

**White Rock Wind Farm - Project Approval MP10\_160**  
**Modification Application No. 4 - Alternative Grid Connection**

**Appendix 3A**

**Biodiversity Assessment**

**Prepared by Environmental Assessments, November 2016**

# BIODIVERSITY (FLORA & FAUNA) ASSESSMENT

## WHITE ROCK WIND FARM

Modification Application for

## ALTERNATIVE GRID CONNECTION AT 330 kV

NOVEMBER, 2016

Prepared for WHITE ROCK WIND FARM Pty Ltd

By

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*I acknowledge the Traditional Custodians of the lands on which I work and pay my respects to Elders past and present.*

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## EXECUTIVE SUMMARY

### Introduction

White Rock Wind Farm Pty Ltd commissioned Environmental Assessments Pty Limited to undertake a flora and fauna (biodiversity) assessment for an alternative grid connection at 330kV for the approved White Rock Wind Farm MP10\_160. The modification involves a 13 km section of 132kV transmission line and a 132/330kV substation and switchyard.

### Study area and overview of Surveys

A corridor study area of approximately 13 kilometres by 100 metres wide was assessed within which a 45 metre wide easement would be finalised. Ecological surveys were undertaken over 12 days. The study area was divided into seven main survey and sampling precinct areas described as Sections 1-7 for clarity in field assessments and the field surveys were undertaken within each of these sections (please refer to Figure 1 which shows the study area and section numbers).

### Findings – Threatened Species

Several threatened species were identified within the study area including:

- the Diamond Firetail was recorded within Section 4 of the study area;
- Little Lorikeet was recorded within Section 3;
- Little Eagle was recorded during field assessment in Section 1 of the study area; and
- The Blackbutt Candlebark *Eucalyptus rubida* subsp. *Barbigerorum* was provisionally recorded (but not confirmed) in several sections of the study area.

No ROTAPs (Rare Or Threatened Australian Plants) were recorded.

### Findings – Endangered Ecological Communities

The **White Box Yellow Box Blakely's Red Gum-endangered ecological community (EEC)** as described under the NSW *Threatened Species Conservation Act, 1995* (TSC Act) is present within the study area. The White Box Yellow Box Blakely's Red Gum-EEC is also listed as a critically endangered ecological community (CEEC) under the Commonwealth's *Environment Protection & Biodiversity Conservation Act, 1999* (EPBC Act) and referred to as 'White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands' under the EPBC Act.

The **Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-EEC** as described under the NSW *Threatened Species Conservation Act, 1995* (TSC Act) is also present but only for a limited extent in the eastern part of the study area.

Additionally, there is a small lineal patch of 'wetland' vegetation community that qualifies as **Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC** as described under the *Threatened Species Conservation Act, 1995* is present within Section 5 and to the west of Star-point #5 of the study area. However, the proposed powerline route has been moved away from this vegetation community and an alternative route for the powerline has been established to prevent any impacts on this EEC. This EEC is also listed as an endangered ecological community under the *Environment Protection & Biodiversity Conservation Act, 1999* where the community is referred to as 'Upland Wetlands of the New England Tablelands (New England Tableland Bioregion) and the Monaro Plateau (South Eastern Highlands Bioregion)' under the EPBC Act.

## Other Threatened Species of Flora and Fauna

There are also several previous records of a range of other threatened species of flora and fauna within the locality of the study area according to the Office of Environment & Heritage's (OEH) Atlas database records. In addition to the threatened species recorded during the field assessments of the study area, the study area also contains potential habitat for the Grey-headed Flying Fox, Greater Broad-nosed Bat, Greater Long-eared Bat, Hoary Wattle Bat, Eastern False Pipistrelle, Large Pied Bat, Eastern Bent-wing Bat, Spotted-tailed Quoll (White Rock precinct), Koala, Square-tailed Kite, Swift Parrot, Regent Honeyeater, Brown Treecreeper, Varied Sittella, Barking Owl, Powerful Owl and the Masked Owl. A detailed microbat survey has been undertaken for the White Rock Wind Farm in late 2015. The report was prepared by Brett Lane and Associates in 2016. The report was prepared to support development of the Bird and Bat Adaptive Management Plan for the Wind Farm, required by Condition C6 of the Project Approval.

## Potential Impacts

Section 2 of the line route contains the largest and most ecologically undisturbed remnant within the study area. The proposed powerline would largely bisect this representation of the White Box, Yellow Box, Blakely's Red Gum Woodland-EEC and impacts to this community would be greatest through this section of the study area. Alternative routes were considered but landowner constraints limited options to vary the route. The Flora and Fauna Management Sub-Plan of the CEMP will set out measures to minimise the impacts and the Biodiversity Offset Package establishes the means to offset impacts that can't be avoided..

The impact on the White Box Yellow Box Blakely's Red Gum-EEC is not expected to be significant as determined through the seven part tests of significance review and assessment process under Section 5A of the *Environmental Planning & Assessment Act, 1979* and the Commonwealth guideline significance assessment under the *Environment Protection & Biodiversity Conservation Act, 1999*. Impacts on White Box Yellow Box Blakely's Red Gum-EEC would be managed through the Flora and Fauna Management Sub-Plan of the CEMP and offset elsewhere in accordance with a Biodiversity Offset Package (BOP) that has been prepared to offset ecological impacts as a result of the proposal.

The impact on the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC is not expected to be significant as determined through the seven part tests of significance review and assessment process under Section 5A of the *Environmental Planning & Assessment Act, 1979* and the Commonwealth guideline significance assessment under the *Environment Protection & Biodiversity Conservation Act, 1999*. Through revised routing of the line, impacts to the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC would now be negligible as the powerline has been diverted away from this EEC.

## Noxious Weeds

There are five (5) declared noxious weeds listed under the *Noxious Weeds Act, 1993* present within the study area and all five species declared as noxious weeds within the Inverell Local Government Area. These weed species include:

- the Sweetbriar *Rosa rubiginosa*,
- Blackberry *Rubus fruticosus* species aggregate,
- Fireweed *Senecio madagascariensis*,
- Prickly Pear *Opuntia stricta* and
- the Chilean Needle Grass *Nassella neesiana*.

All of the above species are listed as Class 4 species under the *Noxious Weeds Act, 1993*. Class 4 species under the NW Act meaning these plants pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area. The Chilean Needle Grass is also listed as a Weed of National Significance.

The WRWF Flora and Fauna Management Plan includes measures for weed management.

## **Biodiversity Offset Package**

Condition C7 of the Project Approval requires the preparation and approval of a Biodiversity Package (BOP). The BOP has been established for Stage 1 and an Offset area and required credits identified. The proposed offset area has sufficient credits available to allow for offsetting impacts of the alternative grid connection at the same location. It is proposed that subject to the Modification being approved, the offset of the project impacts would be added to the Stage 1 Offset Package.

## **Conclusions**

The proposed powerline and substation has been planned and routed in the most environmentally sensitive manner possible for minimising impacts on the most vegetated areas of vegetation communities and fauna habitat values of the study area. It is concluded that the proposed installation of the 132kV powerline, easement and associated access track to the White Rock Wind Farm would not have a significant effect on threatened species and endangered ecological communities listed under the *Threatened Species Conservation Act, 1995* or the Commonwealth's *Environment Protection & Biodiversity Conservation Act, 1999* as all threatened species recorded are expected to continue to occur within the study area following the installation of the powerline. Nonetheless, there are several mitigation measures that should be implemented to minimise impacts of the proposal on threatened species (and their habitats) and endangered ecological communities as well as to the minimisation of overall impacts on the environment. These recommendations are as follows.

## **Recommendations**

- That the White Rock Wind Farm Stage 1 Soil and Water Quality Management Plan be extended to address the grid connection facilities. Progressive Erosion and Sedimentation Control Plans be developed for all Sections of the proposed powerline route and for the substation and switchyard,
- Prior to the commencement of clearing works within the powerline easement, an ecologist should undertake a survey to target:
  - any Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* trees that may be present and could be impacted by the proposal. These trees (if present) should then be marked in the field and that a clearing buffer be implemented to ensure these trees are not impacted by the proposal,
  - any derived native grassland that may be present at pole locations and if practically and reasonably feasible, relocate the pole to minimise biodiversity impacts,
- That an ecologist be consulted during the detailed design on the micro-siting of power poles and to be present during tree clearing operations to capture and relocate displaced fauna from any tree hollows,
- The powerline has been diverted from a large Rough-barked Apple (*Angophora floribunda*) tree with hollows, located in Section 4. Any micro-siting should ensure avoidance.
- Microbat nest boxes are to be provided to replace any loss of tree hollows at a ratio of 2:1,
- That no clearing be undertaken on riparian vegetation located along the Swan Brook in Section 6 or within a distance of 50 metres from the eastern or western side of the creek bank.

- That a Feral Animal & Weed Pest Control Management Plan be developed prior to the construction of the powerline easement,
- That all steps be undertaken to eliminate the spread of the Chilean Needle Grass *Nassella neesiana* from Section 5 to other areas within the study area. Refer to the National Best Practice Management Manual (NSW Dept of Primary Industries),
- That the proposed works associated with the construction and installation of the proposed powerline would be undertaken in an environmentally sensitive manner and that all environmental controls undertaken would ensure that no key threatening processes are triggered,
- That the above recommendations also be incorporated into a Construction Environmental Management Plan (CEMP).



## **AUTHOR'S STATEMENT ON STATE LICENCING REQUIREMENTS & APPROVALS**

The field assessments were undertaken with the following State legislative licences and approval:

- \* NSW National Parks & Wildlife Service  
Scientific Investigation Licence: S11967.
  
- \* NSW Agriculture Animal Research Licence:
  
- \* Animal Care & Ethics Committee Approval:

## 1.0 INTRODUCTION, BACKGROUND & CADASTRE

White Rock Wind Farm Pty Ltd (WRWFPL) commissioned Environmental Assessments Pty Limited to undertake a flora and fauna (biodiversity) assessment for a proposed WRWF Modification involving an alternative grid connection for the approved White Rock Wind Farm.

Environmental Assessments Pty Limited prepared an initial assessment (January, 2013) that supported the WRWF Modification 1 Application. The application was withdrawn in January, 2015 and WRWFPL is preparing a further modification application similar to that for Modification 1. Environmental Assessments has updated its 2013 assessment to address previous comments from OEH in the context of the current modification application. This report is complemented by an offsets assessment for the alternative grid connection, prepared by Eco Logical Australia (ELA) November 2016, that WRWFPL has advised will be provided to DPE with the modification application.

The study area is located 30-40 kilometres east of the township of Inverell and 20-30 kilometres west of Glen Innes township (see Figure 1). The alternative grid connection facilities are additional to and to the west of the White Rock Wind Farm development site that is located between Matheson and Maybole within the New England Tablelands of New South Wales to the south of the Gwydir Highway. The alternative powerline route would extend for a distance of approximately 13 kilometres in length from near White Rock Mountain to a point of connection with an existing 330kV transmission line near Swan Vale.

The “study area” is defined as 50 metres either side of the proposed powerline. The surveys and field assessments covered a corridor 13 kilometres in length and 100 metres wide which allows for consideration of adjustments to the powerline route to minimise impact on any significant ecological issues or attributes.

The “impact area” is defined as the area of direct impact e.g. where trees and native vegetation would be cleared. Within the forested areas of the powerline a minimum corridor width of approximately 15m wide would need to be cleared to maintain the maximum 7.5 m technical and safety clearance required for a 132kV powerline. Eco Logical Australia Pty limited has allowed up to 45m width of easement as cleared for the purpose of offset calculations.

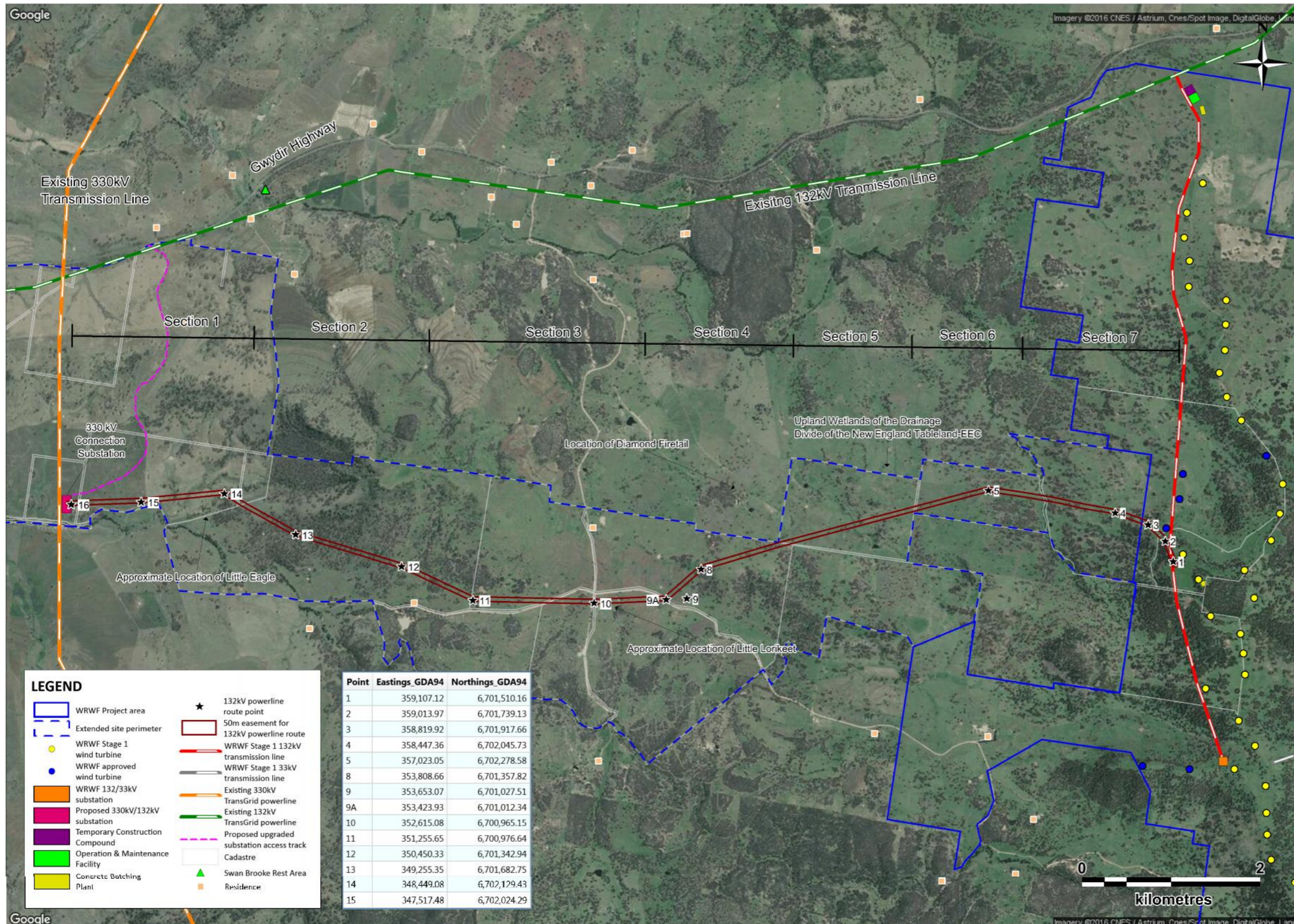
“Region” is defined as the New England Tableland. The study area is situated within the Border Rivers-Gwydir region catchments.

The study area encompasses cleared, semi-cleared and naturally vegetated precincts in generally undulating topography however the eastern section of the proposed powerline route ascends to very steep slopes and escarpment onto the north-western side of White Rock Mountain. The lowest point within the study area is 721 metres ASL towards the western extremity of the study area, the highest point is the White Rock Mountain situated at the eastern extremity of the study area at 1,300 metres ASL. The study area is situated approximately mid-way between Glen Innes and Inverell traversing several properties within the Inverell Local Government Area incorporating a range of various land tenures.

Geographically the study area extends from an existing 330kV powerline easement located on Lot 1 D.P. 624913 in the west to White Rock Mountain (located in Lot 144 D.P. 753260) in the east. The study area can be found on both the Elsmore 1:25,000 topographical map (Series 9138-11-N, 1<sup>st</sup> Edition) and the Stonehenge 1:25,000 topographical map (Series 9238-111-N, 1<sup>st</sup> Edition). The study area straddles three Parishes including the Parish of Newstead, Parish of Ross and the Parish of Balaclava, County of Arrawatta within the Inverell Local Government Area. The study area is bounded by an existing double circuit 330 kV powerline supported on lattice towers in the west and by White Rock Mountain in the east. The study area drains into several streams or creeks including the Kings Creek, Wet Creek and the Swan Brook and the proposed powerline route traverses over Wet Creek and Swan Brook.



Figure 1 - White Rock Wind Farm – Alternative Grid Connection – 132kV line route and substation location





## 2.0 BIOREGIONAL CONTEXT

The study area is situated within the Border Rivers-Gwydir region catchments. The Inverell Local Government Area's natural environment consists of open forests, woodlands, riparian communities, sedgelands, wetlands and aquatic habitats. Broader district and regional conservation areas include (but not limited to) the Kings Plains National Park, Barayamal National Park, Warra National Park, Severn River National Park, Single National Park, Indwarra National Park, Kwiambal National Park, Goonooigall State Conservation Area and the Torrington State Conservation Area. Other conservation areas present within the 'sphere of influence' of the study area include the Little Llangothlin Nature Reserve (a Ramsar site), Billy Bung Lagoon and the Mother of Ducks Lagoon.

The original vegetation of the study area was dominated by White Box Yellow Box Blakely's Red Gum woodland vegetation community which is listed as an endangered ecological community under the NSW *Threatened Species Conservation Act, 1995* and a critically endangered ecological community under the *Environment Protection & Biodiversity Conservation Act, 1999*.

Botanically, the study area is largely located within the Northern Tableland (NT) Botanical Subdivision, however the western extremity of the study area lies just within the North Western Slopes (NWS) Botanical Subdivision of New South Wales (Harden, 1992). These botanical sub-divisions contains a rich biodiversity of NSW flora and fauna. The faunal assemblages are typically Bassian, with the occasional Torresian faunal assemblage occurrence in summer months when visitation by tropical migratory avifauna occurs usually between the months of October to March.

The climatic information of the Glen Innes-Inverell region is that July reaches the minimum temperatures and January is generally the warmest temperature; the minimum average rainfall experienced is in April and December-January is the wettest with an average annual rainfall of 840 mm.

## 3.0 LEGISLATIVE & STATUTORY REQUIREMENTS

### 3.1 OVERVIEW OF APPLICABLE LEGISLATION

State legislation requires consideration of threatened species of fauna and flora, endangered populations and endangered ecological communities under the *Threatened Species Conservation Act, 1995* (TSC Act), the *Environmental Planning & Assessment Act, 1979* (EP&A Act) and the *Fisheries Management Act 1994* (FMA). The *Noxious Weeds Act, 1993* (NW Act) is also relevant in consideration of biodiversity impacts. Where it is considered that threatened species, endangered populations or endangered ecological communities occur or are likely to occur, then a Seven Part Test of Significance (Section 5A of the *EP&A Act, 1979*) must be applied. Seven Part Tests of Significance have been undertaken and are incorporated into this supplementary flora and fauna assessment report (Appendix 2).

At the federal level the *Environment Protection & Biodiversity Conservation Act, 1999* also has provisions that need to be considered in planning and undertaking the project. Additionally, Commonwealth – International agreements in respect of migratory birds and wetlands also require consideration.

The above matters are described in the following sections.

### 3.2 THREATENED SPECIES CONSERVATION ACT 1995

The *TSC Act* consists of two broad categories of threatened species viz: E1 (Endangered) and V (Vulnerable). These two classifications are defined as follows:

**E1: E1 (Endangered)** is defined '*species is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary developments cease to operate; or, its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction; or, it might already be extinct, but it is not presumed extinct*'.

**V: The coding V 'Vulnerable'** is defined '*species that is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate*'.

The *TSC Act* undergoes periodic review by the Scientific Committee established under the Act to consider the inclusion of new information on flora and fauna species and their status. The Scientific Committee has prepared amendments to the Act to include addendum determinations to incorporate additional flora and fauna species, endangered populations (under Part 2, Schedule 1) and endangered ecological communities (Part 3, Schedule 1).

The Scientific Committee has also made a determination to declare 'Key Threatening Processes' in Schedule 3 of the Act. These and other key threatening processes were all considered under Schedule 3 of the Act during this ecological assessment and include;

- *Invasion of native plant communities by exotic perennial grasses,*
- *Predation by the European Red Fox *Vulpes Vulpes*,*
- *Competition and habitat degradation by Feral Goats, *Capra hircus*,*
- *Predation by the Feral Cat *Felis catus*,*
- *Clearing of native vegetation,*
- *Removal of dead wood and dead trees,*
- *Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus*,*
- *Herbivory and environmental degradation caused by feral deer,*
- *Competition from feral honey bees, *Apis mellifera*,*
- *Loss of Hollow-bearing Trees,*
- *Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa*.*

### 3.3 NOXIOUS WEEDS ACT 1993

The *Noxious Weeds Act 1993* (NW Act) establishes a system for the identification and control of noxious weeds in NSW. The NW Act divides noxious weeds into four categories which determine the level of control required. Responsibility for the control of noxious weeds lies with the owner and/or occupier of private land and Crown land, local councils and other public authorities on land they occupy. This obligation can be enforced by the issue of weed control notices by the Minister and local control authorities.

Under Section 13 of the NW Act, public authorities are required to control weeds likely to spread to adjoining land. Five (5) noxious weed species were recorded within the study area and all of these noxious weed species are Class 4 species listed under the NW Act meaning these plants pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.

### 3.4 STATE ENVIRONMENTAL PLANNING POLICIES:

Only one State Environmental Planning Policy-SEPP-44 (Koala Habitat Protection) is pertinent to the study area. The study area qualifies as 'potential Koala habitat' under the terms of State Environmental Planning Policy-44 (Koala Habitat Protection) as:

- the study area is located within a local Government area (Inverell) obliged to administer this Policy;
- the study area is greater than 1 hectare in area; and
- there are known Koala food trees present within the study area that attains a level of 15% in the upper and lower storey of known food trees present within the study area.

A SEPP-44 statement has been prepared and is appended to this ecological assessment report (Appendix 1).

In summary, there are no current Koala records within or adjacent to the study area therefore the study area is not considered 'Core Koala Habitat' under the terms of SEPP-44. Field studies reveal no evidence of the Koala utilising the study area. Nonetheless, as potential Koala habitat occurs in the study area a Seven Part Test of Significance has been applied to the Koala.

### 3.5 ENVIRONMENT PROTECTION & BIODIVERSITY CONSERVATION ACT, 1999

An assessment of matters of National Environmental Significance (NES) has been undertaken in accordance with Commonwealth guidelines under *Environment Protection & Biodiversity Conservation Act, 1999*.

Matters considered include:

- World heritage properties,
- National heritage properties,
- Wetlands of international importance (listed under the Ramsar Convention),
- Listed threatened species and ecological communities,
- Migratory species,
- Commonwealth marine areas,
- The Great Barrier Reef Marine Park,
- Nuclear actions,
- A water resource, in relation to coal seam gas development and large coal mining development.

Species and communities occurring within the study area identified through searches of the *EPBC Act* Protected Matters Database were:

- Blackbutt Candlebark *Eucalyptus rubida ssp. barbigerorum*
- Grey-headed Flying Fox
- White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands
- Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion (New England Tableland Bioregion) and the Monaro Plateau (South Eastern Highlands Bioregion).

Although the Grey-headed Flying Fox is highly likely to forage within the study area the proposal would not have a significant effect on the species, or its habitat.

The White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands is listed as a Critically endangered ecological community (CEEC) under the *Environment Protection & Biodiversity Conservation Act, 1999*.

An assessment of potential impacts reveals that due to the ability to:

- avoid potential individuals of Blackbutt Candlebark,
- the total avoidance of impacts to the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC,
- the relatively small area of impact to the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands-CEEC, and
- the consideration of the offsetting of impacts on biodiversity through the Biodiversity Offset Package (BOP),

the proposed powerline is unlikely to have any significant impact on any national listed threatened species, ecological communities or migratory species.

### 3.6 COMMONWEALTH / FEDERAL INTERNATIONAL AGREEMENTS

#### **China-Australia Migratory Bird Agreement (CAMBA):**

There are no listed CAMBA sites present within or adjacent to the study area.

#### **Japan-Australia Migratory Bird Agreement (JAMBA):**

There are no JAMBA sites present within or adjacent to the study area.

#### **Republic of Korea-Australia Migratory Bird Agreement (RKAMBA):**

There are no RKAMBA sites present within or adjacent to the study area.

#### **RAMSAR SITES:**

The Convention on Wetlands of International Importance (the Ramsar Convention) was signed in Ramsar, Iran on 2 February 1971. Australia is a signatory to this international wetlands conservation agreement and has 65 Ramsar sites that cover more than 8.3 million hectares.

The 65 Australian Ramsar sites include:

- the Gwydir Wetlands (823ha); and
- the Little Llangothlin Nature Reserve (258ha).

While both are located in northeastern NSW, neither is situated in proximity to study area and the would not be affected by the proposal.

There are no Ramsar sites present within or adjacent to the study area. The proposal would not contravene nor compromise this international wetlands convention treaty. Moreover, the proposal would not have a significant effect on any wetland areas.

#### 4.0 EXISTING DEGREE OF DISTURBANCE

The majority of the study area’s understorey vegetation has been previously cleared, primarily for cattle grazing and cultivation purposes. The impact of this action is that the original woodland vegetation is now largely confined to small areas of remnant woodland vegetation with consequential habitat fragmentation effects on the indigenous biota. A consequence of the intensive land-use activities is that pasture grasses and environmental weeds have colonised much of the study area. In addition to these impacts, a wide range of feral animals have also colonised the study area with frequent observations made during the field assessment phase of evidence ecological impacts of pigs, deer, goats, rabbits, hares and foxes; all of the above feral mammal species were observed and recorded within the study area during field surveys.

#### 5.0 THE PROPOSAL

White Rock Wind Farm Pty Ltd proposes to develop alternative grid connection facilities to export electricity generated from the White Rock Wind Farm to the existing 330kV Dumaresq grid infrastructure instead of the 132kV Glen Innes to Inverell transmission line. This involves:

- Construction of approximately 13 kilometres of 132kV double circuit transmission line within a 45 metre wide easement through the study area consisting pole structures (of), electrical conductors (three phases on each side of the pole structures) and access/maintenance tracks. The pole structures would be up to approximately 35 meter high and spaced approximately 200-250 metres apart.
- Construction of a 132kV/330kV substation and 330kV switchyard located adjacent to an existing 330kV lattice-style tower located at the western extremity of the study area. The substation would require an area of up to approximately 200 metres in length by 100 metres in width.

Construction of the powerline is unlikely to involve complete clearance of woodland areas for the 45 metres width of the easement. Vegetation clearance to the conductors would vary to comply with technical and safety requirements. The field surveys undertaken were carried out approximately 50 metres either side of the route defined by the above GPS point locations totalling a width of 100 metres for the full length of the proposed powerline easement. This allows for some micrositing of the line. Grid coordinates were utilised to track the proposed route of the powerline; these grid coordinates and a site plan were issued by White Rock Wind Farm Pty Limited. Coordinates in Table 5-1 (except 9A) are in AGD 66 format. Coordinates in Figure 1 are GDA94.

**TABLE 5-1 – REFERENCE POINTS ALONG 132kV TRANSMISSION LINE**

<b>Ref. Point</b>	<b>Easting</b>	<b>Northing</b>	<b>Ref. Point</b>	<b>Easting</b>	<b>Northing</b>
1	359002	6701322	9	353478	6700693
2	358909	6701551	9A	353424	6701012
3	358715	6701730	10	352510	6700777
4	358342	701858	11	351256	6700716
5	356918	6702091	12	350361	6701146
6	354677	6702450	13	349150	6701495
7	354142	6701523	14	348344	6701942
8	353704	6701170	15	347414	6701836
			16	346628	6701797



## 6.0 METHODOLOGIES

The study area was divided into seven main survey and sampling precinct areas described as Sections 1-7 for clarity during the field assessments and surveys (see Figure 1). The entire study area was surveyed over 12 days in 2012 and 2016 as shown in Table 6-1. Full transects and random meander surveys were conducted on-foot throughout all sections of the study area; several quadrats were also established along the study area's powerline route. Survey locations and threatened species locations are shown in Figure 6.1.

The field assessments included a survey of species listed under the NSW *Threatened Species Conservation Act, (1995)*, species outlined within the Atlas database records for the area and species listed under the Commonwealth's *Environment Protection & Biodiversity Conservation Act, (1999)*. Particular attention was directed towards those listed threatened species known to occur within the locality of the study area. ROTAPs (Rare Or Threatened Australian Plants) were also targeted and considered during the field assessment phase. The assessment was carried out in accordance with the *Threatened Biodiversity Survey and Assessment: Guidelines for Development and Activities. Working Draft, (Dept of Environment & Conservation, 2004)*. The dates, locations and other details of the field surveys are outlined in Table 6-1.

**TABLE 6-1 DETAILS OF SURVEY TIMES**

Date	Weather	Effort	Location	Survey objectives
11/7/12	Overcast & cool	8 hrs	Section 4	Initial reconnaissance followed by both targeted threatened species survey and habitat searches and random meander.
12/7/12	Overcast, mild, moderate winds & rain	8 hrs	Section 1	Initial reconnaissance followed by both targeted threatened species survey and habitat searches and random meander.
14/7/12	Heavily overcast, cold, few showers	8 hrs	Section 3 Q2	Initial reconnaissance followed by both targeted threatened species survey and habitat searches and random meander.
15/7/12	Sunny, clear, warm to cool, moderate winds	4 hrs	Section 4 (again)	Targeted flora and fauna survey and fauna habitat searches and assessments.
16/7/12	Sunny, warm, light winds	6 hrs	Section 4 (again) T3	Targeted flora and fauna survey and fauna habitat searches and assessments.
17/7/12	Sunny, clear, cool	4 hrs	Section 5 & 6 T2 & T4	Initial reconnaissance followed by both targeted threatened species survey and habitat searches and random meander.
17/7/12	Overcast & cool	4 hrs	Section 2 Q1	Targeted flora and fauna survey and fauna habitat searches and assessments.
18/7/12	'moist', foggy, fog & mist, intermittent light showers	8 hrs	Section 7 Q4	Initial reconnaissance followed by both targeted threatened species survey and habitat searches and random meander.
9/8/12	Cold, cloudy & windy	8 hrs	Section 1 T1	Targeted flora and fauna survey and fauna habitat searches and assessments.
10/8/12	Cold, then cool, sunny, windy	8 hrs	Section 6 Q3	Targeted flora and fauna survey and fauna habitat searches and assessments.
20/9/16	Cool then warm, partly cloudy	8 hrs	Modification area (between Star-points #9-#5)	Targeted flora and fauna survey and fauna habitat searches and assessments.
22/9/16	Cool, mostly cloudy & windy	4 hrs	Star-points #8-#12 and general reconnaissance in area and Spring Mtn Rd	Targeted flora and fauna survey and fauna habitat searches and assessments.

## 6.1 VEGETATION & FLORISTICS SURVEY METHODOLOGIES

The assessment methods utilised throughout the study area were a combination of transects, quadrats and random meander surveys. The vegetation transects and quadrats established within the study area are depicted in Figure 2. The results of the transects and quadrats are recorded on OEH/DEC plot data sheets; these data sheets are appended to this biodiversity assessment report (see Appendix 4).

Vascular plant species (including introduced species) were considered in the overall ecological assessment. The height, canopy structure, ecological significance and floristic composition of species and communities were ascertained on-site. Trees, shrubs, sub-shrubs, climbers, ferns, graminoides, monocotyledons, ground covers and herbaceous representatives were taken into account and described. Special emphasis was placed on locating threatened species of flora known to occur within the locality of the study area and ROTAP (**R**are **O**r **T**hreatened **A**ustralian **P**lants), uncommon species, species with poor representation in existing regional National Park estate and species of flora with known geographical limits of the locality. Noxious weeds listed under the *Noxious Weeds Act, 1993* were also considered and recorded during the field assessment phase. Species of taxonomic uncertainty and threatened species of flora were sent to the Royal Botanic Gardens (Sydney) for confirmation. A full list of flora species recorded during the field assessment phase are outlined in Table 8-1.

## 6.2 FAUNA- FIELD ASSESSMENT METHODOLOGIES

The study area's faunal composition and threatened species habitat requirements were assessed in relation to the local and regional ecological significance of those habitats. The context includes the broader Inverell LGA and environs and the Northern Tablelands bioregion. The faunal field assessments noted the reduction in understorey vegetation, degree of disturbance and paucity of habitat features such as rock floaters, rocky outcrops, rock shelters, etc within the study area.

The primary habitat features are the larger trees with hollows, although these were noted to be very limited within the study area's powerline route. Other areas of habitat importance include the riparian precincts and proximity to permanent or ephemeral water sources namely Swan Brook, drainage lines, areas of rushland-marshland or swampy vegetation and remnant areas of vegetation with a dominance of indigenous understorey vegetation. The latter were located in those limited areas of remnant vegetation where fencing excluded cattle and sheep.

Direct and indirect impacts potentially resulting from the proposal were considered in conjunction with habitat fragmentation, the severing of wildlife corridors and the occurrence of anthropogenic barriers. The specific methodologies applied during the field surveys and habitat assessments of the fauna biodiversity values of the study area were as follows:

- Early morning random and opportunistic site bird monitoring to locate and identify all daylight active birds by direct visualisation and aural means throughout the study area and immediate environs including recording of any uncommon or "unusual" species,

- Roosting owls (including both threatened and non-threatened species) were targeted within dense vegetation within or adjacent to the study area, with particular focus on riparian precincts and areas of dense vegetation,
- Owl white-wash excreta, regurgitated pellets and primary-wing feathers were sought within dense vegetation within and adjacent to the study area,
- Overhead migratory birds were considered throughout the study period by observations of sub-populations or flocks of migratory or nomadic species. Targeted searches for the Regent Honeyeater and Swift Parrot were also undertaken,
- Nuclear flocking of small insectivorous birds in canopy trees and within dense understorey vegetation was recorded where possible,
- Nesting sites for threatened species of avifauna such as the Grey-crowned Babbler were targeted,
- Koala scats and positive scratch marks were sought including individual assessments on all ‘sizeable’ White Box and Ribbon Gums within the study area,
- Sap-sites were sought on trees to determine the use of trees within the study area by the Yellow-bellied Glider,
- Tree hollows inspected when possible to locate any sheltering fauna including for hollow dependant birds, mammals, reptiles and frogs,
- Drainage lines inspected for herptofauna, ground nesting birds including quails, waterfowl and swamp harriers,
- Dense areas of tussock grasses were inspected for sheltering or foraging fauna,
- Rock shelters and “caves” in higher topographical areas of the study area below White Rock Mountain were sought for any roosting sites for owls and microbat species,
- Rocky outcrops were inspected for the presence of the Brush-tailed Rock Wallaby,
- Scats identified to determine any macropods present.

### 6.2.1 HABITAT SEARCHES

A habitat assessment was also undertaken on the potential habitat of relevant threatened species of fauna and mitigation measures considered. Methodologies utilised for the habitat assessments included:

- Herptofauna (including reptiles and amphibians) were targeted throughout the study area. Searches and habitat assessments included surveys around the periphery of the study area’s various open dam sites, under sheet iron, fallen logs, log piles, loose and semi-imbedded rocks and rock exfoliates, under loose bark, under accumulations of leaf litter etc,

- Habitat searches included searches for scats, fur, latrine sites and skeletal materials of mammals in all precincts throughout the study area,
- Instream vegetation and habitat structures were inspected and assessed along the Swan Brook riparian precinct,
- Dense rushland/marshland vegetation inspected for reptiles, frogs and marshland avifauna including for nest sites for Swamp Harriers,
- Feral animal “havens” were identified and mapped where present within the study area.

Natural bushrock and rocky shelter sites are limited to a few locations within the study area. The general paucity of these habitat features restricts the degree of habitat potential for reptile species. Amphibian searches were undertaken for frog species including diurnal searches for the Yellow Spotted Tree Frog *Litoria castanea* or other frog species likely to occur. Searches were also made under loose decorticating (shedding) bark pieces from trees.

### 6.2.2 CONSTRAINTS EXPERIENCED

Several constraints were experienced during the field assessment phase which may have reduced the detection of additional fauna (and flora) species. These constraints include the following:

- the winter season sampling period and low temperatures limiting the detection of reptiles and amphibians,
- the degree of previous vegetation and habitat clearing significantly affecting the detection of threatened species that may be present within the study area,
- a considerable degree of hybridisation between various eucalypt species was experienced and difficulty and uncertainty in even the Royal Botanic Gardens (Sydney) herbarium staff in identification to determine some specimens to species level.



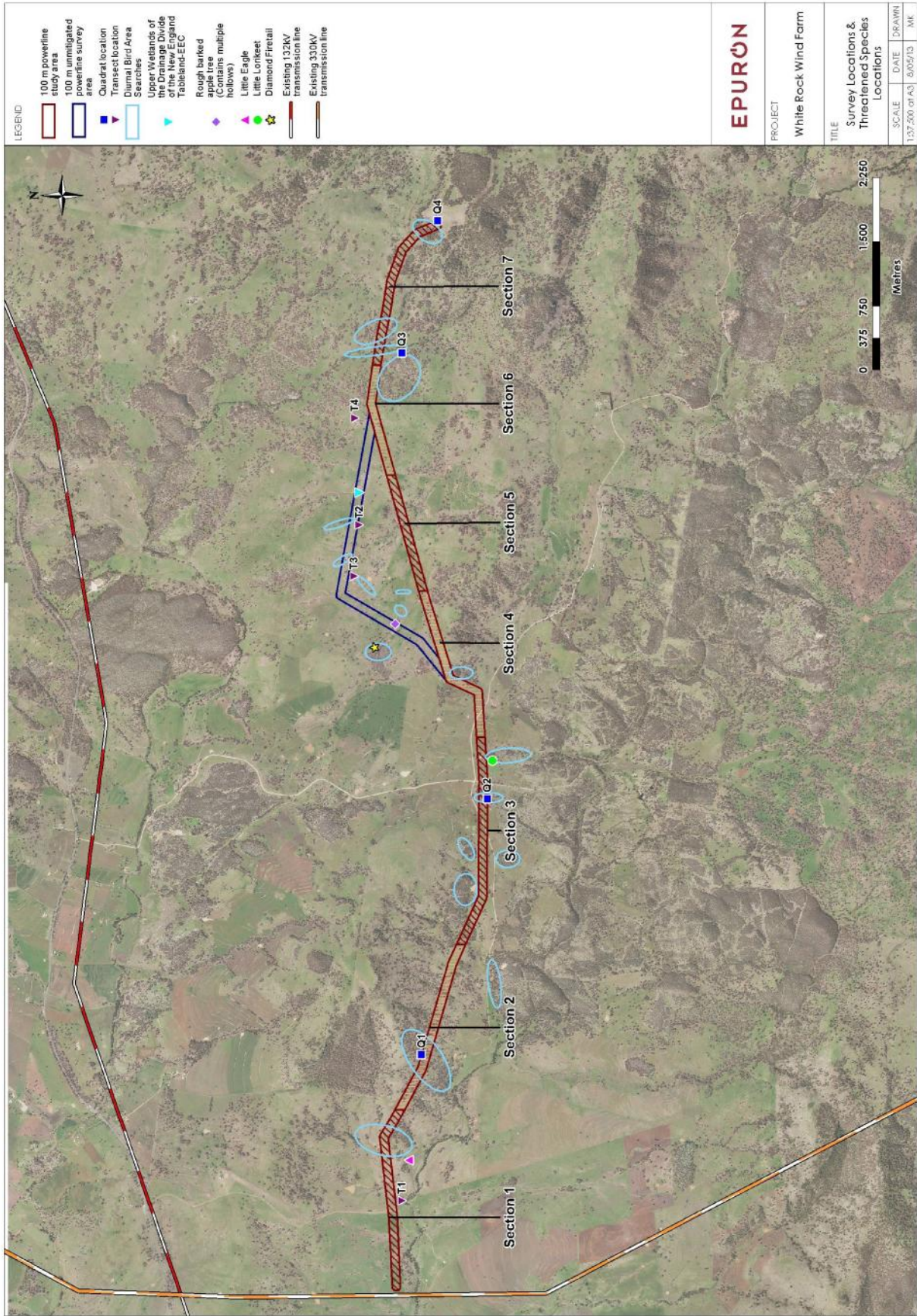


FIGURE 6.1 – SURVEY LOCATIONS AND THREATENED SPECIES LOCATIONS

## 7.0 POTENTIALLY RELEVANT THREATENED FLORA & FAUNA SPECIES

A total of 47 threatened species of flora and 42 threatened species of fauna are registered as occurring within the Inverell and Glen Innes Local Government Areas according to the Office of Environment & Heritage's Atlas database totalling to 89 threatened species. These threatened species are outlined in Table 7-1 (Threatened Species of Flora) and Table 7-2 (Threatened Species of Fauna). Of this number, one threatened flora species, Blackbutt Candlebark is possibly present, three threatened fauna species were recorded and, several other threatened fauna species 'may forage' within the study area on an ad hoc basis.

**TABLE 7-1 POTENTIALLY RELEVANT THREATENED SPECIES OF FLORA**

VERNACULAR NAME	SCIENTIFIC NAME	TSC Act Coding	EPBC Act Coding	RELEVANCE OF HABITAT ON SITE
Cloak Fern	<i>Cheilanthes sieberi ssp. pseudovella</i>	E1		Not recorded
Rod's Star Hair	<i>Astrotricha roddii</i>	E1	E	Not recorded
Hawkweed	<i>Picris evae</i>	V	V	Not recorded
Heath Wrinklewort	<i>Rutidosis heterogama</i>	V	V	Not recorded
Aromatic Peppergrass	<i>Lepidium hyssopifolium</i>	E1	E	Not recorded
Desert Cow Vine	<i>Ipomea diamantinensis</i>	E1		Not recorded
Pygmy Cypress Pine	<i>Callitrus oblonga</i>	V	V	Not recorded
Waterwheel Plant	<i>Aldrovanda vesiculosa</i>	E1		Not recorded
Large-leaved Monotaxis	<i>Monotaxis macrophylla</i>	E1		Not recorded
Torrington Pea	<i>Almaleea cambagei</i>	E1	V	Not recorded
Bailey's Indigo	<i>Indigofera baileyi</i>	E1		Not recorded
Silky Swainson Pea	<i>Swainsona sericea</i>	V		Not recorded
Pindari Wattle	<i>Acacia acrionastes</i>	E1		Not recorded
MacNutt's Wattle	<i>Acacia macnuttiana</i>	V	V	Not recorded
Lancewood	<i>Acacia petraea</i>	E1		Not recorded
Velvet Wattle	<i>Acacia pubifolia</i>	E1	V	Not recorded
Bolivia Wattle	<i>Acacia pycnostachya</i>	V	V	Not recorded



<b>VERNACULAR NAME</b>	<b>SCIENTIFIC NAME</b>	<b>TSC Act Coding</b>	<b>EPBC Act Coding</b>	<b>RELEVANCE OF HABITAT ON SITE</b>
Bolivia Stringybark	<i>Eucalyptus boliviana</i>	V		Not recorded
Ovenden's Ironbark	<i>Eucalyptus caleyi ssp. ovendenii</i>	V	V	Not recorded
Warra Broad-leaved Sally	<i>Eucalyptus camphora ssp. relictata</i>	E1		Not recorded
Northern Blue Box	<i>Eucalyptus magnificata</i>	E1		Not recorded
McKies Stringybark	<i>Eucalyptus mckieana</i>	V	V	Not recorded
Narrow-leaved Peppermint	<i>Eucalyptus nicholii</i>	V	V	Not recorded
<b>Blackbutt Candlebark</b>	<b><i>Eucalyptus rubida ssp. barbigerorum</i></b>	<b>V</b>	<b>V</b>	<b>Provisionally recorded</b> (not confirmed by the RBG Herbarium)
Crescent-leaved Homoranthus	<i>Homoranthus lunatus</i>	V	V	Not recorded
Granite Homoranthus	<i>Homoranthus prolixus</i>	V	V	Not recorded
Grove's Paperbark	<i>Melaleuca groveana</i>	V		Not recorded
Severn River Heath-myrtle	<i>Micromyrtus grandis</i>	E1	E	Not recorded
Barrington Tops Ant Orchid	<i>Chiloglottis platyptera</i>	V		Not recorded
Small Snake Orchid	<i>Diuris pedunculata</i>	E1	E	Not recorded
Hairy Jointgrass	<i>Arthraxon hispidus</i>	V	V	Not recorded
<b>Bluegrass</b>	<b><i>Dichanthium setosum</i></b>	<b>V</b>	<b>V</b>	<b>Not recorded</b>
Finger Panic Grass	<i>Digitaria porrecta</i>	E1		Not recorded
Native Milkweed	<i>Polygala linariifolia</i>	E1		Not recorded
Blackwater Grevillea	<i>Grevillea scortechinii ssp. sarmentosa</i>	V		Not recorded
Scant Pomaderris	<i>Pomaderris queenslandica</i>	E1		Not recorded
Cameron's Tarenna	<i>Triflorensia</i>	E1		Not recorded

<b>VERNACULAR NAME</b>	<b>SCIENTIFIC NAME</b>	<b>TSC Act Coding</b>	<b>EPBC Act Coding</b>	<b>RELEVANCE OF HABITAT ON SITE</b>
	<i>cameronii</i>			
Granite Boronia	<i>Boronia granitica</i>	V	E	Not recorded
Leionema	<i>Leionema lachnaeoides</i>	E1	E	Not recorded
Rusty Desert Phebalium	<i>Phebalium glandulosum ssp. eglandulosum</i>	E1	V	Not recorded
Keith's Zieria	<i>Zieria ingramii</i>	E1	E	Not recorded
<b>Austral Toadflax</b>	<b><i>Thesium australe</i></b>	<b>V</b>	<b>V</b>	<b>Not recorded</b>
Hop Bush	<i>Dodonaea stenophylla</i>	E4		Not recorded
Polblue Eyebright	<i>Euphrasia ciliolata</i>	V		Not recorded
Tentafield Eyebright	<i>Euphrasia orthocheila ssp. peraspera</i>	E1		Not recorded
Bolivia Hill Pimelia	<i>Pimelia venosa</i>	E1	E	Not recorded
Inverell Cycad	<i>Macrozamia humilis</i>	E1		Not recorded

**Bold type** indicates that a Seven Part Test of Significance has been applied (Appendix 2).

'V' denotes .....vulnerable under the *NSW Threatened Species Conservation Act, 1995*

'E1' denotes .....endangered under the *NSW Threatened Species Conservation Act, 1995*

'E4' denotes .....extinct under the *NSW Threatened Species Conservation Act, 1995*

'V' denotes ..... endangered under the *Environment Protection & Biodiversity Conservation Act, 1999*

'E' denotes ..... endangered under the *Environment Protection & Biodiversity Conservation Act, 1999*.



**TABLE 7-2 - THREATENED SPECIES OF FAUNA**

<b>VERNACULAR NAME</b>	<b>SCIENTIFIC NAME</b>	<b>TSC Act Coding</b>	<b>EPBC Act Coding</b>	<b>RELEVANCE OF HABITAT ON SITE</b>
Zigzag Gecko	<i>Oedura rhombifer</i>	E1	V	Not recorded, but may occur in upper slope of Section 7
Border Thick-tailed Gecko	<i>Underwoodisaurus sphrurus</i>	V	E	Not recorded, but may occur in upper slope of Section 7
Yellow-spotted Tree Frog	<i>Litoria castanea</i>	E4 A		Not recorded. No significant habitat present
Australian Painted Snipe	<i>Rostratula australis</i>	E1	V	Not recorded. No significant habitat present
Magpie Goose	<i>Anseranas semipalmata</i>	V		Not recorded. No significant habitat present
Blue-billed Duck	<i>Oxyura australis</i>	V		Not recorded. No significant habitat present
<b>Black Bittern</b>	<i>Ixobrychus flavicollis</i>	V		<b>Not recorded. No significant habitat present, but potential habitat present along Swan Brook and upland swamp vegetation located near Section 5 to the west of Star-point #5.</b>
<b>Square-tailed Kite</b>	<i>Lophoictinia isura</i>	V		<b>Not recorded. Possible foraging &amp; breeding habitat present throughout study area</b>
Squatter Pigeon	<i>Petrophassa scripta</i>	E1	V	Not recorded. Marginal habitat present only
Comb-crested Jacana	<i>Jacana gallinacea</i>	V		Not recorded. No significant habitat present
<b>Hooded Robin</b>	<i>Melanodryas cucullata</i>	V		<b>Not recorded. Marginal habitat present only</b>
<b>Scarlet Robin</b>	<i>Petroica multicolor</i>	V		<b>Not recorded. Marginal habitat present only</b>
<b>Diamond Firetail</b>	<i>Stagonopleura guttata</i>	V		<b>Species recorded within a larger remnant area adjacent to Section 4 within the study area</b>
Black-throated Finch	<i>Poephila cincta</i>	E1	E	Not recorded. Very rare in area. Marginal habitat only
<b>Speckled Warbler</b>	<i>Pyrrholaemus saggitatus</i>	V		<b>Not recorded. Species is highly likely to occur, but would not be significantly affected by the proposal</b>
<b>Little Eagle</b>	<i>Hieraaetus morphnoides</i>	V		<b>Species recorded within Section 1 of the study area</b>
<b>Glossy Black Cockatoo</b>	<i>Calyptorhynchus lathami</i>	V		<b>Not recorded, no food plants present and suitable tree hollows very limited within the study area, however the species is likely to pass over the study area on an ad hoc basis</b>

Turquoise Parrot	<i>Neophema pulchella</i>	V		Not recorded. Limited habitat present
Swift Parrot	<i>Lathamus discolor</i>	E1	CE	<b>Not recorded. However, potential food plants plentiful throughout locality</b>
Little Lorikeet	<i>Glossopsitta pusilla</i>	V		<b>Species recorded within the study area within Section 3</b>
Brown Treecreeper	<i>Climacteris picumnus victoriae</i>	V		<b>Not recorded. Marginal habitat present in Section 6 and the Swan Brook riparian area generally</b>
Regent Honeyeater	<i>Anthochaera phrygia</i>	E1	CE	<b>Not recorded. Potential foraging habitat present.</b>
Black-chinned Honeyeater	<i>Melithreptus gularis gularis</i>	V		Not recorded. Marginal habitat only
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V		<b>Not recorded. Potential habitat present in larger remnant as well as Section 2 and 6</b>
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	V		<b>Not recorded. Marginal habitat present. No nests sites were observed</b>
Powerful Owl	<i>Ninox strenua</i>	V		<b>Potential foraging and roosting habitat present along Swan Brook in Section 6</b>
Barking Owl	<i>Ninox connivens</i>	V		<b>Potential foraging and roosting habitat present along Swan Brook in Section 6</b>
Masked Owl	<i>Tyto novaehollandiae</i>	V		<b>Potential foraging and roosting habitat</b>
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	<b>Potential habitat present in Sections 2 &amp; upper slope of Section 6 and White Rock Mountain</b>
Koala	<i>Phascolarctos cinereus</i>	V	V	<b>Not recorded. However potential habitat &amp; food plants present (White Box <i>Eucalyptus albens</i>)</b>
Yellow-bellied Glider	<i>Petaurus australis</i>	V		No significant habitat present within powerline route, but may occur within the Swan Brook vicinity and upper slope of Section 6 and 7
Squirrel Glider	<i>Petaurus norfolkensis</i>	V		No significant habitat present within powerline route, but may occur within the Swan Brook vicinity and upper slope of Section 6 and 7 as well as Section 2
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V		Potential foraging habitat present throughout the study area and environs. Tree hollows very limited within powerline route
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V		<b>Potential habitat present along all creeks and major drainage</b>

				<b>lines and open dams. However tree hollows for roosting sites for microbats are very limited</b>
Greater Long-eared Bat	<i>Nyctophilus timoriensis</i>	V		Potential foraging habitat present throughout the study area and environs. However tree hollows for roosting are very limited
Hoary Wattle Bat	<i>Chalinolobus nigrogriseus</i>	V		Potential foraging habitat present throughout the study area and environs. However tree hollows for roosting are very limited
<b>Eastern False Pipistrelle</b>	<i>Falsistrellus tasmaniensis</i>	V		<b>Potential foraging habitat present throughout the study area and environs. However tree hollows for roosting are very limited</b>
<b>Yellow-bellied Sheath-tailed Bat</b>	<i>Saccolaimus flaviventris</i>	V		<b>Potential foraging habitat present throughout the study area and environs. However tree hollows are very limited</b>
<b>Eastern Bent-wing Bat</b>	<i>Miniopterus schreibersii</i>	V		<b>Potential foraging habitat present throughout the study area and environs. Caves, rock shelters and other shelter sites suitable for this species are absent from most sections of the study area. However these may be present in adjacent locales to Section 7's escarpment area</b>
<b>Grey-headed Flying Fox</b>	<i>Pteropus poliocephalus</i>	V	V	<b>Potential foraging habitat present throughout the study area and environs. There are no suitable roosting sites for the species anywhere within the study area</b>
<b>Brush-tailed Rock Wallaby</b>	<i>Petrogale penicillata</i>	E1	E	<b>Not recorded. Possible habitat present on and below White Rock Mountain and upper slope of Section 6</b>

**Bold type** indicates that a Seven Part Test of Significance has been applied (Appendix 2).

'V' denotes .....vulnerable under the *NSW Threatened Species Conservation Act, 1995*

'E1' denotes .....endangered under the *NSW Threatened Species Conservation Act, 1995*

'E4 A' denotes..... critically endangered under the *NSW Threatened Species Conservation Act, 1995*

'E' denotes .....endangered under the *Environment Protection & Biodiversity Conservation Act, 1999*

'CE' denotes.....critically endangered under the *Environment Protection & Biodiversity Conservation Act, 1999*.

## 8.0 RESULTS OF FIELD ASSESSMENTS-VEGETATION & FLORISTICS

The indigenous or native vegetation communities present across the study area include the following three endangered ecological communities and, the River Oak riparian community.

- White Box Yellow Box Blakely's Red Gum Woodland-EEC which is dominant throughout the majority of the study area,
- A small section of part of the Ribbon Gum-Mountain Gum vegetation community that forms part of the Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion-EEC located in the far eastern extremity of the study area at a higher elevated position within Section 7, and
- The Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC which occur to the north of Section 5 of the study area. The revised powerline route now avoids this EEC.

Derived Native Grassland (DNG) and "possible" Derived Native Grassland have also been identified within the study area. These areas have been denoted onto the **attached site plans and Figure 2**. There is a lineal band of riparian open forest vegetation dominated by the River Oak *Casuarina cunninghamiana* present which dissects Section 6 of the study area in a north-south axis located along the banks of the Swan Brook.

However, while the above vegetation communities are present to variable degrees of ecological integrity, quality and remnant size within the study area, the majority of the study area is cleared or disturbed as a result of agricultural and grazing pressures. Section 2 of the study area has the largest higher quality area of remnant vegetation. The floristic species composition present throughout the study area is fully described in Table 8-1.

### WHITE BOX YELLOW BOX BLAKELY'S RED GUM WOODLAND

*Endangered ecological community-Threatened Species Conservation Act, 1995.*

*Critically endangered ecological community-Environment Protection & Biodiversity Conservation Act 1999.*

#### Structure & Floristics:

The structure of the White Box Yellow Box Blakely's Red Gum Woodland vegetation community is open woodland with a mean tree height of between 15-20 metres with an open canopy cover. Xeric species tend to dominate the community however in some sheltered situations some minor occurrence of mesic species occur usually small wiry climbers. White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community occurs in the majority of the naturally vegetated areas within the study area and occurs in Section 1-6 and is absent in Section 7. However, the community in Sections 1, 4 and 5 are restricted to a few isolated or small clusters of trees only. The community is represented as scattered remnants in Sections 3 and 6, however there are larger scattered remnants of the community in adjacent areas to the powerline easement in sections 3, 4 and 6. Section 2 contains the largest and least ecologically disturbed area of the Box Yellow Box Blakely's Red Gum Woodland community.

#### Trees:

The tree species present include the White Box *Eucalyptus albens*, Yellow Box *Eucalyptus melliodora*, Blakely's Red Gum *Eucalyptus blakelyi*, 'stringybark' *Eucalyptus subtilier*, Tumbledown Red Gum *Eucalyptus dealbata* <-> Dwyer's Red Gum *Eucalyptus dwyeri* (intergrade), Ribbon Gum *Eucalyptus viminalis* **or** Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* (Schedule, 2, *Threatened Species Conservation Act, 1995*), **or** Mountain Gum *Eucalyptus dalrympleana* ssp. *heptantha*, Rough-barked Angophora *Angophora floribunda* and the Peppercorn Tree *Schinus areira* (exotic). White Box dominates the community, however in some areas pure stands of Yellow Box occur and in other locations White Box and Blakely's Red Gum occur as co-dominants.

**Lower Trees:**

The lower tree species present include the Blackwood *Acacia melanoxylon*, Hickory Wattle *Acacia implexa*, Black Cypress Pine *Callitris endlicheri* and the Kurrajong *Brachychiton populneus*. The above species generally tend to be abundant co-dominants, however *Brachychiton populneus* is a species that occurs in ad hoc situations and in no area does this species occur in any order of abundance.

**Shrubs:**

The shrub species present include the Native Olive *Notelaea macrocarpa* var. *macrocarpa*, Wallaby Weed *Olearia viscidula*, Black Thorn *Bursaria spinosa*, Northern Sandalwood *Santalum lanceolatum*, Northern Silver Wattle *Acacia leucoxylada* ssp. *leucoxylada* and Cassinia *Cassinia quinquefaria*. All of the above species are common and more or less of similar abundance throughout the study area where an understorey is present.

**Monocotyledons & Ground Covers:**

Monocotyledons and ground covers present include Geranium *Geranium solanderi*, Native Violet *Viola* sp, Kidney Weed *Dichondra repens*, Spiny-headed Mat-rush *Lomandra longifolia*, Many-flowered Mat-rush *Lomandra multiflora*, Mat-rush *Lomandra* sp, Scrambling Lily *Geitonoplesium cymosum*, Headache Vine *Clematis glycyphylla*, Stinging Nettle *Urtica incisa*, Drooping Mistletoe *Amyema pendula*, Buttercup *Ranunculus inundatus*, Juncus *Juncus usitatus*, Juncus *Juncus* sp, Kangaroo Grass *Themeda australis*, Windmill Grass *Chloris truncata*, Blady Grass *Imperata cylindrica*, Pitted Blue Grass *Bothriochloa decipiens*, Hedgehog Grass *Echinopogon* sp, Tussock Grass *Poa labillardieri*, *Poa sieberiana*, Wallaby Grass *Austrodanthonia tenuis* and the Three-awn Spear Grass *Aristida vagans*.

Exotic or introduced species include Spear Thistle *Cirsium vulgare* (exotic), St. Barnaby's Thistle *Centaurea solstitialis* (exotic), Sweetbriar *Rosa rubiginosa* (exotic), Blackberry *Rubus fruticosus* (exotic), Prickly Pear *Opuntia stricta* (exotic), Purple-top *Verbena bonariensis*, Fleabane *Conyza bonariensis* (exotic), Fireweed *Senecio madagascariensis* (exotic) and the Chilean Needle Grass *Nassella neesiana* (exotic and a Weed of National Significance).

**Ferns:**

The fern flora is limited however the following species are present within the White Box Yellow Box Blakely's Red Gum woodland vegetation community and include Bristly Cloak Fern *Cheilanthes sieberi* ssp. *sieberi*, Sickie Fern *Pellaea falcata* and the Bracken Fern *Pteridium esculentum* only. The Bristly Cloak Fern is a small terrestrial species that is the most abundant and widespread fern throughout much of the study area even occurring in exposed situations.

**Comments:**

The Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* (Schedule, 2, *Threatened Species Conservation Act, 1995*) was provisionally recorded within the study area but was not recorded by the RBG Herbarium. A seven part test of significance has been applied to the species. No additional threatened species of flora or ROTAPs (Rare Or Threatened Australian Plants) were recorded within the study area and none are expected to occur or be impacted as a result of the proposal.

**Locally Significant Species:** Kurrajong *Brachychiton populneus*.

**Noxious weeds:**

There are five (5) declared noxious weeds listed under the *Noxious Weeds Act, 1993* present within the study area's White Box Yellow Box Blakely's Red Gum Woodland vegetation community and all five species declared as noxious weeds within the Inverell Local Government Area. These weed species include the Sweetbriar *Rosa rubiginosa*, Blackberry *Rubus fruticosus* species aggregate, Fireweed *Senecio madagascariensis*, Prickly Pear *Opuntia stricta* and the Chilean Needle Grass *Nassella neesiana*. All of the above species are listed as Class 4 species under the *Noxious Weeds Act, 1993*. Class 4 species under the NW Act meaning these plants pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area. The Chilean Needle Grass is also a Weed of National Significance.



**Degree of Disturbance:**

The existing degree of disturbance to the study area varies in each section and includes past clearing of trees for cultivation and agricultural pursuits, pasture improvement, selected logging practices, pugging of soils by cattle and sheep and also by feral pigs and deer. Other ecological disturbances include ring-barking of trees by cattle and sheep by chewing into the cambium layer of trees resulting in the death of some trees. Impacts from bushfires and limited and patchy weed invasion is considerable in most areas where previous disturbances has occurred; damage from European Rabbits to the soil structure is also considerable in some areas of the study area. The least affected area from ecological damage and feral pest species is Section 2 and is an area where most threatened species diversity could be expected to occur, e.g. Diamond Firetail, Little Lorikeet.

**RIBBON GUM-MOUNTAIN GUM-SNOW GUM GRASSY FOREST/ WOODLAND OF THE NEW ENGLAND TABLELANDS BIOREGION**

*Endangered ecological community-Threatened Species Conservation Act, 1995*

**Structure & Floristics:**

A form of the Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion-endangered ecological community is located within a small section of vegetation located at the far eastern extremity of the study area and is restricted to the far upper slope of Section 7 of the study area and at a higher elevation on White Rock Mountain.

The structure of the Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland vegetation community within the study area is tall-open forest with a mean tree height of about 25 m with an open canopy cover. Xeric species tend to dominate the community however once again small wiry climbers of mesic species composition are also present. Section 7 containing the Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland vegetation community is situated in an elevated area that experiences very cold climatic and windy conditions with frequent cold fronts, foggy and misty conditions with periodic snow-falls; the elevation of Section 7 is 1,270 metres ASL.

**Trees:**

The tree species present include Mountain Gum *Eucalyptus dalrympleana* ssp. *heptantha*, Ribbon Gum *Eucalyptus viminalis* or possibly Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* (Schedule, 2, *Threatened Species Conservation Act, 1995*). The Snow Gum *Eucalyptus pauciflorus* was noted to be present along the access track to Section 7 even though this species was not recorded within the proposed powerline easement or the site of the proposed substation within Section 7.

**Lower Trees:**

The lower tree species present within Section 7 include the Blackwood *Acacia melanoxylon* and the Hickory Wattle *Acacia implexa* only. Of the above two lower tree species, the Blackwood is the dominant tree species.

**Shrubs:**

The shrub species present include the Black Thorn *Bursaria spinosa*, Native Olive *Notelaea macrocarpa* var. *macrocarpa*, Wallaby Weed *Olearia viscidula* and the Northern Sandalwood *Santalum lanceolatum*. The Black Thorn is the most abundant and conspicuous shrub species present with Section 7.

**Monocotyledons & Ground Covers:**

The monocotyledons and ground covers present include Geranium *Geranium solanderi*, Native Violet *Viola* sp, Kidney Weed *Dichondra repens*, Spiny-headed Mat-rush *Lomandra longifolia*, Scrambling Lily *Geitonoplesium cymosum*, Headache Vine *Clematis glycyphylla*, Stinging Nettle *Urtica incisa*, Cobbler's Peg *Bidens pilosa* (exotic), Fireweed *Senecio madagascariensis* (exotic), Juncus *Juncus* sp, Tussock Grass *Poa labillardieri*, *Poa sieberiana*, Kangaroo Grass *Themeda australis* and Wallaby Grass *Austrodanthonia tenuis*. Tussock Grass *Poa labillardierei* and *Poa sieberiana* are the most common ground cover present in this instance.

**Ferns:**

The fern flora present within Section 7 include Bracken Fern *Pteridium esculentum*, Bristly Cloak Fern *Cheilanthes sieberi* ssp. *sieberi* and the Sickle Fern *Pellaea falcata*.

**Comments:**

A seven part test of significance has been applied to Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion-endangered ecological community and to the Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* (Schedule, 2, *Threatened Species Conservation Act, 1995*) as this species was also provisionally recorded within the study area's Section 7.

No additional threatened species of flora or ROTAPs (Rare Or Threatened Australian Plants) were recorded within Section 7 and none are expected to occur or to be impacted by the proposal.

**Locally Significant Species:** Mountain Gum *Eucalyptus dalrympleana* ssp. *heptantha*.

**Noxious weeds:**

Fireweed *Senecio madagascariensis* only. This species is listed as a Class 4 species under the *Noxious Weeds Act, 1993*. Class 4 species under the NW Act meaning these plants pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.

**Degree of Disturbance:**

There is only limited cattle grazing impacts on this area probably due to the steep rocky nature of the area and density of vegetation on the far upper slopes and the EEC, however there is some evidence of pugging of soils and minor weed invasion on the periphery of the tree-line. Frequent storm events with high wind velocities resulting in damage to large trees is conspicuous as high wind velocities would be a frequent phenomenon in this area being in a highly elevated position in the landscape.

**UPLAND WETLANDS OF THE DRAINAGE DIVIDE OF THE NEW ENGLAND TABLELAND BIOREGION**

*Endangered ecological community-Threatened Species Conservation Act, 1995*

*Endangered ecological community-Environment Protection & Biodiversity Conservation Act 1999.*

The initial route surveyed passed through the Upland Wetland of the Drainage Divide of the New England Tableland Bioregion-Endangered ecological community. For a number of reasons, including minimising potential impacts to a sensitive EEC, the route has now been amended to traverse to the south of this EEC. This shift has resulted in the proposed powerline crossing outside of the EEC. The Upland Wetland of the Drainage Divide of the New England Tableland Bioregion-Endangered ecological community occurs in shallow temporary to near permanent wetlands restricted to the higher altitudes that are above 900 metres ASL associated with the Great Dividing Range of the New England Tableland Bioregion of NSW (OEH, 2012).

While this relocation of the powerline has resulted in crossing of another wetland at a lower elevation to the south of the Upland Wetland (as it falls outside of the definition which is restricted to altitudes above 900 metres ASL), it is proposed that a new Statement of Commitment be applied to this area to ensure it is treated with due caution during detailed design and construction. See new SOC 71 on page 35.

**RIPARIAN COMMUNITY/RIVER OAK VEGETATION COMMUNITY (SWAN BROOK)****Structure & Floristics:**

The structure of the River Oak vegetation riparian community associated with Swan Brook is a tall open to semi-closed riparian forest vegetation community situated along the embankments of Swan Brook and attains a canopy height of approximately 20 metres. This community within the study area is confined to

Section 6 and occurs as a narrow lineal band of broken vegetation. The species diversity is very limited due to the community generally not containing a high species biodiversity insofar floristic species composition. The tree species present within Section 6's riparian community are River Oak *Casuarina cunninghamiana* (dominant) and to a lesser degree Rough-barked Angophora *Angophora floribunda*.

The majority of the understorey is cleared as a result of past clearing and cattle grazing impacts although there are a few shrubs present such as Black Thorn *Bursaria spinosa* being a spinescent species and unpalatable to cattle and the Native Olive *Notelaea macrocarpa* var. *macrocarpa* the latter probably being unpalatable to cattle for one reason or another. Other species present include Spear Thistle *Cirsium vulgare* (exotic), Geranium *Geranium solanderi*, Buttercup *Ranunculus inundatus*, Tussock Grass *Poa labillardierei*, *Poa sieberiana* and the Blady Grass *Imperata cylindrica*.

The Needle-leaf Mistletoe *Amyema cambagei* is also present as an epiphytic parasitical species upon the host trees being the River Oaks *Casuarina cunninghamiana* within this vegetation community and is an inconspicuous epiphytic species on the River Oaks along Swan Brook as the leaves of this mistletoe species are similar in appearance to the phyllodes (leaves) of the host Casuarina. Climbers (vines) are also present and include the Wonga Vine *Pandora pandorana*, Scrambling Lily *Geitonoplesium cymosum* and the Headache Vine *Clematis glycyphylla*; the Wonga Vine in this instance attaining liana status along Swan Brook.

**Comments:**

No threatened species of flora or ROTAPs (Rare Or Threatened Australian Plants) were recorded within Section 6's riparian community or along Swan Brook and none are expected to occur or to be impacted by the proposal.

**Locally Significant Species:**

River Oak *Casuarina cunninghamiana*.

**Noxious weeds:** Nil.

**Degree of Disturbance:**

The overall ecological condition of the riparian community along Swan Brook within Section 6 is considered to be moderate with a well developed canopy of River Oaks extending along the banks of Swan Brook, however the understorey is considerably affected by past and current grazing impacts and stream bank erosion effects which limits healthy recruitment or replacement of juvenile River Oaks within the area. There are no obvious signs of recent harvesting of River Oaks for timber extraction and there are no recent fire scars present on the boles of the remaining River Oaks or other associated vegetation present within this area.

**TABLE 8-1  
OVERALL FLORISTIC SPECIES RECORDED WITHIN THE STUDY AREA**

LIFE FORM	VERNACULAR NAME	SCIENTIFIC NAME
<b>TREES</b>		
	White Box	<i>Eucalyptus albens</i>
	Yellow Box	<i>Eucalyptus melliodora</i>
	Blakely's Red Gum	<i>Eucalyptus blakelyi</i>
	'Stringybark'	<i>Eucalyptus subtilier</i>
	Tumbledown Red Gum <-> Dwyer's Red Gum	<i>Eucalyptus dealbata</i> <-> <i>Eucalyptus dwyeri</i> (intergrade)
	Ribbon Gum <u>or</u> Blackbutt	<i>Eucalyptus viminalis</i> <u>or</u> <i>Eucalyptus</i>



	Candlebark <u>or</u> Mountain Gum (Results from the Royal Botanic Gardens Herbarium did not confirm Blackbutt Candlebark)	<i>rubida</i> subsp. <i>barbigerorum</i> (Schedule, 2, <i>Threatened Species Conservation Act, 1995</i> ) <u>or</u> <i>Eucalyptus dalrympleana</i> ssp. <i>heptantha</i>
	Rough-barked Angophora	<i>Angophora floribunda</i>
	Peppercorn Tree	<i>Schinus areira</i> (exotic)
	River Oak	<i>Casuarina cunninghamiana</i>
	<b>LOWER TREES</b>	
	Blackwood	<i>Acacia melanoxylon</i>
	Hickory Wattle	<i>Acacia implexa</i>
	Black Cypress Pine	<i>Callitris endlicheri</i>
	Kurrajong	<i>Brachychiton populneus</i>
	<b>SHRUBS</b>	
	Native Olive	<i>Notelaea macrocarpa</i> var. <i>macrocarpa</i>
	Wallaby Weed	<i>Olearia viscidula</i>
	Black Thorn	<i>Bursaria spinosa</i>
	Northern Sandalwood	<i>Santalum lanceolatum</i>
	Northern Silver Wattle	<i>Acacia leucoclada</i> ssp. <i>leucoclada</i>
	Cassinia	<i>Cassinia quinquefaria</i>
	<b>MONOCOTYLEDONS &amp; GROUND COVERS</b>	
	Geranium	<i>Geranium solanderi</i>
	Native Violet	<i>Viola</i> sp
	Kidney Weed	<i>Dichondra repens</i>
	Spiny-headed Mat-rush	<i>Lomandra longifolia</i>
	Many-flowered Mat-rush	<i>Lomandra multiflora</i>
	Mat-rush	<i>Lomandra</i> sp
	Scrambling Lily	<i>Geitonoplesium cymosum</i>
	Headache Vine	<i>Clematis glycyphylla</i>
	Stinging Nettle	<i>Urtica incisa</i>
	Spear Thistle	<i>Cirsium vulgare</i> (exotic)
	St. Barnaby's Thistle	<i>Centaurea solstitialis</i> (exotic)
	Sweetbriar	<i>Rosa rubiginosa</i> (exotic & noxious)
	Blackberry	<i>Rubus fruticosus</i> (exotic & noxious)
	Prickly Pear	<i>Opuntia stricta</i> (exotic & noxious)
	Purple-top	<i>Verbena bonariensis</i> (exotic)
	Fleabane	<i>Conyza bonariensis</i> (exotic)
	Cobbler's Peg	<i>Bidens pilosa</i> (exotic)
	Fireweed	<i>Senecio madagascariensis</i> (exotic &

		noxious)
	Drooping Mistletoe	<i>Amyema pendula</i>
	Needle-leaf Mistletoe	<i>Amyema cambagei</i>
	Buttercup	<i>Ranunculus inundatus</i>
	Juncus	<i>Juncus usitatus</i>
	Juncus	<i>Juncus</i> sp
	Kangaroo Grass	<i>Themeda australis</i>
	Windmill Grass	<i>Chloris truncata</i>
	Blady Grass	<i>Imperata cylindrica</i>
	Pitted Blue Grass	<i>Bothriochloa decipiens</i>
	Hedgehog Grass	<i>Echinopogon</i> sp
	Tussock Grass	<i>Poa labillardieri</i>
	Poa	<i>Poa sieberiana</i>
	Wallaby Grass	<i>Austrodanthonia tenuir</i>
	Three-awn Spear Grass	<i>Aristida vagans</i>
	Chilean Needle Grass	<i>Nassella neesiana</i> (exotic , noxious and a Weed of National Significance)
<b>FERNS</b>		
	Bristly Cloak Fern	<i>Cheilanthes sieberi</i> ssp. <i>sieberi</i>
	Sickle Fern	<i>Pellaea falcata</i>
	Bracken Fern	<i>Pteridium esculentum</i>

### COMMENTS RELATING TO TABLE 8-1:

The Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* (Schedule, 2, *Threatened Species Conservation Act, 1995*) was provisionally recorded within the study area. However, the specimens collected were not confirmed by the Royal Botanic Gardens Herbarium.

No additional threatened species of flora or ROTAPs (Rare Or Threatened Australian Plants) were recorded within the study area and none are expected to occur or be impacted as a result of the proposal.

Several environmental weeds are present within the study area and include five species declared as noxious weeds for the Inverell Local Government Area as well as being listed under the *Noxious Weeds Act, 1993*.

These weed species are:

- Sweetbriar *Rosa rubiginosa* (exotic),
- Blackberry *Rubus fruticosus* (exotic),
- Fireweed *Senecio madagascariensis* (exotic),
- Prickly Pear *Opuntia stricta* (exotic) and
- Chilean Needle Grass *Nassella neesiana*.

## 9.0 FAUNA & FAUNA HABITATS

There is limited native fauna habitat present throughout much of the study area due to the degree of previous disturbance within most precincts as well as severe habitat fragmentation. The exceptions to this are a larger area within Section 2 and a proportion of Section 6 and Section 7.

However, the study area (and its various remnant patches of vegetation) is potential habitat to a range of threatened species as well as species of local and regional significance. Threatened species recorded on site are the Diamond Firetail, Little Lorikeet and the Little Eagle. Seven Part Tests of Significance has been applied to these and additional relevant threatened species (see appendices).

The study area also provides suitable habitat for several locally or regionally significant species such as the Wedge-tailed Eagle, Black Falcon, Little Falcon, Nankeen Kestrel, Brown Goshawk, Double-barred Finch, White-winged Chough, Crimson Rosella, Musk Lorikeet, Yellow-tailed Black Cockatoo, Stubble Quail, Peaceful Dove and the White-throated Treecreeper as these species were recorded during the field surveys. Notable species recorded during the field survey of the study area included the Eastern Grey Kangaroo, Red-necked Wallaby and the Echidna. The full list of fauna species recorded is appended to this ecological assessment report. Table 9-1 lists fauna species recorded in the study area.

### TREE HOLLOWES:

Several large trees with large tree hollows were noted to be present within the study area and several of these hollows were considered to be potential nesting sites for a range of threatened species including the Masked Owl, Barking Owl, Glossy Black Cockatoo as well as a number of smaller species including the Little Lorikeet, Squirrel Glider and microbats. However, the majority of these tree hollows are located outside of the powerline easement and impact area. A small number are located in the escarpment and in the vicinity of the proposed substation on White Rock Mountain. One large Rough-barked Angophora located in Section 4 contains multiple hollows and should be marked on site and a buffer zone instigated. The GPS coordinates to this tree are 354446 and 6702103 (MGA 94 Zone 56).

### AVIANS:

The avians (birds) were the most frequently recorded form of fauna observed within the study area. Three threatened species of avians were recorded within the study area including the Diamond Firetail (Schedule 2, *TSC Act*, 1995), Little Eagle (Schedule 2, *TSC Act*, 1995) and the Little Lorikeet (Schedule 2, *TSC Act*, 1995). Raptors (birds of prey) were noted to be the most diverse avian group recorded. The species of avians recorded are outlined in Table 9-1.

### MAMMALIANS:

Indigenous mammals recorded within the study area were largely macropods where the Eastern Grey Kangaroo was the most notable and prolific indigenous species. Introduced or exotic species recorded included the Feral Pigs, Feral Goats, Fallow Deers, European Foxes, Brown Hares and European Rabbits (see Table 4). Cattle and sheep are numerous throughout much of the study area.

Small mammals expected to occur include the Southern Bush Rat *Rattus fuscipes*, Pacific Black Rat *Rattus rattus* (exotic), Yellow-footed Antechinus *Antechinus flavipes*, Brown Antechinus *Antechinus stuartii* and the introduced House Mouse *Mus musculus*. No threatened species of terrestrial small mammals are likely to occur within the study area. No threatened species of macropods are likely to occur including the Brush-tailed Rock Wallaby however, potential habitat may occur within the far upper slope and escarpment of Section 7.

Other species that may occur include the Sugar Glider *Petaurus breviceps*, Common Ring-tailed Possum *Pseudocheirus peregrinus*, Common Brush-tailed Possum *Trichosurus vulpecula* and possibly the Bobuck *Trichosurus caninus*. It is expected that the Grey-headed Flying Fox *Pteropus poliocephalus* (Schedule 2, *Threatened Species Conservation Act, 1995*) would forage within the study area during the flowering period of all of the eucalypts present within the study area.

#### HERPTOFAUNA:

The herpetofauna recorded were considerably limited due to the winter sampling and survey season undertaken (see Table 4). There are limited suitable habitat features for herpetofauna present within the study area including a lack of bushrock substrates or rocky outcrops, a limited number of fallen logs, stags and a general lack of a rich floristic species composition within most sections of the study area. The 'richer' habitat areas for herpetofauna within the study area are generally within the riparian precinct. Other herpetofauna expected to occur may include the Keferstein's Tree Frog *Litoria dentata*, Smooth Toadlet *Uperoleia laevigata* and Lesueur's Frog *Litoria lesueurii*.

Reptiles expected to occur include (but not limited to) the Bearded Dragon *Pogona barbata*, Burton's Legless Lizard *Lialis burtonis*, Eastern Water Dragon *Physignathus lesueurii*, Lace Monitor (goanna) *Varanus varius*, Blue-tongue Skink *Tiliqua scincoides*, *Anomalopus swansonii*, Blind Snake *Ramphotyphlops nigrescens*, Carpet Python *Morelia spilota*, Copperhead *Austrelaps superbus*, Green Tree Snake *Dendrelaphis punctulatus*, Swamp Snake *Hemiaspis signata*, Mainland Tiger Snake *Notechis scutatus*, Eastern Brown Snake *Pseudonaja textilis*, Blue-bellied Black Snake *Pseudechis guttatus*, Common Black Snake *Pseudechis porphyriacus* and the Common Long-necked Tortoise *Chelodina longicollis*. No threatened species of reptiles or amphibians are expected to be significantly affected by the proposal.

#### NOCTURNAL AVIANS:

Nocturnal species of avians expected to occur including the Boobook Owl *Ninox novaeseelandiae*, Barn Owl *Tyto alba*, Tawny Frogmouth *Podargus strigoides* and the Australian Owlet Nightjar *Aegotheles cristatus* (locally significant). Large forest owls expected to occur include three Schedule 2 *TSC Act* species; the Powerful Owl *Ninox strenua* Barking Owl *Ninox connivens* and the Masked Owl *Tyto novaehollandiae*. Any of these species may forage within the study area on an *ad hoc* basis at any time of the year but mainly in Sections 2, 6 and 7 only however, the Barking Owl may forage in wider areas and distant remnant vegetation units.

**TABLE 9-1 - FAUNA SPECIES RECORDED WITHIN THE STUDY AREA**

<b>VERNACULAR NAME</b>	<b>SCIENTIFIC NAME</b>
<b>AVIFAUNA</b>	
Wedge-tailed Eagle	<i>Aquila audax</i>
<b>Little Eagle</b>	<b><i>Hieraaetus morphnoides</i> (Schedule 2, TSC Act, 1995)</b>
Black Falcon	<i>Falco subniger</i>
Brown Falcon	<i>Falco berigora</i>
Little Falcon	<i>Falco longipennis</i>
Nankeen Kestrel	<i>Falco cenchroides</i>
Black-shouldered Kite	<i>Elanus notatus</i>
Brown Goshawk	<i>Accipiter fasciatus</i>
<b>Diamond Firetail (finch)</b>	<b><i>Stagonopleura guttata</i> (Schedule 2, TSC Act, 1995)</b>
Double-barred Finch	<i>Poephila bichenovii</i>
Torresian Crow	<i>Corvus orru</i>
Australian Magpie	<i>Gymnorhina tibicen</i>
Pied Butcherbird	<i>Cracticus nigrogularis</i>
Grey Butcherbird	<i>Cracticus torquatus</i>
Pee Wee	<i>Grallina cyanoleuca</i>
White-winged Chough	<i>Corcorax melanorhamphos</i>
Pied Currawong	<i>Strepera graculina</i>
Red-rumped Parrot	<i>Psephotus haematonotus</i>
Crimson Rosella	<i>Platyercus elegans</i>
Eastern Rosella	<i>Platyercus eximius</i>
Musk Lorikeet	<i>Glossopsitta concinna</i>
<b>Little Lorikeet</b>	<b><i>Glossopsitta pusilla</i> (Schedule 2, TSC Act, 1995)</b>
Rainbow Lorikeet	<i>Trickoglossus haematodus</i>
Galah	<i>Cacattua roseicapilla</i>
Sulphur-crested Cockatoo	<i>Cacattua galerita</i>
Yellow-tailed Black Cockatoo	<i>Calyptorhynchus funereus</i>
Stubble Quail	<i>Coturnix pectoralis</i>

Crested Pigeon	<i>Ocyphaps lophotes</i>
Peaceful Dove	<i>Geopelia striata</i>
Noisy Miner	<i>Manorina melanocephala</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>
White-faced Heron	<i>Ardea novaehollandiae</i>
Wood Duck	<i>Chenonetta jubata</i>
Australian Grebe	<i>Tachybaptus novaehollandiae</i>
Spotted Pardalote	<i>Pardalotus punctatus</i>
Mistletoebird	<i>Dicaeum hirundinaceum</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Variegated Wren	<i>Malurus assimilis</i>
White-throated Treecreeper	<i>Cormobates leucophaea</i>
<b>MAMMALIANS (INDIGENOUS)</b>	
Eastern Grey Kangaroo	<i>Macropus giganteus</i>
Red-necked Wallaby	<i>Macropus rufogriseus</i>
Swamp Wallaby	<i>Wallabia bicolor</i>
Echidna	<i>Tachyglossus aculeatus</i> (road kill)
<b>MAMMALIANS (INTRODUCED)</b>	
Feral Pig	<i>Sus scrofa</i>
Feral Goat	<i>Capra hircus</i>
Fallow Deer	<i>Dama dama</i>
European Fox	<i>Vulpes vulpes</i>
Brown Hare	<i>Lepus capensis</i>
European Rabbit	<i>Oryctolagus cuniculus</i>
<b>HERPETOFAUNA</b>	
burrowing” skink	<i>Hemiegis decresiensis</i>
Eastern Sign-bearing Froglet	<i>Crinia parinsignifera</i>
Common Froglet	<i>Crinia signifera</i>
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>

## 9.1 VEGETATION TO BE REMOVED AS A RESULT OF THE PROPOSAL

The three endangered ecological communities recorded within or adjacent to the study area were

- White Box Yellow Box Blakely's Red Gum Woodland-EEC,
- Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-EEC,
- Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC.

Of the above three endangered ecological communities, only two EECs would be partly affected by the proposal being White Box Yellow Box Blakely's Red Gum Woodland-EEC and the Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-EEC. The Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion EEC would no longer be affected by the proposal as the powerline has now been diverted away from the location of the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC.

The following table lists the various EECs, establishes the biometric vegetation types, rates the overall condition and quantifies the overall loss of that particular EEC from within the study area as a result of the proposal, based on a 15m width of clearing.

**TABLE 9-2 - ESTIMATED IMPACTS ON VEGETATION**

<b>EEC</b>	<b>BIOMETRIC VEGETATION TYPE</b>	<b>OVERALL VEGETATION CONDITION</b>	<b>IMPACT AREA (HA) (based on 15m clearance)</b>
White Box Yellow Box Blakely's Red Gum Woodland-EEC	Vegetation Type ID BR116. Blakely's Red Gum-Yellow Box grassy open forest or woodland of the New England Tablelands.	Poor to moderate, but mostly poor	2.003 Ha
Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-EEC	Vegetation Type ID 126. Candlebark-Manna Gum Woodland of the New England Tablelands	Moderate condition but very limited area affected	0.127 Ha
Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC	Vegetation Type ID BR101. Basalt plateau lagoons of the New England Tablelands	Moderate to good condition	Zero. An alternative route has been established to prevent impact on this EEC
Derived Native Grassland (DNG)	Not applicable	Poor to moderate condition	Zero. Powerpoles would be micro-sited outside the DNG areas hence no impact

The total permanent impact area for the alternative grid connection on native vegetation based on a clearance width of 15m is 2.13 hectares. This is additional to impacts of the White Rock Wind Farm as approved. White Rock Wind Farm Pty Ltd would seek an increase in the clearing limit for the Ribbon Gum-Mountain Gum to allow for this additional impact. Further discussion on the significance of the impacts listed in Table 9-2 and justification for these losses is included in Section 10.



## 10.0 DISCUSSION

### THREATENED SPECIES, POPULATIONS AND ENDANGERED ECOLOGICAL COMMUNITIES:

This section reviews the following:

- Three (3) threatened flora species (vulnerable)
- Seventeen (17) threatened fauna species (Schedule 2 listed as vulnerable)
- Three (3) threatened fauna species (Schedule 1 listed as endangered)
- Endangered Ecological Communities

#### 10.1 THREATENED SPECIES - FLORA

##### **Austral Toadflax *Thesium australe***

*Vulnerable, Threatened Species Conservation Act, 1995*

*Vulnerable-Environment Protection & Biodiversity Conservation Act 1999.*

The study area appears *prima facie* to contain partial potential habitat for *Thesium australe* by way of general association with the Kangaroo Grass *Themeda australis* which is present within the study area. Although *Thesium australe* was targeted throughout the study area, the species was not actually recorded within the study area during the field assessment phase. Moreover, several factors contribute to the threat of the habitat of the species including (but not limited to) intensification of grazing pressures, agricultural developments and weed invasion. Significant cattle and sheep grazing is a continual land-use regime present throughout most sections of the study area with a limited impact in Section 2. Nonetheless, a Seven Part Test of Significance has been applied to the species demonstrating that the proposal would not have a significant effect on *Thesium australe* or its habitat. Finally, RPS (2011) state that in their area of surveys encapsulating the adjacent Wind Farm proposal, the species had been widely recorded in the local area, nonetheless, RPS also did not record the species in their study area in spite of their targeted survey effort RPS (*Op cit*).

##### **Bluegrass *Dichanthium setosum***

*Vulnerable, Threatened Species Conservation Act, 1995*

*Vulnerable-Environment Protection & Biodiversity Conservation Act 1999.*

The Bluegrass *Dichanthium setosum* is a species that occurs in moderately disturbed woodland and grassy remnant and highly disturbed pastures within heavy basaltic black soils and red-brown loams with clay subsoils (Bluegrass Profile OEH, 2012) The species is also associated with White Box and Yellow Box woodlands (White Box Yellow Box Blakely's Red Gum-EEC and Derived Native Grasslands. Threats to the species are heavy grazing by domestic stock and clearing of habitat for pasture improvement and cropping (OEH, *Op cit*).

Targeted surveys for *Dichanthium setosum* had been undertaken throughout the study area by Environmental Assessments Pty Limited however the species was not recorded within the study area's powerline route. Although according to RPS (2011), *Dichanthium setosum* has been recorded to the south of the proposed Wind Farm site (RPS, *Op cit*), nonetheless, *Dichanthium setosum* was not recorded by RPS during their surveys of the Wind Farm site, nor were any other threatened species of flora within their study area. A Seven Part Test of Significance has been prepared for this species demonstrating that the proposal would not have a significant effect on *Dichanthium setosum* or its habitat.



**Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum*** (Not confirmed as present)

*Vulnerable, Threatened Species Conservation Act, 1995*

*Vulnerable-Environment Protection & Biodiversity Conservation Act 1999.*

The Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* is listed as ‘Vulnerable’ under both the NSW *Threatened Species Conservation Act, 1995* and the Commonwealth’s *Environment Protection & Biodiversity Conservation Act, 1999*. The Blackbutt Candlebark is a tree that grows between 15 metres and 40 metres in height, occurs in grassy woodland on deep, fertile clay-loam soils and has a restricted distribution in the Northern Tablelands of NSW occurring as scattered populations from west of Glen Innes and Guyra and in the Moonbi Ranges between Woolbrook and Nundle (Department of Sustainability, Environment, Water, Population and Communities, (DSEWPC) 2012). The distribution of the Blackbutt Candlebark overlaps White Box Yellow Box Blakely’s Red Gum Grass Woodland and Derived Native Grassland-EEC (DSEWPC, *Op cit*).

The Blackbutt Candlebark is not known to occur within any conservation areas including National Park estate at this stage. Threats to the Blackbutt Candlebark include destruction and disturbance of habitat due to road works, powerline installations, clearing and fragmentation of woodland habitat for agricultural and development; most populations occur on private property (OEH, 2012).

The Blackbutt Candlebark was only provisionally recorded within the study area. Herbarium staff at the Royal Botanic Gardens (Sydney) could not confirm with absolute certainty that the plant specimens were *Eucalyptus rubida* subsp. *barbigerorum* due to taxonomic anomalies between this species and at least two other eucalypt species present within the area. Nonetheless, most individuals of this species were observed outside of the impact area.

Finally, even though several individuals of *Eucalyptus rubida* subsp. *barbigerorum* were provisionally recorded during the field assessment surveys of the study area, the proposal is unlikely to have a significant effect on the species as most of the specimens observed were noted to occur outside of the powerline easement. Prior to the commencement of clearing works within the powerline easement, an ecologist should undertake a targeted assessment on the species and fully locate the trees that are likely to be impacted by the proposal. These trees should then be marked in the field and a buffer be implemented to ensure they are not impacted by the proposal.

## 10.2 THREATENED SPECIES - FAUNA

### *Schedule 2, Threatened Species Conservation Act: species listed as Vulnerable*

**Little Eagle *Hieraaetus morphnoides***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Little Eagle *Hieraaetus morphnoides* was recorded within the study area’s Section 1 during the field assessment phase. However no raptor nests were located within the study area. The Little Eagle is highly likely to predate on the population of rabbits which is currently plentiful within the study area.

The Little Eagle occurs in open eucalypt forest and woodlands or open woodlands and occurs throughout much of mainland Australia. The Little Eagle has historically been dependant on rabbits, however following the spread of calicivirus and subsequent decline in rabbits, the Little Eagle has also declined in numbers across most bioregions in NSW especially the sheep-wheat belt (OEH, 2012). The breeding productivity, the species is declining on the Northern Tablelands with some territory-holding males remaining unpaired (OEH, *Op cit*). Threats to the Little Eagle include clearing and degradation of foraging and breeding habitat as well as possibly secondary poisoning from the rabbit poison *pindone*. The Little Eagle would not be significantly affected by the proposal and it is likely that the species would still occur within the study area following the construction of the powerline.

### **Diamond Firetail *Stagonopleura guttata***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Diamond Firetail is a small colourful finch that occurs in eucalypt woodlands and open forest and mallee habitats through central and eastern NSW, parts of southern Queensland, and Victoria to the Eyre Peninsula in South Australia. In NSW it occurs predominantly west of the Great Dividing Range with outlier populations occurring on the Cumberland Plain west of Sydney and in the Hunter Valley, Clarence, Richmond and Snowy River valleys (OEH, 2012). Localised and regional declines are known for the Diamond Firetail including within the New England Tableland Bioregion.

The Diamond Firetail was recorded within one of the vegetation remnants during the field assessment phase of the study area. This remnant was noted to be of considerable size and in good ecological condition with limited impacts from grazing from cattle and sheep. This vegetation remnant contains a considerable density of White Box Yellow Box Blakely's Red Gum-EEC with a healthy understorey of shrubs, groundcovers and grasses with good structural components and features such as fallen logs, rocks etc. This vegetation remnant has considerable ecological value and is not located directly under the powerline route and would remain unaffected by the proposal.

### **Varied Sittella *Daphoenositta chrysoptera***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Varied Sittella *Daphoenositta chrysoptera* is a small insectivorous sedentary passerine bird of forests and woodlands that cover most of the mainland Australia excluding deserts and open grasslands (OEH, 2012). The Varied Sittella has undergone a moderate reduction in population due to habitat decline in both cover and quality and the species may also be affected by dominance of Noisy Miners in woodland patches. Key threatening process relevant to the species includes clearing of native vegetation, loss of hollow-bearing trees and removal of dead wood and trees. Even though potential habitat of the species is present within parts of the study area, and noting that the species was recorded in a nearby area during the ecological surveys for the White Rock Wind Farm proposal, the species was not recorded on site. The species is unlikely to be significantly affected by the proposal as the majority of the powerline would traverse through mostly cleared and disturbed habitat.

### **Black Bittern *Ixobrychus flavicollis***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Black Bittern was not recorded within the study area or in other adjacent areas during the field assessment phase. The Black Bittern occurs in a range of habitats including in flooded grasslands, woodland, forest, rainforests and mangrove communities. The species primary potential habitat within the study area is the Swan Brook area and immediate environs where dense occurrence of instream vegetation is present. The proposal would not have a significant effect on the Black Bittern or its habitat as the powerlines would be elevated at a considerable height over Swan Brook and there would be no need to clear any riparian vegetation associated with Swan Brook.

### **Little Lorikeet *Glossopsitta pusilla***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Little Lorikeet *Glossopsitta pusilla* was recorded within Section 3 within the study area during the field assessment phase. Other similar species were also recorded namely large populations of the allied species the Musk Lorikeet feeding largely on the inflorescence of the White Box *Eucalyptus albens* (pers observation).

### **Glossy Black Cockatoo *Calyptorhynchus lathami***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Glossy Black Cockatoo occurs from central coastal Queensland, eastern NSW and north-eastern Victoria. There is an isolated population on Kangaroo Island in South Australia (Slater, Slater & Slater, 1992). The Glossy Black Cockatoo is an extremely conspicuous large black cockatoo and is a specialist niche feeder of the Forest Oak *Allocasuarina torulosa* and to a lesser extent the Black She-oak *Allocasuarina littoralis* located in open forests and woodlands (personal observation), however these primary food plants are absent from the study area.

The Glossy Black Cockatoo when feeding on these food plants species tends to chew the fruiting cones of the plant and discards the cones onto the forest floor. None of the above food plants were observed within the study area although the allied tree species the River Oak *Casuarina cunninghamiana* is present within the study area; the Glossy Black Cockatoo does not generally feed on River Oaks.

There is no evidence that the Glossy Black Cockatoo had been feeding on the allied tree species *Casuarina cunninghamiana* trees within the study area. These trees had been examined for evidence of chewed fruiting cones pertaining to the Glossy Black Cockatoo as a precautionary measure, however, no evidence was found to substantiate the utility of these trees by the Glossy Black Cockatoo and no chewed cones were located. There are no suitable tree hollows for breeding purposes present within the study area that would be appropriate for the Glossy Black Cockatoo. Therefore, a significant effect on the Glossy Black Cockatoo is unlikely to occur as a result of the proposal.

### **Powerful Owl *Ninox strenua***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Powerful Owl occurs in open forests habitats within the region (personal observation) and (O'Brien, 1990). The known distribution of the Powerful Owl is south-eastern Australia from the Dawson River, Queensland to south-east South Australia (Slater et al, 1992). The Powerful Owl prefers to roost within deep gullies and rainforest habitats where adequate canopy shelter is afforded. The study area does not contain steep gullies or rainforest habitats. However, the riparian community is present within the study area that may be sufficient as a roosting site for the Powerful Owl.

Evidence of the occurrence or use of the study area by the Powerful Owl (and all other species of owls known to occur within the bioregion) had been sought throughout the entire study area. Owl white-wash excreta, pellets, primary wing feathers and other signs of owls were sought; no evidence of the Powerful Owl had been located within the study area. Nonetheless, it is expected that this species forages within the study area on an ad hoc basis in search of prey-food to the species. The Powerful Owl is known to predate on the Grey-headed Flying Fox and other arboreal mammals such as possum species. There are limited potential nesting or appropriate roosting sites available within the study area for the Powerful Owl. The proposal is unlikely to have a significant effect on the Powerful Owl. As the Powerful Owl is expected to forage within the broader environs of the study area, a Seven Part Test of Significance has been prepared for this species.

### **Barking Owl *Ninox connivens***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Barking Owl is an uncommon to rare resident in open forest, woodlands and wooded watercourses and in arid and coastal regions in most parts of northern and eastern Australia and the south-west of Western Australia (Slater, Slater & Slater, 1992). Roosts were sought throughout the study area for this and other large forest owl species, however no owls or tell-tale distinct white-wash were located at any location within the study area including along the Swan Brook and its associated riparian vegetation. Although the species is likely to forage within section 6 and section 7 within the study area, the proposed powerline easement is unlikely to have a significant effect on this species. A Seven Part Test of Significance has been prepared for the Barking Owl and is attached to this assessment report.

### **Masked Owl *Tyto novaehollandiae***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Masked Owl occurs mainly in coastal and sub-coastal forests and woodlands and occur at higher densities in regions with the greatest local diversity of forest and woodland structural formations (Debus, 1994). The proposal is unlikely to have a significant effect on the Masked Owl due to the lack of substantial habitat within the study area.

### **Grey-headed Flying Fox *Pteropus poliocephalus***

*Vulnerable, Threatened Species Conservation Act, 1995*

*Vulnerable-Environment Protection & Biodiversity Conservation Act 1999.*

The Grey-headed Flying Fox is highly likely to forage within most parts of the study area especially when each respective tree species enters into inflorescence including the eucalypts and *Angophora floribunda* trees. There are no current roosting or camp sites of the Grey-headed Flying Fox present within or adjacent to the study area. The riparian habitat along the Swan Brook is not suitable as a roosting site for the Grey-headed Flying Fox. Therefore, the proposal would not have a significant effect on the Grey-headed Flying Fox.

### **Yellow-bellied Glider *Petaurus australis***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Yellow-bellied Glider is unlikely to forage or occur within the study area but may still ultimately be found to be present in other areas adjacent to the study area namely within the riparian zone in Section 6 and dense bushland to the east of the study area. No Yellow-bellied Glider sap-site trees were observed or recorded within the study area that would otherwise indicate the use of the study area by the Yellow-bellied Glider. The proposal is unlikely to have a significant effect on the Yellow-bellied Glider. A Seven Part Test of Significance has not been applied to the Yellow-bellied Glider.

### **Koala *Phascolarctos cinereus***

*Vulnerable, Threatened Species Conservation Act, 1995*

*Vulnerable-Environment Protection & Biodiversity Conservation Act 1999.*

The known geographic distribution of the Koala is north Queensland, south-eastern Queensland, and coastal NSW, parts of coastal and inland Victoria and small residual colonies in South Australia. The Koala was not recorded within the study area and that evidence of the Koala utilising the study area had not been observed. The White Box *Eucalyptus albens* and the Ribbon Gum *Eucalyptus viminalis* are two of the ten feed tree species to the Koala and are listed in Schedule 2 of State Environmental Planning Policy-44 (Koala Habitat Protection). Both of these tree species are present within the study area. There are no records of the Koala for the vicinity of the study area according to the OEH's Atlas database records.

No scats, positively identified Koala scratch marks or individuals of the Koala were observed within the study area. Nonetheless, State Environmental Planning Policy-44 (Koala Habitat Protection) applies to the study area and a SEPP-44 statement has been prepared and is appended to this ecological assessment report.

### **Spotted-tailed (Tiger) Quoll *Dasyurus maculata***

*Vulnerable, Threatened Species Conservation Act, 1995*

*Endangered-Environment Protection & Biodiversity Conservation Act 1999.*

The Spotted-tailed Quoll is a terrestrial and arboreal carnivorous marsupial and its body weight lies within the 'critical weight-range' of Australian mammals. This species occurs within both forested and woodland habitats. The known distribution of the Spotted-tailed Quoll is from south-east Queensland, coastal NSW, north-eastern Victoria and Tasmania. There is considerable variation in habitat preferences for the Spotted-tailed Quoll as demonstrated by the various locations and habitats where this species occurs within the bioregion. The Spotted-tailed Quoll is unlikely to be present within the majority of study area due to the degree of habitat disturbance and the prevalence of foxes within the study area. Moreover, there are very few suitable tree hollows or terrestrial hollow logs available within the study area to retain a viable population of the Spotted-tailed Quoll. If the species is present within the study area, then it is likely to forage within the Swan Brook vicinity or the far upper slope and escarpment area in Section 6 and Section 7. The proposal is unlikely to have a significant effect on the Spotted-tailed Quoll.

### **Eastern Bent-wing Bat *Miniopterus schreibersii* & Little Pied Bat *Chalinolobus picatus***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Eastern Bent-wing Bat *Miniopterus schreibersii* is moderately common in the region and prefers to forage in open forests and woodlands especially within well-timbered valleys (Strahan, 1983). The Eastern Bent-wing Bat roosts in caves, tunnels, mine shafts and possibly suitable rock shelters. There are no potential roosting sites for the species located within the study area, however it is possible that such roosting habitat are located in the escarpment area around White Rock Mountain and environs. Churchill, (1998) states the Eastern (Large) Bent-wing Bat occurs in a broad range of habitats including rainforest, wet and dry sclerophyll forest, monsoon forest, woodland, paperbark forest and open grasslands.

RPS (2011) found that two threatened species of microbats were recorded in their study area of the Wind Farm site being the Eastern Bent-wing Bat (Schedule 2, Threatened Species Conservation Act, 1995) and the Little Pied Bat Schedule 2, Threatened Species Conservation Act, 1995). According to RPS (Op-cit), the Eastern Bent-wing Bat was the most frequently recorded microbat species with 12 out of 21 sites sampled in their study area whereas the Little Pied Bat was recorded as "possible" level of identification at two sites. RPS (2011) state that the greatest level of microbat activity was within Ribbon Gum woodland.

In regards to roosting sites of the above two threatened species of microbats, the Eastern Bent-wing Bat roosts in caves, mine shafts, tunnels etc and is not a tree hollow dependant species therefore impacts on tree hollows as a result of either the powerline or the Wind Farm proposals are inconsequential; in regards to the Little Pied Bat, the species tends to roost in trees (hollows) as well as caves, abandoned mines and houses (Churchill, 1998) although it appears that the species generally tends to roost in caves. It is considered likely that both the Eastern Bent-wing Bat and the Little Pied Bat would also occur within the powerline easements and environs, however the proposal is unlikely to have a significant on these species even with the removal of a few scattered tree hollows that would largely be inconsequential to these threatened species of microbats. To compensate the removal of tree hollows within the powerline easement, an ecologist would be present during any tree clearing operations to capture and relocate any fauna present within the tree hollows as well as salvaging and translocating tree hollows. The RPS study (2011) state that they consider that a small number of hollow-bearing trees may be removed and that impact on hollow-dependant species is unlikely to be significant; this is also considered to be the case by Environmental Assessments Pty Limited with the proposed powerline easement. Finally, to compensate the loss of any tree hollows impacting on microbats generally, micro-bat roost boxes would replace the loss of tree hollows at a ratio of 2:1 within the powerline easement however the microbat roost boxes would be established immediately outside of the powerline easement prior to the construction of the powerline.

### **Yellow-bellied Sheath-tailed Bat *Saccolaimus flaviventris***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Yellow-bellied Sheath-tailed Bat is a large above canopy feeding and foraging species of microbat. This species may be one of the few migratory species of microbats. Strahan (1983) suggests that its apparent rarity may be linked to the fact the Yellow-bellied Sheath-tailed Bat flies rapidly and high and is seldom collected. Hoyer (1995) states that little is known on the diet, foraging behaviour or roosting behaviour of the



Yellow-bellied Sheath-tailed Bat. The species is rare in collections (Churchill, 1998). The proposal is unlikely to have a significant effect on this species based on the limited habitat available and the general paucity of tree hollows within the powerline easement.

#### **Eastern Free-tail Bat *Mormopterus norfolkensis***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Eastern Free-tail Bat roosts in tree hollows in dry eucalypt forests and woodlands (Churchill, 1998). There are limited trees with hollows present throughout the study area. The proposal is unlikely to have a significant effect on this species based on the limited habitat available and the general paucity of tree hollows within the powerline easement.

#### **Greater Broad-nosed Bat *Scoteanax rueppellii***

*Vulnerable, Threatened Species Conservation Act, 1995*

The Greater Broad-nosed Bat *Scoteanax rueppellii* is becoming more frequently harp-trapped or electronically detected in many forested areas in the region. Although the Greater Broad-nosed Bat is probably more abundant and more widely distributed than previously considered it is still uncommon to rare even on a regional basis. Parnaby (1992) considers that the occurrence of this species is 'sparse'. The Greater Broad-nosed Bat feeds on insects as well as vertebrates. Strahan (1983) suggests that the Greater Broad-nosed Bat forages in tree-lined creeks and the junction of woodland and cleared paddocks. Churchill (1998) states this species roosts in hollow tree trunks and branches as well as roofs of old buildings. The Greater Broad-nosed Bat is expected to occur along the associated creek precincts and likely within the Swan Brook area within and adjacent to the study area as well as possibly within the study area's open dam sites. However, the proposal is unlikely to have a significant effect on this species due to the limited number of tree hollows present within the powerline easement.

### ***Schedule 1, Threatened Species Conservation Act: species listed as Endangered***

#### **Regent Honeyeater *Anthochaera phrygia***

*Endangered, Threatened Species Conservation Act, 1995*

*Critically endangered-Environment Protection & Biodiversity Conservation Act 1999.*

The Regent Honeyeater *Anthochaera phrygia* is listed in Schedule 1 (Endangered) of the NSW *Threatened Species Conservation Act, 1995* and is classified as endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act, 1999*. Populations of the Regent Honeyeater may pass through the study area and the broader locality at any given time especially during the winter season and may remain generally undetected as nomadic individuals, residual flocks or transient immature birds. The Regent Honeyeater occurs mainly in the box-ironbark open forests and riparian stands of *Casuarina* on the inland slopes of the Great Dividing Range (Menkhorst, Schedvin and Geering, 1998). However, the Regent Honeyeater also occurs in coastal open forests including Swamp Mahogany *Eucalyptus robusta* forests and floodplains. The Regent Honeyeater is unlikely to depend on the study area for survival due to the degree of habitat disturbance and the prevalence of Noisy Miners; moreover its potential food resources are widespread throughout the locality and indeed the Northern Tablelands Bioregion, the species was not recorded even though eucalypts were noted to be in-flowering during the field assessment phase, therefore the proposal is unlikely to have a significant on the Regent Honeyeater

#### **Swift Parrot *Lathamus discolor***

*Endangered, Threatened Species Conservation Act, 1995*

*Critically endangered-Environment Protection & Biodiversity Conservation Act 1999.*

The Swift Parrot is listed as an endangered species in both the state and Commonwealth legislation. The Swift Parrot favours winter flowering food plant species the Swift Parrot depends on locally as the species tends to visit mainland Australia during the months of May to August and is generally a nectivorous species that depends on nectar and pollen food sources obtained in woodlands and forests of NSW. The Swift Parrot breeds in Tasmania, not on mainland Australia. The Swift Parrot has declined from an excess of 10, 000 pairs to less than 1,000 pairs (OEH, 2012) therefore the species is endangered. A significant effect on the Swift Parrot is unlikely to occur as a result of the proposal as the majority of the species potential food plants would be retained and unaffected in this instance. It is reiterated that this species breeds in Tasmania, therefore the limited tree hollows present within the study area are of little consequence to the Swift Parrot.

### **Brush-tailed Rock Wallaby *Petrogale penicillata***

*Endangered, Threatened Species Conservation Act, 1995*

*Endangered-Environment Protection & Biodiversity Conservation Act 1999.*

The Brush-tailed Rock Wallaby *Petrogale penicillata* is a medium-sized wallaby species closely associated with rocky habitats generally found along the Great Dividing Range but populations are now more fragmented throughout its range (OEH, 2012). Most of the populations are now small and isolated from other colonies of the species (OEH, Op cit). The majority of the study area's powerline route is unsuitable as habitat for the Brush-tailed Rock Wallaby however there is potential habitat for the species located in the escarpment area in the upper slope and cliff-line of Section 6 and Section 7. Nonetheless, clearing works within these areas would be undertaken in an environmentally sensitive manner and ecological disturbances minimised. The species was not recorded in these areas during the field assessment phase, therefore the proposed powerline easement is unlikely to have a significant effect on the Brush-tailed Rock Wallaby.

## 10.3 ENDANGERED POPULATIONS:

There are endangered populations of the Tusked Frog population in the Nandewar and New England Tableland Bioregions and the Australian Brush-turkey in the Nandewar and Brigalow Belt South Bioregions. Neither of these endangered populations were found to be present within the study area and the proposal would therefore not have a significant effect on these endangered populations.

## 10.4 ENDANGERED ECOLOGICAL COMMUNITIES UNDER THE *THREATENED SPECIES CONSERVATION ACT, 1995:*

Several endangered ecological communities have now been registered as occurring within the Northern Tablelands and the Glen Innes and Inverell Local Government Areas according to the Office of Environment & Heritage's Atlas database records. These endangered ecological communities include the following EECs. Those listed in bold were found within the study area.

### **Endangered Ecological Communities:**

- Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions,
- **White Box Yellow Box Blakely's Red Gum Woodland,**
- New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion,

- **Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion,**
- Howell Shrublands in the New England Tableland and Nandewar Bioregions,
- McKies Stringybark/Blackbutt Open Forest in the Nandewar and New England Tableland Bioregions,
- **Ribbon Gum - Mountain Gum - Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion,**
- Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions,
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepain, Nandewar and Brigalow Belt South Bioregions,
- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions.

#### **Critically Endangered Ecological Communities:**

None under the NSW *Threatened Species Conservation Act, 1995*.

The White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands is listed as a Critically endangered ecological community (CEEC) under the *Environment Protection & Biodiversity Conservation Act, 1999*.

The above endangered ecological communities listed in **bold-type** are EECs present within the study area in varying degrees or now within the environs of the study area such as in the case of Upland Wetlands-EEC. The endangered ecological communities are further described and discussed in greater detail below.

#### **White Box Yellow Box Blakely's Red Gum Woodland (White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands)**

*Endangered ecological community-Threatened Species Conservation Act, 1995.*

*Critically endangered ecological community-Environment Protection & Biodiversity Conservation Act 1999.*

The White Box Yellow Box Blakely's Red Gum Woodland-EEC is found in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands and NSW South Western Slopes Bioregions and is listed under Part 3 of the *Threatened Species Conservation Act, 1995*. The community is found on relatively fertile soils on the tablelands and western slopes (OEH, 2012). The White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community is generally characterised by White Box *Eucalyptus albens*, Yellow Box *Eucalyptus melliodora* and Blakely's Red Gum *Eucalyptus blakelyi* in varying proportions.

The White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community is found throughout the study area's natural vegetation and associated patches of remnant vegetation with the exception of the far upper slope of Section 7. The White Box *Eucalyptus albens* is the dominant tree species within the study area's representation of this EEC, however in some sections of the study area all three characteristic tree species are present whereas in other locales the tree species association is White Box-Blakely's Red Gum. However, the lower slopes in Section 6 are dominated by Yellow Box where White Box and to a lesser extent Blakely's Red Gum are minorities. Most of the understorey of this EEC within the

study area is cleared and heavily grazed by cattle and sheep with mostly spinescent or unpalatable species remaining such as the Black Thorn *Bursaria spinosa* and Native Olive *Notelaea macrocarpa* var. *macrocarpa*. Feral animal pest species have also had considerable impacts on the condition of this EEC within the study area where feral pigs, goats, deer and rabbits were commonly observed.

In some remnants present, there is limited access by cattle and sheep and in those areas a considerable understorey persists with a dominance of native shrubs, monocotyledons, ground covers and grasses that are characteristic species associated with the EEC. These remnants, although directly impacted by the proposed powerline, do have the most conservation values and are more likely to be habitat of threatened species of fauna associated with the EEC such as the Diamond Firetail, Hooded Robin and Varied Sittella etc.

Section 2 contains the largest and most ecologically undisturbed remnant within the study area. The proposed powerline would largely bisect this representation of the White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community and the proposal would have the greatest impact on this community.

### **Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion**

*Endangered ecological community-Threatened Species Conservation Act, 1995.*

This EEC was found to be present although largely restricted to the far upper slope of Section 6 and Section 7 within the study area namely in the far eastern extremity of the study area. This EEC occurs at higher elevation 700 metres to 1,500 metres above sea level (ASL) consisting of open forest 2-30 metres high with a sparse understorey of shrubs, grasses and herbs and mostly confined to high undulating basalt plateaus with deep chocolate or krasnozem loam soils on the New England Tableland (OEH, 2012).

The species composition of this EEC is generally Ribbon Gum *Eucalyptus viminalis*, Mountain Gum Mountain Gum *Eucalyptus dalrympleana* ssp. *heptantha* and Snow Gum *Eucalyptus pauciflora*. The EEC is frequently associated or found in juxtaposition with White Box Yellow Box Blakely's Red Gum Woodland.

Key threatening processes affecting this EEC include high frequency fire and invasion of exotic perennial grasses. The proposed powerline would not have a significant effect on this EEC as strict environmental controls and best practice management strategies outlined in the mitigation measures proposed including limiting clearing impacts to what is absolutely necessary as well as implementation of suitable erosion and sedimentation control measures would be in place to ensure that any key threatening processes are managed accordingly.

### **Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community**

*Endangered ecological community-Threatened Species Conservation Act, 1995.*

*Endangered ecological community-Environment Protection & Biodiversity Conservation Act 1999.*

The Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC representation within the wider study area is limited to a small area located to the west of Star-point #5 which is now well outside of the study area's area of impact. The Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC is listed under *Part 3 of Schedule 1 of the NSW Threatened Species Conservation Act, 1995* and is also listed under the *Environment Protection & Biodiversity Conservation Act, 1999*.

The Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC occurs in shallow temporary to near permanent wetlands restricted to the higher altitudes that are above 900 metres

ASL associated with the Great Dividing Range of the New England Tableland Bioregion of NSW (OEH, 2012). The Final Determination (OEH, *Op cit*) states that the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC have small local catchments and are found on a range of geological formations most commonly associated with Tertiary basalt flows and that the vegetation generally consists of sedges, rushes and aquatic plants. Approximately 70% of the original extent of Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC has been lost through draining and damming practices.

The potential impacts on this EEC was further considered and that the proposed powerline route has now been diverted away from this EEC which prevent any impacts on the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC in this instance.

## 10.5 LOCALLY & REGIONALLY SIGNIFICANT SPECIES

In addition to the threatened species recorded during the field assessment phase, several species of local and regional significance were also recorded. These species include the Wedge-tailed Eagle, Black Falcon, Brown Falcon, Little Falcon, Black-shouldered Kite, Nankeen Kestrel, Brown Goshawk, Double-barred Finch, White-winged Chough, Crimson Rosella, Musk Lorikeet, Yellow-tailed Black Cockatoo, Stubble Quail, Peaceful Dove, White-throated Treecreeper, Red-necked Wallaby, Echidna, *Hemiegis decresiensis* and the Eastern Sign-bearing Froglet (*Crinia parinsignifera*).

## 10.6 RELEVANT KEY THREATENING PROCESSES

There are several relevant key threatening process applicable to the study area. Impacts on the biodiversity of the study area require management. The following is a list of key threatening processes that are listed for the Northern Tablelands Bioregion by the OEH's Atlas database program, Key threatening processes that are relevant to the proposal or to the study area's biodiversity are highlighted in **bold-type**.

- **Invasion of native plant communities by exotic perennial grasses,**
- Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations,
- **Predation by the European Red Fox *Vulpes Vulpes* (Linnaeus, 1758),**
- Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* (Fr. Smith) into NSW,
- **Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758,**
- Introduction of the Large Earth Bumblebee *Bombus terrestris* (L.),
- Anthropogenic Climate Change,
- **Predation by the Feral Cat *Felis catus* (Linnaeus, 1758),**
- **Clearing of native vegetation,**
- **Removal of dead wood and dead trees,**
- Invasion and establishment of Scotch Broom (*Cytisus scoparius*),
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis,
- **Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands,**
- **High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition,**
- **Invasion and establishment of exotic vines and scramblers,**



- Invasion of native plant communities by *Chrysanthemoides monilifera*,
- Invasion and establishment of the Cane Toad (*Bufo marinus*),
- **Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.),**
- **Bushrock removal,**
- Infection of native plants by *Phytophthora cinnamomi*,
- Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish),
- **Herbivory and environmental degradation caused by feral deer,**
- Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners,
- Loss or degradation (or both) of sites used for hill-topping by butterflies,
- Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*,
- Competition from feral honey bees, *Apis mellifera* L,
- **Loss of Hollow-bearing Trees,**
- **Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa*,**
- Invasion, establishment and spread of Lantana (*Lantana camara*) L. sens. Lat,
- Importation of Red Imported Fire Ants *Solenopsis invicta*,
- Invasion of Native Plant Communities by African Olive *Olea europaea* L. subsp. *cuspidate*.

The proposed works associated with the construction and installation of the proposed powerline would be undertaken in an environmentally sensitive manner and that all environmental controls undertaken would ensure that none of the above-listed key threatening processes are triggered. This would be achieved and incorporated into a Construction Environmental Management Plan (CEMP).

## 10.7 WILDLIFE CORRIDORS & HABITAT FRAGMENTATION

The proposed construction and development of the powerline and associated easement and the substation to be located at the western extremity of the study area would not result in the severing of wildlife corridor units within the study area or affect the movement of wildlife and seed plant propagules or populations within the vicinity. Section 2 contains a substantial occurrence of White Box Yellow Box Blakely's Red Gum vegetation community and that the proposed powerline would bisect this endangered ecological community.

In regards to habitat fragmentation impacts, the majority of the study area is in a highly fragmented state. However, the proposed powerline easement would physically fragment the large remnant present within Section 2 into two sections namely north and south by approximately 50 metres in width. However, this action would not have a significant effect on threatened species, populations and endangered ecological communities in this instance as the overall study area's threatened species and endangered ecological communities would still persist in the locality following establishment of the powerline easement through this section of the study area.

## 11.0 BIODIVERSITY OFFSETS STRATEGY

The Project Application and Environmental Assessment, 2011 included a biodiversity offset proposal to mitigate or compensate for the wind farm project's impacts on fauna and flora.(refer to page 127 of the EA and pages 83-85 of the RPS Ecology Assessment). The determination of the project application in July 2012 provided for Condition C7 of the White Rock Wind Farm Project Approval that requires the proponent to develop a Biodiversity Offset Package (BOP) in consultation with OEH prior to the commencement of construction.

During 2016, White Rock Wind Farm has developed a Biodiversity Offset Package (BOP) for Stage 1 in consultation with OEH. Eco Logical Australia was engaged to undertake the development of the WRWF Biodiversity Offset Package. This has included confirming the process to offset the impacts, the credit requirement arising from the project's impacts, the proposed offset location(s), the credits that can be created at the location(s) to meet the project obligations and a program to implement the offset. The process has reached an advanced stage and enables confidence that the WRWF Stage 1 Offset will be met by the BOP.

Assessment of the offset area has identified excess credits to that required for WRWF Stage 1 and it is expected that offsets to address impacts of both the alternative grid connection and WRWF Stage 2 will be confirmed within the property where the Stage 1 offset proposal is located.

It is proposed that the biodiversity impact of the grid connection would also be included with the impact of the other wind farm infrastructure to develop an expanded Biodiversity Offset Package. The quantum and condition of the vegetation impacted by the alternative powerline has been documented within this Biodiversity Assessment report based on Epuron's previous advice for the MOD 1 application to apply a 15m clearance zone within the 50m easement. Based on the 15m clearance, the impact was assessed as 2.003 Ha of White Box Yellow Box Blakely's Red Gum Woodland-EEC and only 0.127 Ha of Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-EEC.

More recently in 2016, Eco Logical Australia (ELA) has been engaged by White Rock Wind Farm Pty Limited to prepare indicative Major Project Offset Policy calculations for the proposed alternative grid connection. These offset calculations were formulated with the use of Framework for Biodiversity Assessment (FBA) offset credit calculator (ELA, November, 2016). ELA (2016) had assessed the estimated loss of vegetation on a "worse-case scenario" considering a 45m wide clearance zone. The results of Eco Logical's FBA credit calculations are shown in Table 11.1.

It was also assessed that there would be no loss of Derived Native Grasslands (DNG), as the powerpoles would be micro-sited to avoid areas of Derived Native Grasslands and possible DNG. In regards to the loss of any habitat of the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC, the area containing this EEC would now be avoided as the alternative route shown in this assessment has been diverted to avoid impacts on this EEC.

Eco Logical has also identified sufficient credits within potential offset areas to meet the credit requirement for the alternative grid connection.

Subject to the Modification Application being approved, WRWFPL would ensure the implementation of an approved BOP to satisfy the additional offset obligations of the alternative grid connection project.

TABLE 11.1 - Eco Logical FBA impact and credit calculations for loss of tree and mid-story vegetation along the alternate 132kV transmission line route.

Veg Zone	Plant Community Type	PCT / BVT	Ancillary	Current SV	Area (ha)	Future SV	Credits	Credits/ha
1	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar Bioregion	PCT 599 / BVT 271	Woodland	63.93	1.21	22.95	42	34.65
3	Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	PCT 554 / BR330	Woodland	90.62	0.53	27.60	27	50.65
4	White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	PCT 590 / BR391	Woodland	63.93	4.06	22.95	140	34.46
					5.8		209	36.03
<b>Derived Native Grassland Areas – not impacted</b>								
Veg Zone	Plant Community Type	PCT / BVT	Ancillary	Current SV	Area (ha)	Future SV	Credits	Credits/ha
2	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar Bioregion	PCT 599 / BVT 271	DNG***	32.79	3.72	32.79	14	3.76
5	White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	PCT 590 / BR391	DNG***	40.44	7.58	40.44	28	3.69
					11.3		42	3.72

\*\*\*DNG areas will not be impacted as all poles will be positioned to avoid DNG areas.

## 12.0 CONCLUSIONS & RECOMMENDATIONS

Several threatened species were identified as being present within or adjacent the study area during the field assessments. The threatened species are:

- Diamond Firetail (*Schedule 2, Threatened Species Conservation Act, 1995*) was recorded within Section 4 of the study area;
- Little Lorikeet (*Schedule 2, Threatened Species Conservation Act, 1995*) was recorded within Section 3 of the study area;
- Little Eagle (*Schedule 2, Threatened Species Conservation Act, 1995*) was recorded in Section 1 of the study area; and
- Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* (also *Schedule 2, Threatened Species Conservation Act, 1995*) was provisionally recorded in several sections of the study area.

Three endangered ecological communities were recorded within the study area. These endangered ecological communities consist of

- the White Box Yellow Box Blakely's Red Gum-EEC which was found to be present in varying degrees of quality and size classes throughout or located adjacent to the majority of the powerline route
- the Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-EEC was found to be limited to the far upper slope of Section 6 and Section 7 on White Rock Mountain.
- the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC was found to be present within Section 5 of the study area, however this EEC is now avoided as an alternative route of the powerline has been developed avoiding impacts on this EEC.

No endangered populations or critical habitat were found to be relevant within the study area.

White Rock Wind Farm Pty Ltd has planned the alternative grid connection in the most environmentally sensitive manner possible taking into consideration to minimise impacts on the most vegetated areas within the vicinity minimising destruction to vegetation communities and fauna habitat values of the study area. It is concluded that the proposed installation of the 132kV powerline and associated access track to the White Rock Wind Farm would not have a significant effect on threatened species and endangered ecological communities that are listed under the *Threatened Species Conservation Act, 1995* or the Commonwealth's *Environment Protection & Biodiversity Conservation Act, 1999* as all threatened species and ecological communities recorded are expected to continue to occur within the study area following the installation of the powerline.

Despite the above conclusion, there are several mitigation measures that should be implemented to further minimise impacts of the proposal on threatened species (and their habitats) and endangered ecological communities as well as to the minimisation of overall impacts on the environment. These recommendations are as follows:

- That the White Rock Wind Farm Stage 1 Soil and Water Quality Management Plan be extended to address the grid connection facilities. Progressive Erosion and Sedimentation Control Plans be developed for all Sections of the proposed powerline route and for the substation and switchyard,
- Prior to the commencement of clearing works within the powerline easement, an ecologist should be undertake a targeted assessment on the species and fully locate the majority of the Blackbutt Candlebark *Eucalyptus rubida* subsp. *barbigerorum* trees that are likely to be impacted by the

proposal. These trees should then be marked in the field and that a clearing buffer be implemented to ensure these trees are not impacted by the proposal,

- That an ecologist be consulted during the detailed design on the micro-siting of power poles and to be present during tree clearing operations to capture and relocate displaced fauna from any tree hollows,
- Microbat nest boxes are to be provided to replace any loss of tree hollows at a ratio of 2:1,
- That the powerline be diverted from a tree with hollows within the large Rough-barked Apple (*Angophora floribunda*) located in Section 4 (now diverted),
- That no clearing be undertaken on riparian vegetation located along the Swan Brook in Section 6 or within a distance of 50 metres from the eastern or western side of the creek bank as a requirement for safe clearances as per Statement of Commitments.
- That a Feral Animal & Weed Pest Control Management Plan be developed prior to the construction of the powerline easement,
- That all steps be undertaken to eliminate the spread of the Chilean Needle Grass *Nassella neesiana* from Section 5 to other areas within the study area. Refer to the National Best Practice Management Manual (NSW Dept of Primary Industries),
- That the proposed works associated with the construction and installation of the proposed powerline would be undertaken in an environmentally sensitive manner and that all environmental controls undertaken would ensure that no key threatening processes are triggered,
- That the above recommendations also be incorporated into a Construction Environmental Management Plan (CEMP).



## 13.0 REFERENCES

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## 14.0 GLOSSARY OF TERMS

Anthropogenic waste:	Waste materials eg: dumped bricks, tyres, household rubbish, bottles etc
Arboreal:	Pertaining to trees
Arborescent:	Tree-like in form or appearance
Aural:	Listening
Biota:	The flora and fauna of a given region
Bioregional:	A regional perspective of plant and animal assemblages
Critical-weight range fauna:	Medium-size mammals that have been significantly affected by European settlement and associated introduction of carnivorous mammals viz: cat, fox and dog. Many native mammals outside of this ‘critical-weight range’ have not been affected by these introductions
Detritivore:	A feeder of detritus from decaying plants and animals (detritus)
EEC:	Endangered Ecological Community
EPA Act:	<i>Environmental Planning &amp; Assessment Act, 1979</i>
EPBC Act:	<i>Environment Protection &amp; Biodiversity Conservation Act, 1999</i>
Exotic:	An introduced plant or animal not native or indigenous
FM Act:	<i>Fisheries Management Act, 1994</i>
Indigenous:	A native plant or animal to any given area
NES:	National Environmental Significance
OEHL:	Office Environment & Heritage
Ramsar:	The convention of wetlands of international importance. Australia is a signatory to the Ramsar convention
Piscivorous:	Fish-eating
Riffle:	A length of waterway where water of shallow depth flows rapidly over stones or river gravel and may produce a small rapid
Riparian (vegetation):	Vegetation occurring on the banks of a creek, river or stream
ROTAP:	‘Rare Or Threatened Australian Plants’
Seral:	An underdeveloped stage of a plant community or plant succession

Sphere-of-influence:	Environmental or biological factors outside of a given study site that influence the biota within a study site
Stag:	Dead standing tree, frequently containing hollow limbs
Sympatric:	The ability of animals or plants having similar or near parallel ecological requirements cohabiting with another related or similar species within the same habitat
Scientific Committee:	The scientific committee of persons appointed under the NSW <i>Threatened Species Conservation Act, 1995</i>
SEPP:	State Environmental Planning Policy
SEWPaC:	Sustainability, Environment, Water, Population and Communities
TSC Act:	<i>NSW Threatened Species Conservation Act, 1995</i>
WONS	Weed of National Significance

## APPENDIX 1

### STATE ENVIRONMENTAL PLANNING POLICY-44

#### (KOALA HABITAT PROTECTION)

The New South Wales State Environmental Planning Policy (SEPP)-44 (Koala Habitat Protection) was applied to the study area at Swan Vale within the Inverell Local Government Area.

Schedule 1 of the Policy lists Inverell as a local government area obliged to administer this Policy. Schedule 2 of the SEPP-44 Policy lists a range of ten eucalypt tree species as important food plants to Koalas and that Koalas are frequently associated with in the wild. The White Box *Eucalyptus albens* and the Yellow Box *Eucalyptus melliodora* are two of the ten species listed within this Policy. Step 1 of the Policy is to determine if the area is “Potential Koala Habitat”. SEPP-44 states that if the tree species types listed in Schedule 2 constitute at least 15 % of the total number of trees in the upper or lower strata of the tree component then the Policy is triggered rendering the site area as “Potential Koala Habitat”. The degree of representation of both of the above trees species combined on-site constitutes more than 15 % of the total number of trees species present rendering the study area as “Potential Koala Habitat” under the terms of SEPP-44.

Step 2 of the assessment is to determine if the area is “Core Koala Habitat” defined as where a resident population of Koalas are known to occur or that other evidence exists such as breeding females and where recent or historical records of the Koala exists. There are no Koala records occurring within or adjacent to the study area according to the OEH Atlas/ GIS database records.

During the field assessments of the study area, precautionary field searches were undertaken and included a search for absolute identifiable Koala scats and associated Koala positive scratch marks on trees. No Koala scats were observed below potential food trees including White Box or the Yellow Box. No scratch marks were observed on potential food trees and no other biological evidence of Koalas was found including Koala scats.

It is therefore concluded that the study area is not “Core Koala Habitat” and that no further provisions of SEPP-44 should apply to the proposal.



## APPENDIX 2

### ***Environment Protection & Biodiversity Conservation Act, 1999-Matters of National Environmental Significance - Significant impact guidelines 1.1***

#### **(Critically endangered ecological communities)**

#### **White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands Significant impact criteria**

***An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:***

##### ***Reduce the extent of an ecological community,***

**Assessment:** The initial impact on White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation has been assessed and an offset area identified that provides the required offset credits in accordance with expanded Biodiversity Offset Package (BOP). This implementation of the Biodiversity Offset Package would compensate for the initial loss of the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation within the study area therefore there would be no net-loss of White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation community, therefore a reduction of the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation would be negligible in this instance.

##### ***Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines,***

**Assessment:** There would be an initial increase in the fragmentation of the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation within Section 2 of the powerline route as the powerline would extend through this vegetation community in that particular area of the study area. However with the establishment of the offset area and the implementation of the Biodiversity Offset Package, other areas of fragmented representations of this vegetation community would be revegetated within the offset area therefore reducing fragmentation impacts in the locality.

##### ***Adversely affect habitat critical to the survival of an ecological community,***

**Assessment:** No, the proposal would not affect habitat that is critical to the survival of the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands critically endangered ecological community to a higher degree than already exists on-site.

##### ***Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns,***

**Assessment:** No, the proposed installation of the grid connection, substation and switchyard would not modify or destroy abiotic factors that are necessary for the survival of the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation community. There would be no reduction of any groundwater levels, increase nutrients or cause soil to be disturbed outside of the area of proposed works and would not cause substantial alteration of the surface water drainage patterns in the area. Adequate erosion and soil devices would be installed in accordance with the Erosion & Sedimentation

Control Plan as part of the CEMP. All aspects of the entire construction program for the grid connection and associated works would be strictly managed in accordance with the Construction Environmental Management Plan (CEMP) to ensure that all matters affecting the environment are continually managed at all stages and phases of the development.

***Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting,***

**Assessment:** The proposed installation of the grid connection and associated works would not cause a substantial change in the species composition of the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation community. All species present would still occur within the immediate vicinity outside of the area of the proposed works following the completion of the installation of the grid connection, substation and switchyard and associated works.

***Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established, or***

**Assessment:** No, although the proposed installation of the grid connection, substation, switchyard and associated works would initially reduce the ecological community in the area by approximately 2.003 hectares, an area of offset would also be established to compensate for this initial loss of the community and the Biodiversity Offset Package would ensure that the quality and integrity of the community would be maintained. This has been addressed within the Biodiversity Offset Package. During the construction phase, the CEMP would also include a Weed Management Plan that would ensure that environmental and noxious weeds are not exacerbated to a higher degree than already exists within the study area.

***Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or interfere with the recovery of an ecological community.***

**Assessment:** No, the proposal would not include the use of any fertilisers, herbicides or other chemicals to affect the White Box-Yellow Box-Blakely's Red Gum grassy woodlands and derived native grasslands vegetation community.

### ***Environment Protection & Biodiversity Conservation Act, 1999-Matters of National Environmental Significance - Significant impact guidelines 1.1***

**(Vulnerable species)                      Blackbutt Candlebark**

#### **Significant impact criteria**

***An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:***

***Lead to a long-term decrease in the size of an important population of a species,***

**Assessment:** No, the proposed grid connection and associated works would not lead to a long-term decrease in the size of the population of the Blackbutt Candlebark as the species was only provisionally identified within the study area and that the majority of the individuals were observed outside of the powerline easement.

***Reduce the area of occupancy of an important population,***

**Assessment:** No, the majority of the species would be retained and unaffected by the proposal. Therefore the proposal would not result in the reduction of the area of the Blackbutt Candlebark.

***Fragment an existing important population into two or more populations,***

**Assessment:** No, the proposal would not result in fragmentation of any population of the Blackbutt Candlebark.

***Adversely affect habitat critical to the survival of a species,***

**Assessment:** No, as no area within the study area contains critical habitat to the Blackbutt Candlebark. No critical habitat for the species is listed at this stage.

***Disrupt the breeding cycle of an important population,***

**Assessment:** No, the proposed grid connection and associated works would not disrupt the breeding cycle of the Blackbutt Candlebark at any stage of the species life-cycle.

***Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,***

**Assessment:** No, the proposal would not modify, destroy, remove or isolate or decrease the availability or quality of habitat of the Blackbutt Candlebark to the extent that would result in a decline of the species in this instance.

***Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat,***

**Assessment:** No, as a Weed Management Plan will be implemented and incorporated in the CEMP to ensure that invasive plants and animals are controlled and managed to minimise impacts throughout the study area.

***Introduce disease that may cause the species to decline, or***

**Assessment:** The proposed grid connection, substation, switchyard and associated works would not introduce any disease that may cause the Blackbutt Candlebark to decline.

***Interfere substantially with the recovery of the species.***

**Assessment:** No, the proposed works would not interfere with the recovery of the species in this instance. All appropriate environmental controls would be in-place prior to the commencement of the proposed grid connection and associated works through the implementation of the CEMP.

## APPENDIX 3 - SEVEN PART TESTS OF SIGNIFICANCE

### WHITE BOX-YELLOW BOX-BLAKELYS RED GUM WOODLAND-ENDANGERED ECOLOGICAL COMMUNITY

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community is not a species *per se* as this EEC is a community or assemblage of flora and fauna occurring within certain ecological parameters as defined in the White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community Final Determination. This section of the Seven Part Test does not apply to the proposal or to this Significance Assessment process.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no formally declared 'endangered populations' of the White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community within the Inverell LGA under the terms of the *Threatened Species Conservation Act, 1995*. The White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community is a community or assemblage of flora and fauna occurring within certain ecological parameters as defined in the Final Determination of the community. This criteria (b) does not apply to the proposal or to the Significance Assessment process.

***(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, it is unlikely that there would be an adverse effect on the localised occurrence of the White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community that would result in the placement of the community at risk of localised extinction as a result of the action proposed. The proposal would result in the retention of most of the remaining areas of the EEC in the immediate locality. It is also proposed that an offset area representing this EEC be established in a nearby area and would be subjected to management in accordance with the Biodiversity Offset Package.

***(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, there would be no substantial or adverse modification of White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community that would place the local occurrence of the community at risk of extinction as the community is present throughout the general locality and throughout the Inverell LGA at this stage and that the offset area would in effect result in a no nett-loss of the EEC from the locality.

**(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, and*

The study area's representation of the community is that most areas of the community are already in a modified ecological condition as a result of past and current landuse activities in the area and environs.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

Yes, Section 2 of the study area would become fragmented as a result of the installation of the proposed powerline. The remaining areas of the EEC would not become fragmented or isolated from other areas of habitat of the White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community to a significantly higher degree than already exists. Moreover, with the implementation of the Biodiversity Offset Package, other areas of fragmentation representing this EEC would be subjected to revegetation works therefore reducing fragmentation impacts of the EEC in the locality.

*(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 proposal would not result in the removal of a significant area of White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community as this vegetation community would be offset in a nearby area and that no nett-loss of the vegetation community would occur.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No, the action proposed would not have an adverse on critical habitat of the White Box Yellow Box Blakely's Red Gum Woodland-endangered ecological community as no critical habitat has been assigned to the community at this stage.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

There is a National Recovery Plan for the White Box Yellow Box Blakely's Red Gum Woodland and is referred to in the National Recovery Plan as *White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland*, (May, 2011). The National Recovery Plan is also adopted and applicable for the state of NSW. The proposal is consistent with the National Recovery Plan for the community as the proposed offset area *inter alia* would be managed in accordance with the Biodiversity Offset Package meets the objectives of the National Recovery Plan including '*achieving a no nett loss in the extent and condition of the ecological community*'.

**(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.**

No, the proposal would not trigger any key threatening process including 'clearing of native vegetation'. The proposal would not significantly increase the impact of the key threatening process '*clearing of native vegetation*' in this instance. '*Invasion of native plant communities by exotic perennial grasses*' may also be a relevant key threatening process under the terms of the NSW *Threatened Species Conservation Act, 1995*. However, '*Invasion of native plant communities by exotic perennial grasses*' would not triggered in this instance as precautions would be implemented to ensure that triggering of key threatening processes are avoided or minimised in accordance with the CEMP.



## SEVEN PART TEST OF SIGNIFICANCE

### **RIBBON GUM-MOUNTAIN GUM-SNOW GUM FOREST/WOODLAND OF THE NEW ENGLAND TABLELAND BIOREGION-ENDANGERED ECOLOGICAL COMMUNITY**

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community is not a species *per se* as it is a vegetation community or assemblage of flora and fauna occurring within certain ecological parameters as defined in the 'Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community' Final Determination. This section of the Seven Part Test does not apply to the proposal or to this Significance Assessment process.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no formally declared endangered populations of the Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community within the Inverell LGA under the terms of the *Threatened Species Conservation Act, 1995*. The Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community is a vegetation community or assemblage of flora and fauna species occurring within certain ecological parameters as defined in the Final Determination of the community. This criteria (b) does not apply to the proposal or to the Significance Assessment process.

***(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, there would be no significant or any adverse effect of 'Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community' within or adjacent to the study area that would result in the placement of the community at risk of localised extinction as a result of the action proposed ie: the construction of the powerline easement and associated works. The community is found throughout the locality of the study area and is limited within the study area's far eastern extremity. Efforts would be taken to minimised clearing impacts on this EEC in this area and that stringent

environmental controls would be in-place at all times and stages of the proposed construction of the grid connection in accordance with the CEMP.

*(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, there would be no substantial or adverse modification of Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community that would place the local occurrence of the community at risk of extinction. The majority of the community present lies within adjacent areas to the study area would be retained and unaffected by the proposal.

***(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, and*

Much of the environs of the study area has already been modified to a considerable degree from past land use practices including land clearing and heavy grazing impacts by cattle, sheep, feral pigs and deer. There would be no significant area of the community removed or modified as a result of the proposal and that the more 'pristine' areas of the community would be retained and unaffected by the proposed powerline easement.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already fragmented and isolated from other areas of habitat that once formed part of the larger Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community in the local area. The proposal would not further physically isolate or fragment the study area from other areas of suitable habitat in the area to a significant degree than already exists.

*(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,*

There would be no significant area of habitat removed, modified, fragmented or isolated, as the broader study area's more pristine Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community areas are located outside of the impact area and would be retained and unaffected by the proposal.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, the action proposed would not have an adverse on critical habitat of the 'Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community'. There is no listing of 'critical habitat' for the community at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

The proposal would be consistent with the objectives of any relevant recovery plan and any threat abatement plans. However, the recovery plan for 'Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-endangered ecological community' has not at this stage been prepared.

***(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.***

No, the proposal would not constitute a key threatening process (including clearing of native vegetation) that would impact on the endangered ecological community in this instance.

## SEVEN PART TEST OF SIGNIFICANCE

### UPLAND WETLANDS OF THE DRAINAGE DIVIDE OF THE NEW ENGLAND TABLELANDS BIOREGION-ENDANGERED ECOLOGICAL COMMUNITY

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

*(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

No, the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community is not a species *per se* as it is a vegetation community or assemblage of flora and fauna occurring within certain ecological parameters as defined in the 'Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community' Final Determination. This section of the Seven Part Test does not apply to the proposal or to this Significance Assessment process.

*(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,*

No, there are no formally declared endangered populations of the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community within the Inverell LGA under the terms of the *Threatened Species Conservation Act, 1995*. The Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community is a vegetation community or assemblage of flora and fauna species occurring within certain ecological parameters as defined in the Final Determination of the community. This criteria (b) does not apply to the proposal or to the Significance Assessment process.

*(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, there would be no significant or any adverse effect on 'Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community' within or adjacent to the study area that would result in the placement of the community at risk of localised extinction as a result of the action proposed ie: the construction of the powerline easement and associated works. **This EEC is situated in an area located to the north of the proposed powerline easement The proposed powerline has now been diverted a considerable distance away from this EEC as an alternative route has now been established avoiding this EEC.**

*(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, there would be no substantial or adverse modification of Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community that would place the local occurrence of the community at risk of extinction. As the powerline has now been re-routed away from this EEC, there would be no substantial adverse modification of the Upland Wetlands of the Drainage Divide -endangered ecological community from within the study area.

***(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, and*

Previous clearing and grazing impacts by cattle and sheep as well as “pugging soils” as a result of cattle treadage impacts may have previously impacted on this EEC (personal observation). However there would be no area of the EEC to be removed or modified as a result of the proposal and that the community would be retained and unaffected by the proposed powerline easement.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area’s representation of the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community is naturally disjunct from other areas of habitat of the EEC. The proposal would not further physically isolate or fragment the study area from other areas of suitable habitat in the area.

*(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,*

There would be no area of habitat removed, modified, fragmented or isolated as the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community would be retained in its entirety in this instance.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, the action proposed would not have an adverse on critical habitat of the ‘Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community’. There is no listing of ‘critical habitat’ for the Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

The proposal would be consistent with the objectives of any relevant recovery plan and any threat abatement plans. However, the recovery plan for ‘Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-endangered ecological community’ has not at this stage been prepared.

***(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.***

No, the proposal would not constitute a key threatening process (including clearing of native vegetation) or other threats such as damming, draining or alteration of the hydrology of the area that would impact on the endangered ecological community.

## SEVEN PART TEST OF SIGNIFICANCE

### **BLACKBUTT CANDLEBARK (*Eucalyptus rubida* subsp. *barbigerorum*)**

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, *Eucalyptus rubida* subsp. *barbigerorum* was provisionally identified as being present within the study area. However, it was noted that the species was located both within and outside of the proposed powerline easement with more individuals noted to be present outside of the area of impact. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the species to such an extent that a viable local population would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of *Eucalyptus rubida* subsp. *barbigerorum* at this stage.

***(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*

*(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,*

*Eucalyptus rubida* subsp. *barbigerorum* is a subspecies in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

***(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, and*

No significant area habitat for *Eucalyptus rubida* subsp. *barbigerorum* would be removed or modified as a result of the proposal as there is suitable habitat present in adjacent areas to the impact zone.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for *Eucalyptus rubida* subsp. *barbigerorum* as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state.

*(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of *Eucalyptus rubida* subsp. *barbigerorum* to a significant degree than already exists.

*(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, no critical habitat for *Eucalyptus rubida* subsp. *barbigerorum* has at this stage been designated to the species.

*(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

No, there are no recovery plans or threat abatement plans pertaining to *Eucalyptus rubida* subsp. *barbigerorum* at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

*(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.*

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of, a key threatening process. *Clearing of native vegetation* and *high frequency fires* are two relevant key threatening processes that may have an impact on the species as well as timber collection, destruction and disturbance of habitat due to road-works etc, however the proposal would not trigger the ‘*clearing of native vegetation*’ key threatening process and there would be no increase in the *frequency of fires* etc as a result of the proposal.

## SEVEN PART TEST OF SIGNIFICANCE

### AUSTRAL TOADFLAX *Thesium australe*

*Section 5A of the Environmental Planning & Assessment Act, 1979 ‘Significant effect on threatened species, populations and endangered ecological communities, or their habitats’.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

*(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*



No, *Thesium australe* was not recorded within the study area. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the species to such an extent that a viable local population would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of *Thesium australe* at this stage.

***(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*

*(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,*

*Thesium australe* is a species in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

***(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, and*

No significant area habitat for *Thesium australe* would be removed or modified as a result of the proposal as the species was not recorded during the field assessment phase. Moreover, there is suitable habitat present in the locality of the study area where the species is known to occur. These areas would not be impacted as a result of the proposal.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for *Thesium australe* as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state. Moreover, the powerline would be erected over any areas of Derived Native Grassland and any “potential” habitat would be largely retained.

*(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of *Thesium australe* to a significant degree than already exists.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, no critical habitat for *Thesium australe* has at this stage been designated to the species.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, the proposed action would not contravene any recovery or threat abatement plans.

***(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.***

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of, a key threatening process. *Clearing of native vegetation* and *high frequency fires* are two possible relevant key threatening processes that may have an impact on the species as well threats such as intensification of grazing pressures, agricultural developments and weed invasion. The proposal would not exacerbate these threats to a significant degree than already exists.

## SEVEN PART TEST OF SIGNIFICANCE

### **BLUEGRASS - *Dichanthium setosum***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, *Dichanthium setosum* was not recorded within the study area. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the species to such an extent that a viable local population would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of *Dichanthium setosum* at this stage.

***(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*

*(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,*

*Dichanthium setosum* is a species in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

***(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, and*

No significant area habitat for *Dichanthium setosum* would be removed or modified as a result of the proposal. In addition, areas of Derived Native Grasslands would be retained in this instance.

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for *Dichanthium setosum* as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state.

(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of *Dichanthium setosum* to a significant degree than already exists.

(e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, no critical habitat for *Dichanthium setosum* has at this stage been designated to the species.

(f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

No, there are no recovery plans or threat abatement plans pertaining to *Dichanthium setosum* at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

(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.*

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of, a key threatening process. *Clearing of native vegetation* and *high frequency fires* are two relevant key threatening processes that may have an impact on the species however the proposal would not trigger the '*clearing of native vegetation*' key threatening process and there would be no increase in the *frequency of fires* etc as a result of the proposal. Threats to the species include heavy grazing by domestic stock and clearing of habitat for pasture improvement and cropping (OEH, *Op cit*) however the proposal would not exacerbate these threats to a higher degree than already exists.

## SEVEN PART TEST OF SIGNIFICANCE

### DIAMOND FIRETAIL - *Stagonopleura guttata*

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under

this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Diamond Firetail was recorded with an area of high quality of remnant vegetation within Section 4 of the study area. This area of high quality vegetation lies just outside of the area of impact by the proposed powerline easement and would be unaffected by the proposal. It is also expected that the Diamond Firetail would forage and possibly breed within the vegetation present within Section 2 being the largest higher quality area of vegetation within the ecological 'sphere of influence' of the study area, however it is expected that the species would still persist within the broader study area should the powerline proposal proceed. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the species to such an extent that a viable local population would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Diamond Firetail at this stage.

***(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*

*(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,*

The Diamond Firetail is a species in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

***(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, and*

No significant area habitat for the Diamond Firetail would be removed or modified as a result of the proposal as there is suitable habitat present in adjacent areas to the impact zone.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for the Diamond Firetail as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state being situated in primarily intensive farming land.

*(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of the Diamond Firetail to a significant degree than already exists.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No, no critical habitat for the Diamond Firetail has at this stage been designated to the species.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

No, there are no recovery plans or threat abatement plans pertaining to Diamond Firetail this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

**(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.**

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of, a key threatening process. *Clearing of native vegetation* and *high frequency fires* are two relevant key threatening processes that may have an impact on the Diamond Firetail as well as habitat degradation, overgrazing of the understorey and nest predation in remnant vegetation unit.

## SEVEN PART TEST OF SIGNIFICANCE

### LITTLE EAGLE *Hieraaetus morphnoides*

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

**(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the proposal would not have an adverse effect on the life cycle of the Little Eagle to the extent that would place the species at risk of localised extinction although the Little Eagle was recorded within Section 1 of the study area. There would be no significant removal of any significant amount of habitat, no removal of nesting or roosting sites and no removal of prey-food items or their habitat that the species may depend upon. The limited amount of vegetation to be removed as a result of the proposal in comparison to the amount of foraging habitat required by the species, would be inconsequential to the Little Eagle and that the species would continue to persist in the area following the completion of the installation of the powerline easement and associated works and that the local viable population of the species is unlikely to be placed at risk of extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Little Eagle listed at this stage.

***(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*

*(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,*

***(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, and*

No significant area of Little Eagle foraging habitat would be removed and that there are no nesting sites present within the proposed powerline easement.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already fragmented and isolated from other bulk forests in the locality. The removal of vegetation within the study area to accommodate the proposal is relatively minor and would not cause significant habitat fragmentation or isolation to a significantly higher degree than already exists. The Little Eagle is also highly capable to forage from within one parcel of remnant vegetation to another with ease.

*(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,*

There are no significantly important habitat characteristics present within the study area for the Little Eagle that would be removed. The species is more likely to obtain its prey-food from the margins of the remnant and in open area namely European Rabbits. However, it is expected that the broader locality would be of importance to the species as the Little Eagle requires large tracts of bulk woodland and open areas for survival.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, there is no designated critical habitat for the Little Eagle at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, there are no recovery or threat abatement plans currently adopted for the Little Eagle at this stage.

***(g) whether the action proposed constitutes or is part of a key threatening processor is likely to result in the operation of, or increase the impact of, a key threatening process.***

No, as the proposal would not constitute 'clearing of native vegetation' KTP in this instance. Moreover, the proposal would not trigger or exacerbate any other relevant key threatening processes. The main threats to the Little Eagle are clearing and degradation of its breeding and foraging habitat as well as possibly secondary poisoning from the rabbit poison *pindone*.



## SEVEN PART TEST OF SIGNIFICANCE

### **SQUARE-TAILED KITE - *Lophoictinia isura***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
  - (a) each of the factors listed in subsection (2)
  - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the proposal would not have an adverse effect on the life cycle of the Square-tailed Kite to the extent that would place the species at risk of localised extinction. There would be no significant removal of any significant amount of habitat, no removal of nesting or roosting sites and no substantial removal of prey-food items or their habitat that the species may depend upon. The Square-tailed Kite has a very large home-range and forages widely over large tracts of open forests and woodlands (pers obs). The Square-tailed Kite is regularly observed within the Mardi-Tuggerah vicinity by local The limited amount of vegetation to be removed as a result of the proposal would be inconsequential to the Square-tailed Kite and that the species would continue to persist in the area following the completion of the installation of the powerline and that the local viable population of the species (if occurring) is unlikely to be placed at risk of extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Square-tailed Kite listed at this stage.

***(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*
- (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,*

***(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, and*

No significant area of Square-tailed Kite foraging habitat would be removed and that there are no nesting sites present within the study area's proposed powerline easement (pers obs).

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already fragmented and isolated from other bulk forests in the locality. The removal of vegetation within the study area to accommodate the proposal is relatively minor and would not cause significant habitat fragmentation or isolation to a significantly higher degree than already exists. The Square-tailed Kite is also highly capable to forage from within one parcel of remnant vegetation to another with ease.

(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,*

There are no significantly important habitat characteristics present within the study area for the Square-tailed Kite. However, it is expected that the broader locality would be of importance to the species as the Square-tailed Kite requires large tracts of bulk open forests and woodland for survival.

(e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, there is no designated critical habitat for the Square-tailed Kite at this stage.

(f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

No, there are no recovery or threat abatement plans currently adopted for the Square-tailed Kite at this stage.

(g) *whether the action proposed constitutes or is part of a key threatening processor is likely to result in the operation of, or increase the impact of, a key threatening process.*

No, as the proposal would not constitute 'clearing of native vegetation' KTP in this instance. Moreover, the proposal would not trigger or exacerbate any other relevant key threatening processes.

## SEVEN PART TEST OF SIGNIFICANCE

### **LITTLE LORIKEET - *Glossopsitta pusilla***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

(a) *in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

No, the Little Lorikeet would not be affected by a hypothetical action within the study area to the extent that would otherwise place the species at risk of localised extinction. The Little Lorikeet was recorded within Section 3 of the study area during the field assessment phase. However the Little Lorikeet's food plants are widespread throughout the locality and the bioregion overall and that both its food plants and potential nesting hollows are widespread within the locality of the study area and beyond. Therefore, the proposal is unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction in this instance.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Little Lorikeet present within the Inverell LGA or elsewhere at this stage.

***(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*

Not applicable.

*(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,*

Not applicable.

***(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, and*

No significant area of habitat of the Little Lorikeet would be removed or modified. The species habitat is widespread throughout the bioregion and the locality. There would be minor loss of the species food plants within the study area (ie: some flowering eucalypts etc), however these food plants are highly replicated throughout the region and that the loss of some of these food plants within the study area would be relatively inconsequential to the species.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already in a fragmented and isolated state. The proposal would not further significantly fragment or isolate the study area from other bulk forests than already currently exists.

*(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,*

There is considerable important habitat to the Little Lorikeet present within the study area, however the majority of the environs of the study area's habitat would be retained and unaffected by the proposal.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, as no area of habitat of the Little Lorikeet has been identified as critical habitat at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, there are no recovery plans or threat abatement plans pertaining to the Little Lorikeet at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

***(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.***

No, land clearing or removal of native vegetation may in some circumstances trigger a key threatening process, however, the proposal does not include *clearing of native vegetation* KTP. There would be no triggering of any key threatening processes in this instance that would have an impact on the Little Lorikeet.

## SEVEN PART TEST OF SIGNIFICANCE

### **SWIFT PARROT - *Lathamus discolor***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, no significant area of habitat pertaining to the Swift Parrot that would be impacted as a result of the proposed construction of the powerline easement and associated works as most of the species food trees e.g. winter flowering eucalypts etc would be retained and unaffected by the proposal. Therefore, the proposal would not place the species at risk of a localised extinction. The Swift Parrot does not breed on mainland Australia; however, the species is likely to forage within the locality.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Swift Parrot in NSW as the species is itself endangered.

***(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 Swift Parrot does not constitute an ecological community.

***(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,***

Not applicable.

**(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, and*

No, there would be a limited area of habitat removed or modified as a result of the proposal. The vast majority of habitat of the species would be retained and unaffected by the proposal.

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already in a highly fragmented and isolated state from other bulk woodland areas in the locality. Any development of the subject site would not result in any significant further fragmentation or isolation of habitat than already exists, moreover the species is highly capable of flying from one remnant area to another.

(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,*

There is no significant area of important Swift Parrot habitat to be removed, modified, fragmented or isolated. Most of the study area's potential food trees would be retained and unaffected by the proposal. Moreover, the vegetation within the locality is well replicated within the locality at this stage.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No, the action proposed would not have an adverse on any Swift Parrot critical habitat either directly or indirectly.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

The proposal would be consistent with the objectives of a recovery plan and any threat abatement plans that may be finalised on either the state or federal level.

**(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.**

No, the relevant key threatening processes to the Swift Parrot are *clearing of native vegetation* and *predation by the feral cat*. However the proposal would not constitute significant clearing of native vegetation and would not result in the increase of a feral cat problem in the locality.

## SEVEN PART TEST OF SIGNIFICANCE

### **GLOSSY BLACK COCKATOO - *Calyptorhynchus lathami***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the study area does not support viable habitat of the Glossy Black Cockatoo. The Glossy Black Cockatoo forages in a variety of open forest and woodland habitats. However, the Glossy Black Cockatoo is a specialist feeder preferring to forage on the fruiting cones of the Forest Oak *Allocasuarina torulosa* (*personal observation*). There are no Forest Oak trees present or other suitable food trees within the study area even though the allied tree species the River Oak *Casuarina cunninghamiana* is present along the Swan Brook in which the Glossy Black Cockatoo does not feed on. Moreover, there are no suitable tree hollows for the species present within the powerline route *per se*. Therefore, the proposal would not have an adverse effect on the Glossy Black Cockatoo or its localised population.

***b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Glossy Black Cockatoo present within the Northern Tablelands Bioregion at this stage.

***(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*

Not applicable.

*(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,*

Not applicable.

***(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, and*

There is no significant area of habitat of the Glossy Black Cockatoo present within the study area. There are no food trees and that nest sites (suitable large tree hollows) are too infrequent within the study area. However, all trees with large hollows outside of the impact area would be retained.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already isolated and fragmented from other areas of suitable habitat. Any future development impacts of the study area would not further fragment or isolate habitat of the species. The species is also capable of flying from one remnant area of habitat to another in any given locality.

*(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,*



There is no important habitat to the Glossy Black Cockatoo present within the study area so as to cause removal, modification, fragmentation or isolation of habitat of the species.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, as no critical habitat of the Glossy Black Cockatoo has been declared under state or federal legislation at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No recovery plans or threat abatement plans pertaining to the Glossy Black Cockatoo has been declared under state or federal legislation at this stage.

***(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.***

No, *clearing of native vegetation* and *high frequency fires* are key threatening processes that affect the habitat of the Glossy Black Cockatoo, however there is no significant habitat of the Glossy Black Cockatoo present within the study area due to the lack of suitable food trees and limited potential nesting sites (large tree hollows).

## SEVEN PART TEST OF SIGNIFICANCE

### **BLACK BITTERN - *Ixobrychus flavicollis***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Black Bittern would not be affected by the proposal or associated actions within the study area to the extent that would otherwise place the Black Bittern at risk of localised extinction. The Black Bittern was not recorded within the subject site however the species may utilise the study area's Swan Brook riparian area located in Section 6 of the study area.

The proposed powerline easement would extend over this creek and avoid impact on the riparian vegetation present and therefore minimise impacts on the foraging and potentially breeding habitat of the species. Therefore, the proposal (the action proposed) is unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no listed endangered populations of the Black Bittern at this stage.

***(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***

Not applicable.

***(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,***

Not applicable.

***(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, and***

No significant area of habitat of the Black Bittern would be removed or modified as a result of the proposal. The habitat of the Black Bittern would be retained and unaffected by the proposal.

***(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and***

No, the proposal would not fragment or isolate habitat for the species to a higher degree than already exists, moreover the habitat of the species is already largely fragmented and isolated.

***(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,***

No area of Black Bittern habitat would be removed, modified or isolated in this instance.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, as no area of habitat of the Black Bittern has been identified as critical habitat at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, there are no recovery plans or threat abatement plans pertaining to the Black Bittern at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

***(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.***

No, there will be no triggering of any key threatening processes in this instance.

## SEVEN PART TEST OF SIGNIFICANCE

### **REGENT HONEYEATER - *Anthochaera phrygia***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the proposed construction of the proposed powerline easement and associated facilities is unlikely to have a significant effect on a local viable population of the Regent Honeyeater. Although the species has been recorded for the locality of the study area, the proposal would not have an adverse effect on the life cycle of the Regent Honeyeater such that a viable local population of the species is likely to be placed at risk of extinction. The majority of the species habitat and its food plants would be retained and unaffected by the proposal.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Regent Honeyeater as the species is itself endangered.

***(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*

*(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,*

Not applicable.

***(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, and*

There is no significant extent or area of Regent Honeyeater habitat to be removed or modified as a result of the proposal within the study area.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already fragmented and isolated from other areas of habitat and that the proposal could proceed without further significant fragmentation or isolation of habitat of the species.

*(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,*

There is no significant area of habitat of the Regent Honeyeater present within the proposed powerline easement that would affect the long-term survival of the Regent Honeyeater in the locality. The remaining areas outside of the development and impact area would be retained and unaffected by the proposal; these areas would not be removed, modified, fragmented or isolated to an extent greater than currently exists.

*(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, there is no designated critical habitat declared for the Regent Honeyeater at this stage.

*(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

The proposal would be consistent with the objectives of the Regent Honeyeater Recovery Plan. There are no listed relevant threat abatement plans for the species.

*(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.*

No, the most relevant key threatening processes to the Regent Honeyeater are *clearing of native vegetation* and *predation by the feral cat*. The proposal would not constitute clearing of native vegetation under the Act and would not result in an increase in feral cats.

## SEVEN PART TEST OF SIGNIFICANCE

### POWERFUL OWL - *Ninox strenua*

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

*(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

No, the proposed installation of the powerline easement and associated facilities would not have an adverse effect on the life cycle of the Powerful Owl to the extent that would place the species at risk of localised extinction. There would be no significant removal of habitat, no removal of nesting or roosting sites and no significant removal of prey-food items or their habitat. If the Powerful Owl does actually forage within the

study area, then it is likely to forage within the canopy trees in Section 6 and Section 7 on an ad hoc basis only.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Powerful Owl listed at this stage.

***(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*

*(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,*

Not applicable.

***(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, and*

No significant area of Powerful Owl habitat would be removed. There are no roosting sites present within the study area with the possible exception of the riparian area located in Section 6. This area's vegetation would be retained and unaffected by the proposal.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already fragmented and isolated from other bulk forests and woodlands in the locality. Any future development of the study area would not cause significant habitat fragmentation or isolation. The Powerful Owl is also capable to forage from within one parcel of remnant vegetation to another with ease.

*(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,*

There are no significantly important habitat characteristics present within the study area for the Powerful Owl. However, it is expected that the broader study area may have importance to the species as the Powerful Owl requires large bulk open forests for survival namely the far upper slope of Section 6 and the vicinity of White Rock Mountain in Section 7.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, there is no designated critical habitat for the Powerful Owl at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, the proposal would not be inconsistent with the recovery plan for large forest owls, there are no threat abatement plans currently adopted for any threatening processes for the Powerful Owl at this stage.

***(g) whether the action proposed constitutes or is part of a key threatening processor is likely to result in the operation of, or increase the impact of, a key threatening process.***

No, as the proposal would not constitute 'clearing of native vegetation' KTP in this instance. Other key threatening processes include continued loss of native hollow bearing trees and removal of coarse woody debris due to fire wood harvesting practices and *competition from feral honeybees*. However, the proposal would not trigger or exacerbate any of the above key threatening processes.

## SEVEN PART TEST OF SIGNIFICANCE

### **BARKING OWL - *Ninox connivens***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

- (a) each of the factors listed in subsection (2)
- (b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the proposal would not have an adverse effect on the life cycle of the Barking Owl to the extent that would place the species at risk of localised extinction. There would be no significant removal of habitat, no removal of nesting or roosting sites and no significant removal of prey-food items or their habitat. If the Barking Owl does actually forage within the study area, then it is likely to forage within the canopy trees on an ad hoc basis. However, the species would still forage within the locality of the site following the completion of the establishment of the powerline easement.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Barking Owl present within the Inverell Local Government Area.

***(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***

Not applicable as the Barking Owl is a species in its own right and does not constitute an ecological community *per se*.

***(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,***

Not applicable as above.

***(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, and*

No significant area of Barking Owl habitat would be removed and there are no roosting sites present within the study area's powerline easement with the exception of the riparian area within Section 6. This area of riparian vegetation would be retained and unaffected by the proposal.

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already fragmented and isolated from other bulk woodlands and forests in the locality. Any future development of the study area would not cause significant habitat fragmentation or isolation to a significantly greater state than already exists. The Barking Owl is also capable to forage from within one parcel of remnant vegetation to another with ease.

(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,*

There are no significant important habitat characteristics present within the study area for the Barking Owl. However, it is expected that the broader study area may have importance to the species as the Barking Owl requires large bulk open forests for survival. The species is also expected to forage along the Swan Brook and environs.

(e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, no area of habitat of the Barking Owl has been identified as critical habitat under the terms of the *Threatened Species Conservation Act, 1995* or the Commonwealth's *Environment Protection & Biodiversity Conservation Act, 1999* at this stage as the species is not eligible for listing for critical habitat status as the species is not listed as an endangered species.

(f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

A Recovery Plan for the Barking Owl (large forest owls) has been prepared. The proposal would not be inconsistent with the Recovery Plan for the species and large forest owls generally.

(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.*

No, as the proposal would not constitute 'clearing of native vegetation' KTP in this instance. Other key threatening processes include continued loss of native hollow bearing trees and removal of coarse woody debris due to fire wood harvesting practices and *competition from feral honeybees*. However, the proposal would not trigger or exacerbate any of the above key threatening processes to affect the Barking Owl.

## SEVEN PART TEST OF SIGNIFICANCE

### **MASKED OWL *Tyto novaehollandiae***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species,

populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the proposal would not have an adverse effect on the life cycle of the Masked Owl to the extent that would place the species at risk of localised extinction. There would be no significant removal of habitat, no removal of nesting or roosting sites and no significant removal of prey-food items or their habitat.

If the Masked Owl does actually forage within the study area, then it is likely to forage within the canopy trees on an *ad hoc* basis. However, the species would still forage within the locality of the site following the completion of the establishment of the powerline easement.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Masked Owl present within the Inverell Local Government Area.

***(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*

Not applicable as the Masked Owl is a species in its own right and does not constitute an ecological community *per se*.

*(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,*

Not applicable as above.

***(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, and*

No significant area of Masked Owl habitat would be removed and there are no roosting sites present within the study area's powerline easement with the exception of the riparian area within Section 6 and possible the far upper slope and escarpment of Section 6 and Section 7. This area of riparian vegetation would be retained and unaffected by the proposal and that minimal clearing would be undertaken in the remaining areas of Section 6 and 7.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already fragmented and isolated from other bulk woodlands and forests in the locality. The proposed powerline easement would not cause significant habitat fragmentation or isolation to a

significantly greater state than already exists. The Masked Owl is also capable to forage from within one parcel of remnant vegetation to another.

*(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,*

There are no significant important habitat characteristics present within the study area for the Masked Owl. However, it is expected that the broader study area may have importance to the species as the Masked Owl requires large bulk open forests for survival. The species is also expected to forage along the Swan Brook and environs.

*(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, no area of habitat of the Masked Owl has been identified as critical habitat under the terms of the *Threatened Species Conservation Act, 1995* or the Commonwealth's *Environment Protection & Biodiversity Conservation Act, 1999* at this stage as the species is not eligible for listing for critical habitat status as the species is not listed as an endangered species.

*(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

A Recovery Plan for the Masked Owl (large forest owls) has been prepared. The proposal would not be inconsistent with the Recovery Plan for the species and large forest owls generally.

*(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.*

No, as the proposal would not constitute 'clearing of native vegetation' KTP in this instance. Other key threatening processes include continued loss of native hollow bearing trees and removal of coarse woody debris due to fire wood harvesting practices and *competition from feral honeybees*. However, the proposal would not trigger or exacerbate any of the above key threatening processes to affect the Masked Owl.

## SEVEN PART TEST OF SIGNIFICANCE

### **VARIED SITTELLA - *Daphoenositta chrysoptera***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

*(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

No, the Varied Sittella was not recorded during the field assessment phase. However, it is expected that the species would forage and possibly breed within the study area generally. It is also expected that the Varied Sittella would forage and possibly breed within the vegetation present within Section 2 being the largest higher quality area of vegetation within the ecological 'sphere of influence' of the study area, however it is expected that the species would still persist within the broader study area should the powerline proposal proceed. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the species to such an extent that a viable local population would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Varied Sittella at this stage.

***(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*

*(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,*

The Varied Sittella is a species in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

***(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, and*

No significant area habitat for the Varied Sittella would be removed or modified as a result of the proposal as there is suitable habitat present in adjacent areas to the impact zone.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for the Varied Sittella as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state being situated in primarily intensive farming land.

*(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of the Varied Sittella to a significant degree than already exists.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, no critical habitat for the Varied Sittella has at this stage been designated to the species.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, there are no recovery plans or threat abatement plans pertaining to Varied Sittella at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

***(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.***

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of, a key threatening process.

*Clearing of native vegetation, Loss of hollow-bearing trees and Removal of dead wood and dead trees* are relevant key threatening processes that may have an impact on the Varied Sittella.

## SEVEN PART TEST OF SIGNIFICANCE

### **BROWN TREECREEPER - *Climacteris picumnus ssp. victoriae***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Brown Treecreeper was not recorded within the study area. Potential habitat of the Brown Treecreeper is present along the riparian community habitat area located in Section 6, however the species was not recorded. Nonetheless, the riparian habitat would be retained and unaffected by the proposal. Therefore, the life-cycle of the species would not be affected and that any local viable population of the species would not be placed at risk of extinction as a result of the proposal.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Brown Treecreeper in NSW.

***(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 Brown Treecreeper does not constitute an ecological community.

***(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,***

Not applicable.

**(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, and*

No habitat of the Brown Treecreeper would be removed or modified as a result of the proposal.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already in a highly fragmented and isolated state from other bulk suitable habitat areas of the species in the locality. The proposal would not result in the significant further fragmentation or isolation of habitat as the species is highly capable of flying from one remnant area to another and that precautions would be applied to minimise impact on the local population of the species namely through the protection of the riparian habitat area.

*(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,*

There is some possible localised importance of Brown Treecreeper habitat present within the study area namely the Swan Brook precinct and environs. However, this area would be unaffected by the proposal.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, the proposal would not affect critical habitat. No critical habitat has been declared for the Brown Treecreeper at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, the proposal would be consistent with the objectives of a recovery plan and any threat abatement plans that may be finalised on either the state or federal level for the Brown Treecreeper.

***(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.***

No, the relevant key threatening processes to the Brown Treecreeper are *clearing of native vegetation* and *predation by the feral cat*. The proposal would not constitute significant clearing of native vegetation and would not result in an increase in feral cats.

## SEVEN PART TEST OF SIGNIFICANCE

### **HOODED ROBIN - *Melanodryas cucullata***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.



(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Hooded Robin was not recorded during the field assessment phase. However, it is expected that the species would forage and possibly breed within the study area generally. It is also expected that the Hooded Robin would forage and possibly breed within the vegetation present within Section 2 and possibly in the upper slope of Section 6 being the largest higher quality areas within the ecological 'sphere of influence' of the study area. However it is expected that the species would still persist within the broader study area should the powerline proposal proceed. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the Hooded Robin to such an extent that a viable local population would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Hooded Robin at this stage.

***(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*

*(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,*

The Hooded Robin is a species in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

***(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, and*

No significant area habitat for the Hooded Robin would be removed or modified as a result of the proposal as there is suitable habitat present in adjacent areas to the impact zone.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for the Hooded Robin as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state being situated in primarily intensive farming land.

*(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of the Hooded Robin to a significant degree than already exists.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, there is no designated critical habitat for the Hooded Robin has at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No, there are no recovery plans or threat abatement plans pertaining to Hooded Robin at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

***(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.***

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of, a key threatening process. *Clearing of native vegetation, Loss of hollow-bearing trees and Removal of dead wood and dead trees* may be relevant key threatening processes that may have an impact on the Hooded Robin however threats generally consists of removal of dead timber, habitat degradation by stock grazing and weed invasion and habitat fragmentation and predation on nests by Currawongs and Ravens etc.

## SEVEN PART TEST OF SIGNIFICANCE

### **SCARLET ROBIN - *Petroica multicolor***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

- (a) each of the factors listed in subsection (2)
- (b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Scarlet Robin was not recorded during the field assessment phase, however, it is expected that the species would forage and possibly breed within the study area generally. It is also expected that the Scarlet Robin would forage and possibly breed within the vegetation present within the upper slope of Section 6 and Section 7 being more suitable and higher quality areas for the species. However it is expected that the species would still persist within the broader study area should the powerline proposal proceed. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the Scarlet Robin to such an extent that a viable local population would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Scarlet Robin at this stage.

**(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*

*(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,*

The Scarlet Robin is a species in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

**(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, and*

No significant area habitat for the Scarlet Robin would be removed or modified as a result of the proposal as there is suitable habitat present in adjacent areas to the impact zone.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for the Scarlet Robin as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state being situated in primarily intensive farming land.

*(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of the Scarlet Robin to a significant degree than already exists.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No, there is no designated critical habitat for the Scarlet Robin has at this stage.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

No, there are no recovery plans or threat abatement plans pertaining to Scarlet Robin at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

**(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.**

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of a key threatening process. *Clearing of native vegetation and Removal of dead wood and dead trees* are relevant key threatening processes that may have an impact on the Scarlet Robin, however threats generally consists of predation on nests by Currawongs.

## SEVEN PART TEST OF SIGNIFICANCE

### **SPECKLED WARBLER - *Pyrrholaemus saggitatus***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
  - (a) each of the factors listed in subsection (2)
  - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
  - (a) ***in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Speckled Warbler was not recorded during the field assessment phase. However, it is expected that the species would forage and possibly breed within the study area generally. It is also expected that the Speckled Warbler would forage and possibly breed within the vegetation present within Section 2 being the largest higher quality area of vegetation within the ecological 'sphere of influence' of the study area as well as in the upper slopes and ridges and escarpment area of Section 6 and Section 7. It is expected that the species would still persist within the broader study area should the powerline proposal proceed. Therefore, the proposed installation of the powerline route and associated works would not have an adverse effect on the life-cycle of the species to such an extent that a viable local population of the Speckled Warbler would be placed at risk of localised extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Speckled Warbler at this stage.

***(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*
- (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,*

The Speckled Warbler is a species in its own right and does not constitute an endangered ecological community. Therefore this section of the Seven Part Test of Significance is not applicable.

***(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, and*

No significant area habitat for the Speckled Warbler would be removed or modified as a result of the proposal as there is suitable habitat present in adjacent areas to the impact zone.

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No significant area of habitat would be likely to become further fragmented or isolated from other areas of habitat for the Speckled Warbler as a result of the proposed installation of the powerline easement. Much of the study area is already in a fragmented and isolated ecological state being situated in primarily intensive farming land.

(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 proposal would not result in the significant removal, modification, fragmentation or isolation of habitat of the Speckled Warbler to a significant degree than already exists.

(e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, no critical habitat for the Speckled Warbler has at this stage been designated to the species.

(f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

No, there are no recovery plans or threat abatement plans pertaining to Speckled Warbler at this stage. Therefore, the proposed action would not contravene any recovery or threat abatement plans.

(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.*

No, the proposed installation of the powerline easement would not constitute or are part of a key threatening process, or is likely to result in the operation of, or result in the increase of, a key threatening process. *Clearing of native vegetation and Removal of dead wood and dead trees* are likely relevant key threatening processes that may have an impact on the Speckled Warbler and its habitat.

## SEVEN PART TEST OF SIGNIFICANCE

### **GREY-CROWNED BABBLER - *Pomatostomus temporalis* ssp. *temporalis***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

(a) *in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

No, the Grey-crowned Babbler or their large characteristic nests were not recorded within the study area. Although general habitat is present throughout the study area for the species, the proposal would not be placed at risk of localised extinction based on the lack of any evidence the species inhabiting the area.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Grey-crowned Babbler in NSW.

***(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 Grey-crowned Babbler does not constitute an ecological community.

*(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,*

Not applicable.

***(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, and*

No area of significant habitat for the species is present in this instance.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already in a highly fragmented and isolated state from other bulk suitable habitat areas of the species in the locality. Any development of the study area would not result in the significant further fragmentation or isolation of habitat as the species is highly capable of flying from one remnant area to another.

*(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,*

There is potential localised importance of Grey-crowned Babbler habitat present within the study area, however there are no outstanding evidence that the species utilises the study area. The species is also highly conspicuous and if present, would have been easily recorded.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, the proposal would not affect critical habitat. No critical habitat has been declared for the Grey-crowned Babbler at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

Any future development of the study area would be consistent with the objectives of a recovery plan and any threat abatement plans that may be finalised on either the state or federal level.



***(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.***

No, the relevant key threatening processes to the Grey-crowned Babbler are *clearing of native vegetation and predation by the feral cat*. The proposal would not constitute significant clearing of native vegetation and would not result in the increase in feral cats; finally, the remaining areas of habitat located outside of the impact area would be retained.

## SEVEN PART TEST OF SIGNIFICANCE

### **SPOTTED-TAILED (TIGER) QUOLL - *Dasyurus maculatus***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

- (a) each of the factors listed in subsection (2)
- (b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the Spotted-tailed Quoll is unlikely to utilise the habitat areas within the majority of the powerline easement of the study area due to the level of habitat degradation and the prevalence of foxes. Therefore, the proposal would not result in the localised extinction of a viable population of Spotted-tailed Quoll. If the species exists within the study area, then this species would forage within the riparian area or the far upper slope and ridge of Section 6 & 7.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Spotted-tailed Quoll declared at this stage.

***(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 Spotted-tailed Quoll does not constitute an endangered ecological community. This section of the Assessment of Significance Test does not apply.

***(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,***

Not applicable as above.

**(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, and*

No area of significant habitat would be removed or modified as a result of the proposal. The majority of the study area no longer supports significant habitat of the Spotted-tailed Quoll as the study area has been considerably altered by past and persistent landuse activities in the area.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the study area is already isolated and fragmented from other areas of suitable habitat.

*(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 study area does not support significant habitat of the Spotted-tailed Quoll. Therefore, any future development activities of the study area would not remove, modify, fragment or isolate habitat of the species and that there would be no effects on the long-term survival of the Spotted-tailed Quoll.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, there is no formally declared critical habitat that pertains to the Spotted-tailed Quoll.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

There are no recovery plans or threat abatement plans attributed to the Spotted-tailed Quoll at this stage. A relevant Commonwealth approved Threat Abatement Plan is the Predation by the European Fox. The proposal would not result in the increase in the local population of the European Fox.

***(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.***

No, clearing operations is a class of activity that is well recognised as a key threatening process to the habitat of threatened dasyurids (marsupial carnivores) and as such *clearing of native vegetation* is declared as a key threatening process under the terms of the *Threatened Species Conservation Act, 1995* which applies to the Spotted-tailed Quoll. However, the proposal would not result in gross clearing of habitat of the Spotted-tailed Quoll. Moreover, the proposal would not result in the increase in the local population of the European Fox to affect the Spotted-tailed Quoll to a higher degree than already exists.

## SEVEN PART TEST OF SIGNIFICANCE

### **KOALA - *Phascolarctos cinereus***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the proposed establishment of the powerline easement and associated facilities would not likely result in an adverse effect on the life cycle of the Koala to the extent that a local viable population of the Koala would be placed at risk of extinction. The Koala was not recorded within the study area and there are no records of the species within or adjacent to the study area. Although there are two designated Koala food trees present being *Eucalyptus albens* (White Box) and *Eucalyptus melliodora* (Yellow Box), no evidence had been located to indicate that the study area is of any significant importance to the Koala. The general environs surrounding the study area is likely to be too fragmented for the Koala to persist in the area. Therefore, the proposal is unlikely to adversely have an effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no endangered populations of the Koala present within the Inverell Local Government Area.

***(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*

*(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,*

Not applicable.

***(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, and*

No area of Core Koala habitat would be removed or modified as the study area contains potential Koala habitat only. The species is unlikely to be present within the study area or immediate environs of the study area. Moreover, the majority of the species food plants within the vicinity of the study area would be retained and unaffected by the proposal.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, there is no significant area of habitat pertaining to the Koala present within the study area. However, there are several food trees of the Koala present including *Eucalyptus albens* and *E. melliodora*. Much of the study area is already fragmented and isolated from core Koala habitat areas in the region.

*(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 study area does not contain important habitat to the Koala even though 'potential habitat' exists within the study area.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No, there is no critical habitat of the Koala listed for the Inverell Local Government Area at this stage.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

Any future development of the study area would be consistent with any recovery or threat abatement plans for the Koala. It appears that there is no viable Koala habitat present within the study area or environs.

**(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.**

No, the removal native vegetation is a class of action that is a key threatening process to the Koala under the terms of the *Threatened Species Conservation Act, 1995*. However, the proposed establishment of the powerline easement would not result in the triggering of 'clearing of native vegetation' under the *Threatened Species Conservation Act, 1995*.

## SEVEN PART TEST OF SIGNIFICANCE

### **GREY-HEADED FLYING FOX - *Pteropus poliocephalus***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

**(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the life cycle of the Grey-headed Flying Fox is unlikely to be disrupted by the proposal to the extent that it would have an adverse effect on the life cycle of the species such that a viable local population of the species would likely to be placed at risk of extinction. The Grey-headed Flying Fox is highly likely to forage widely within the study area as well as in the locality and the bioregion generally during inflorescence of the various eucalypts during the flowering period of each respective tree species. However, the study area does not contain suitable roosting habitat of the Grey-headed Flying Fox as the site is too exposed and contains no suitable roosting sites for the species even within the Swan Brook locale.

**(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

There is no currently listed “endangered population” of the Grey-headed Flying Fox under the terms of the *Threatened Species Conservation Act, 1995* at this stage.

***(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

The Grey-headed Flying Fox is not an endangered or critically endangered ecological community, therefore this section does not apply to the species.

*(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*

*(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,*

The Grey-headed Flying Fox is not an endangered or critically endangered ecological community, therefore this section does not apply to the species.

***(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, and*

There would be relatively minor removal of Grey-headed Flying Fox foraging habitat as a result of the proposal as it would be necessary to remove some trees to accommodate the powerline easement. However, all of the potential food trees are very common and abundant within the area (*personal observation*). The Grey-headed Flying Fox is likely to forage very widely within the districts open forest and woodlands.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, the Grey-headed Flying Fox is capable of flying from one tree to another, across roads, paddocks, bare open ground or remnant vegetation. The species easily disperses by flight from one area to another.

*(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 study area has no significant importance as a potential roosting site for the Grey-headed Flying Fox. The study area’s potential food plants are locally significant food trees, however, the potential food trees are abundant within the region and that the proposal would not have an effect on the long-term survival of the species in the locality.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No critical habitat has been formally designated to the species at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

The proposed establishment of the powerline easement would be consistent with the objectives of the recovery plan and any threat abatement plans for the Grey-headed Flying Fox.

***(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.***

Clearing of native vegetation and high frequency fires are formally declared as key threatening processes under the terms of the *Threatened Species Conservation Act, 1995* that applies to the Grey-headed Flying Fox. However, the proposal would not trigger or exacerbate any of the above key threatening processes.

## SEVEN PART TEST OF SIGNIFICANCE

### **GREATER BROAD-NOSED BAT - *Scoteanax rueppellii***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the life cycle of the Greater Broad-nosed Bat is not likely to be adversely affected by the proposal as the potential foraging habitat (the Swan Brook) and any potential roosting areas including tree hollows located outside of the impact area would be retained. Therefore, there is no risk of a localised extinction of a viable population of the species as a result of the proposal. The ecological integrity of the riparian zone of Swan Brook would not be compromised in this instance. The powerlines would be strung high over the riparian area (consisting of foraging habitat of the Greater Broad-nosed Bat) avoiding removal of instream vegetation and associated trees located along this watercourse.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no “endangered populations” declared for the Greater Broad-nosed Bat at this stage under the terms of the *Threatened Species Conservation Act, 1995*.

***(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

Not applicable.

***(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***

***(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,***

Not applicable.



**(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, and*

No significant area of habitat of the Greater Broad-nosed Bat would be removed or modified as a result of the proposal. There would be no removal of roosting or significant foraging habitat of the species.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, as no area of habitat would be fragmented or isolated as a result of the proposal.

*(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,*

There is no significant or important area of habitat of the Greater Broad-nosed Bat present throughout most of the study area with the exception of the Swan Brook precinct within Section 6 of the study area.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No, there is no designated critical habitat pertaining to the Greater Broad-nosed Bat at this stage.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

There are no current recovery plans or threat abatement plans for the Greater Broad-nosed Bat on a state or federal context.

**(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.**

No, the *clearing of native vegetation* and *high frequency fires* are expected to be relevant key threatening processes applicable to the Greater Broad-nosed Bat. However, the proposal would not constitute gross clearing of native vegetation and would not result in the increase in the frequency of fires and is unlikely to trigger any other key threatening processes.

## SEVEN PART TEST OF SIGNIFICANCE

### **EASTERN BENT-WING BAT - *Miniopterus schreibersii***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the life cycle of the Eastern Bent-wing Bat is not likely to be adversely affected by the proposed installation of the powerline easement and associated facilities. The majority of the study area is considered to be potential marginal foraging habitat to the species, however in regards to potential roosting habitat, no caves or other similar structures were observed, however ‘caves’ or rock shelters may be present in the far upper slope of Section 6.

Nonetheless, the proposal would not impact on any rocky habitat within the upper slope or escarpment area associated with White Rock Mountain. Therefore, there is no risk of a localised extinction of a viable population of the Eastern Bent-wing Bat arising from the proposal.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no “endangered populations” declared for the Eastern Bent-wing Bat under the terms of the *Threatened Species Conservation Act, 1995* at this stage.

***(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

The Eastern Bent-wing Bat is a species in its own right and does not constitute a community. This section of the Significance Test does not apply to the Eastern Bent-wing Bat.

*(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*

The Eastern Bent-wing Bat is a species in its own right and does not constitute a community. This section of the Significance Test does not apply to the species.

*(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,*

The Eastern Bent-wing Bat is a species in its own right and does not constitute a community. This section of the Significance Test also does not apply to the Eastern Bent-wing Bat.

***(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, and*

No significant area of habitat of the species would be removed or modified should the proposal proceed. No significant area of foraging habitat would be removed and no potential roosting habitat would be affected by the proposal.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, as the species is a flying mammal and can easily disperse throughout the locality. The proposal would not fragment or isolate any areas of habitat pertaining to the species.

*(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,*

There is no significant area or important area habitat of the Eastern Bent-wing Bat present within the study area with the possible exception of potential roosting habitat in the far upper slope and escarpment. These features would be unaffected by the proposal.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No, there is no designated critical habitat pertaining to the Eastern Bent-wing Bat at this stage.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

There are no recovery plans or threat abatement plans for the Eastern Bent-wing Bat at this stage either on a state or federal context.

**(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.**

No, the *clearing of native vegetation* and *high frequency fires* are expected to be relevant key threatening processes applicable to the Eastern Bent-wing Bat. However, the proposal would not constitute significant clearing of native vegetation habitat of the species in this context and would not result in the increase in the frequency of fires.

## SEVEN PART TEST OF SIGNIFICANCE

### **YELLOW-BELLIED SHEATH-TAILED BAT - *Saccolaimus flaventris***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

**(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the study area is potential marginal foraging habitat to the Yellow-bellied Sheath-tailed Bat and potential roosting habitat in the form of tree hollows occur mainly as scattered tree hollows widely outside of the impact area. The proposal would not result in the significant removal of trees with hollows. Therefore, the proposal would not have an adverse effect on the species life cycle of the species such that a viable local population of the species would be placed at risk of extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Yellow-bellied Sheath-tailed Bat under either state or federal legislation.

***(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

Not applicable.

*(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*

Not applicable

*(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,*

Also not applicable as the Yellow-bellied Sheath-tailed Bat is a species in its own right and does not constitute an ecological community *per se*.

***(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, and*

No significant area of habitat would be removed or modified as a result of the proposal. Most of the study area is already modified and considerably 'removed'. The proposal would be established without any significant removal or modification of habitat of the Yellow-bellied Sheath-tailed Bat.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, as the study area is already in a highly modified, fragmented and isolated state. The proposed powerline easement would not fragment or isolate any other areas of habitat remaining of the Yellow-bellied Sheath-tailed Bat to a significantly higher degree than already exists.

*!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,*

There is no significant area of habitat of the Yellow-bellied Sheath-tailed Bat present within the study area. The proposal would have no significant effect on the long-term survival of the Yellow-bellied Sheath-tailed Bat in the locality.

***(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, there is no designated critical habitat declared for the Yellow-bellied Sheath-tailed Bat either in state or federal spheres at this stage.

***(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No recovery or threat abatement plans have been developed for the Yellow-bellied Sheath-tailed Bat.

***(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.***

Clearing operations in areas of native vegetation and high frequency fires are likely to be relevant key threatening processes applicable to the habitat of the Yellow-bellied Sheath-tailed Bat however the proposal would not result in gross clearing of habitat of the species. Finally, the proposal would not result in an increase in the frequency of fires in the locality.

## SEVEN PART TEST OF SIGNIFICANCE

### **EASTERN FALSE PIPISTRELLE - *Falsistrellus tasmaniensis***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*

(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the study area is potential marginal foraging habitat to the Eastern False Pipistrelle and potential roosting habitat in the form of tree hollows occur mainly as scattered tree hollows widely outside of the impact area. The proposal would not result in the significant removal of trees with hollows. Therefore, the proposal would not have an adverse effect on the species life cycle of the species such that a viable local population of the species would be placed at risk of extinction.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no endangered populations of the Eastern False Pipistrelle at this stage under either state or federal legislation.

***(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

Not applicable.

***(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***

Not applicable.

(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,*

Also not applicable as the Eastern False Pipistrelle is a species in its own right and does not constitute an ecological community *per se*.

**(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, and*

No significant area of habitat would be removed or modified as a result of the proposal. Most of the study area is already modified and considerably 'removed'. The proposal would be established without any significant removal or modification of habitat of the Eastern False Pipistrelle.

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, as the study area is already in a highly modified, fragmented and isolated state. The proposed powerline easement would not fragment or isolate any other areas of habitat remaining of the Eastern False Pipistrelle to a significantly higher degree than already exists.

(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,*

There is no significant area of habitat of the Eastern False Pipistrelle present within the study area. The proposal would have no significant effect on the long-term survival of the Eastern False Pipistrelle in the locality.

**(e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),***

No, there is no designated critical habitat declared for the Eastern False Pipistrelle either in state or federal spheres at this stage.

**(f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,***

No recovery or threat abatement plans have been developed for the Eastern False Pipistrelle at this stage.

**(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.***

Clearing operations in areas of native vegetation and high frequency fires are likely to be relevant key threatening processes applicable to the habitat of the Eastern False Pipistrelle however the proposal would not result in gross clearing of habitat of the species. Finally, the proposal would not result in an increase in the frequency of fires in the locality.

## SEVEN PART TEST OF SIGNIFICANCE

### **BRUSH-TAILED ROCK WALLABY - *Petrogale penicillata***

*Section 5A of the Environmental Planning & Assessment Act, 1979 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats'.*



(1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:

(a) each of the factors listed in subsection (2)

(b) any assessment guidelines.

(2) The following factors must be taken into account in making a determination under this section:

***(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

No, the life cycle of the Brush-tailed Rock Wallaby is not likely to be adversely affected by the proposed installation of the powerline easement and associated facilities. The majority of the study area does not contain suitable habitat for the species. However, it is possible that the far upper slope of Section 6 and its associated escarpment area on the interface of Section 7 (below White Rock Mountain) may contain suitable habitat for the Brush-tailed Rock Wallaby. However, this area would be cleared and managed in an environmentally sensitive manner and that no rocky outcrops would be destroyed. The proposal would not impact on any rocky habitat within the upper slope or the escarpment area associated with White Rock Mountain. Therefore, there is no risk of a localised extinction of a viable population of the Brush-tailed Rock Wallaby.

***(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

No, there are no “endangered populations” declared for the Brush-tailed Rock Wallaby under the terms of the *Threatened Species Conservation Act, 1995* as the species is already endangered overall.

***(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

The Brush-tailed Rock Wallaby is a species in its own right and does not constitute a community. This section of the Significance Test does not apply to the Brush-tailed Rock Wallaby.

***(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***

The Brush-tailed Rock Wallaby is a species in its own right and also does not constitute a community. This section of the Significance Test does not apply to the species.

***(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,***

As above.

***(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, and***

No significant area of habitat of the Brush-tailed Rock Wallaby would be removed or modified should the proposal proceed. No significant area of foraging habitat would be removed and no ‘camp sites’ for the Brush-tailed Rock Wallaby would be affected by the proposal.

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

No, as the escarpment and upper slopes would not be significantly impacted by the proposal. Clearing would be undertaken on a few trees only in that area and the remaining habitat areas in that vicinity being the far upper slope and escarpment would be retained and unaffected by the proposal.

*(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,*

There is no significant area or important area habitat of the Brush-tailed Rock Wallaby present throughout the majority of the study area with the possible exception of potential sheltering habitat in the far upper slope and escarpment. These features would be unaffected by the proposal.

*(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No, there is no designated critical habitat pertaining to the Brush-tailed Rock Wallaby at this stage.

*(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

Any recovery plans or threat abatement plans for the Brush-tailed Rock Wallaby would be strictly adhered to during the construction of the powerline facility.

*(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.*

No, there are numerous threat-causing agents to the Brush-tailed Rock Wallaby including competition by feral grazing animals such as goats and possibly deer and predation by foxes etc. However *clearing of native vegetation* and *high frequency fires* are expected to be relevant key threatening processes applicable to the Brush-tailed Rock Wallaby. Nonetheless, the proposal would not constitute significant clearing of native vegetation habitat of the species in this context and would not result in the increase in the frequency of fires.

## **APPENDIX 4**

### **VEGETATION FIELD SURVEY - PLOT DATA SHEETS**

# DECCW VEGETATION FIELD SURVEY FORM

<b>Location</b>			<b>Survey Name</b>	<b>Plot No.</b>	<b>Recorders</b>		
<b>Date</b>		<b>Site No.</b>	WR Section 1	T1	Danny O'Brien		
<b>AMG grid reference</b>	zone 54 55 56	datum: AGD66	Easting:		Northing:		Position in quadrat:
<b>Base Plot size</b>		<b>Orientation of 0.1 or 0.04ha plot</b>		<b>marked</b>	yes no	<b>photo # / orientation</b>	

## Structure & Composition (within 0.04 ha quadrat)

<b>Structural Formation</b>		<b>Ecological Community (TSC Act 1995)</b>	yes / likely / no	
<b>Keith Class</b>				Confidence: high mod low N.A.
<b>Regional Veg Class (BVT)</b>				Confidence: high mod low N.A.
<b>BioMetric Type (or NVCA)</b>				Confidence: high mod low N.A.
<b>Other:</b>				Confidence: high mod low N.A.
			<b>Botanic Subdivision</b>	North Western Slopes

## NVIS Level V (within 0.04 ha quadrat)

Indicate Cover Type (bold): crown cover / projected cover / projected foliage cover

Stratum	Growth form	Species name	Cover	Abund	For The Entire	Field No.
Upper					Upper Stratum Height to crown (m) min mode max	
Upper						
Upper						
Mid					Mid Stratum Height to crown (m) min mode max	
Mid						
Mid						
Ground					Ground Stratum Height to crown (m) min mode max	
Ground						
Ground						

Growth form: T=tree, M=mallee tree, S=shrub, Y=mallee shrub, Z=heath shrub, C=chenopod shrub, G=tussock grass, H=hummock grass, D=sod grass, V=sedge, R=rush, E=fern, P=palm

Cover: <1,1,2,3,4,5, 10,15,20,25,30,35, Abund: 1,2,3,4,5,6,7,8,9,10 20,50,100,500,1000,>1000

Condition (within 0.04 ha)	Upper stratum	Mid stratum	Ground stratum Grasses	Ground stratum Shrubs	Ground stratum Other	Cover %			Condition (within 0.1 or 0.04ha quadrat)	
<b>Native richness</b>						<b>Litter</b>		<b>Rock</b>		<b>No. trees with hollows</b>
<b>Native cover</b>						<b>Bare ground</b>		<b>Fungi</b>		<b>Woody debris</b> lineal metres
<b>Exotic cover</b>						<b>Crypt-ogam</b>		<b>Other</b>		<b>Woody regeneration</b> No. upper stratum

(within 0.1 or 0.04 ha quadrat)

<b>Woody stem-sizes</b> (tally within category)	5- <10	10- <20	20- <30	30 cm DBH measure all	
(or, measure all 5cm DBH)					
<b>Tree health</b>	no evidence	branchlets dead	small branches dead	main branches dead	trees dead

## DECC VEGETATION FIELD SURVEY FORM

<b>Land Use</b> (dominant)	nature conservation	travelling stock route	forestry	grazing	grazing / cropping	cropping	other:
<b>Land Cover</b> (upper stratum)	none	native	environmental planting	native plantation	exotic plantation	exotic other:	
<b>Land Cover</b> (ground stratum)	none	native	environmental planting	native plantation	exotic crop	exotic other:	
<b>Age structure</b>	early regeneration	advanced regeneration	uneven age	mature	senescent		

Site History	Freq. code	Age code	Land Manager Survey: categories, quantities, comments				
Grazing management			not grazed	set stocked	rotational / cell grazing		
Farming			none	direct drill	disc plough	mouldboard rotary hoe	
Erosion control			none	contour cultivation	contour banks	mulching	other
Pasture improvement rates (fertiliser) kg/ha			none	<125	126-250	>250	
Pasture improvement rates (lime/dolomite) t/ha			none	<2	2-4	4-7	>7
Timber extraction (incl. firewood)							
Regrowth management							
Weed control							
Pest animal control							
Burning							
Other							

Frequency: 0=no record, 1=rare (>5yrs), 2=occasional (2-5yrs), 3=frequent (<2yrs).

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood collection			
Grazing			
Fire damage			
Storm damage			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

### Physiography

Morphological Type:	Landform Element:	Landform Pattern:	Microrelief:
Lithology:	Soil Surface Texture:	Soil Colour:	Soil Depth:
Slope:	Aspect:	Elevation:	Site Drainage:
			Distance to nearest water and type:









# VEGETATION FIELD SURVEY FORM

SITE No. WR-Section 1,  
T1

Location			Survey Name	Plot No.	Recorders
Date 10/8/12		Site No.	WR Section 1	T1	Danny O'Brien. Environmental Assessments P/L
AMG grid reference	zone	datum:	Transect Start (0m)		Transect End (50m)
	54 55 56	AGD66	E 347600	E 347700	
			N 6701750	N 6701850	
Transect length	100m	orientation	South-west-north-east	marked	yes no photo # / orientation

Ground Cover	Tally first point of contact (<1m), every 50cm along 50m transect (0.5m to 50m = 100 points)	TOTAL
Litter	<5%	
Bare Ground	<5%	
Cryptogam	0	
Woody debris	<2%	
Rock	0	
Exotic – Annual		
Exotic – Perennial	<i>Senecio sp</i>	
Shrub (crown height <1m)	<i>Notelaea macrocarpa var. macrocarpa</i>	
Grass – Hummock *		
Grass – Other *	<i>Themeda australis, Aristida vagans (exotic), Austrodanthonia tenuir</i>	
Forb *	<i>Cirsium vulgare (exotic), Centaurea solstitialis (exotic), Dichondra repens, Verbena bonariensis (exotic), Conyza bonariensis (exotic), Amyema pendula, Geranium solanderi, Ranunculus inundatus.</i>	
Sedge / Rush *	<i>Juncus usitatus</i>	
Fern *	<i>Cheilanthes sieberi ssp. sieberi</i>	
Other *	Prickly Pear <i>Opuntia stricta (exotic), Eucalyptus albens, E. melliodora, E. blakelyi.</i>	

\* native species

Other	Tally presence within 25cm radius, every 50cm along 50m transect (0.5m to 50m = 100 points)	TOTAL
Dung – stock	Bovine, moderate	
Dung – exotic pests	Feral pigs, minor	
Dung – native	Minor macropods	
Woody seedlings	0	

# DECCW VEGETATION FIELD SURVEY FORM

<b>Location</b>			<b>Survey Name</b>	<b>Plot No.</b>	<b>Recorders</b>
<b>Date</b>	16/7/12	<b>Site No.</b>	WR-Section 4	T3	Danny O'Brien
<b>AMG grid reference</b>	zone 54 55 56	datum: AGD66	Easting:		Northing:
<b>Base Plot size</b>		Orientation of 0.1 or 0.04ha plot	<b>marked</b>	yes no	<b>photo # / orientation</b>

## Structure & Composition (within 0.04 ha quadrat)

<b>Structural Formation</b>		<b>Ecological Community (TSC Act 1995)</b>	yes / likely / no	
<b>Keith Class</b>				Confidence: high mod low N.A.
<b>Regional Veg Class (BVT)</b>				Confidence: high mod low N.A.
<b>BioMetric Type (or NVCA)</b>				Confidence: high mod low N.A.
<b>Other:</b>				Confidence: high mod low N.A.
			<b>Botanic Subdivision</b>	Northern Tablelands

## NVIS Level V (within 0.04 ha quadrat)

Indicate Cover Type (bold): crown cover / projected cover / projected foliage cover

Stratum	Growth form	Species name	Cover	Abund	For The Entire	Field No.
Upper					Upper Stratum Height to crown (m) min mode max	
Upper						
Upper						
Mid					Mid Stratum Height to crown (m) min mode max	
Mid						
Mid						
Ground					Ground Stratum Height to crown (m) min mode max	
Ground						
Ground						

Growth form: T=tree, M=mallee tree, S=shrub, Y=mallee shrub, Z=heath shrub, C=chenopod shrub, G=tussock grass, H=hummock grass, D=sod grass, V=sedge, R=rush, E=fern, P=palm

Cover: <1,1,2,3,4,5, 10,15,20,25,30,35, Abund: 1,2,3,4,5,6,7,8,9,10 20,50,100,500,1000,>1000

Condition (within 0.04 ha)	Upper stratum	Mid stratum	Ground stratum Grasses	Ground stratum Shrubs	Ground stratum Other	Cover %			Condition (within 0.1 or 0.04ha quadrat)
<b>Native richness</b>						<b>Litter</b>		<b>Rock</b>	<b>No. trees with hollows</b>
<b>Native cover</b>						<b>Bare ground</b>		<b>Fungi</b>	<b>Woody debris</b> lineal metres
<b>Exotic cover</b>						<b>Crypt-ogam</b>		<b>Other</b>	<b>Woody regeneration</b> No. upper stratum

(within 0.1 or 0.04 ha quadrat)

<b>Woody stem-sizes</b> (tally within category)	5- <10	10- <20	20- <30	30 cm DBH measure all
(or, measure all 5cm DBH)				
<b>Tree health</b>	no evidence	branchlets dead	small branches dead	main branches dead
				trees dead

# DECC VEGETATION FIELD SURVEY FORM

<b>Land Use</b> (dominant)	nature conservation	travelling stock route	forestry	grazing	grazing / cropping	cropping	other:
<b>Land Cover</b> (upper stratum)	none	native	environmental planting	native plantation	exotic plantation	exotic other:	
<b>Land Cover</b> (ground stratum)	none	native	environmental planting	native plantation	exotic crop	exotic other:	
<b>Age structure</b>	early regeneration	advanced regeneration	uneven age	mature	senescent		

Site History	Freq. code	Age code	Land Manager Survey: categories, quantities, comments				
Grazing management			not grazed	set stocked	rotational / cell grazing		
Farming			none	direct drill	disc plough	mouldboard rotary hoe	
Erosion control			none	contour cultivation	contour banks	mulching	other
Pasture improvement rates (fertiliser) kg/ha			none	<125	126-250	>250	
Pasture improvement rates (lime/dolomite) t/ha			none	<2	2-4	4-7	>7
Timber extraction (incl. firewood)							
Regrowth management							
Weed control							
Pest animal control							
Burning							
Other							

Frequency: 0=no record, 1=rare (>5yrs), 2=occasional (2-5yrs), 3=frequent (<2yrs).

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood collection			
Grazing			
Fire damage			
Storm damage			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

## Physiography

Morphological Type:	Landform Element:	Landform Pattern:	Microrelief:
Lithology:	Soil Surface Texture:	Soil Colour:	Soil Depth:
Slope:	Aspect:	Elevation:	Site Drainage:
			Distance to nearest water and type:









# VEGETATION FIELD SURVEY FORM

SITE No. WR-Section 4,  
T3

Location			Survey Name	Plot No.	Recorders
Date	16/7/12	Site No.	WR-Section 4	T3	Danny O'Brien, Environmental Assessments P/L
AMG grid reference	zone	datum: AGD66	Transect Start (0m)		Transect End (50m)
	54 55 56		E 354900	E 355000	
			N 6702310	N 6702310	
Transect length	100m	orientation	North-south	marked	yes no photo # / orientation

Ground Cover	Tally first point of contact (<1m), every 50cm along 50m transect (0.5m to 50m = 100 points)	TOTAL
Litter	<2	
Bare Ground	<5	
Cryptogam	0	
Woody debris	5%	
Rock	0	
Exotic – Annual	<i>Senecio</i> sp	
Exotic – Perennial		
Shrub (crown height <1m)	<i>Notelaea macrocarpa</i> var. <i>macrocarpa</i> , <i>Bursaria spinosa</i> , <i>Cassinia quinquefaria</i> , <i>Olearia viscidula</i> , <i>Acacia leucoclada</i> ssp. <i>leucoclada</i>	
Grass – Hummock *		
Grass – Other *	<i>Nassella neesiana</i> (exotic), <i>Poa sieberiana</i> , <i>Echinopogon</i> sp, <i>Chloris truncata</i> , <i>Themeda australis</i> , <i>Bothriochloa decipiens</i>	
Forb *	<i>Lomandra longifolia</i> , <i>Viola</i> sp, <i>Geranium solanderi</i> , <i>Centaurea solstitialis</i> (exotic), <i>Conyza bonariensis</i> (exotic)	
Sedge / Rush *	<i>Juncus usitatus</i>	
Fern *		
Other *	<i>Eucalyptus albens</i> , <i>E. melliodora</i> , <i>Angophora floribunda</i> , <i>Acacia implexa</i> , <i>Rubus fruticosus</i> (exotic)	

\* native species

Other	Tally presence within 25cm radius, every 50cm along 50m transect (0.5m to 50m = 100 points)	TOTAL
Dung – stock	<5% (bovines)	
Dung – exotic pests	<5% (feral pigs)	
Dung – native	<2% (macropods)	
Woody seedlings		

# DECCW VEGETATION FIELD SURVEY FORM

<b>Location</b>			<b>Survey Name</b>	<b>Plot No.</b>	<b>Recorders</b>		
<b>Date</b>	17/7/12	<b>Site No.</b>	WR-Section 6	T4	Danny O'Brien. Environmental Assessments P/L		
<b>AMG grid reference</b>	zone 54 55 56	datum: AGD66	Easting:		Northing:		Position in quadrat:
<b>Base Plot size</b>		Orientation of 0.1 or 0.04ha plot		<b>marked</b>	yes no	<b>photo # / orientation</b>	

## Structure & Composition (within 0.04 ha quadrat)

<b>Structural Formation</b>		<b>Ecological Community (TSC Act 1995)</b>	yes / likely / no	
<b>Keith Class</b>				Confidence: high mod low N.A.
<b>Regional Veg Class (BVT)</b>				Confidence: high mod low N.A.
<b>BioMetric Type (or NVCA)</b>				Confidence: high mod low N.A.
<b>Other:</b>				Confidence: high mod low N.A.
			<b>Botanic Subdivision</b>	Northern Tablelands

## NVIS Level V (within 0.04 ha quadrat)

Indicate Cover Type (bold): crown cover / projected cover / projected foliage cover

Stratum	Growth form	Species name	Cover	Abund	For The Entire	Field No.
Upper					Upper Stratum Height to crown (m) min mode max	
Upper						
Upper						
Mid					Mid Stratum Height to crown (m) min mode max	
Mid						
Mid						
Ground					Ground Stratum Height to crown (m) min mode max	
Ground						
Ground						

Growth form: T=tree, M=mallee tree, S=shrub, Y=mallee shrub, Z=heath shrub, C=chenopod shrub, G=tussock grass, H=hummock grass, D=sod grass, V=sedge, R=rush, E=fern, P=palm

Cover: <1,1,2,3,4,5, 10,15,20,25,30,35, Abund: 1,2,3,4,5,6,7,8,9,10 20,50,100,500,1000,>1000

Condition (within 0.04 ha)	Upper stratum	Mid stratum	Ground stratum Grasses	Ground stratum Shrubs	Ground stratum Other	Cover %			Condition (within 0.1 or 0.04ha quadrat)
<b>Native richness</b>						<b>Litter</b>		<b>Rock</b>	<b>No. trees with hollows</b>
<b>Native cover</b>						<b>Bare ground</b>		<b>Fungi</b>	<b>Woody debris</b> lineal metres
<b>Exotic cover</b>						<b>Crypt-ogam</b>		<b>Other</b>	<b>Woody regeneration</b> No. upper stratum

(within 0.1 or 0.04 ha quadrat)

<b>Woody stem-sizes</b> (tally within category)	5- <10	10- <20	20- <30	30 cm DBH measure all	
(or, measure all 5cm DBH)					
<b>Tree health</b>	no evidence	branchlets dead	small branches dead	main branches dead	trees dead

# DECC VEGETATION FIELD SURVEY FORM

<b>Land Use</b> (dominant)	nature conservation	travelling stock route	forestry	grazing	grazing / cropping	cropping	other:
<b>Land Cover</b> (upper stratum)	none	native	environmental planting	native plantation	exotic plantation	exotic other:	
<b>Land Cover</b> (ground stratum)	none	native	environmental planting	native plantation	exotic crop	exotic other:	
<b>Age structure</b>	early regeneration	advanced regeneration	uneven age	mature	senescent		

## Site History

	Freq. code	Age code	Land Manager Survey: categories, quantities, comments				
Grazing management			not grazed	set stocked	rotational / cell grazing		
Farming			none	direct drill	disc plough	tynd implement	mouldboard rotary hoe
Erosion control			none	contour cultivation	contour banks	mulching	other
Pasture improvement rates (fertiliser) kg/ha			none	<125	126-250	>250	
Pasture improvement rates (lime/dolomite) t/ha			none	<2	2-4	4-7	>7
Timber extraction (incl. firewood)							
Regrowth management							
Weed control							
Pest animal control							
Burning							
Other							

Frequency: 0=no record, 1=rare (>5yrs), 2=occasional (2-5yrs), 3=frequent (<2yrs).

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

## Plot Disturbance

	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood collection			
Grazing			
Fire damage			
Storm damage			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

## Physiography

Morphological Type:	Landform Element:	Landform Pattern:	Microrelief:
Lithology:	Soil Surface Texture:	Soil Colour:	Soil Depth:
Slope:	Aspect:	Elevation:	Site Drainage:
			Distance to nearest water and type:









# VEGETATION FIELD SURVEY FORM

SITE No. WR-Section 6,  
T4

Location			Survey Name	Plot No.	Recorders		
Date	17/7/12	Site No.	WR-Section 6	T4	Danny O'Brien. Environmental Assessments P/L		
AMG grid reference	zone	datum: AGD66	Transect Start (0m)		Transect End (50m)		
	54 55 56		E 356750		E 356850		
			N 6702300		N 6702100		
Transect length	100m	orientation	North-south	marked	yes no	photo # / orientation	

Ground Cover	Tally first point of contact (<1m), every 50cm along 50m transect (0.5m to 50m = 100 points)	TOTAL
Litter	10%	
Bare Ground	<2%	
Cryptogam	Not observed	
Woody debris	25% (high)	
Rock	<5%	
Exotic – Annual		
Exotic – Perennial	<i>Senecio</i> sp	
Shrub (crown height <1m)	<i>Bursaria spinosa</i> , <i>Notelaea macrocarpa</i> var. <i>macrocarpa</i>	
Grass – Hummock *		
Grass – Other *	<i>Themeda australis</i> , <i>Aristida vagans</i> (exotic) <i>Poa sieberiana</i> , <i>Imperata cylindrica</i> ,	
Forb *	<i>Cirsium vulgare</i> (exotic), <i>Verbena bonariensis</i> (exotic),	
Sedge / Rush *		
Fern *		
Other *	<i>Rosa rubiginosa</i> (exotic), <i>Eucalyptus melliodora</i> , <i>E. blakelyi</i> , <i>E. albens</i> , <i>Eucalyptus dwyeri</i> , <i>Angophora floribunda</i> , <i>Acacia implexa</i> , <i>Acacia melanoxylon</i> ,	

\* native species

Other	Tally presence within 25cm radius, every 50cm along 50m transect (0.5m to 50m = 100 points)	TOTAL
Dung – stock	Not observed	
Dung – exotic pests	< 2% (Deer, pigs)	
Dung – native	<2 % (macropods)	
Woody seedlings		



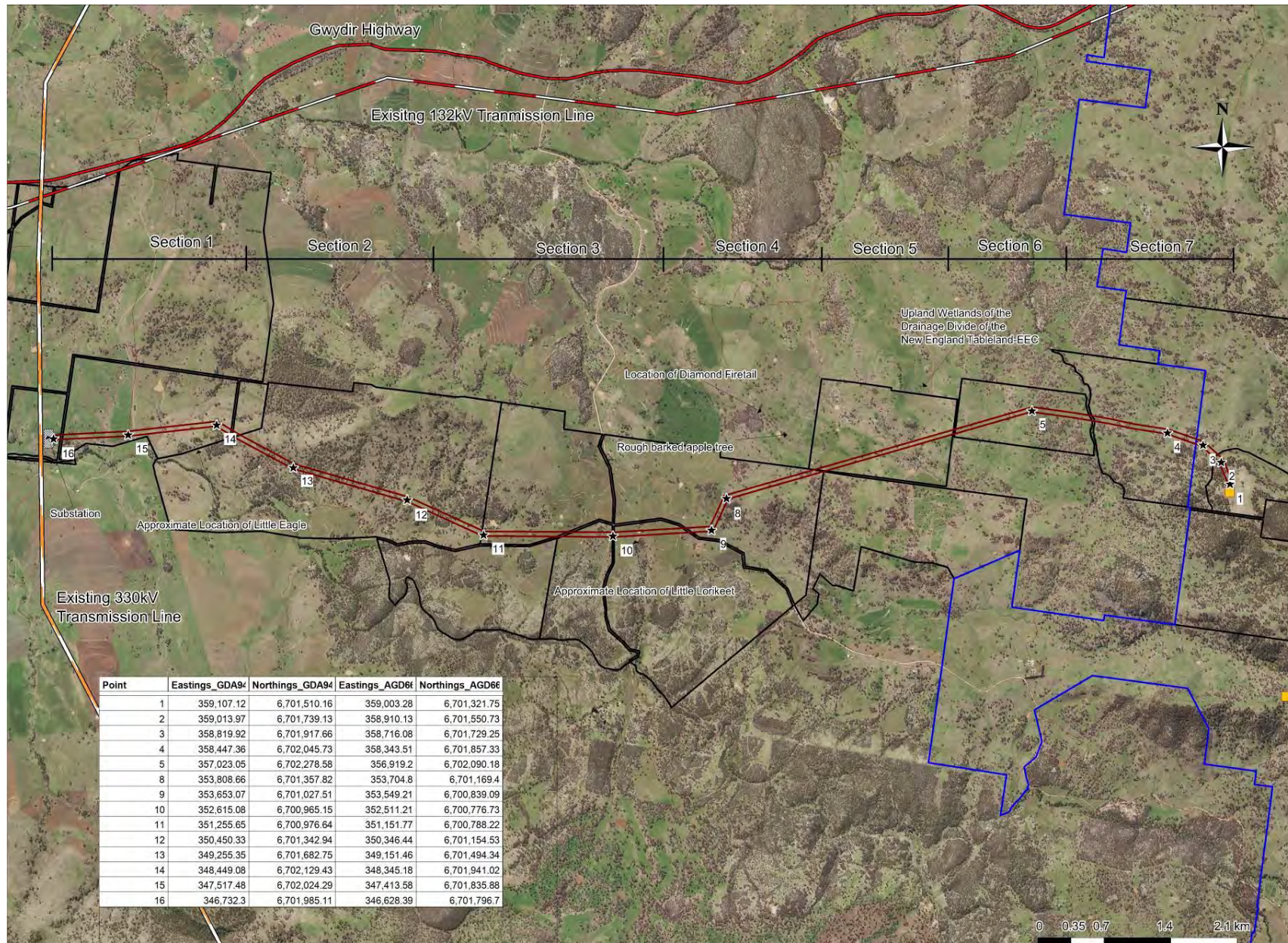


Figure 1 - Alternative 132kV Powerline Route and Substation Location



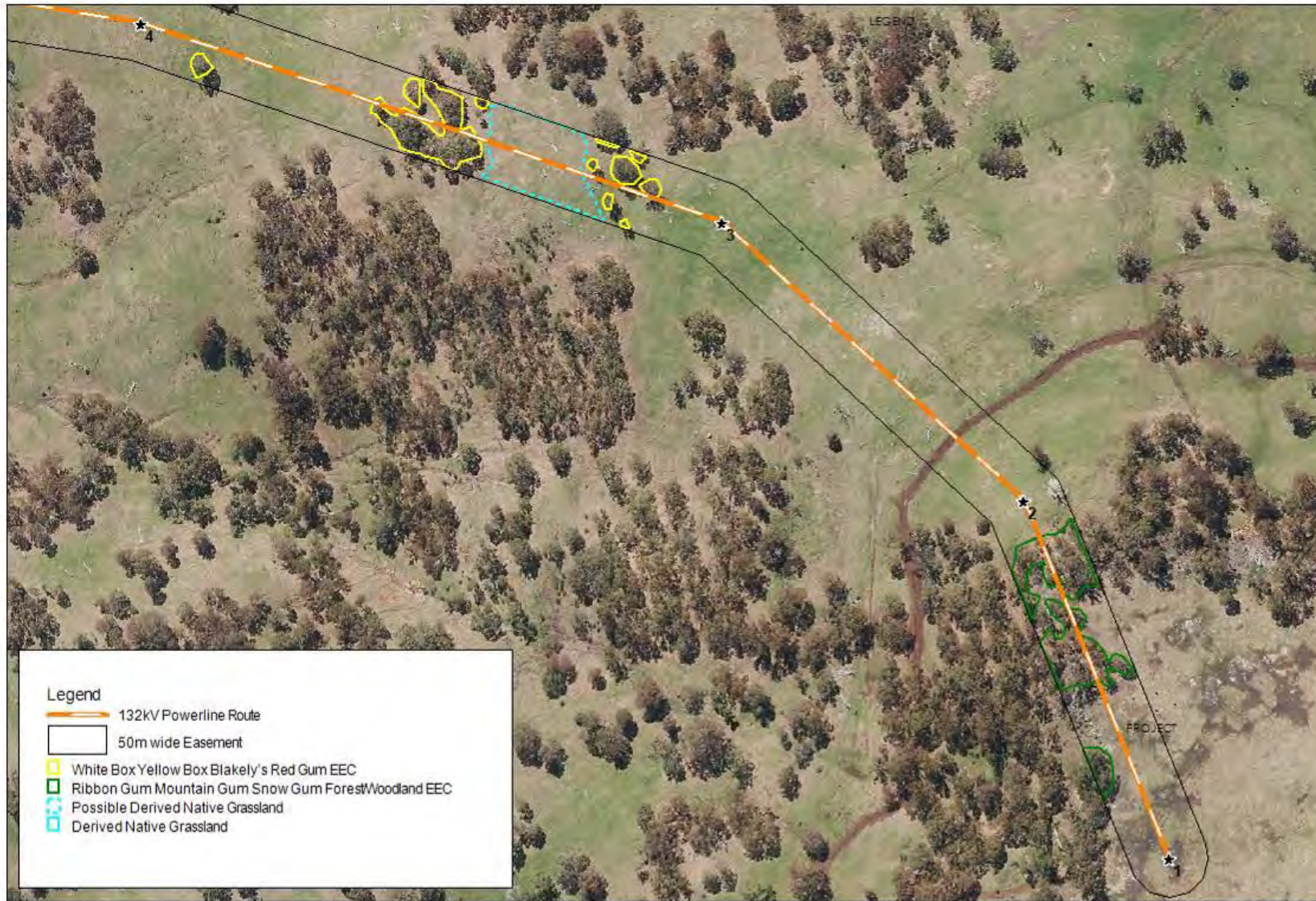


Figure 2 – Vegetation Mapping Point 1 to Point 4





Figure 3 – Vegetation Mapping Point 4 to Point 5



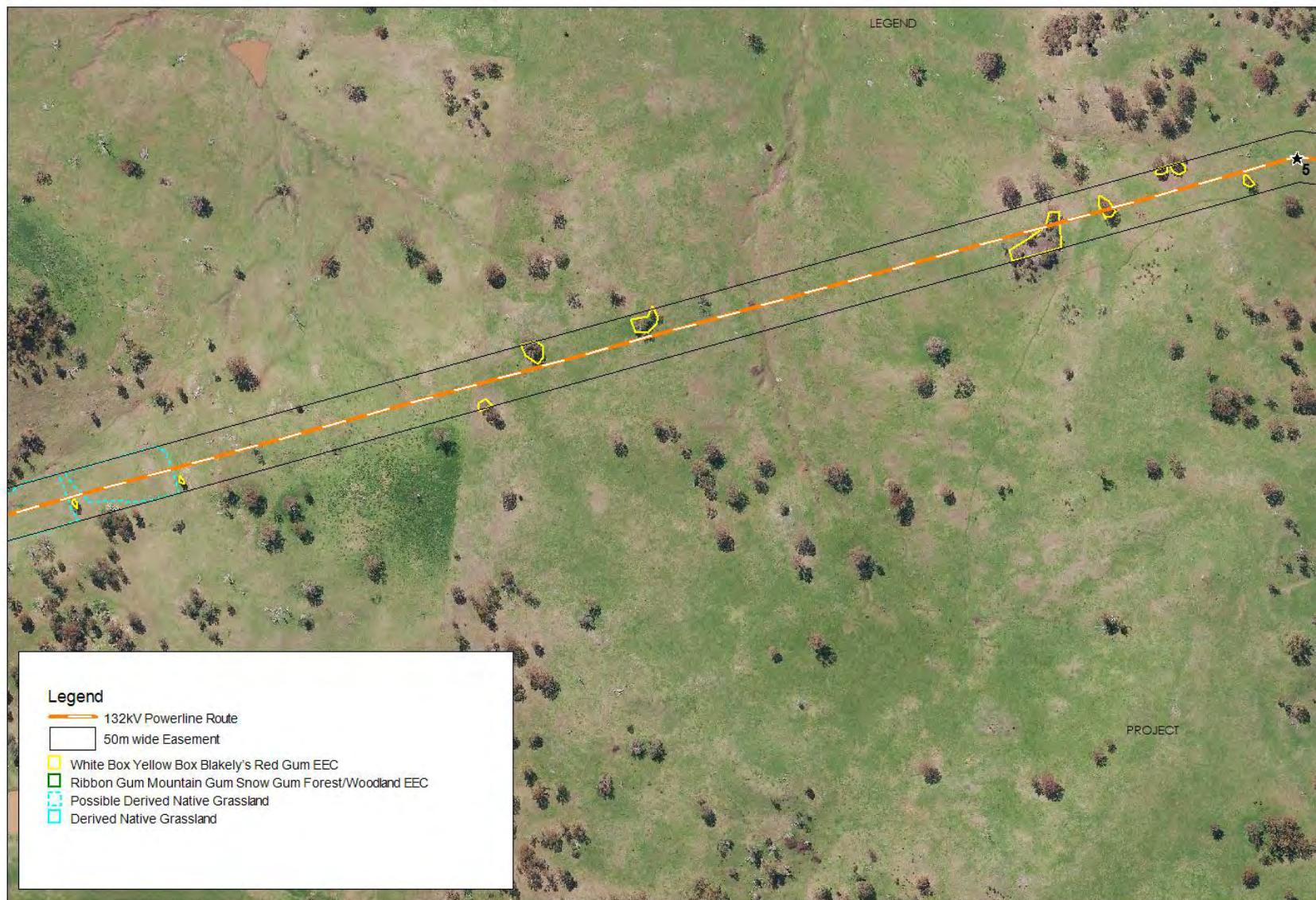


Figure 4 – Vegetation Mapping Point 5 to Point 8 (Eastern Section)





Figure 5– Vegetation Mapping Point 5 to Point 8 (Western Section)



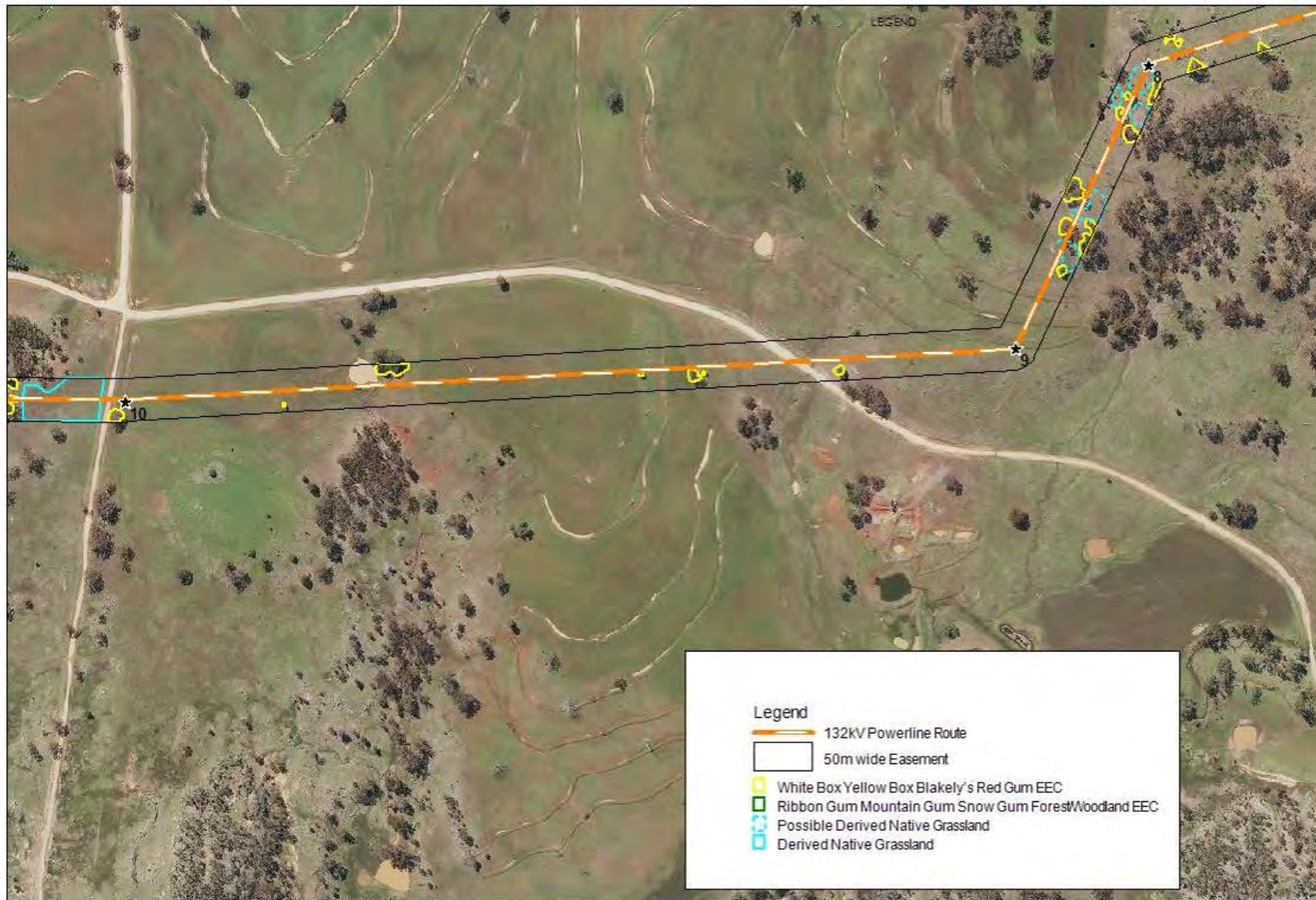


Figure 6– Vegetation Mapping Point 8 to Point 10





Figure 7 – Vegetation Mapping Point 10 to Point 11





Figure 8 – Vegetation Mapping Point 11 to Point 12



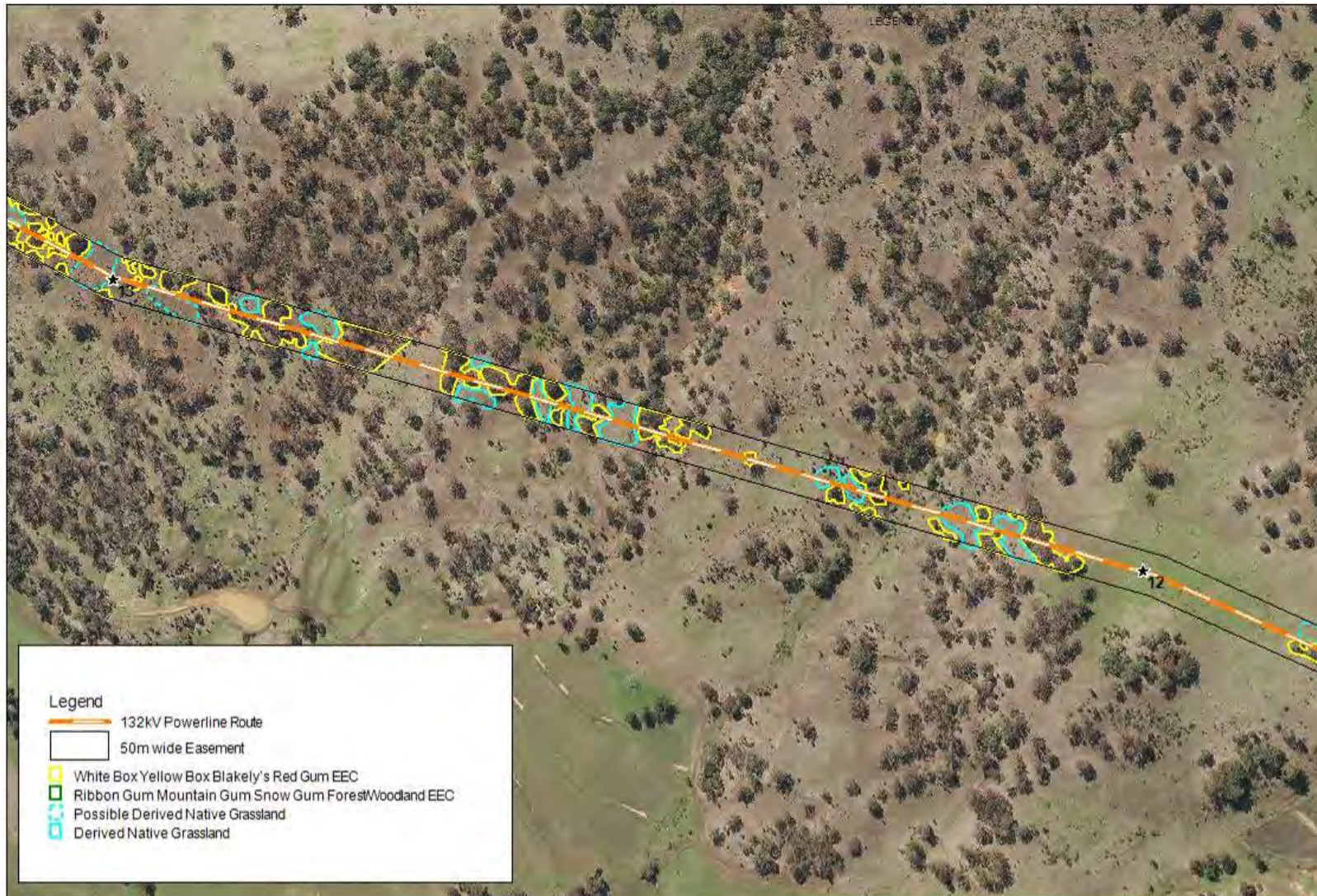
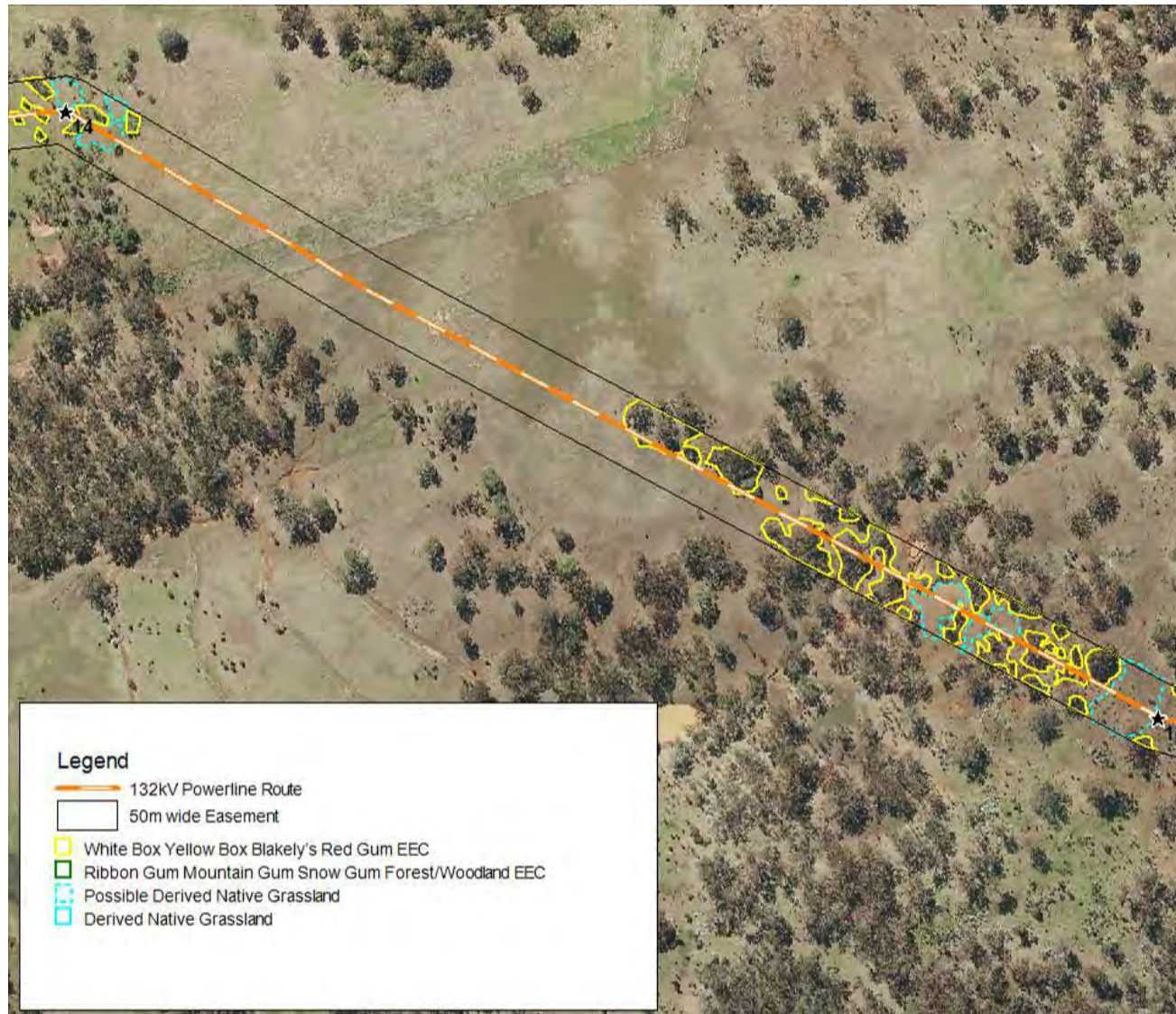


Figure 9 – Vegetation Mapping Point 12 to Point 13





*Figure 10 – Vegetation Mapping Point 13 to Point 14*



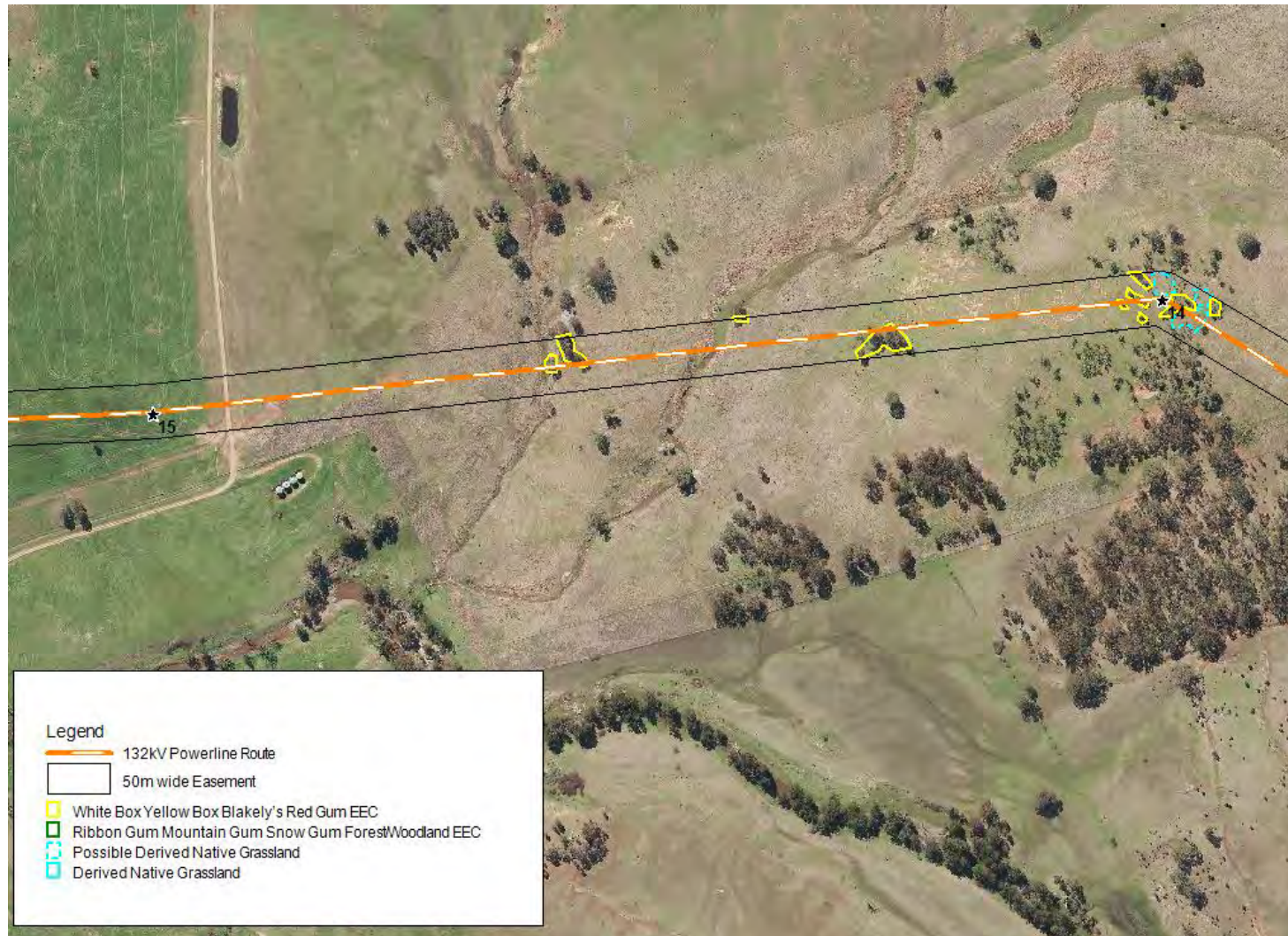


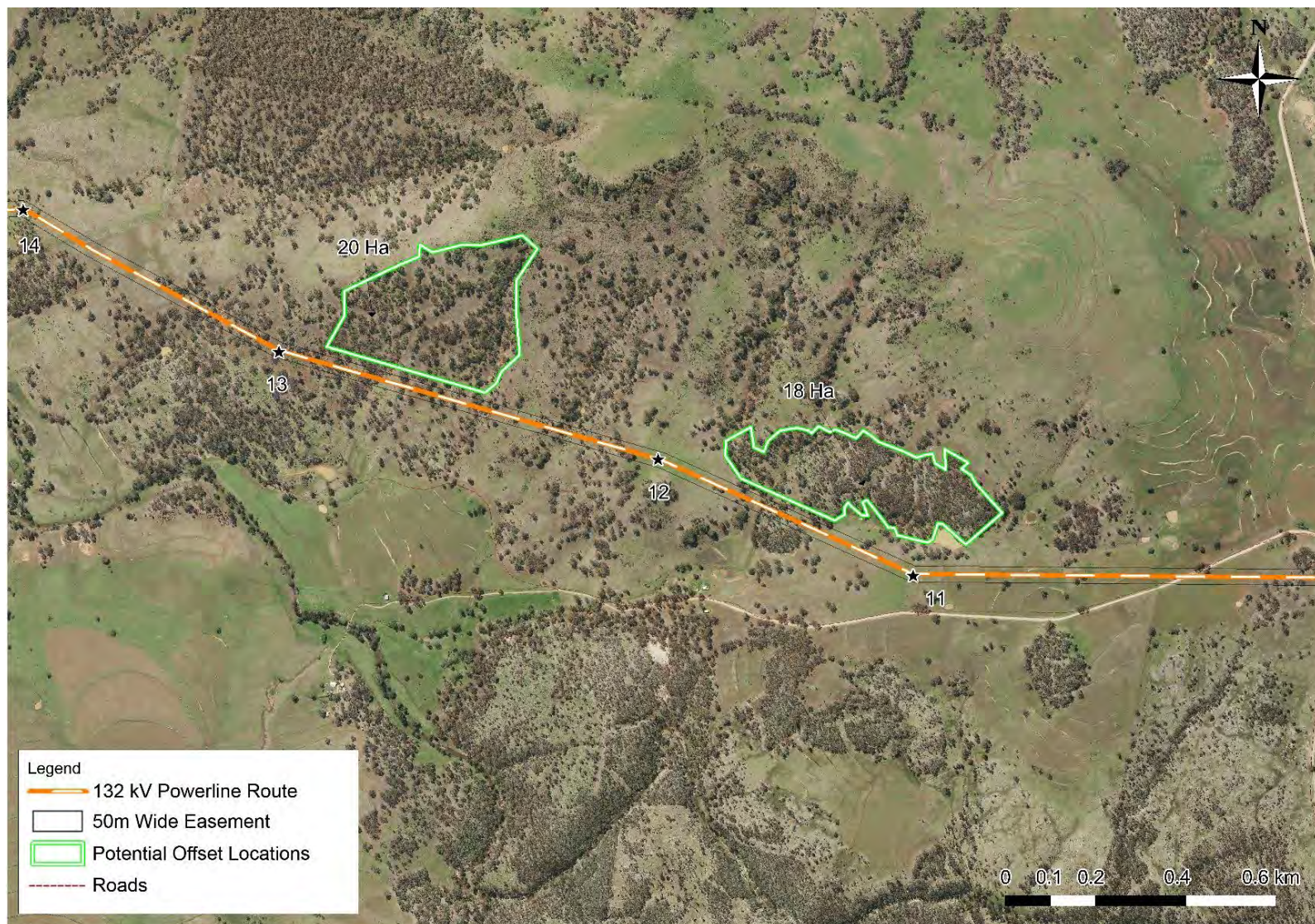
Figure 11 – Vegetation Mapping Point 14 to Point 15





Figure 12 - Vegetation Mapping Point 15 to Point 16





*Figure 13 – Potential White Box Yellow Box Blakely's Red Gum Woodland-EEC Offset Areas*

APPENDIX 6

ALTERNATIVE GRID CONNECTION SURVEY - SITE PHOTOGRAPHS

Plate 1 – Section 1

Plate 2 – Section 1

Plate 3 – Section 2

Plate 4 – Section 2

Plate 5 – Section 2

Plate 6 – Section 3

Plate 7 – Section 3

Plate 8 – Section 4

Plate 9 – Section 4

Plate 10 – Section 5

Plate 11 – Section 5

Plate 12 – Section 5

Plate 13 – Section 5

Plate 14 – Section 6

Plate 15 – Section 6

Plate 16 – Section 6

Plate 17 – Section 6

Plate 18 – Section 6

Plate 19 – Section 7

Plate 20 – Section 7





**Plate 1-Section 1**-View of the approximate location of the proposed substation and switchyard site within Section 1 of the study area. This site is totally cleared of all indigenous vegetation. This area also forms part of a cultivation area namely for lucerne crops. This site locale is the western extremity of the study area with the alternative grid connection linking to the adjacent 330kV powerline lattice tower facilities conspicuous within the photo.



**Plate 2- Section 1:** -Partial view of Section 1 showing the 330kV powerline in the background indicating the largely cleared and open nature of this section of the study area. Note the small remnant area of degraded White Box Yellow Box Blakely's Red Gum-EEC to the left of the photo. Note no understorey vegetation remains within the remnant.



**Plate 3-Section 2-** View of Section 2 of the study area indicating White Box Yellow Box Blakely's Red Gum-EEC. Section 2 contains the highest quality and quantity of the EEC within the study area. Habitat features such as logs, rocks and drainage lines are also common features within Section 2 as well as four generations of trees being present (deceased trees, adults, sub-adults and saplings). Note a reasonably developed understorey vegetation as well as considerable Drooping Mistletoe plants (*Amyema pendula*) are present within the canopies of the trees.



**Plate 4-Section 2-** View of Section 2 of the study area indicating White Box Yellow Box Blakely's Red Gum-EEC with an open indigenous grassy understorey in this area of Section 2. Small areas of Derived Native Grasslands (DNG) occur in between, or adjacent to some areas of remnant vegetation. There is some natural regeneration of emerging eucalypts and spinescent shrubs present in the foreground and mid-ground of the photo. White Box *Eucalyptus albens* is the dominant tree species in this photo.





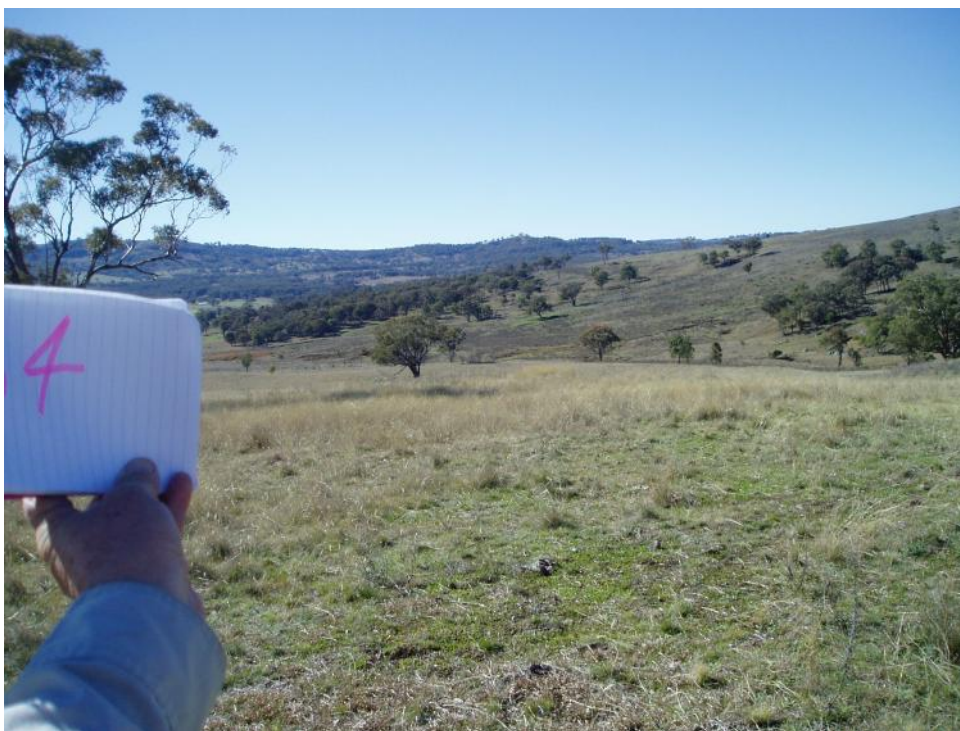
**Plate 5-Section 2-** View facing west of the eastern end of Section 2 of the study area indicating cleared open pasture grazing land in the foreground and mid-ground. White Box Yellow Box Blakely's Red Gum-EEC is conspicuous in the background.



**Plate 6-Section 3-** View of Section 3 of the study area facing east indicating a small area of remnant White Box Yellow Box Blakely's Red Gum-EEC in the background. This powerline would generally extend in the cleared areas of the study area where possible.



**Plate 7-Section 3-**View of Section 3 of the study area facing east indicating the same small area of remnant White Box Yellow Box Blakely's Red Gum-EEC adjacent to the road. This remnant area is dominated by White Box *Eucalyptus albens*. Both cattle and sheep graze in this area. Eastern Grey Kangaroos (*Macropus giganteus*) and European Rabbits are also common throughout the study area and in addition to cattle and sheep grazing also contribute to the grazing pressures in the wider area.



**Plate 8-Section 4-**View of Section 4 of the study area facing north indicating White Box Yellow Box Blakely's Red Gum-EEC remnant and isolated trees are scattered widely throughout the study area. The powerline would bypass the majority of trees and remnants and DNG where possible.





**Plate 9-Section 4-**View of isolated White Box *Eucalyptus albens*. This tree species was in-flowering during the field assessment phase and frequently visited by numerous flocks of Musk Lorikeets and other nectivorous birds.



**Plate 10-Section 5-** Partial view of Section 5 facing west indicating the patchy nature of native understorey vegetation (background) within the majority of the study area with the exception of Section 2 and parts of Section 6.





**Plate 11-Section 5-**View of a large part of Section 5 of the study area indicating the extent of clearing and grazing by beef cattle in the area. The alternative powerline route has now been diverted away from this area but would extend along a similar area to the south of this photo. White Rock Mountain can be seen in the distance.



**Plate 12-Section 5-** View of part of Section 5 of the study area facing west indicating the extent of clearing and grazing by beef cattle. The ridge in the background of this photo is an important wildlife refuge habitat area in particular for avifauna due to the dense cover of understorey vegetation. Raptors are common in this area.



**Plate 13-Section 5.** View of occurrence of Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC located in Section 5 of the study area facing north. This area would now be avoided and the alternative powerline would be diverted away from this EEC avoiding all impacts to the EEC.



**Plate 14-Section 6-** View of part of Section 6 of the study area facing east indicating the extent of clearing and grazing by beef cattle and sheep. The alternative powerline would extend along the northern (left) side of the fence.





**Plate 15-Section 6-** Another view of part of Section 6 of the study area facing east indicating the extent of clearing and grazing by beef cattle and sheep. The alternative powerline would extend along the northern (left) side of the fence generally through the cleared open gap in the vegetation in the mid-ground. Note White Box Yellow Box Blakely's Red Gum-EEC is present on both sides of the alternative powerline route.



**Plate 16-Section 6-** Another view of part of Section 6 of the study area facing west. The ridge line in the background is situated in Section 5.





**Plate 17-Section 6-** View of riparian vegetation along Swan Brook within Section 6 of the study area. The trees along this creek are dominated by River Oak *Casuarina cunninghamiana*. This creek area is also a significant wildlife habitat and refuge area and an important area and water source for birds, mammals, reptiles and amphibians. The River Oaks would be retained and unaffected by the proposal.



**Plate 18-Section 6-** Partial view of the eastern end of Section 6 facing south-east. Note River Oaks in the mid-ground associated with the adjacent Swan Brook; Spring Mountain is conspicuous in the background of this photo.





**Plate 19-Section 7-** View of cleared open area on White Rock Mountain in a high altitude area and eastern extremity of the study area. *Poa* sp dominates the cleared grassy landscape on White Rock Mountain.



**Plate 20-Section 7-** Partial view of Section 7 (situated on White Rock Mountain) and the location of the Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland of the New England Tableland Bioregion-EEC. There are some trees with hollows present in this area. These trees with hollows would be retained and unaffected by the proposal.