	*Diuris tricolor (syn D. sheiffiana)**	None (moderate)	Moderate	C	2	Medium	Yes
	*Diuris pedunculata**	None (high)	Absent	E	3	Low	No
	*Digitaria porrecta**	None (high)	Absent	E	3	Low	No
Silky Pomaderris	*Pomaderris sericea**	None (high)	Absent	E	3	Low	No
	Pomaderris queenslandica	None (high)	Absent	E	3	Low	No
Denman Pomaderris	*Pomaderris reperta**	None (high)	Absent	E	4	Low	No
	*Prostanthera discolor**	None (high)	Absent	E	2	Low	No
	*Prostanthera cineolifera**	None (high)	Absent	E	2	Low	No
	*Prostanthera cryptandroides**	None (high)	Absent	E	2	Low	No
	*Prostanthera stricta**	None (high)	Absent	E	2	Low	No
	*Philotheca ericifolia**	None (high)	Absent	E	2	Low	No
	*Commersonia rosea**	None (high)	Absent	E	3	Low	No
	*Lasiopetalum longistamineum**	None (high)	Absent	E	2	Low	No
	*Rulingia procumbens**	None (high)	Absent	E	3	Low	No
Austral Toadflax	*Thesium australe**	None (high)	Absent	E	2	Low	No
Wollemi Pine	*Wollemia nobilis**	None (high)	Absent	E	4	Low	No

* Dual listed on the State and Commonwealth Acts ** Listed solely on the Commonwealth Act

Table 10: Preliminary Ecological Risk Analysis - Fauna

Common Name	Scientific Name	Site Occurrence (Level of Certainty)	Site Habitat Value	Likelihood	Consequence	Risk Analysis	Subject Species
Booroolong Frog	*Litoria booroolongensis**	Absent (High)	Absent	E	3	Low	No
Giant Barred Frog	*Mixophyes iteratus**	Absent (High)	Absent	E	3	Low	No
Worm Skink	*Aprasia parapulchella**	Absent (High)	Absent	E	3	Low	No
Sydney Broad-headed Snake	*Hoplocephalus bungarioides**	Absent (High)	Absent	E	3	Low	No
Collared Whip Snake	*Suta flagellum*	Absent (High)	Absent	E	3	Low	No
Mallee Fowl	*Leipoa ocellata**	Absent (High)	Absent	E	3	Low	No
Square-tailed Kite	*Lophoictinia isura*	Absent (Low)	High	C	2	Medium	Yes
Bush Stone-curlew	*Burhinus grallarius*	Absent (Moderate)	Moderate	C	3	High	Yes
Australian Painted Snipe	*Rostratula australis**	Absent (High)	Absent	E	3	Low	No
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Absent (High)	Absent	E	2	Low	No
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	Known	Low	D	2	Medium	Yes
Swift Parrot	*Lathamus discolor**	Absent (Moderate)	Moderate	D	3	Medium	Yes
Superb Parrot	*Polytelis swainsonii**	Absent (High)	Low	E	2	Low	No
Turquoise Parrot	*Neophema pulchella*	Absent (Moderate)	Moderate	C	2	Medium	Yes
Barking Owl	*Ninox connivens*	Absent (Moderate)	High	C	2	Medium	Yes
Powerful Owl	*Ninox strenua*	Absent (Low)	Low	D	2	Low	No
Masked Owl	*Tyto novaehollandiae*	Absent (High)	Low	D	2	Low	No
Brown Treecreeper	*Climacteris picumnus*	Known	High	C	2	Medium	Yes
Speckled Warbler	*Pyrrholaemus sagittatus*	Known	High	C	2	Medium	Yes
Painted Honeyeater	*Grantiella picta*	Absent (Low)	High	C	2	Medium	Yes
Black-chinned Honeyeater	*Melithreptus gularis gularis*	Absent (Low)	High	C	2	Medium	Yes
Regent Honeyeater	*Anthochaera phrygia**	Absent (Moderate)	Moderate	C	3	High	Yes
Gilbert's Whislter	*Pachycephala inornata*	Absent (Low)	Moderate	C	2	Medium	Yes
Hooded Robin	*Melanodryas cucullata*	Absent (Low)	High	C	2	Medium	Yes
Grey-crowned Babbler	*Pomatostomus temporalis*	Absent (Low)	Low - Moderate	C	2	Medium	Yes
Diamond Firetail	*Stagonopleura guttata*	Known	High	A	2	Extreme	Yes
Spotted-tailed Quoll*	*Dasyurus maculata**	Absent (Moderate)	Moderate	D	3	Medium	Yes
Koala	*Phascolarctos cinereus*	Absent (High)	Low	E	2	Low	No
Squirrel Glider	*Petaurus norfolcensis*	Absent (Moderate)	Moderate	C	2	Medium	Yes
Brush-tailed Rock-wallaby	*Petrogale penicillata**	Absent (High)	Absent	E	4	Low	No
Large-eared Pied Bat	*Chalinolobus dwyeri**	Absent (Low)	High	D	2	Low	No
Little Pied Bat	*Chalinolobus picatus*	Absent (Low)	High	D	2	Low	No

Common Name	Scientific Name	Site Occurrence (Level of Certainty)	Site Habitat Value	Likelihood	Consequence	Risk Analysis	Subject Species
Eastern Bentwing Bat	*Miniopterus schreibersii*	Absent (Low)	Moderate	D	2	Low	No
Eastern Long-eared Bat	*Nyctophilus timoriensis**	Absent (Low)	High	C	2	Medium	Yes
Large-footed Myotis	*Myotis adversus*	Absent (High)	Absent	E	2	Low	No
Yellow-bellied Sheath-tailed Bat	*Saccolaimus flaviventris*	Absent (Low)	High	C	2	Medium	Yes

* Dual listed on the State and Commonwealth Acts ** Listed solely on the Commonwealth Act

This EIA report is based on extensive widespread systematic and targeted surveys over a number of seasons throughout EL6288, of which the site is contained within, with specific onsite survey activity limited to systematic flora surveys and opportunistic observations. As such a lower level of certainty is placed over most fauna species, thus commanding a greater weighting of 'site habitat value' in the risk analysis.

For most threatened flora, the high level of certainty is a consequence of targeted surveys conducted within the site (for most species) and is thus a reliable robust platform for evaluating risk. However, in the case of threatened fauna a landscape based assessment approach has been adopted, this representing a conservative appraisal of the site. Greater reliance on the baseline dataset for EL6288 is therefore implied.

5.2.1 Risk Minimisation Strategies

The proposed modifications, as depicted in **Figure 1**, would have a maximum direct impact footprint of approximately 5.61 ha. Indirect impacts have been estimated on the basis of a 30m buffer resulting in an expecting impact of 5 ha.

In the absence of specific impact management actions, the proposed modifications will result in a net loss of local native vegetation cover and habitat. General strategies aimed at minimising these impacts include:

- Consider avoiding areas of high biodiversity; and/or
- Undertake weed management prior to and after the proposed construction works; and/or
- Avoidance of important biodiversity values such as trees with hollows or threatened species habitats; and/or
- Development of plans of management to moderate onsite development impacts; and/or
- Initiate/ support regional initiatives and/or DECCs priority actions for threatened biodiversity; and/or
- Offset site impacts through compensatory habitat initiatives and/or biobanking scheme.

These general strategies form the underlying framework for the development of the impact management approach.

5.2.2 Summary of Ecological Risk Analysis

The main conclusion of the preliminary ecological risk analysis (Section 5.2) is a focus on the use of mitigation actions to increase the certainty of expected impact intensity. It is assumed that baseline and site species field surveys are supportive of this focus.

Impact management actions considered for this development include:

- Implementation of enhancement management actions for lands indirectly impacted by these proposed modifications (e.g. feral animal control and weed management including weedy natives);
- Monitoring works, particularly for areas affected by indirect impacts;
- Avoidance of hollow bearing trees, where practicable;
- Avoidance of construction works coinciding with breeding events for woodland birds;
- Management of hollow bearing trees that are to be removed through the use of fauna clearance, relocation and compensatory habitat initiatives;
- Revegetation of proximal lands to provide local offsets for vegetation clearing; and
- Provision of biodiversity offsets for vegetation cover loss, particularly areas classified as WBYBBRW EEC/ CEEC

It is considered that the assumptions generated from the preliminary ecological risk analysis are sufficiently robust to support the recommended field survey approach and development of appropriate and sustainable mitigation actions. In this respect there is sufficient confidence in the base assumptions to support an impact assessment (i.e. “Assessment of Significance”) for the nominated ‘Subject Species’.

6.0 MATTERS OF ECOLOGICAL SIGNIFICANCE

6.1 Subject Species

6.1.1 Threatened Species

Database searches (DECC, 2008; DEWHA, 2008), spatial analysis of relevant Mitchell Landscapes/ vegetation types, site habitat features and the preliminary risk analysis collectively identified 21 "Subject Species" and one EEC/ CEEC requiring consideration in this assessment. Targeted site surveys identified moderate to high value threatened species habitat (i.e. Diamond Firetail, Hooded Robin, Grey-crowned babbler and Speckled Warbler), the presence of WBYBBRW EEC/ CEEC and confirmed potential core/ secondary habitat for many of the remaining 'Subject Species'. Discussion of these species is provided in the following sections.

Habitat Values

Threatened owls, such as the Powerful Owl (*N. strenua*) may potentially use various parts of the site for foraging and/or breeding purposes, particularly where proximal large intact native vegetation remnants occur with suitable roost habitat and presence of ground and arboreal fauna (i.e. foraging resources). Similarly, the Glossy Black Cockatoo (*Calyptorhynchus lathami*) is also likely to utilise forests adjoining the site, particularly due to the presence of Sheoak foraging resources within these proximal vegetation remnants.

However, the site does not contain sufficient resources (i.e. trees with large hollows; plentiful Sheoak and arboreal fauna habitat) to support core foraging/ breeding for these species. In this context, the site represents low value habitat for these species with the sites greatest attribute being its connection between large vegetation remnants with known populations. Given the scale of the development and the propensity for movement by these species over developed landscapes it is considered that the proposed development is unlikely to have an adverse impact resulting in a significant impact. As such there is no further consideration of the Powerful Owl, Glossy-black Cockatoo and Barking Owl in this assessment.

Conversely, sedentary/ home range dependant threatened woodland bird species such as the Grey-crowned Babbler, Hooded Robin and Speckled Warbler are more sensitive to localised impacts, particularly where known/ potential core habitat values are involved. The results of baseline studies (Ecovision Consulting, 2008) show the site as having moderate to high habitat value for these species. As the proposed development would have a permanent impact on existing vegetation cover and associated habitat, it is considered that there is increased risk of a significant impact on these species. Further assessment of these species is warranted.

Habitat values for nectar seeking species such as the Swift Parrot (*L. discolor*) and Regent Honeyeater (*X. phrygia*) occur throughout the locality (e.g. winter flowering eucalypts), with these habitat attributes present throughout the Box vegetation types. The presence of the occasional spring-summer flowering Yellow Box and Blakely's Redgum indicates a potential for foraging activity within the site during this period. The presence of Mistletoe also raises the potential for the Painted Honeyeater, this being a species known to occur within close proximity to the site. Whilst breeding habitat values are largely absent from the site (except Painted Honeyeater), the presence of potential foraging habitat indicates the potential for an impact on these species. As such, these species will be further considered in this assessment.

Species utilising large areas of undisturbed vegetation as part of their natural home ranges may also potentially use the site (e.g. Spotted-tailed Quoll, Square-tailed Kite, Bush-stone Curlew). The Spotted-tailed Quoll would primarily use the site as a movement corridor between nearby large native vegetation remnants and intermittently as an opportunistic foraging area. The Square-tailed Kite and Bush-stone Curlew would also use the site in a similar manner, however, may also use the site for nesting purposes.

Microchiropteran bats identified as 'subject species' include cave and non-cave roosting species. In relation to cave dwelling species, it is considered that the site represents important foraging habitat due to the increased insect resources of the nearby riparian corridor. Tree roosting species are likely to be similarly attracted to the site and proximal areas, with the presence of tree hollows indicating the potential for roost and breeding activity. In this respect, the Eastern Bent-wing Bat, Little Pied Bat, Large-eared Pied Bat,

Eastern Long-eared Bat and Yellow-bellied Sheath-tail Bat may potential experience an impact as a consequence of the proposed development. However, the extent of this impact is greatest on tree dwelling species, with the loss of potential foraging habitat for the cave dwelling species being limited within the context of the locality. As such the Eastern Long-eared Bat and Yellow-bellied Sheath-tail Bat will further considered within this assessment.

6.1.2 EPs

Three EPs may potentially occur within the locality, these being Hunter Catchment populations of the Tiger Orchid (*Cymbidium canaliculatum*), Weeping Myall (*Acacia pendula*) and River Redgum (*Eucalyptus camaldulensis*). Targeted biodiversity surveys confirmed the absence of these three listed populations from the site and locality. Whilst potential habitat occurs for at least the Tiger Orchid (*Cymbidium canaliculatum*), Weeping Myall (*Acacia pendula*), their absence from the site indicates a low likelihood for there being a deleterious impact on these species. No further assessment is warranted for these species.

6.1.3 EECs

There are known occurrences of WBYBBRW EEC within the locality (Ecovision Consulting, 2008), this being the only EEC/ CEEC within the area. Targeted surveys confirmed the presence of this EEC within the site (1.32 ha), thereby warranting further consideration of this matter in this report.

6.1.4 Matters of NES (EPBC Act 1999)

The site is not located in a:

- Declared world heritage property;
- Ramsar wetland;
- Commonwealth marine area; or
- Represent a nuclear action.

Threatened Species, EPs and EECs

The Protected Matters Report (DEWHA, 2008) identified 8 threatened species and 1 critically endangered ecological community (CEEC) and/or their habitats listed on the EPBC Act within the locality. Several of these listed threatened species are considered to potentially occur within the habitats described for the site these being the Hoary Sunray (*L. albicans var tricolor*) Painted Diuris (*Diuris tricolor*), Large-eared Pied Bat (*C. dwyeri*) and Spotted-tailed Quoll (*D. maculatus*). Commonwealth listed species relevant to this assessment have already been identified (i.e. Subject Species) and will be considered in this report. WBYBBRW and Derived Grasslands CEEC occurs within the site (1.32 ha) and will consequently be considered within this assessment.

Migratory Species

Migratory species listed within the schedules of the EPBC Act are known to occur within the locality. With some species being observed within and/or adjacent the site during baseline studies such as those listed on the Protected Matters Search. Notwithstanding the presence of potential/ known habitat for migratory species, it is considered that the extent of the proposed modifications would have marginal impacts on these locally occurring habitat values.

6.1.5 Critical Habitat

No mapped critical habitat listed on the EPBC Act occurs within or adjacent to the site.

6.2 SEPP 44 – Koala Habitat Protection

Surveys for Koala trees and activity was undertaken to determine the occurrence of potential/core Koala habitat within the site. One preferred Koala foraging tree species was found to occur within the site (Grey Gum). However, the density of this species was found to be less than 15% thus eliminating the presence of potential habitat. Koalas have not been detected onsite and as such the site is not considered to constitute 'Potential Koala Habitat' or 'Core Koala Habitat'.

7.0 IMPACT MANAGEMENT

The proposed development would have an adverse impact on WBYBBRW and Derived Grasslands EEC/ CEEC and habitat (foraging/ breeding) for threatened/ declining woodlands birds and microchiropteran bats.

Avoiding a significant impact on threatened biodiversity requires the consideration of impact management actions, particularly those that achieve a 'maintain and improve' outcome. The following global management actions, in order of preference, may form part of any considerations focused on impact minimisation:

- Avoidance (e.g. exclusion of development from areas that contribute to the threatened biodiversity lifecycles or time construction works after the completion of breeding lifecycle event); and/or
- Onsite mitigation (e.g. retention of representative habitats within site together with management regimes); and/or
- Offsite direct/ indirect offsets (e.g. compensatory habitat, regional recovery management).

In the case of these modifications, it is considered that the first two listed impact management actions are applicable to minimising the developments impact on trees with hollows, vegetation loss and impacts on known threatened biodiversity habitat. The following discusses these two issues in greater detail.

Loss of Tree Hollows

Baseline and site specific biodiversity surveys have identified at least two tree hollow dependant species within the locality these being the Eastern Long-eared Bat and Brown Treecreeper. Whilst tree hollows located onsite may not be solely responsible for the presence of tree hollow dependant fauna, it is considered that these habitat attributes would play a significant role in regulation of local populations reliant on this habitat feature over time. As there are trees with hollows located within the development area, it is reasonable to conclude that the removal of these habitat features may result in a higher order impact on threatened biodiversity lifecycles that may ultimately threaten population viability.

Impact management involving avoidance is the most preferable solution, followed by the use of onsite mitigation then finally by offsite offsets (e.g. compensatory habitat). Where impacts cannot be avoided or mitigated it is recommended that offsite offsets be considered to achieve a 'Maintain and Improve' outcome. In this case, offsets would involve the re-establishment of tree hollows (i.e. natural and/or artificial nesting boxes) within the nearby landscape to maintain the occurrence and density of this habitat feature within the locality. Natural hollows are preferred over nesting boxes as the lifespan of a natural hollow is likely to far exceed a manufactured structure. Other mitigation considered important is fauna clearing during construction works and relocation.

Indirect Impacts on Proximal Vegetation

From site and locality data (Ecovision Consulting, 2008) it is apparent that proximal native vegetation offers important foraging grounds for many threatened woodland birds, microchiropteran bat species and movement corridors for threatened birds such as the Glossy Black Cockatoo. Hollows within this landscape are equally important as are hollows in dead or dying trees. Areas of vegetation are also classified as belonging to the WBYBBRW and Derived Grasslands EEC/ CEEC.

Threatened Biodiversity Habitat

Threatened woodland bird habitat has been identified within the site. Observations and habitat analysis clearly identified moderate to high habitat values for many locally occurring threatened woodland species. Thus, it is assumed that the lifecycles of these species have the potential to involve site habitats over time. A small area of WBYBBRW EEC/ CEEC was also found to occur within the site, with the net loss attributed to whole effect of the proposed modifications being 1.32 ha.

In this sense the preferred impact management approach is avoidance where practicable, (e.g. timing of construction works outside breeding periods and retention of hollow bearing trees). Other actions contributing to a lower impact, at a local level, would include offsets involving revegetation. At a more strategic level, offsets dedicated to the conservation reserve network on a like for like basis also represent an important contribution to the minimisation of impacts.

7.1 Recommended Impact Management Actions

The following impact management strategies are recommended for the proposed development to reduce the development impacts on threatened biodiversity:

- Avoid construction works during the breeding cycle of known and potential threatened woodland species that occur within the locality (i.e. construction during autumn – early winter months preferable);
- Implement a plan of management for the removal of hollow bearing trees. This is to include removal techniques, hollow salvage, compensatory measures and monitoring;
- Undertake local revegetation works to minimise the cumulative impact of vegetation loss from the locality, hence the retention/ maintenance of fauna habitats within the locality;
- Undertake weed and feral animal control programs throughout proximal areas of indirect impact. This is to be accompanied by monitoring works to assess the success of enhancement actions; and
- Establish a 'like for like' offset for vegetation directly impacted by the proposed development. The extent of this offset is to be determined by the Consent Authority and government agencies, with the extent of this offset to have regard for other actions such as offsite revegetation works.

In relation to predicted indirect impacts on offsite WBYBBRW and Derived Grasslands EEC/ CEEC, matters such as weed control and water/ erosion management represent important management themes for impact minimisation. These indirect impacts are to be managed within the framework of any approved management plans prepared in response to the conditions of consent for Stage 1 of the MCP where they apply, with additional management works including monitoring to be included in such approved actions.

Impact Assessment Assumptions

The assessment and conclusions presented within this EIA report rely on the implementation of the above impact management actions. In this respect, the recommended impact management actions are of sufficient scope and extent to minimise the risk of a significant impact on threatened biodiversity examined in this report.

Conversely, a limited uptake of these measures would significantly weaken the assessment conclusions. In such circumstances, the impact assessment contained within this report would be unsupported with the potential for a significant impact on threatened biodiversity remaining untested.

8.0 IMPACT ASSESSMENT

8.1 EP&A Act

The "Assessment of Significance" presented below in **Table 11** is a landscape based assessment for all the nominated 'Subject Species' identified in **Table 6** and **7**. The landscape assessment approach considers all matters in a holistic manner and, where necessary, localised habitat features critical to threatened biodiversity lifecycles. Other considerations supporting this assessment are described **Section 5.0** (i.e. Impact Analysis) and **Section 7.1** (Impact Mitigation) where proposed mitigation actions and assessment assumptions are detailed.

Table 11: Assessment of Significance – Threatened Species, EPs and EECs

Assessment Criteria	Assessment
a) In the case of a threatened species …… is likely to be placed at risk of extinction.	The loss of vegetation from the site will impact most threatened woodland species of the locality, particularly those identified in the preliminary ecological risk analysis. However, the extent of proposed vegetation clearing in combination with the recommended mitigation actions would substantially offset these impacts. Timed construction works combined with revegetation and offsets would provide a 'maintain and improve' outcome that would not place any of the assessed threatened biodiversity at risk of extinction.
b) In the case of an endangered population, .. is likely to be placed at risk of extinction.	No. The site does not contain any member of a listed endangered population. The proposed development would not result in the significant loss of potential habitat or indirect impacts on potential/ known habitat.
c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	No. The direct permanent impacts of the proposed development would result in the loss of 1.32 ha of WBYBBRW EEC. This loss represents a localised decline of approximately 0.5% when compared to conserved occurrences of WBYBBRW EEC immediately to the east within the Goulburn River National Park. Further offsetting by the dedication of this EEC to the conservation reserve network would ensure this predicted outcome.
(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	No. The extent of WBYBBRW EEC adjacent to the site could be impacted by changes in hydrology, this potentially acting as a catalyst for improvement of weed habitat (increased water and nutrients). However, through mitigation (i.e. enhancement works) it is proposed to manage the potential offsite impacts through weed and sediment/ erosion management actions. There is no predicted impact on conserved patches of this EEC.
(d)In relation to the habitat of a threatened species, population or ecological community:	
(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed.	The removal of hollow bearing trees has the potential to directly impact the roosting habitat of threatened woodland birds and microchiropteran bats known to occur within the locality (i.e. Brown Treecreeper; Eastern Long-eared Bat; Yellow-bellied Sheath-tail Bat). Mitigation is proposed to offset such losses involving hollow felling, fauna clearing and compensatory habitat management actions. The loss of foraging and potential breeding habitat for woodland birds such as the Diamond Firetail, which are known to occur within the locality, is limited by the retention of native vegetation of similar character to the west and provision of offsets for native vegetation loss and EEC loss. The local abundance of important habitat resources will not be significantly compromised.
(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as	No. The loss of an 8m wide patch of native vegetation (i.e. fenceline) would not adversely affect wildlife corridors within the locality. No fragmentation of any consequence is expected as a consequence of the proposed modification.

Assessment Criteria	Assessment
a result of the proposed action.	
(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The importance of the vegetation to be removed is considered high for most threatened woodland bird species of the locality. Site vegetation is likely to contribute to the breeding most locally occurring threatened woodland species. The importance of this habitat is recognised through the proposed mitigation where local actions focused on revegetation and provision of offsets are recommended to ensure that long term viability for threatened woodland species is conserved within the locality.
(e) Whether critical habitat will be directly or indirectly affected.	No critical habitat declared within or adjacent to the site. No further consideration warranted.
(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	There is a recovery plan for the Bush-stone Curlew which identified land clearing as a threat to its conservation. The proposed action, when combined with the mitigation works is consistent with the recovery plan through its recommendations for revegetation and offset.
(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	Yes. The proposed development of the site is likely to result in the loss of one hollow bearing tree and as such resulting in the operation of the "Loss of Tree Hollows" KTP. Land clearing is also a result of the proposed modification, however, the extent of this clearing within the context of the locality is of limited consequence.

This impact assessment clearly identifies the potential for an impact on the threatened biodiversity (i.e. Subject Species), which has been averted through avoidance (i.e. tree hollows and construction timing), management provisions (i.e. tree hollow removal and weed management) and offsets (i.e. tree hollows; native vegetation offsets and EEC/ CEEC offsets). The impact is balanced by the mitigation measures, which provide opportunity to obtain a "maintain and improve" outcome. Within this context, it is considered that the proposed development would not have a significant impact on locally occurring threatened biodiversity, particularly those identified as 'Subject Species' within this EIA report.

8.2 EPBC Act

Listed Threatened Species

No known threatened species habitat listed on the EPBC Act occurs within the site. However, potential secondary habitat has been identified for species such as the Spotted-tailed Quoll (*D. maculatus*), Regent Honeyeater (*A. phrygia*), Swift Parrot (*L. discolor*) and Large-eared Pied Bat (*C. dwyeri*). Whilst these species and other EPBC Act 'Subject Species' have habitat preferences that are generally contained within large vegetation remnants they are known to use and/or occupy smaller vegetation remnants such as that associated with the site.

Listed Communities

White Box Yellow Box Blakely's Redgum Woodland and Derived Grasslands CEEC has known occurrences within the locality, with the site identified to contain approximately 0.2 ha of this community. Within the context of the locality, this represents an approximate 0.15% loss relative to nearby known occurrences within the Goulburn River National Park (at least 150 ha). Mitigation recommending the provision of an offset for this loss further consolidates this conclusion. No significant impact is expected to occur on this CEEC as a consequence of site development.

Listed Migratory Species

Nine migratory species (terrestrial and wetland) were identified in the EPBC Act Protected Matters Report as potentially occurring in the locality. However, none of the listed migratory species or their habitats is likely to occur within the site. Therefore, it is concluded that there will be no significant impact on this matter of NES.

Significance Analysis

The nature and magnitude of the development's impact has considered the following matters to determine whether a referral to the Department of Environment and Water Conservation is necessary.

Table 12: NES Matters

All on site and off site impacts	Permanent removal of native vegetation from the site will result in a permanent inconsequential biodiversity loss that will not significantly impact any important populations (i.e. mitigation including vegetation management and offsets). Sufficient habitat contained within the locality/ retained within the site.
All direct and indirect impacts	Direct impacts will be largely restricted to the site with the impact being the permanent loss of groundcover biodiversity and some fauna habitats. Direct impacts will result in the net loss of 0.2ha of WBYBBRW and Derived Grasslands CEEC, with offsite offsets proposed to minimise this impact. Impacts on the Large-eared Pied Bat (*C. dwyeri*) will be restricted to foraging habitat, which is abundant throughout the locality and not currently at threat.
The frequency and duration of the action	The proposed development is planned to be a single event and will be permanent.
The total impact which can be attributed to that action over the entire geographic area affected	Low.
The sensitivity of the receiving environment	The sensitivity of the receiving environment is high (i.e. known threatened species habitat). Mitigation proposed to offset impacts.
The degree of confidence with which the impacts of the action are known and understood	A high degree of confidence is placed on this assessment.

In summary, it is concluded that there would be an impact on matters of NES within tolerance limits assuming the implementation of the recommended impact management actions (**Section 9.0**). Thus, it is considered that a referral is not required for the further analysis of this development to determine whether the proposed development is a controlled action under the EPBC Act.

8.3 SEPP 44 – Koala Habitat Protection

The site was assessed for Koala activity using the following methods:

- A search of the NPWS *Wildlife Atlas* Database (DEC, 2008);
- A survey on foot, with koala food trees being inspected for signs of koala use. Trees were inspected and identified for the presence of koalas, characteristic scratch and claw marks on the trunk and scats around the base of each tree. The proportion of trees showing signs of koala use was calculated. Additionally the location and density of droppings, if found, were documented; and
- Identification and an assessment of tree density (stems/ha) for preferred feed trees listed in SEPP No. 44 - Koala Habitat Protection, including an estimate of the tree density for each tree species across the site, determined by averaging the percentage of stems counted.

One preferred Koala feed tree species listed on Schedule 2 of SEPP 44 was found within the area of impact (Grey Gum), with its representation within this area being less than 15% cover (i.e. not regarded as potential koala habitat). No Koalas or evidence of recent Koala activity was observed during the survey period indicating the site is not core habitat. Given the low abundance of Koala preferred feed tree species and absence of koala activity; it is considered that no further consideration of this matter is required for this site.

9.0 CONCLUSIONS

The impact review and assessment provided in this report supports the following findings and conclusions.

- Known habitat for at least four threatened fauna species listed on the TSC Act occur within the areas impacted by the proposed modifications to Stage 1 of the MCP;
- Habitat of moderate to high value also exists for various threatened flora and fauna species listed on the TSC Act/ EPBC Act;
- No EP's listed on the TSC Act occur within the site;
- WBYBBRW EEC/ CEEC is known to occur within the site and would be directly/ indirectly impact by the proposed modifications;
- No Critical Habitat listed on the TSC Act and/or the EPBC Act occurs within the site;
- Through the implementation of the proposed mitigation actions the proposed development is predicted to have a 'maintain and improve' outcome for threatened biodiversity; and
- The impact on local and/or regional wildlife corridors would be low as the proposed modifications will not sever areas of moderate to high ecological value that contribute to the function of important wildlife corridors.

Assuming implementation of the recommended impact management actions it is considered that the proposed development would not result in a significant impact on threatened biodiversity known to/ or potentially occur within or adjacent the site.

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