

# **FLORA AND FAUNA ASSESSMENT**

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## **PROPOSED OVERHEAD TRANSMISSION LINE CAPITAL WIND FARM SOUTHERN TABLELANDS, NSW**

*prepared by*

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## **1. INTRODUCTION**

Infigen Energy are investigating a new transmission line on their Capital Wind Farm near Bungendore, on the Southern Tablelands of New South Wales.

Kevin Mills & Associates were engaged by Infigen Energy to prepare a flora and fauna assessment report covering the proposed new transmission line to accompany the development application.

The proposed transmission line is about 11.5 kilometres in length, linking Capital 2 Wind Farm development in the west to the electrical substation at the south-eastern corner of the Capital Wind Farm site; see **Figure 1**.

The purpose of this report is to assess the impact of the proposed transmission line on flora and fauna. The report contains:

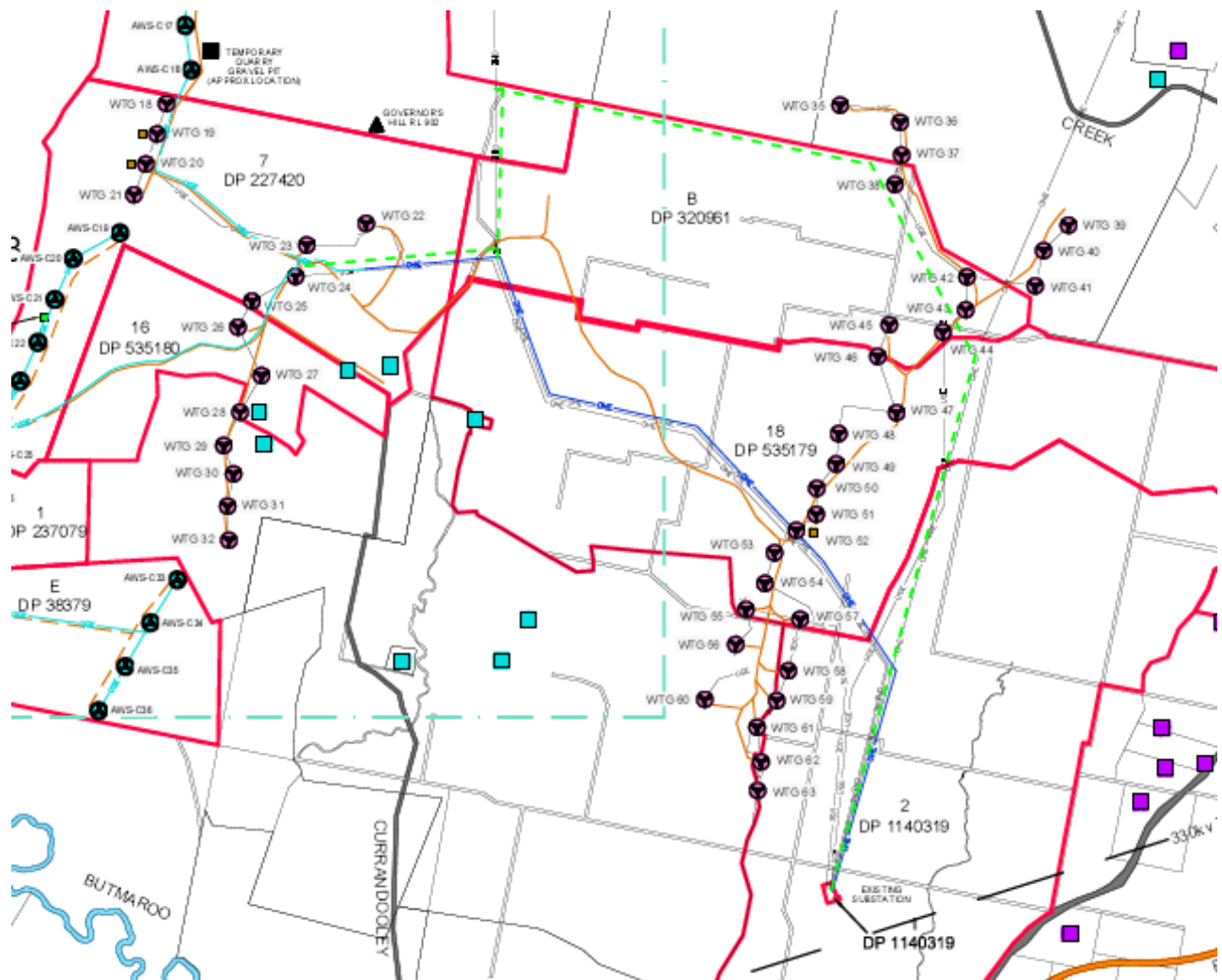
1. a description of the vegetation and fauna habitats along the route of the line;
2. an assessment of the potential impact of the proposal on flora and fauna, including:
  - species, populations and communities listed under the New South Wales *Threatened Species Conservation Act 1995*;
  - matters of national environmental significance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
  - Koala habitat, as required under *State Environmental Planning Policy No.44 - Koala Habitat Protection*;
3. a discussion of what measures could be taken to avoid or minimise the impact of the proposal on native flora and fauna.

## **2. THE STUDY AREA**

The Bungendore - Tarago area has had a long history of sheep grazing, commencing well before 1850. The land has generally been cleared of woodland and much has been pasture improved, seeded with pasture species and fertilised. The broad valley floors have often been ploughed and cropped. Remnant woodland is mainly restricted to the steep topography and in small stands of remnant trees here and there across the grazing land.

The proposed route of the transmission line is about 11.5 kilometres long, extending east from the approved Capital 2 Wind Farm extension near Lake George on the western side of the Capital Wind Farm site. The route traverses the existing wind farm west to east, and then crosses the northern end of Hammond Ridge, before turning south to follow an existing transmission line to the substation.

The study area is the route of the transmission line and the immediately surrounding land. The route was not marked on the ground at the time of the survey, but the available maps and ground features readily allowed the route to be identified.



**Figure 1. Route of the Proposed Transmission Line.**  
Dashed green line indicates the route.

### 3. SURVEY METHODS

#### 3.1 Flora Survey Methods

An inspection of the route was undertaken on 12 and 13 October 2011. The Capital Wind Farm site has been surveyed for various purposes over the past few years so is relatively well known to the consultant. The purpose of the survey was to classify and describe the vegetation along the route, and to assess the potential for threatened species to occur there.

In the field, bearings were taken from colour aerial photographs and a map showing the route of the line, particularly the existing wind farm infrastructure, and nearby features.

The main purpose of the flora survey was to classify and describe the vegetation, to map the distribution of the plant communities of importance (if necessary), to record as many as possible of the plant species present, and to search for and identify potential habitat for threatened plant species.

The vegetation survey techniques combined traverses of the study area with disciplined vegetation sampling on specific sites. The traverses, which were undertaken on foot and by motor vehicle, were designed to

cover the full topographic variation of the site, the full range of plant communities and potential habitat for threatened plant species. The traverses were also random because of their exploratory purpose.

Plant species were searched for throughout the study area during the current investigation, with particular searches being carried out wherever indigenous (native) plants were likely to be found. Both indigenous and exotic (weed) species were identified and recorded.

Notes were made on the structure and condition of the vegetation, and the height and proportional coverage of each layer. The general description of each plant community is based on the data collected during these vegetation sampling surveys and the traverses of the study area.

#### Vegetation Classification

The vegetation communities on the study area were classified on the basis of their structure and the name(s) of the dominant species in the tallest stratum, using the structural classification system devised by Walker and Hopkins (1990). The various vegetation classes within the system, including open forest, woodland, open woodland, shrubland, heathland and grassland, are based on the growth form of the plants in the tallest stratum and the crown separation between the plants in the tallest stratum (whether touching, overlapping, separated, isolated, etc.).

The following definitions used in this report are widely accepted in the botanical literature; most of those relating to grasslands are from the report by Rehwinkel (1997).

Forest: a community of relatively closely spaced trees (projective foliage cover >30%) growing taller than 10 metres.

Woodland: a community of well spaced trees (projective foliage cover 10-30%) growing to a height of 4 to 30 metres.

Open Woodland: a community of scattered trees (projective foliage cover <10% growing to a height of 4 to 30 metres.

Grassland: vegetation dominated by grasses and forbs, with <10% tree and/or shrub cover.

Native Grassland: grassland with >50% of vegetation cover composed of indigenous species, >50% of all species are native, and the minimum vegetation cover, alive or dead, is >10%.

Natural Grassland: native grassland considered to have had <10% tree and/or shrub cover at the time of European settlement.

Secondary Grassland: a native grassland remaining after the removal or dieback of previously occurring trees and/or shrubs, where these occupied >10% cover.

Native Pasture: containing native and introduced species, where introduced species occupy >50%, but <75% of both cover and species present, where pasture species have often been mechanically sown. Grassland where a single species of native perennial grass dominates, for example *Austrostipa* spp., but other natives are very scarce is also categorised as native pasture.

Exotic Grassland: where >75% of species and cover are composed of introduced plants.

Sown Pasture: where the dominant plants are sown exotic species (>75% cover), usually fertilised land used for grazing (e.g. Ryegrass and Clover).

Cropland: a species that is sown, usually following ploughing, for commercial harvest (e.g. Wheat) or stock feed.

Natural Temperate Grassland: a threatened grassland community listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act*. The Recovery Plan for Natural Temperate Grassland (Environment ACT 2006) provides the following information:

"The community is dominated by moderately tall (25-50cm) to tall (50cm – 1.0m), dense to open tussock grasses with up to 70% of the species being forbs. The community may be treeless or contain up to 10% cover of trees, shrubs or sedges. In the Southern Tablelands, Natural Temperate Grasslands are located at altitudes between 560 and 1200 metres in valleys influenced by cold air drainage and in broad plains. The community occurs within the geographical region of the Southern Tablelands of NSW and ACT, which extends southwards from the Abercrombie River to the Victorian Border, from Boorowa and Jindabyne to the west and Goulburn to Braidwood and Bombala to the east."

"Natural Temperate Grassland is a native ecological community that is dominated by native species of perennial tussock grasses. The dominant grasses are *Themeda triandra* [australis], *Austrodanthonia* species, *Bothriochloa macra* and *Poa* species. The upper canopy stratum generally varies in height from mid-high (0.25-0.5m) to tall (0.5-1.0m). There is also a diversity of native herbaceous plants (forbs), which may comprise up to 70% of species present. The community is naturally treeless or has less than 10% projective foliage cover of trees or shrubs in its tallest stratum. The ecological community that makes up NTG-ST [Natural Temperate Grassland – Southern Tablelands] is defined by the vegetation structure thought to have been present at the time of European settlement."

#### Nomenclature

The plant species names in this report are the current names published by the National Herbarium of New South Wales in the *Flora of New South Wales* (Harden 1992-2002). Most of the common names are from the *Flora of New South Wales* (op. cit.), *Australian Plant Genera* by Baines (1981) and *Weeds of the South-east* by Richardson, Richardson and Shepherd (2006). A useful reference is the book by Eddy *et al.* (1998), *Grassland Flora. A field guide for the Southern Tablelands*.

### **3.2 Fauna Survey Methods**

Fauna surveys were conducted on the same days as the flora surveys; i.e. 12 and 13 October 2011. The field survey concentrated on mammals, birds, reptiles and amphibians, with the aim of detecting as many as possible of the species present. The survey results indicate which fauna species were found, but should not be regarded as a full inventory of the species that would occur there. Previous fauna surveys on the Capital Wind Farm site by the consultant undertaken over the past seven years provide information on the animals known to be present in the area.

Mammals were identified by sight and by interpreting their distinctive calls. The mammal survey also involved a ground search for scats, tracks and diggings. Because of an almost complete lack of trees within the footprint of the proposed quarry, neither spotlighting surveys nor bat surveys were undertaken. The birds on the study area and nearby were also identified by sight and by interpreting their calls.

A search for reptiles was conducted primarily using the technique of 'rock rolling'. Potential basking sites were also investigated, especially near water and on bare surfaces, and general vigilance was maintained for reptiles during all other survey work. The frogs in the study area were identified by interpreting their distinctive calls. A search was conducted for frogs in moist areas and habitat niches, especially under rocks, wood and debris near dams.

#### Nomenclature

The fauna species nomenclature in this report is based on the Australian Museum's *The Mammals of Australia* (Strahan 1995), *Australian Bats* (Churchill 1998), *Systematics and Taxonomy of Australian Birds* (Christidis & Boles 2008) and *Reptiles and Amphibians of Australia* (Cogger 1992).

### 3.3 Targeted Surveys

In addition to general flora and fauna surveys in the study area, this study and previous studies since 2004 by the consultant included targeted surveys for threatened species and ecological communities. Following interrogation of the NSW Wildlife Atlas, assessment of the habitat in the study area and the consultant's experience in the locality, the following species were selected for targeted field surveys and/or habitat assessment.

#### Plants

<i>Diuris aequalis</i>	Buttercup Double-tail
<i>Dodonaea procumbens</i>	Creeping Hopbush
<i>Swainsona sericea</i>	Silky Swainson-pea

#### Communities

Yellow Box - Blakely's Red Gum Woodland  
 Natural Temperate Grassland (listed only by the Commonwealth)  
 Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland

#### Reptiles

Pink-tailed Worm Lizard	<i>Aprasia parapulchella</i>
Striped Legless Lizard	<i>Delma impar</i>
Grassland Earless Dragon	<i>Tympanocryptis pinguicolla</i>
Rosenberg's Monitor	<i>Varanus rosenbergi</i>
Little Whip Snake	<i>Suta flagellum</i>

#### Birds

Brown Treecreeper	<i>Climacteris picumnus</i>
Diamond Firetail	<i>Stagonopleura guttata</i>
Flame Robin	<i>Petroica phoenicea</i>
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>
Hooded Robin	<i>Melanodryas cucullata</i>
Little Eagle	<i>Hieraaetus morphnoides</i>
Painted Honeyeater	<i>Grantiella picta</i>
Regent Honeyeater	<i>Anthochaera phyrgia</i>
Scarlet Robin	<i>Petroica boodang</i>
Speckled Warbler	<i>Chthonicola sagittata</i>
Superb Parrot	<i>Polytelis swainsonii</i>
Varied Sittella	<i>Daphoenositta chrysoptera</i>
White-browed Woodswallow	<i>Artamus superciliosus</i>

#### Mammals

Koala	<i>Phascolarctos cinereus</i>
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Following an inspection of the transmission line route and consideration of the habitats present in relation to the above species, the most likely species to be found within the study area are listed threatened woodland birds under the TSC Act 1995 and listed migratory species under the EPBC Act 1999. The Little Whip Snake is also considered possible in one part of the study area, i.e. woodland on Hammond Ridge.



## 4. RESULTS

### 4.1 The Vegetation

#### **Original Vegetation Patterns**

The following description of the pre-European vegetation patterns in the locality was previously prepared by the consultant. The original vegetation patterns can be interpreted through observations of remnant woodland and trees that still occur in the area. The majority of the vegetation appears to have been a grassy woodland dominated by

Inland Scribbly Gum *Eucalyptus rossii*, Broad-leaved Peppermint *Eucalyptus dives* and Red Stringybark *Eucalyptus macrorhyncha*. Less common trees were Blackwood *Acacia melanoxylon*, Hickory Wattle *Acacia implexa* and Black She-oak *Allocasuarina littoralis*. The understorey was apparently grassy with occasional shrubs. In sheltered places Narrow-leaved Peppermint *Eucalyptus radiata* occurred. On the valley floors, a woodland of Yellow Box *Eucalyptus melliodora* occurred with a grassy understorey and probably well-spaced trees. In a few exposed locations, Snow Gum *Eucalyptus pauciflora* grew in a woodland community again with a grassy understorey. The broad valley north of the substation and on similar topography on Capital Wind Farm land probably supported Yellow Box *Eucalyptus melliodora* and Blakely's Red Gum *Eucalyptus blakelyi* grassy woodland, probably in a savannah formation (i.e. trees very well spaced). On some of the very broad valley bottoms and flat land adjacent to Lake George, natural temperate grassland probably occurred; i.e. tree cover less than 10 percent.

The grassland understorey changed from place to place depending on topography, geology and exposure. The ridges would have contained a significant shrub component, while the broad valley had few if any shrubs. Poorly drained flats probably supported a tussock grassland dominated by River Tussock *Poa labillardieri*, with Snow Gum *Eucalyptus pauciflora*. On sand on the flats east of Lake George, Manna Gum *Eucalyptus viminalis* and Snow Gum *Eucalyptus pauciflora* grow.

#### **Vegetation in the Area Today**

The route of the transmission line was surveyed from west to east and notes made on the vegetation observed on and near the route. A series of photographs was taken along the route, and these are provided in **Appendix 1**. A plant list was prepared and is provided at **Appendix 2**.

The vast majority of the land traversed is totally treeless. The only trees on the route are at the northern end of Hammond Ridge. The grassland along the route is mainly derived from the original woodland. This ranges from native grassland to exotic grassland. The majority of the route is across native pasture, as defined this is a grassland that contains "native and introduced species, where introduced species occupy >50%, but <75% of both cover and species present, where pasture species have often been mechanically sown." Although usually dominated by a native perennial grass, particularly *Austrostipa* spp., the diversity of native herbaceous species is low to very low. No sites of high native grassland diversity were found along the route.

The transmission line route just impinges upon the woodland at the far northern end of Hammond Ridge; see photographs in **Appendix 1**. That woodland contains the trees Inland Scribbly Gum *Eucalyptus rossii* and Broad-leaved Peppermint *Eucalyptus dives*. In the vicinity of this woodland, scattered small trees of Black Wattle *Acacia mearnsii* occur. The broad valley north of the new substation is virtually treeless; see photographs in **Appendix 1**. Some of the grassland is native grassland but is not particularly diverse; see survey plot 2 in **Appendix 3**.

### 4.2 The Fauna

The fauna of the study area is typical of the rural environment of the region. The species list is composed of wetland species found on farm dams, woodland species in remnant patches of woodland and robust species associated with cleared farmland. The list at **Appendix 3** contains the names of the species previously recorded in the locality (Kevin Mills & Associates 2005) and those species observed during this and other investigations in 2011.

## 5. THREATENED SPECIES, POPULATIONS AND COMMUNITIES

### 5.1 Threatened Species

Threatened species in New South Wales are listed on schedules under the New South Wales *Threatened Species Conservation Act 1995* (TSC Act), where they are classified "endangered" (Schedule 1, Part 1), "vulnerable" (Schedule 2) or "presumed extinct" (Schedule 1, Part 4). Nationally threatened species are listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as "extinct", "critically endangered", "endangered", "vulnerable" or "conservation dependent".

Threatened species with potential to occur in the district were identified during previous studies by Kevin Mills & Associates (2005, 2009); the resulting list appears below, in **Table 1**. No threatened plant species have been recorded on the Capital Wind Farm site to date; several threatened woodland birds have been recorded over the past few years (these species names are in bold in **Table 1**).

**Table 1**  
**Threatened species occurring in the Region**

Species	TSC Act <sup>+</sup>	EPBC Act <sup>+</sup>	Potential to occur on the subject land
<b>Plants</b>			
<i>Diurus aequalis</i> Buttercup Double-tail	E	V	This small ground orchid occurs in woodland and forest with a grassy understorey. It would not occur in the area, given the Long history of grazing and vegetation modification.
<i>Dodonaea procumbens</i> Creeping Hop Bush	V	V	A prostrate shrub, <i>D. procumbens</i> grows in woodland on sandy soils. There is no suitable habitat on the subject land.
<i>Swainsona sericea</i> Silky Swainson-pea	V	-	<i>S. sericea</i> is a small herb that occurs in native grassland. There is very little native grassland in the area; the species has Never been found locally.
<b>Mammals</b>			
Koala <i>Phascolarctos cinereus</i>	V	-	Koalas would not occur in the area because of a lack of suitable habitat.
<b>Birds</b>			
Brown Treecreeper <i>Climacteris picumnus</i>	V	-	These three woodland bird species would not occur on the vast majority of the route of the line. There is no woodland habitat there to attract them. None have previously been
Hooded Robin <i>Melanodryas cucullata</i>	V	-	-ecorded on the wind farm land.
Speckled Warbler <i>Chthonicola sagittata</i>	V	-	-
<b>Diamond Firetail</b> <i>Stagonopleura guttata</i>	V	-	The species is occasionally observed throughout the wind farm land.
Regent Honeyeater <i>Xanthomyza phrygia</i>	E	E	There are no preferred food trees, such as Yellow Box, in the area and very few trees; very unlikely to occur.
Freckled Duck <i>Stictonetta naevosa</i>	V	-	Freckled Ducks occasionally occur on Lake George and Lake Bathurst; the line is not near these water bodies.

Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	V	-	Glossy Black-Cockatoos would not occur along the route of the line, here is no suitable habitat.
<b>Gang-gang Cockatoo</b> <i>Callocephalon fimbriatum</i>	V	-	Recorded once on the eastern edge of the wind farm land; could conceivably occur in the woodland on Hammond Ridge occasionally.
Magpie Goose <i>Anseranas semipalmate</i>	V	-	Magpie Geese are not expected to occur near the line as it is not near the local water bodies.
<b>Flame Robin</b> <i>Petroica phoenicea</i>	V	-	Occasionally recorded in paddocks on the wind farm land.
Scarlet Robin <i>Petroica boodang</i>	V	-	Probably occasionally occurs in woodland in the vicinity of the proposed line (Hammond Ridge area).
Little Eagle <i>Hieraaetus morphnoides</i>	V	-	Probably occasionally occurs in the area.
Varied Sittella <i>Daphoenositta chrysoptera</i>	V	-	Probably occasionally occurs in woodland in the vicinity of the proposed line (Hammond Ridge area).
White-browed Woodswallow <i>Artamus superciliosus</i>	V	-	Large numbers can occur on the tablelands during inland drought conditions, otherwise the species is absent.
<b>White-fronted Chat</b> <i>Epthianura albifrons</i>	V	-	Occasionally recorded locally on valley floors, not necessarily near water.
<b>Reptiles</b>			
Little Whip Snake <i>Suta flagellum</i>	V	-	Little Whip Snakes are not expected to occur on the majority of the route; potential exists in woodland on Hammond Ridge.
Striped Legless Lizard <i>Delmar impar</i>	V	V	There is no suitable habitat in the area for Striped Legless Lizards; they occur in natural temperate grassland and there are no local records.
Pink-tailed Worm-lizard <i>Aprasia parapuchella</i>	V	V	Pink-tailed Worm-lizards are unlikely to occur in the area; the species occurs in rocky areas with native grassland.
Grassland Earless Dragon <i>Tympanocryptus lineata pinguicolla</i>	E	E	This species would not occur in this area; there is no suitable grassland habitat and no local records.
<b>Frogs</b>			
Green and Golden Bell Frog <i>Litoria aurea</i>	E	V	This species would not occur near the line route. There is no wetland habitat.
<b>Invertebrates</b>			
Golden Sun Moth <i>Synemon plana</i>	E	CE	Golden Sun Moths occur in natural temperate grassland, they would be unlikely to occur in the area because of the poor quality of the grassland; there are no local records.

<sup>+</sup> V = vulnerable; E = endangered; CE = critically endangered; - = not listed.

## 5.2 *Migratory Species*

In addition to threatened species, the EPBC Act allows for the listing of internationally protected migratory species, i.e. species listed under the Japan - Australia Migratory Bird Agreement (JAMBA), the China - Australia Migratory Bird Agreement (CAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Various internationally protected migratory species occur have been recorded in the vicinity of Capital Wind Farm, species such as the Australian Wood Duck, Australian Shelduck, Pacific Black Duck, Nankeen Kestrel, Brown Falcon and Wedge-tailed Eagle. However, there is no important habitat on the subject land for such species and the habitat along the route of the transmission line is not likely to support an ecologically important proportion of a population of such species.

## 5.3 *Endangered Populations*

Endangered populations in New South Wales are listed under the TSC Act (Schedule 1, Part 2). There are no provisions under the EPBC Act for the listing of endangered populations. No endangered populations have been declared in the locality.

## 5.4 *Endangered Ecological Communities*

Endangered ecological communities in New South Wales are listed under the TSC Act (Schedule 1, Part 3). Nationally threatened ecological communities are listed under the EPBC Act. Several endangered ecological communities and nationally threatened ecological communities occur on the Southern Tablelands of New South Wales; i.e. White Box Yellow Box Blakely's Red Gum Woodland, Natural Temperate Grassland of the Southern Tablelands and Montane Bogs and Fens. Much of the low-lying country in the locality once supported Yellow Box - Blakely's Red Gum Woodland or, on broad valley floors near Lake George, native grassland with few if any trees (i.e. natural temperate grassland). Snow Gum Woodland (Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland) occurred in some places, although there is virtually none left today. Very few remnants of these communities remain, although many paddocks support a native pasture where some native perennial grasses are common.

The native grassland in the locality is either secondary grassland, originally growing as an understorey to a *Eucalyptus rossii* – *Eucalyptus dives* woodland or, on the lowest country, Yellow Box – Blakely's Red Gum Woodland. That community is not a listed endangered ecological community. Some native grassland patches in the valley north of the substation is secondary grassland originating from a Yellow Box – Blakely's Red Gum Woodland, which is a listed endangered ecological community; see plot data in **Appendix 3**.

# 6. *IMPACT ASSESSMENT*

## 6.1 *Overview*

The construction of the proposed transmission line will have no significant impact on native flora and fauna. The proposed route almost totally traverses treeless land with a cover of native pasture, exotic grassland and improved pasture.

An assessment of the quality of native grassland in the area was undertaken using the method developed and described by Rehwinkel (2007); see **Appendix 3**. That method provides a “floristic value score” that determines the quality of a grassland patch. The score obtained by the plot is 5. Rehwinkel (2007) states that “if the score derived using this method is 4 or above, then the site has moderate to high floristic value”. Observations in the study area and the quality scores obtained in this and previous studies indicate that the grassland in the area is of low quality, with occasional moderate quality patches.

Patches of woodland, not part of a listed endangered ecological community, occur on the Hammond Ridge. It is estimated that five small trees would require removal in the Hammond Ridge area; i.e. along the northern fence line (see Photograph 2 in **Appendix 1**). These can and should be avoided as they are of local habitat value to native flora and fauna. Elsewhere, there are occasional scattered paddock trees; these also should be avoided wherever practical for their habitat and landscape values. Other habitat features such as watercourses and rock outcrops are generally minor in the area and will not be significantly affected.

## **6.2 Impact on Threatened Species, Populations and Communities**

### **6.2.1 Legislative Context**

#### ***Threatened Species Conservation Act 1995***

Under the provisions of the *Threatened Species Conservation Act 1995*, the impact of a proposed action, development or activity on species, populations and communities (and their habitats) is assessed by applying various factors set out under Section 5A of the New South Wales *Environmental Planning and Assessment Act 1979* (EPA Act). Commonly referred to as the "seven part test", these factors assist the proponent and the determining authority to decide whether the impact is likely to be significant and whether a Species Impact Statement (SIS) should be prepared.

The TSC Amendment Act allows the Minister for the Environment to issue assessment guidelines to assist proponents to determine whether an action is likely to significantly affect threatened species, populations or ecological communities, or their habitats. The then Department of Environment and Conservation published draft guidelines in August 2005.

#### ***Environment Protection and Biodiversity Conservation Act 1999***

The impact of a proposed action on matters of national environmental significance is assessed under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Matters of national environmental significance are World Heritage properties, National Heritage places, wetlands of international importance (RAMSAR wetlands), threatened species and ecological communities listed under the EPBC Act, migratory species listed under the EPBC Act, Commonwealth marine environment, and nuclear actions (including uranium mining).

An "action" is a project, a development, an undertaking, an activity or a series of activities, and an alteration of any of the above. An action can be on Commonwealth land, State land council land, private land, or water.

Approval is required from the Commonwealth Environment Minister for actions that are likely to have a significant impact on a matter of national environmental significance; these are called "controlled actions". A proposed action is a "controlled action" if:

- is likely to have a significant impact on a matter of national environmental significance,
- is likely to have a significant impact on the environment of Commonwealth land,
- is to be undertaken on Commonwealth land and is likely to have a significant impact on the environment anywhere, and
- is an action to be taken by the Commonwealth that is likely to have a significant impact on the environment anywhere.

Only the Commonwealth can advise definitively whether a proposed action is a controlled action; however, the Department of the Environment and Heritage has prepared guidelines to facilitate a self-assessment process to help proponents decide whether an action is likely be a controlled action that should be referred to the Minister for assessment and approval. The *Significant Impact Guidelines: Matters of National Environmental Significance* (DEH May 2006) replaced the *EPBC Act Administrative Guidelines on Significance* (Environment Australia 2000).

**SEPP No.44 - Koala Habitat Protection**

*State Environmental Planning Policy No.44 - Koala Habitat Protection* (SEPP 44) (New South Wales 1995) encourages the conservation and management of natural vegetation providing habitat for Koalas, to ensure a permanent free-living population over the species' present range and to reverse the current trend of Koala population decline. SEPP 44 applies in the local government areas listed under Appendix 1 of the policy.

SEPP 44 helps to identify "potential Koala habitat", i.e. "areas of native vegetation where the trees of the types listed in Schedule 2 [of SEPP 44] constitute at least 15% of the total number of trees in the upper or lower strata of the tree component". If no Schedule 2 tree species are present or if they constitute less than 15% of the total number of trees present, then no further provisions of the Policy apply.

If more than 15% of the trees in the area are Schedule 2 tree species, then an assessment must be made by a qualified person to determine whether the area contains "core Koala habitat", a term applied to "an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population".

**6.2.2 Assessment under the TSC Act**

The "seven part test" set out under Section 5A of the EPA Act has been applied below, to assist in determining whether the proposed development is likely to have a significant effect on species, populations and ecological communities (and their habitats) listed under the TSC Act.

*(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*

The transmission line is not likely to have an adverse effect on the life cycle of any threatened species to the extent that a viable local population of the species is likely to be placed at risk of extinction. No threatened plant species were recorded. Although a few threatened woodland birds probably occur in the general area, these will not be impacted by a transmission line that traverses cleared land. Minimal ground disturbance will occur, as vehicles have ready access to the line route with no need to construct tracks. Pole installation need not cause a large disturbance to vegetation or soils; see Photograph 5 in **Appendix 1**.

*(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*

The transmission line is not likely to have an adverse effect on the life cycle of any endangered population. No endangered populations have been declared on, or adjacent to, the subject land.

*(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*

*(ii) is likely to substantially and adversely modify the composition of the ecological community such that its occurrence is likely to be placed at risk of extinction*

The transmission line will not have an adverse effect on endangered ecological communities; there are none in the study area, because the sites are dominated by native pasture and exotic grassland that, at most, are very poor examples of the listed White Box - Yellow Box Blakely's Red Gum Woodland. Small areas of native grassland north of the substation may be secondary grassland from this community, but their quality is not very high (see results of survey plot), and disturbance there is minimal as the access track already exists.

*(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
- (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
- (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 habitat for threatened species, populations or ecological communities will be removed or modified, or will become fragmented or isolated in order to construct the transmission line.

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

Critical habitat refers only to those areas of land listed in the Registers of Critical Habitat. No critical habitat has been declared in the study area.

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

The proposal is not inconsistent with any recovery plan or threat abatement plan.

- (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.

Key threatening processes in New South Wales are listed under the TSC Act and *Fisheries Management Act 1994* (FMA Act). The proposed action would involve very minor clearing of native vegetation, but only to a negligible extent.

### **Conclusion, TSC Act**

In our opinion, the transmission line is not likely to have a significant effect on any threatened species, populations or communities listed under the *Threatened Species Conservation Act 1995*, or their habitats, and the preparation of a Species Impact Statement (SIS) is not warranted.

### **6.2.3 Assessment under the EPBC Act**

The following questions in the *Significant Impact Guidelines* (DEWR May 2006) must be addressed when deciding whether or not to refer a proposed action to the Commonwealth Minister for the Environment:

1. Are there any matters of national environmental significance located in the area of the proposed action (noting that 'the area of the proposed action' is broader than the immediate location where the action is undertaken; consider also whether there are any matters of national environmental significance adjacent to or downstream from the immediate location that may potentially be impacted)?

Response: Various internationally protected migratory species occur in the general area, e.g. Australian Wood Duck, Australian Shelduck, Pacific Black Duck, Nankeen Kestrel, Brown Falcon and Wedge-tailed Eagle. The small patches of native (secondary) grassland north of the substation are not a part of the listed White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland community (Box Gum Woodland) listed threatened ecological community as it does not meet the minimum criteria for that community.

2. Considering the proposed action at its broadest scope (that is, considering all stages and components of the action, and all related activities and infrastructure), is there potential for impacts, including indirect impacts, on matters of national environmental significance?

Response: The potential for the proposed transmission line to impact on internationally protected migratory species is expected to be negligible, given the type and small amount of habitat involved.

3. Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance (and if so, is the effectiveness of these measures certain enough to reduce the level of impact below the 'significant impact' threshold)?

Response: There is no necessity to undertake such measures as there are no matters of national environmental significance in the area.

4. Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts (important, notable, or of consequence, having regard to their context or intensity)?

Response: No; the potential impact is expected to be negligible.

### **Assessment**

An action must be referred to the Commonwealth Minister if it has, will have, or is likely to have a significant impact on matters of national environmental significance. The impact of the proposed transmission line on internationally protected migratory species has been assessed below, by applying the significant impact criteria for migratory species. No nationally endangered communities occur there and no nationally threatened species are likely to occur there.

#### *Significant Impact Criteria for Critically Endangered and Endangered Ecological Communities*

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

- reduce the extent of an ecological community;
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;
- adversely affect habitat critical to the survival of an ecological community;
- 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;
- 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;
- 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
  - 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.

There are no endangered ecological communities (EEC) along the proposed transmission line. There are a few patches of native grassland in the valley north of the Capital Wind Farm substation that are probably secondary grassland derived from a Yellow Box-Red Gum Woodland that is part of the community complex listed under the act. However, these areas do not meet the minimum criteria for the community set by the Commonwealth.

#### *Significant Impact Criteria for Listed Migratory Species*

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

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.



An area of "important habitat" for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at particular life-cycle stages; and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

In relation to migratory species, "population" means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

The proposed transmission line is not likely to have a significant impact on listed migratory species. There is no "important habitat" on the land traversed for such species and the habitat in the area is not likely to support an "ecologically important proportion of a population" of such species.

### **Conclusion, EPBC Act**

In our opinion, the construction of the proposed transmission line is not likely to have a significant impact on matters of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act*. Referral to the Commonwealth Minister for the Environment for assessment and approval is therefore not warranted.

### **6.2.4 Assessment under SEPP 44**

*State Environmental Planning Policy No.44 - Koala Habitat Protection* (SEPP 44) applies in this area, but there are no Schedule 2 Koala food trees recorded on the subject land. The area is therefore not "potential Koala habitat" and no further provisions of the Policy apply.

## **7. CONCLUSION AND RECOMMENDATIONS**

The construction of the proposed transmission line from the Capital Stage 2 Wind Farm to the substation on the Capital Wind Farm site is across almost treeless grazing land. None of this vegetation or the habitat found there are of high value for native flora and fauna.

The transmission line is not likely to have a significant impact on threatened species, populations or ecological communities listed under the *Threatened Species Conservation Act 1995* and on matters of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act*. The preparation of a Species Impact Statement (SIS) and referral to the Commonwealth Minister for the Environment for assessment and approval are therefore not warranted.

The following recommendations are made to avoid and minimise the impact of the proposed transmission line on flora and fauna.

- Vehicle tracks should not be created to gain access to the route to construct the line. Vehicles can readily access the pole sites without such construction, which has the potential to cause erosion and impacts on grazing land.
- Vehicle traffic to pole locations should be minimised to avoid erosion and soil compaction.
- The route at the northern end of Hammond Ridge is on the very edge of a stand of woodland. A few trees only need to be removed; tree removal should be absolutely minimised.

- Weed control on the properties traversed is not the responsibility of the operator or contractors associated with the project; however measures need to be taken to ensure that the construction of the line does not exacerbate the weed problem on the properties involved. This is particularly important in regard to the spreading of invasive weeds to new locations; advice should be sought from land owners as to any weed issues that should be considered.
  - The valley north of the substation contains some native grassland, albeit of low to moderate quality. Disturbance there should be kept to a minimum; access is readily available off the existing, parallel vehicle track.
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## 8. REFERENCES

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**APPENDIX 1**  
**PHOTOGRAPHS OF THE PROPOSED TRANSMISSION LINE ROUTE**



1. Looking east along the northern boundary of the wind farm site. The line would be to the right, southern side of this fence. Hammond Ridge is in the far distance; see next photograph.



2. Looking along the proposed route at the northern end of Hammond Ridge. The line would follow the right, southern side of this fence.



3. Land at the northern end of Hammond Ridge; here there is mainly native pasture with scattered small trees of *Acacia mearnsii*.





4. The eastern end of the proposed line, looking south towards the substation in the far distance. The new line would be to the right (west) of the existing line shown here.



5. These poles were installed on the Capital wind farm site with minimal disturbance to the ground cover vegetation.

## APPENDIX 2

### LIST OF PLANT SPECIES FOR THE STUDY AREA

#### Apiaceae

*Hydrocotyle laxiflora* Stinking Pennywort

#### Asteraceae

*Chrysocephalum apiculatum* Common Everlasting  
*Cotula australis* Common Cotula  
*Cymbonotus ? lawsonianus* Austral Bears-ear  
*Leptorhynchos squamatus* Scaly Buttons  
*Solenogyne dominii* Smooth Solenogyne  
*Triptilodiscus pygmaeus* Austral Sunray  
*Vittadinia gracilis* Woolly New Holland Daisy  
*Vittadinia muelleri* Narrow-leaf New Holland Daisy  
*\*Arctotheca calendula* Capeweed  
*\*Carthamus lanatus* Saffron Thistle  
*\*Cirsium vulgare* Spear Thistle  
*\*Conyza sp.* Fleabane  
*\*Gamochaeta sp.* Cudweed  
*\*Hypochaeris radicata* Flatweed  
*\*Onopordium acanthium* Scotch Thistle

#### Campanulaceae

*Wahlenbergia gracilis* Australian Bluebell

#### Caryophyllaceae

*Spergularia rubra* Sandspurry  
*\*Cerastium fontanum* Mouse-ear Chickweed  
*\*Paronychia brasiliensis* Chilean Whitlow Wort  
*\*Petrohragia nanteuillii* Proliferous Pink

#### Colchicaceae

*Wurmbea dioica* Early Nancy

#### Convolvulaceae

*Convolvulus erubescens* Australian Bindweed  
*Dichondra repens* Kidney Weed

#### Crassulaceae

*Crassula sieberiana* Stonecrop

#### Cyperaceae

*Lepidosperma laterale* Variable Sword-sedge

#### Epacridaceae

*Lissanthe strigosa* Peach Heath  
*Melichrus urceolatus* Urn Heath

#### Euphorbiaceae

*Poranthera microphylla* Small Poranthera

#### Fabaceae

##### Faboideae (subfamily)

*Dillwynia sp.* Parrot Pea  
*\*Trifolium subterraneum* Subterranean Clover

##### Mimosoideae (subfamily)

*Acacia mearnsii* Black Wattle  
*Acacia melanoxylon* Blackwood

**Geraniaceae***\*Erodium* sp.

Stork's-bill

**Goodeniaceae***Goodenia hederacea*

Ivy Goodenia

**HALORAGACEAE***Gonocarpus tetragynus**Haloragis heterophylla*

Poverty Raspwort

Swamp Raspwort

**Juncaceae***Juncus* spp.

Rushes

**Lomandraceae***Lomandra filiformis*

Wattle Mat-rush

**Myrtaceae***Eucalyptus dives**Eucalyptus rossii*

Broad-leaved Peppermint

Inland Scribbly Gum

**Oxalidaceae***Oxalis* sp.

Wood Sorrel

**Phormiaceae***Dianella revoluta**Stypandra glauca*

Spreading Flax-lily

Nodding Blue Lily

**Plantaginaceae***Plantago varia**\*Plantago lanceolata*

Variable Plantain

Ribbed Plantain

**Poaceae***Aristida ramosa**Austrodanthonia carphoides**Austrodanthonia* sp.*Austrostipa bigeniculata**Austrostipa scabra**Bothriochloa macra**Cynodon dactylon**Joycea pallida**Microlaena stipoides**Panicum effusum**Poa sieberiana**Themeda australis**\*Avena* sp.*\*Bromus hordeaceus**\*Holcus lanatus**\*Hordeum* sp.*\*Nassella trichotoma**\*Pentaschistis airoides**\*Phalaris* sp.*\*Poa bulbosa*

Three-awned Speargrass

Short Wallaby Grass

Wallaby Grass

Tall Speargrass

Corkscrew

Red-leg Grass

Couch Grass

Silvertop Wallaby Grass

Weeping Grass

Hairy Panic

Poa Tussock

Kangaroo Grass

Oats

Soft Brome

Yorkshire Fog

Barley Grasses

Serrated Tussock

False Hairgrass

Phalaris

Bulbous Bluegrass

**Polygonaceae***\*Acetosella vulgaris*

Sheep Sorrel

**Primulaceae***\*Anagallis arvensis*

Blue Pimpernel

**Rosaceae***Acaena* sp.

Sheep's Burr

**Rubiaceae***Asperula conferta*

Common Woodruff

**Thymelaeaceae***Pimelea curviflora*Curved Rice-flower

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### APPENDIX 3

#### GRASSLAND SURVEY SHEET

<b>Site name:</b> Woodlawn Transmission Line			<b>Plot ID:</b> CWF 02		<b>Date:</b> 6/10/09	
<b>Community:</b> <i>Poa sieberiana</i> grassland <b>Land Tenure:</b> Freehold						
<b>Soil:</b> Sandy.		<b>Aspect:</b> North <b>Alt.</b> 760m		<b>Geology:</b> Devonian granite.		<b>Slope:</b> Level
<b>GPS (centre):</b> 55 0730087 6104728			<b>Topography:</b> Broad valley floor			
Species Name (native species only)	Braun- Blanquet Score	Species Type Code	Indicator Species level 2	Indicator Species level 2 with the exception of those with scores of 'r'	Indicator Species (level 1 & 2)	Indicator Species levels 1 & 2 with the exception of those with scores of 'r'
Ref. in Rehwinkel (2007).	See p.9	Appendices	Table C	Table D	Table E	Table F
<i>Asperula conferta</i>	1	1			1	1
<i>Austrodanthonia carphoides</i>	3	C				
<i>Bothriochloa macra</i>	1	C				
<i>Convolvulus erubescens</i>	1	C				
<i>Crassula sieberiana</i>	2	C				
<i>Cymbonotus</i> sp.	1	C				
<i>Dichondra repens</i>	+	C				
<i>Lomandra filiformis</i>	1	1			1	1
<i>Ophioglossum lusitanicum</i>	+	2	+		+	
<i>Panicum effusum</i>	1	C				
<i>Poa sieberiana</i>	5	C				
<i>Solenogyne dominii</i>	1	C				
<i>Triptilodiscus pygmaeus</i>	1	1			1	1
<i>Wurmbea dioica</i>	+	2	+		+	
<b>Exotics</b>						
* <i>Aira elegans</i>	2					
* <i>Carthamus lanatus</i>	2					
* <i>Erodium</i> sp.	1					
* <i>Gamochaeta americana</i>	1					
* <i>Hypochaeris radicata</i>	1					
* <i>Lolium</i> sp.	1					
* <i>Nassella trichotoma</i>	1					
* <i>Poa bulbosa</i>	1					
* <i>Trifolium subterraneum</i>	1					
<b>TALLY:</b>			2	-		2
<b>SITE'S FLORISTIC VALUE SCORE:</b>						4

Tally: count, do not total, the number of entries in the required columns: *Indicator species level 2* (count all entries), *Indicator species level 2 with the exception of those with scores of "r"* (count entries with scores greater than "r"). *Indicator species levels 1 & 2 with the exception of those with scores of "r"* (count entries with scores greater than "r")

To derive a **floristic value score** for a site, **total** the three tally numbers along the base of the table.

**APPENDIX 4****LIST OF ANIMAL SPECIES FOR THE CAPITAL WIND FARM SITE AND VICINITY**

## Notes:

- a. Source of record:
1. Recorded previously in the near vicinity, including records from the NSW Wildlife Atlas (P).
  2. Recorded in the project area in 2011 (S).
- b. Introduced bird species are indicated by an asterisk (\*).

**MAMMAL SPECIES**

<b>FAMILY</b> Species		Previous Studies	This Study
<b>TACHYGLOSSIDAE</b> Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	P	
<b>PHASCOLARCTIDAE</b> Koala	<i>Phascolarctos cinereus</i>	P	
<b>VOMBATIDAE</b> Common Wombat	<i>Vombatus ursinus</i>	P	S
<b>PSEUDOCHEIRIDAE</b> Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	P	
<b>PHALANGERIDAE</b> Common Brushtail Possum	<i>Trichosurus vulpecula</i>	P	
<b>MACROPODIDAE</b> Eastern Grey Kangaroo Common Wallaroo Red-necked Wallaby Swamp Wallaby	<i>Macropus giganteus</i> <i>Macropus robustus</i> <i>Macropus rufogriseus</i> <i>Wallabia bicolor</i>	P P P P	S
<b>MURIDAE</b> Black Rat* House Mouse*	<i>Rattus rattus</i> <i>Mus musculus</i>	P	S
<b>CANIDAE</b> European Red Fox*	<i>Vulpes vulpes</i>	P	S
<b>LEPORIDAE</b> Rabbit* Brown Hare*	<i>Oryctolagus cuniculus</i> <i>Lepus capensis</i>	P P	S
<b>EQUIDAE</b> Horse*	<i>Equus caballus</i>	P	
<b>BOVIDAE</b> Domestic Cattle*	<i>Bos taurus</i>		S
<b>BOVIDAE</b> Domestic Sheep*	<i>Ovis aries</i>	P	S
<b>CERVIDAE</b> Sambar Deer* Fallow Deer*	<i>Cervus unicolor</i> <i>Dama dama</i>	P P	S

**BIRD SPECIES**

<b>FAMILY</b>		Previous	This
Species		Nearby	Study
Atlas			
<b>CASUARIIDAE</b>			
Emu	<i>Dromaius novaehollandiae</i>	P	
<b>PHASIANIDAE</b>			
Stubble Quail	<i>Coturnix pectoralis</i>	P	S
<b>ANATIDAE</b>			
Blue-billed Duck	<i>Oxyura australis</i>	P	
Greylag Goose*	<i>Anser sp.</i>	P	
Musk Duck	<i>Biziura lobata</i>	P	
Black Swan	<i>Cygnus atratus</i>	P	
Australian Shelduck	<i>Tadorna tadornoides</i>	P	
Australian Wood Duck	<i>Chenonetta jubata</i>	P	S
Freckled Duck	<i>Stictonetta naevosa</i>	P	
Pacific Black Duck	<i>Anas superciliosa</i>	P	S
Magpie-Goose	<i>Anseranas semipalmata</i>	P	
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	P	
Australian Shoveler	<i>Anas rhynchotis</i>	P	
Grey Teal	<i>Anas gracilis</i>	P	S
Chestnut Teal	<i>Anas castanea</i>	P	S
Hardhead	<i>Aythya australis</i>	P	
<b>PODICIPEDIDAE</b>			
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	P	S
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	P	
<b>PHALACROCORACIDAE</b>			
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	P	S
<b>ARDEIDAE</b>			
White-faced Heron	<i>Egretta novaehollandiae</i>	P	S
White-necked Heron	<i>Ardea pacifica</i>	P	
Intermediate Egret	<i>Ardea intermedia</i>	P	
<b>THRESKIORNITHIDAE</b>			
Australian White Ibis	<i>Threskiornis molucca</i>	P	
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	P	S
<b>ACCIPITRIDAE</b>			
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	P	
Brown Goshawk	<i>Accipiter fasciatus</i>	P	
Black-shouldered Kite	<i>Elanus axillaris</i>		S
Collared Sparrowhawk	<i>Accipiter cirrhoceph</i>	P	
Wedge-tailed Eagle	<i>Aquila audax</i>	P	S
Little Eagle	<i>Hieraaetus morphnoides</i>	P	
<b>FALCONIDAE</b>			
Brown Falcon	<i>Falco berigora</i>	P	S
Peregrine Falcon	<i>Falco peregrinus</i>	P	
Nankeen Kestrel	<i>Falco cenchroides</i>	P	S
<b>RALLIDAE</b>			
Spotted Crake	<i>Porzana tabuensis</i>	P	
Purple Swamphen	<i>Porphyrio porphyrio</i>	P	

Eurasian Coot	<i>Fulica atra</i>	P	
<b>SCOLOPACIDAE</b>			
Marsh Sandpiper	<i>Tringa stagnatilis</i>	P	
Pectoral Sandpiper	<i>Calidris melanotos</i>	P	
Common Greenshank	<i>Tringa nebularia</i>	P	
Ruddy Turnstone	<i>Arenaria interpres</i>	P	
Curlew Sandpiper	<i>Calidris ferruginea</i>	P	
<b>RECURVIROSTRIDAE</b>			
Banded Stilt	<i>Caldorhynchus leucocephalus</i>	P	
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	P	
<b>CHARADRIIDAE</b>			
Red-capped Plover	<i>Charadrius ruficapillus</i>	P	
Double-banded Plover	<i>Charadrius bicinctus</i>	P	
Grey Plover	<i>Pluvialis squatarola</i>	P	
Pacific Golden Plover	<i>Pluvialis fulva</i>	P	
Red-kneed Dotterel	<i>Erythronyx cinctus</i>	P	
Banded Lapwing	<i>Vanellus tricolor</i>	P	
Masked Lapwing	<i>Vanellus miles</i>	P	
<b>LARIDAE</b>			
Silver Gull	<i>Chroicocephalus novaehollandiae</i>	P	
<b>COLUMBIDAE</b>			
Rock Dove*	<i>Columba livia</i>	P	
Common Bronzewing	<i>Phaps chalcoptera</i>	P	
Crested Pigeon	<i>Ocyphaps lophotes</i>	P	S
<b>CACATUIDAE</b>			
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	P	
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	P	
Galah	<i>Eolophus roseicapillus</i>	P	S
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	P	S
<b>PSITTACIDAE</b>			
Crimson Rosella	<i>Platycercus elegans</i>	P	S
Eastern Rosella	<i>Platycercus eximius</i>	P	S
Red-rumped Parrot	<i>Psephotus haematonotus</i>	P	S
<b>CUCULIDAE</b>			
Pallid Cuckoo	<i>Cacomantis pallidus</i>	P	S
<b>PODARGIDAE</b>			
Tawny Frogmouth	<i>Podargus strigoides</i>	P	
<b>HALCYONIDAE</b>			
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	P	S
Sacred Kingfisher	<i>Todiramphus sanctus</i>	P	
<b>MEROPIIDAE</b>			
Rainbow Bee-eater	<i>Merops ornatus</i>	P	
<b>CLIMACTERIDAE</b>			
White-throated Treecreeper	<i>Cormobates leucophaea</i>	P	
<b>MALURIDAE</b>			
Superb Fairy-wren	<i>Malurus cyaneus</i>	P	S
<b>PARDALOTIDAE</b>			
Spotted Pardalote	<i>Pardalotus punctatus</i>	P	

Striated Pardalote	<i>Pardalotus striatus</i>	P	S
White-browed Scrubwren	<i>Sericornis frontalis</i>	P	
Weebill	<i>Smicromis brevirostris</i>	P	
White-throated Gerygone	<i>Gerygone albogularis</i>	P	
Brown Thornbill	<i>Acanthiza pusilla</i>	P	
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	P	
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	P	S
Yellow Thornbill	<i>Acanthiza nana</i>	P	
Striated Thornbill	<i>Acanthiza lineata</i>	P	
Southern Whiteface	<i>Aphelocephala leucopsis</i>	P	
<b>MELIPHAGIDAE</b>			
Red Wattlebird	<i>Anthochaera carunculata</i>	P	S
Noisy Friarbird	<i>Philemon corniculatus</i>	P	
Noisy Miner	<i>Manorina melanocephala</i>	P	
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	P	
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	P	
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	P	
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	P	
White-naped Honeyeater	<i>Melithreptus lunatus</i>	P	
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	P	
White-fronted Chat	<i>Epthianura albifrons</i>	P	S
<b>PETROICIDAE</b>			
Scarlet Robin	<i>Petroica boodang</i>	P	
Flame Robin	<i>Petroica phoenicea</i>	P	
<b>NEOSITTIDAE</b>			
Varied Sittella	<i>Daphoenositta chrysoptera</i>	P	
<b>PACHYCEPHALIDAE</b>			
Golden Whistler	<i>Pachycephala pectoralis</i>	P	
Rufous Whistler	<i>Pachycephala rufiventris</i>	P	
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	P	
<b>DICRURIDAE</b>			
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	P	
Restless Flycatcher	<i>Myiagra inquieta</i>	P	
Magpie-lark	<i>Grallina cyanoleuca</i>	P	S
Rufous Fantail	<i>Rhipidura rufifrons</i>	P	
Grey Fantail	<i>Rhipidura albiscapa</i>	P	
Willie Wagtail	<i>Rhipidura leucophrys</i>	P	S
Spangled Drongo	<i>Dicrurus bracteatus</i>	P	
<b>CAMPEPHAGIDAE</b>			
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	P	
White-winged Triller	<i>Lalage sueurii</i>	P	
<b>ORIOLIDAE</b>			
Olive-backed Oriole	<i>Oriolus sagittatus</i>	P	
<b>ARTAMIDAE</b>			
Dusky Woodswallow	<i>Artamus cyanopterus</i>	P	S
Grey Butcherbird	<i>Cracticus torquatus</i>	P	
Australian Magpie	<i>Cracticus tibicen</i>	P	S
Pied Currawong	<i>Strepera graculina</i>	P	
Grey Currawong	<i>Strepera versicolor</i>	P	
<b>CORVIDAE</b>			
Australian Raven	<i>Corvus coronoides</i>	P	S
Little Raven	<i>Corvus mellori</i>	P	S

<b>CORCORACIDAE</b>				
White-winged Chough	<i>Corcorax melanorhamphos</i>	P		S
<b>ALAUDIDAE</b>				
Eurasian Skylark*	<i>Alauda arvensis</i>	P		
<b>MOTACILLIDAE</b>				
Australasian Pipit	<i>Anthus novaeseelandiae</i>	P		S
<b>PASSERIDAE</b>				
House Sparrow*	<i>Passer domesticus</i>	P		
Red-browed Finch	<i>Neochmia temporalis</i>	P		
Diamond Firetail	<i>Stagonopleura guttata</i>			S
<b>FRINGILLIDAE</b>				
European Goldfinch*	<i>Carduelis carduelis</i>	P		S
<b>HIRUNDINIDAE</b>				
Welcome Swallow	<i>Hirundo neoxena</i>	P		S
Tree Martin	<i>Petrochelidon nigricans</i>	P		
Fairy Martin	<i>Hirundo ariel</i>			S
<b>ZOSTEROPIDAE</b>				
Silvereye	<i>Zosterops lateralis</i>	P		
<b>MUSCICAPIDAE</b>				
Bassian Thrush	<i>Zoothera lunulata</i>	P		
Common Blackbird*	<i>Turdus merula</i>	P		
<b>STURNIDAE</b>				
Common Starling*	<i>Sturnus vulgaris</i>	P		S
<b>FROGS</b>				
<b>FAMILY</b>		Previous		This
Species		Nearby		Study
<b>MYOBATRACHIDAE</b>				
Common Eastern Froglet	<i>Crinia signifera</i>	P		S
Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>	P		
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>	P		
Smooth Toadlet	<i>Uperoleia laevigata</i>	P		S
<b>HYLIDAE</b>				
Green and Golden Bell Frog	<i>Litoria aurea</i>	P		
Verreaux's Tree Frog	<i>Litoria verreauxii</i>	P		
<b>REPTILES</b>				
<b>FAMILY</b>		Previous		This
				Study
<b>CHELIDAE</b>				
Long-necked Tortoise	<i>Chelodina longicollis</i>	P		S
<b>AGAMIDAE</b>				
Jacky Lizard	<i>Amphibolurus muricatus</i>	P		
Bearded Dragon		P		
<b>SCINCIDAE</b>				
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>	P		
Striped Skink	<i>Ctenotus robustus</i>			S
Cunningham's Skink	<i>Egernia cunninghami</i>	P		S

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Three-toed Skink	<i>Hemiergis decresiensis</i>	P	
Red-throated Skink	<i>Pseudemoia platynota</i>		S
Eastern Blue-tongued Lizard	<i>Tiliqua scincoides</i>	P	S
Blotched Blue-tongued Lizard	<i>Tiliqua nigrolutea</i>	P	S
<b>ELAPIDAE</b>			
Eastern Tiger Snake	<i>Notechis scutatus</i>	P	S
Eastern Brown Snake	<i>Pseudonaja textilis</i>	P	
Little Whip snake	<i>Suta flagellum</i>	P	

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