

surveyed for Brolga and their habitat quality was assessed. The majority of wetlands surveyed were found to be of low quality (Executive Summary Table B). The Level Three survey in 2008, which visited all wetlands on private land (with the exception of one property) within three kilometres of the wind farm, found a similar number of wetlands in each habitat quality category.

Executive Summary Table B: Wetland habitat Quality during 2007 and 2008

Habitat quality	Percentage of Wetlands (2007)	Percentage of Wetlands (2008)
Low	64	63
Low-moderate	10	17
Moderate	12	11
Moderate-high	7	3
High	7	6

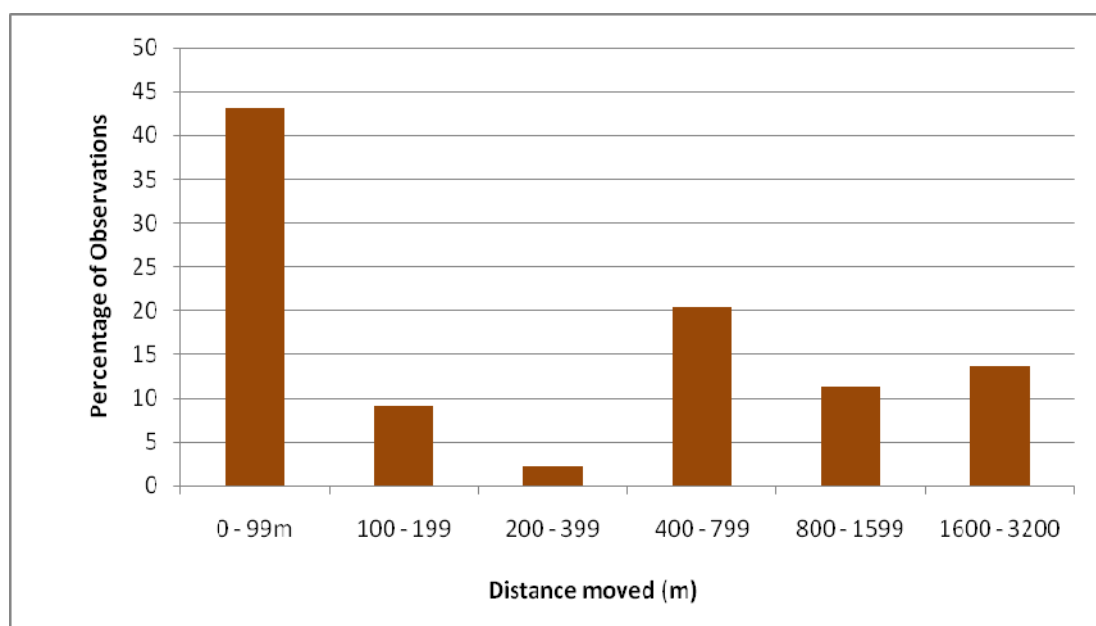
No pairs of Brolgas were found breeding within the boundaries of the proposed Stockyard Hill Wind Farm site during the 2007 and 2008 surveys. However, one Brolga pair nested on the edge of Lake Goldsmith during the 2007 survey (approximately 500 metres from the nearest part of the proposed wind farm). Sites where Brolgas have been observed in the past (AVW, DSE data), such as Buln Gherin Swamp and Black Lake, did not support Brolgas in those breeding seasons. Six other confirmed breeding sites during the 2007 survey were located west and south of the wind farm, within 20 kilometres.

Following this initial survey, a more detailed Level 3 survey was undertaken whereby detailed behavioural observations were recorded to determine how breeding Brolgas moved about their breeding sites and from this, how they were most likely to move across the proposed wind farm. Pairs of Brolga were observed and flight details, including habitat at destination and flight height and distance were recorded.

At these breeding sites, the majority of Brolga flights were of short distance, with more than 50% of the flights being less than 200 metres (Executive Summary Figure C).

During short flights (< 200 metres) the habitat at the destination was predominantly pasture, whilst following longer flights (> 400 metres to 3.2 kilometres) the habitat at the destination was predominantly wetlands. This suggests that areas of pasture within 200 metres of the breeding site, and the wetland habitat of the breeding site itself, provide the bulk of the foraging resources during breeding. During longer-distance movements, Brolgas visited other wetlands more frequently than pasture. The limited extent of wetlands compared with pasture indicated that the location of wetlands noticeably influences the direction of movements greater than 400 metres.

Executive Summary Figure C: Observed Brolga Flight Distance from Breeding Sites (n = 44).



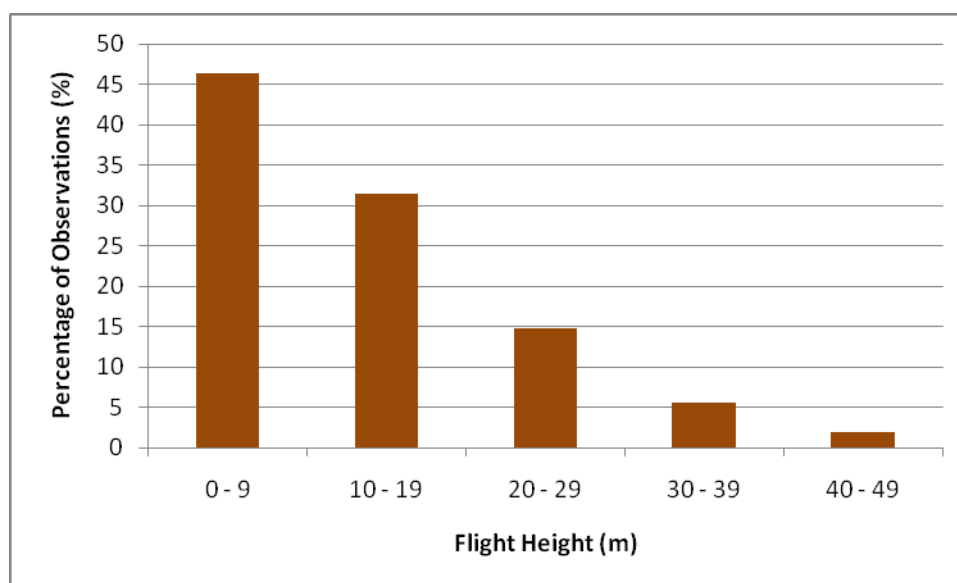
Based on these findings, a Brolga ‘breeding home range’ has been defined as:

- A 400 metre zone around the nesting site including both pasture and wetlands; and
- A zone which includes all intact wetlands within a 3.2 kilometre radius of the nesting site.

The selection of foraging sites during the breeding season is assumed to be dependent on the availability of habitats within home ranges. Based on the information collected during the field surveys and GIS information, it was possible to calculate the percentage of home ranges occupied by wetland habitats. An average of 28% of home ranges comprised wetland habitats (ranging between 0.7% and 89.4%, with 15 of the 18 home ranges studied supporting less than 50% wetlands by area). Observations indicated that more than 50% of observed flights over 400 metres from the nesting site occurred towards wetlands. Taking into consideration the significantly lower proportion of home ranges occupied by wetlands, this data indicates a preference by Brolgas for flying towards wetlands when foraging from breeding sites.

The majority of the flight heights were below 10 metres with approximately 90% of the total flights observed being below 30 metres (Executive Summary Figure D).

Executive Summary Figure D: Percentage of Breeding Season Flight Observations at Difference Heights



Between the breeding and flocking season, Brolga disperse from their breeding sites to their flocking sites, where they will remain until the following breeding season. A similar survey to the Level 2 breeding survey was undertaken during the migration season in 2007. This enables the number of movements of birds during the migration season to be estimated. A pair was estimated to make four movements between wetlands on its way from the breeding to the flocking site.

Prior to the breeding season, Brolgas flock in small to large groups. A flocking site is defined as a place where more than five birds are observed consistently during the flocking season. Historical records and current observations suggest that observations of flocking Brolgas fall into two categories:

- Sites where large numbers of Brolgas regularly occur within and between years, exclusively in larger, more reliably full, wetlands (termed ‘traditional’ flocking sites); and
- Sites where large numbers of Brolgas have occurred once or for only one of the last 20 years (termed ‘one-off stopover’ sites).

Traditional flocking sites are considered to have much greater value for Brolgas than one-off stopover sites. Movements to and from one-off stopover sites are more likely to resemble the movements Brolgas make in the migration seasons. These two types of flocking sites have been accounted for in the collision risk modelling (Smales 2008a) which has been undertaken and is detailed later within this report.

A number of historical and current flocking sites have been observed within 20 kilometres of and in the proposed wind farm. In particular, the four historical sites are:

- Lake Goldsmith (two records in 1988);
- Pasture west of Lake Goldsmith;
- Slate Lake; and

- Pasture near the southern part of the proposed wind farm (two sites).

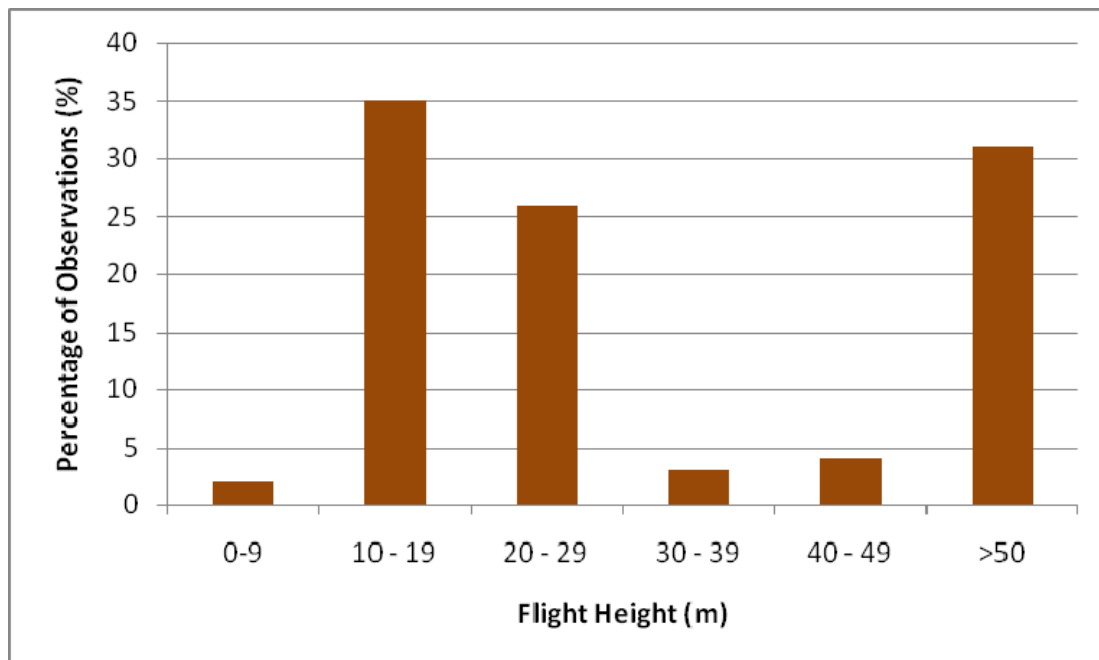
During the initial assessments a significant flocking site was observed at Pink Lake, situated approximately 20 kilometres south-west of the wind farm boundary. During the flocking survey, data collected included all flight height, distance and habitat at the destination. Brolga movements throughout the survey were very similar, whereby they roosted at night at the lake and foraged during the day in three nearby fields.

Movements from the flocking site either comprised:

- Short distance flights within the core flocking area, mostly involving changes in position among the flock or display flights. Such flights covered less than 100 metres; and
- Longer distance flights to and from foraging areas. The distance of these flights varied depending on the position of the foraging paddock-stubble in relation to the main core flocking area. During the observations, the distance varied between 150 and 300 metres to a maximum of 3500 metres.

The majority of the observed flights (63%) were less than 30 metres above ground (Executive Summary Figure E). However, a considerable proportion of flights (> 30%) were above 50 metres, usually between 60 metres and 80 metres above ground. Flight height was found to be strongly correlated with flight distance; the further the distance travelled the higher the flight (correlation coefficient of 0.7665; $P < 0.001$). Most flights beyond 1000 metres were to heights of more than 50 metres above the ground to a maximum height of 100 metres.

Executive Summary Figure E: Percentage of Flocking Season Observations at Different Flight Heights



Impacts and Mitigation

Wind farms have the potential to impact Brolga from the following four sources:

- Collisions with turbines and powerlines;

- Habitat loss;
- Disturbance (including barrier effect); and
- Habitat exclusion.

Collision Risk

No studies examining the impact of wind farms on Brolga have yet been undertaken. However, studies elsewhere in the world on cranes, which exhibit similar behaviours, may be informative in assessing whether a wind farm will significantly impact Brolga populations. Generally observations suggest that cranes avoid turbines. There is one record of a crane colliding with a wind turbine in Germany.

A collision risk analysis was undertaken using the information obtained during the behavioural studies (Smales 2009a). This estimated that across all seasons, the total likely annual collision rate of Brolga with operating wind turbines at the proposed Stockyard Hill Wind Farm was 0.2 birds per year. Powerline collisions were estimated at 0.03 birds per year (Smales 2009b). These estimates are considered to be conservative (i.e. they err on the high side).

PVA modelling (McCarthy 2009) indicates that this order of mortality would result in the loss of an extra one or two birds from the population over 20 years and that an increase of 0.25 birds recruited to the adult population per annum would be sufficient to mitigate this impact.

Habitat Loss, Disturbance, Barrier Effect and Habitat Exclusion

Habitat loss can be permanent or temporary depending on the source of impact. Habitats can be directly lost through habitat removal, degradation from a reduction in water quality, or indirectly lost through permanent and temporary disturbance. Barrier effect arises when turbines form a closely spaced, continuous line, which can disrupt the usual flight routes of birds between roosting and foraging habitats (Drewitt & Landston 2006). Energy which would otherwise be used for foraging or breeding is then used to undertake a significant detour, which can affect long term survival and reproduction.

It is unknown whether Brolga is sensitive to disturbance during construction and operational activities but their wariness of human activity when breeding suggests that they are. For this reason the wind farm layout has been designed to include a precautionary turbine exclusion zone around known Brolga breeding sites. This has also been designed to reduce collision risk (see above).

Additionally, in an attempt to remove potential barrier effects during the migration season, two 1.5 kilometre corridors have been left between groups of turbines within the wind farm.

Impacts to breeding Brolga have been significantly minimised by altering the design of the wind farm. Design measures that have been adopted are summarised below and include:

- An initial breeding site exclusion zone of 400 metres has been established around each known historical and current breeding sites. This will permit movement of breeding birds to pasture areas nearby (breeding Brolgas used pasture more consistently within this distance than beyond it).

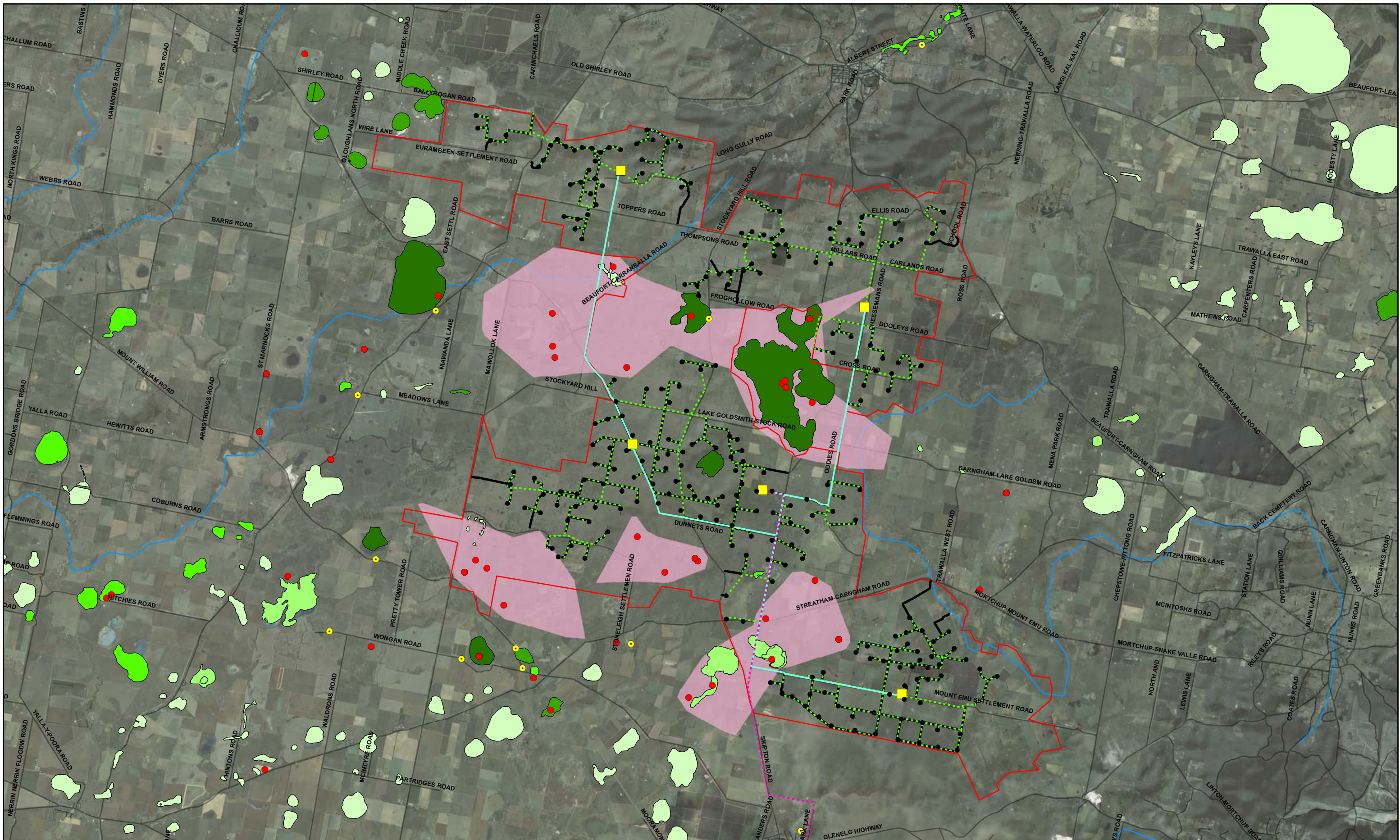
- Around historical and current breeding sites, all usable wetlands (i.e. not converted to farming uses) within 3.2 kilometres of each breeding site (the maximum distance breeding Brolgas were observed to move from a breeding site) have been included, together with the above exclusion zone in a full ‘breeding home range’ exclusion zone.
- A further disturbance exclusion zone of an additional 300 metres around the entire ‘breeding home range’ has been established for each historical (useable) and current known breeding site. This will prevent excessive disturbance from turbines reducing the suitability of the home range for the birds.

Impacts to migrating Brolga have also been assessed as not significant. However, turbines located in close proximity may result in a barrier effect, which has the potential to significantly affect the Brolga movements between breeding and flocking sites, particularly for birds that breed to the east of the wind farm site. To ameliorate this effect, the wind farm has been designed to include two movement corridors; in the northern part of the wind farm (1.5 kilometres wide); and in the southern part of the wind farm (two kilometres wide).

The majority of flocking sites are situated more than five kilometres from the wind farm boundary. Turbine exclusion zones of five kilometres have been established on the wind farm to ensure that flocking Brolga are not impacted by the proposed wind farm. One former flocking site within five kilometres of turbines is no longer used by Brolga as it has been drained and is used for agriculture.

Notwithstanding these measures, there is still the possibility that some Brolga may frequent the wind farm area and be exposed to collision risk with turbines and powerlines. Collision risk modelling based on this ‘residual’ risk has been undertaken, and the results have been evaluated using a Population Viability Assessment for the Brolga in Victoria.

Based on the analyses provided in the above, impacts of the proposed Stockyard Hill Wind Farm on Brolga are not considered to be significant.



Legend

- Study Area
- Proposed Turbines
- Access Tracks
- Internal Powerlines
- - - - Onsite UG Ret Cabling
- - - - External Powerlines
- Proposed Substations
- Roads
- Streams

Habitat Quality of Wetlands

 very low - low	 moderate - high
 low - moderate	 high
 moderate	



- Bolga Records (AVW)**
- Breeding Records
 - Sighting Records
 - Bolga Home Range

Executive Summary Figure F: Bolga Habitats and Results Overview

Project: Proposed Stockyard Hill Wind Farm
 Client: Stockyard Hill Wind Farm Pty. Ltd.

Project No.: 7132	Date: 24/09/2009	Created by: Brett Lane / Syahrudin
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Chapter 5: Powerline Route Assessment

Introduction and Methods

A vegetation and fauna assessment was undertaken on the proposed powerline routes which connect the proposed wind farm a terminal station and national grid. Methods involved field assessments of flora and fauna along three alternative routes, followed by a detailed assessment of the preferred route.

The preferred route was chosen to avoid as many vegetated roadsides as possible.

Results

The initial screening of route options indicated that up to five listed threatened plant species were identified as being potentially present in the alignment area. These were Clover Glycine, Hairy Tails, Large-headed Fireweed, Small Milkwort and Spiny Rice-flower.

The proposed powerline routes passed collectively through 12 remnant habitat zones from the following three EVCs: Plains Grassland, Creekline Grassy Woodland and Grassy Woodland. No native vegetation occurred at the terminal station site. The conservation significance of remnant patches of vegetation was identified as being High or Very High, according to the Framework.

Suitable habitat was found for the following three listed fauna species: Brolga, Fat-tailed Dunnart and Striped Legless Lizards. This information was used to inform the choice of the route of the proposed powerlines.

Impacts and Offsets

The preferred route alignment was chosen to avoid as much roadside remnant native vegetation as possible. Approximately 0.021 hectares (0.009 habitat hectares) of Plains Grassland EVC will need to be removed for the construction of the preferred powerline route. Total offsets required for the proposed removal of native vegetation along the preferred route includes 0.019 habitat hectares of Very High Conservation Significance Plains Grassland. As a rule of thumb, based on a 20% improvement of the offset site, an area of 0.1 hectares of Plains Grassland would be required to compensate for this loss. In addition, two large trees are to be protected and 10 new trees are to be recruited to account for the loss of one scattered River Red Gum.

Regulatory Implications

The EPBC Act listed ecological community Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) was identified on the preferred alignment route (the same areas as Plains Grassland EVC, described above). No important habitats for listed threatened or migratory species occur along the preferred powerline route alignment. Recommendations are provided in Section 3.5 to minimise disturbance to native vegetation and fauna habitat during the construction of the powerline.

Western (Basalt) Plains Grassland Community, listed under the FFG Act, was recorded on roadsides affected by the preferred powerline route. Five FFG Act listed flora species had the potential to occur. As the majority of the powerline study area is within road reserves, which are public land, the provisions of the FFG Act apply. Therefore any removal of native vegetation in the form of Plains Grassland (Western Plains Grassland

Community), as well as any removal of the above mentioned protected flora, would require a licence under the *FFG Act*.

The Brolga is the only fauna species listed as threatened under the *FFG Act* previously recorded near the preferred powerline alignment route. No additional *FFG Act* listed threatened fauna species are considered likely to occur along the route because of a lack of suitable habitat.

No flora species from the *Advisory List of Rare and Threatened Plants in Victoria* (DSE 2005) were recorded from the study area during the current investigation.

Similarly, no fauna species from the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2007b) were recorded during the current survey. However one species, the Fat-tailed Dunnart, is likely to occur in parts of the proposed powerline route, where the roadside reserve consisted of native vegetation. As much habitat for this species on the region's roadsides has been avoided in choosing the preferred route; it is unlikely impacts would be significant.

Permit and License Requirements

Any removal of native vegetation in the form of Plains Grassland (Western Plains Grassland Community), as well as any removal of the above mentioned protected flora, for the construction of the powerline would require a licence under the *FFG Act*.

CHAPTER 1 INTRODUCTION

1.1 Scope of Work

Stockyard Hill Wind Farm Pty. Ltd. engaged Brett Lane and Associates Pty. Ltd. (BL&A) to conduct detailed flora and fauna assessments of the proposed site of the Stockyard Hill Wind Farm.

Key elements of this work are reported here, as follows:

- Initial vegetation mapping and flora assessment (Chapter 2);
- Initial threatened flora survey, habitat hectare assessment and net gain analysis (Chapter 2);
- Targeted grassland survey (Chapter 2);
- Fauna assessment (Chapter 3);
- Targeted Brolga investigations (Chapter 4); and
- Assessment of the proposed powerline route and terminal station (Section 3.5).

Wherever appropriate, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the occurrence or likelihood of occurrence of a species, it is assumed that it could be in an area of habitat, if suitable, and the implications under legislation and policy are considered accordingly.

1.2 Approach

In accordance with the ‘avoid, minimise, offset’ principles of net gain, required under the state Native Vegetation Management Framework, the layout of the proposed wind farm, including generators, access roads and other infrastructure, was designed to avoid patches of native vegetation, wherever possible.

1.3 Proposed Development Site Description

The proposed Stockyard Hill Wind Farm (approximately 23 510 hectares) is located between Beaufort and Skipton in south-west Victoria. The study area is bounded on all sides by private property, with the exception of a small portion of the southern boundary that abuts the Blacks Creek Nature Conservation Reserve.

The land under investigation is used almost entirely for agricultural purposes with the majority being cultivated for grazing and cropping, including most low-lying drainage lines and floodplains. This type of land management has dated back to the 1800s. Therefore, the majority of the site has been significantly modified from its pre-European settlement condition.

The proposed wind farm site can be divided into two sections, roughly divided by Lake Goldsmith, a prominent geographical feature in the area. The northern section begins approximately 3 kilometres south of Beaufort and extends approximately 10 kilometres to the west and 5 kilometres to the east. The southern section occurs south of Lake Goldsmith, extending 15 kilometres to the west and 10 kilometres to the east and to within 5 kilometres north of Skipton.

The wind farm site is primarily located in the Victorian Volcanic Plain bioregion, with the hilly land north of Lake Goldsmith in the northern part of the study area occurring within the Central Victorian Uplands bioregion. This area comprises shallow, rocky soils on hilltops as well as deeper clays and loams in valleys and on lower ground. Quartzite was a common feature in this area. Several dams and drainage lines were observed on lower ground, and in gullies on higher hills.

Vegetation observed in the northern part of the study area comprised the following:

- Mostly intact Heathy Forest on hills, dominated by Messmate Stringybark, Yellow Box and Red Stringybark;
- Pine plantations with or without a ground layer of indigenous grasses and forbs in the northern-central part of the study area;
- Undulating plains at lower elevations that had undergone extensive ringbarking and grazing leaving a scattering of large Eucalypts over an intact (e.g. supporting grazing-tolerant grasses and forbs) to highly degraded and weedy ground layer;
- Rolling hills supporting mostly treeless, introduced pasture with or without a sparse cover of indigenous grasses, some of which may have recolonised such areas following past ploughing and/or cropping; and
- A recently established oat crop on a property in the north-western part of the study area.

Within wooded areas, the proposed development footprint was located along existing firebreaks which had been frequently slashed, cleared of logs and driven over.

The local geology is quaternary basalt, derived from ancient eruption points such as Stockyard Hill, an extinct volcano the crater of which currently holds Black Lake, a semi-saline water body. Low stony rises, including surface and embedded rock, are common across the site, especially in unimproved and uncultivated areas of pasture.

Major wetlands found either abutting the wind farm site boundary or occurring within the site include Lake Goldsmith and Black Lake. Several other smaller wetlands, such as freshwater meadows and shallow freshwater marshes, are scattered within the site, in addition to minor drainage lines and creeks which traverse the site, mostly in the west and north. Some areas of pasture also become seasonally inundated or waterlogged.

The remainder of the study area, comprising flat to undulating lowland plains, occurred within the Victorian Volcanic Plain bioregion. Numerous dams, drainage lines and winter-wet depressions were observed throughout this area including an unnamed creekline that crossed Cheesemans Road between Carlands Road and Ellis Road, Stockyard Hill. Soils were heavy basaltic clays and loams with frequent stony knolls and outcropping basalt. Part of this southern area included an extinct volcanic crater associated with Black Lake (dry during the current investigation), just to the south-west of Lake Goldsmith. Lake Goldsmith was situated in the approximate centre-point of the study area. It was dry for most of the study period, although the southern part of the lake held shallow water in spring 2007.

Observed vegetation in the southern part of the study area included:

- Heavily grazed and highly degraded pasture on plains and low, stony rises; this vegetation was dominated by Weeping Grass and Wallaby/Spear Grasses with very few (if any) indigenous forbs as well as a high cover of weeds;
- Heavily grazed and disturbed introduced pasture on more pronounced stony rises; this vegetation was dominated by introduced species such as Cape Weed and Sweet Vernal-grass, and had a very sparse cover, if any, of indigenous grasses and forbs;
- Wetter areas within drainage lines and wet depressions on the rim and base of the extinct volcanic crater associated with Black Lake; this vegetation was dominated by indigenous tussock grasses and supported an array of grazing-tolerant indigenous herbs; and
- Introduced pasture (dominated by Cape Weed) and recently established oat crops on granitic hills in the far south-eastern corner of the study area.

Blacks Creek Nature Conservation Reserve is situated adjacent to the southern edge of the proposed wind farm and immediately west of Stockyard Hill Road. This reserve supports remnant native grassland vegetation and a known population of the threatened Striped Legless Lizard.

More substantial areas of native vegetation are located within some 20 kilometres of the study area. Langi Ghiran State Park is situated approximately 20 kilometres to the north-west of the study area, separated by grazed and cropped country that has had most of its remnant trees removed. Mount Buangor State Park occurs 10 kilometres to the north-west of the study area, just east of Langi Ghiran State Park. Lake Burrumbeet is within 18 kilometres of the east of the study area. The most south-eastern part of the study area is located approximately 11 kilometres to the north-west of extensive remnant forest that is more-or-less contiguous with Enfield State Park. Land between consists of mostly grazed or cropped farmland. A complex network of wetlands and drainage lines also lies within 20 kilometres to the south-west of the study area.

The entire study area falls within the Glenelg Hopkins catchment. It is currently zoned Road Zone – Category 1 (RDZ1) along the disused road reserve accessing proposed Turbine 98 and along the Stockyard Hill – Skipton Road and part of Geelong Road, and Farming Zone (FZ) on the remainder of the study area. The study area is covered by the Shire of Pyrenees Planning Scheme.

The only overlay affecting the current proposed development footprint is an Environmental Significance Overlay – Schedule 1 (ESO1) which is located on and around Black Lake near the centre of the study area. This area includes the proposed location for Turbine 139 (including construction pad) as well as sections of access tracks proposed for Turbines 174, 139 and 121.

The proposed location of the terminal station is south-west of the intersection of Four Tree Hill Road and Collins Road. It is located immediately north of and adjacent to an existing 500 kV powerline, west of a shelterbelt tree plantation, south of a Blue Gum plantation and east of Lake Straun. The site supports introduced vegetation, having been subject to regular cultivation.

1.4 Regulatory Requirements

1.4.1 Native Vegetation Management Framework

The Native Vegetation Management Framework (the Framework) is a state-wide policy, separate from a local planning overlay that informs applications for permits for the removal of trees or vegetation. In the latter case, different criteria and controls may apply to those described below.

1.4.1.1 How the Framework Operates

Removal of native vegetation requires a planning permit under Clause 52.17 of all Victorian Planning Schemes. Before issuing a planning permit, Responsible Authorities are obliged to refer to Clause 15.09 (Protection of Flora and Fauna) in the Planning Scheme. This refers in turn to the Framework.

Any proposal to remove native vegetation from the study area must demonstrate that the three-step approach of ‘Net Gain’ outlined in the Framework has been applied. This approach is hierarchical and includes the following principles:

- Adverse impacts on native vegetation should be **avoided**, particularly removal of vegetation;
- Where impacts cannot be avoided, impacts should be **minimised** through responsive planning and design, with input from relevant experts; and
- Appropriate **offsets** need to be identified to compensate for native vegetation removal.

A combination of project design and offsetting should aim to achieve a net gain in the area and quality of native vegetation across Victoria.

1.4.1.2 Defining and Assessing Native Vegetation

Native vegetation in Victoria has been defined by DSE as belonging to three categories (DSE 2007b):

- Remnant patch;
- Scattered trees; and
- Degraded treeless vegetation.

A description of these is provided below with the prescribed DSE methods to assess them.

Remnant Patch

Remnant patches of native vegetation comprise indigenous plant species considered part of a clearly definable EVC and are defined by the DSE as:

- An area of native vegetation, with or without trees, where at least 25% of the understorey cover is indigenous (excluding bare ground); and/or
- “A group (*i.e. three or more*) of trees where the tree canopy cover is at least 20%” (DSE 2007a).

Remnant patch vegetation is assessed using the habitat scoring or habitat hectare method (Parkes *et al.* 2003; DSE 2004) whereby components of native vegetation (e.g. tree canopy, understorey and ground cover) are assessed against a DSE-issued EVC benchmark (see appendices) that described the notional pre-European condition of that EVC. The score effectively measures the percentage resemblance of the vegetation to its original condition.

The habitat hectare score assists in defining the value of remnant native vegetation for assessing its conservation significance and for calculating offsets if removal of native vegetation is approved.

Scattered Trees

DSE (2007a) define scattered trees as indigenous trees with a diameter at breast height (1.3 metres) (DBH) > 10 centimetres “*within an area where at least 75% of the total understorey plant cover is introduced vegetation and the overall canopy cover for a group (i.e. three or more) of the tree is less than 20%*”.

Scattered trees are counted and their DBH measured. The size class of scattered trees is based on the large tree DBH in the relevant benchmark for the EVC to which it once belonged.

Degraded Treeless Vegetation

Degraded treeless vegetation comprises all other vegetation (DSE 2007a) including:

- Treeless vegetation with less than 25% total cover of indigenous species (excluding bare ground); or
- Treeless vegetation that has greater than 25% total cover of indigenous species (excluding bare ground) but is dominated by a small number of opportunistic native species which were unlikely to have been dominant prior to a disturbance event (e.g. cropping).

1.4.2 Establishing Conservation Significance

Responses to planning permit applications to remove native vegetation vary depending on the conservation significance of the vegetation proposed for removal. Conservation significance determines both the likelihood of approval and, importantly, the scale of the required offset. This is summarised in Table 1.

Table 1: Likely Response to Applications for Removal of Intact Native Vegetation

Framework conservation significance	Likely response to application for clearing	Likely offset requirements
Very high	Clearing not permitted unless exceptional circumstances apply. Offset Management Plan to be submitted with application.	Substantial Net Gain At least 2 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed
High	Clearing generally not permitted.	Net Gain At least 1.5 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are

Framework conservation significance	Likely response to application for clearing	Likely offset requirements
		removed
Medium	Clearing generally not permitted.	Equivalent Gain At least 1 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed
Low	Clearing may be permitted but only as part of an appropriate sustainable use response.	Equivalent Gain At least 1 X calculated loss in habitat hectares

Offset targets are directly related to the habitat hectare value of the removed vegetation. They can comprise indigenous vegetation retained for conservation purposes within the study area, or vegetation elsewhere, secured on a case-by-case basis by the proponent or through the DSE Bush Broker scheme.

Clause 66.02 of all Victorian Planning Schemes specifies the role of the DSE in the assessment of indigenous vegetation removal planning permit applications. If an application is referred to the DSE, the Responsible Authority must follow that department's recommendation in relation to that permit application. The criteria presented in Table 2 indicate when the DSE becomes a referral authority.

Table 2: Application referral criteria

Applications will be referred to the Department of Sustainability and Environment under the following circumstances:
<p>Scattered Trees To remove more than 15 trees of DBH less than 40 centimetres To remove more than 5 trees of DBH 40 centimetres or greater (DBH = diameter at 1.3 metres above ground)</p>
<p>Remnant Patch Vegetation (may include trees) To remove more than 0.5 hectares of vegetation in an EVC with Bioregional Conservation Status of Endangered, Vulnerable or Rare To remove more than 1 hectares of vegetation in an EVC with Bioregional Conservation Status of <i>depleted or least concern</i></p>

For this project, a Referral to DSE is necessary due to removal of greater than 1 hectare of native vegetation.

1.4.3 Flora and Fauna Guarantee Act 1988

The *FFG Act* lists threatened flora and fauna species. The *FFG Act* has limited direct application to private land. However, Clause 15.09 of all Victorian Planning Schemes makes reference to this Act. The local planning authority is likely to consider impacts on *FFG Act*-listed species and communities when deciding on planning permit applications.

A licence is required under the *FFG Act* for the removal from public land of threatened species or communities or protected flora. This licence is obtained from DSE.

1.4.4 Planning Scheme

Removal of native vegetation on allotments of 0.4 hectares or more requires a planning permit under Clause 52.17 of all Victorian Planning Schemes. Before issuing a planning permit, Responsible Authorities are obligated to refer to Clause 15.09 (Protection of Flora and Fauna) in the Planning Scheme. This refers in turn to the Framework.

Habitat Zones X and Y (described in Chapter 2) are subject to an ES01. This overlay relates to the local designated water supply catchment and borehole areas and aims to protect supply and quality of potable water supply for the surrounding farmland and townships. Examples of issues relevant to this overlay include pollution, surface water disruption, erosion and sedimentation. A planning permit is required under the overlay to:

- Remove, destroy or lop more than 1 hectare of vegetation, or vegetation that is within 30 metres of a waterway, waterbody or water supply channel; or
- Construct a building or construct or carry out works if the building or works:
 - Are within 100 metres of a waterway, spring or bore, or within 300 metres of a water body or water supply channel;
 - Will generate wastewater or increase or potentially increase wastewater generation and will not be connected to reticulated sewerage;
 - Are within 6 metres of an effluent disposal field;
 - Include a site cut or fill of greater than one metre in depth or greater than 0.03 hectares in area;
 - Are for the construction or enlargement of a dam or swimming pool; or
 - Are to facilitate intensive animal husbandry, aquaculture or horticulture.

1.4.5 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act contains a list of threatened species and ecological communities that are considered to be of national conservation significance. Any impacts on these species considered significant requires the approval of the Minister for the Environment. If there is a possibility of a significant impact on nationally threatened species or communities or listed migratory species is 'likely', a Referral under the EPBC Act should be considered.

Likely is defined as a 'real or not remote chance or possibility'. A significant impact is defined as an impact that is 'important' or 'notable' with consideration of the context and intensity of the effect. Context might include the conservation status of a species or community at any given geographic level and intensity indicates degree of likely change. So for example, a very intense effect (e.g. large-scale habitat removal) could trigger an assessment for a species that is not particularly vulnerable. Conversely, a small intensity change could require assessment if the species is highly vulnerable. Both context and intensity have to be considered together and if there is any small chance that this could be significant, a referral would normally be required.

A Referral has been submitted by Stockyard Hill Wind Farm Pty. Ltd. and the Commonwealth Minister for the Environment has determined that the project is a 'controlled action', based on the precautionary principle. It will be subject to an assessment and will require approval under the EPBC Act.

1.4.6 DSE Threatened Species Advisory List

Rare and threatened species advisory lists administered by the Department of Sustainability and Environment include flora and fauna species known to be rare or threatened throughout the state. Although the advisory list has no statutory status, the Responsible Authority will consider impacts on any species on the list when assessing a planning application.

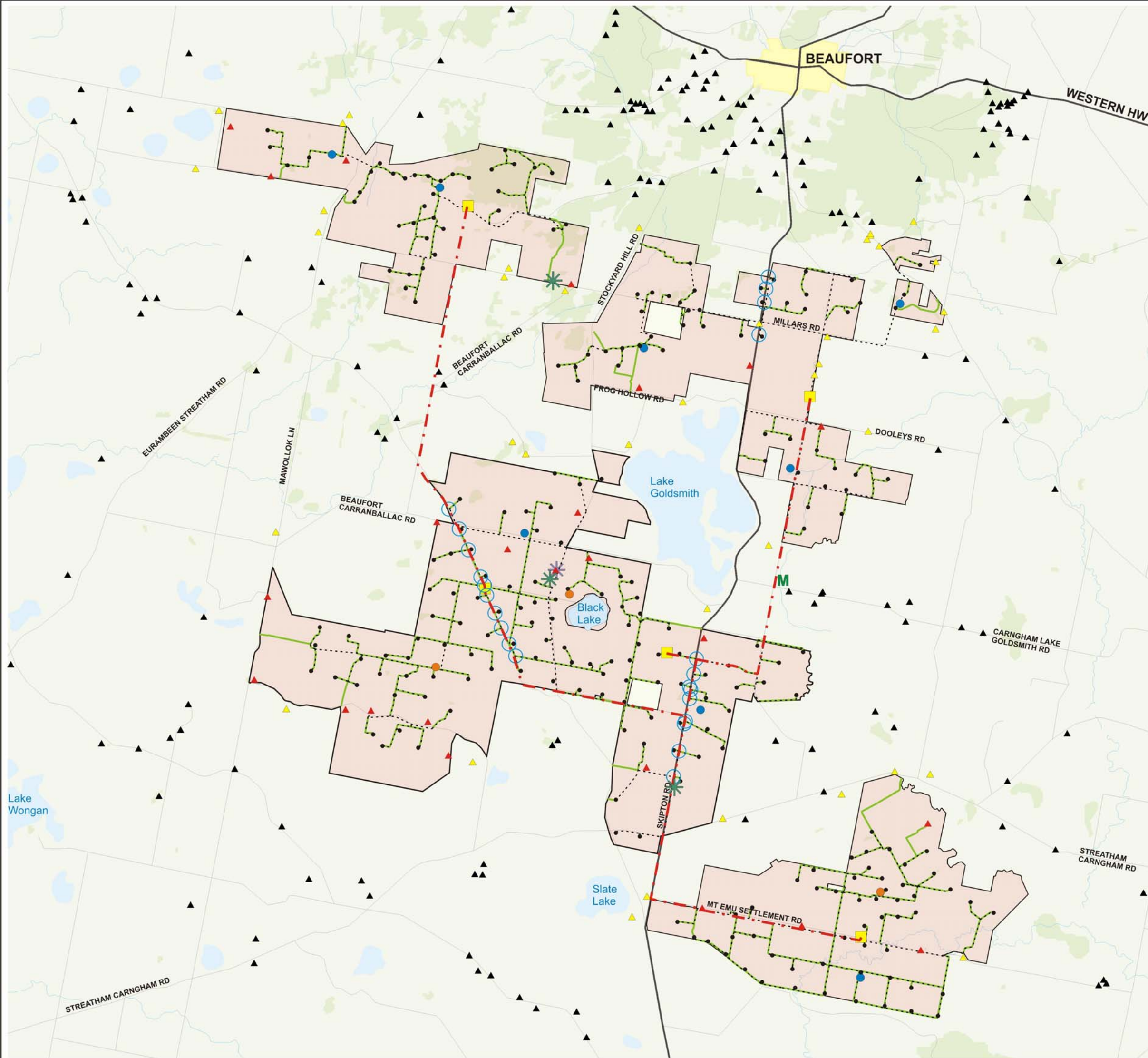
1.4.7 Glenelg Hopkins Native Vegetation Management Plan

The proposed Stockyard Hill Wind Farm lies within the jurisdiction of the Glenelg Hopkins Catchment Management Authority who has produced a Native Vegetation Management Plan. Under certain circumstances the Framework refers to this Native Vegetation Management Plan which provides alternative offset targets requirements specific to the Glenelg Hopkins Catchment.

1.5 Proposed Stockyard Hill Wind Farm

The survey area comprised 57 landholders and an area of approximately 23,510 hectares. It is anticipated that the wind farm will use less than 1% of the subject site, with the remainder of land to be retained for agricultural use.

The turbine layout is presented in Figure 1, and was designed following results from the technical assessments and discussions with relevant specialists.



- Legend**
 SCALE: 1:190,000 @ A3
 1:95,000 @ A1
- Major Roads
 - Minor Roads
 - ▭ Proposed Site Boundary
 - ▭ Townships
 - Major Creeks
 - Wetlands/Waterbodies
 - Major Vegetation Areas
 - M Lake Goldsmith Steam Museum
 - Proposed Turbines
 - Existing Monitoring Masts
 - Proposed Monitoring Masts
 - ▲ Houses within Region
 - ▲ Houses within 500m of Site Boundary
 - ▲ Houses within Site Boundary
 - - - Internal (within the site boundary) Powerlines
 - - - Underground Cabling
 - Access Tracks
 - ▭ Proposed Substations
 - * Maintenance Facility
 - New Access to RDZ1 (Road Zone1)
 - * Staging Area/ Concrete Batching Plants

**STOCKYARD HILL WIND FARM
 INDICATIVE SITE LAYOUT PLAN**

Project No: 0081729	Drawing No: LS2_0081729
Date: 02/07/09	Drawing size: A1
Drawn by: GK	Reviewed by: HB

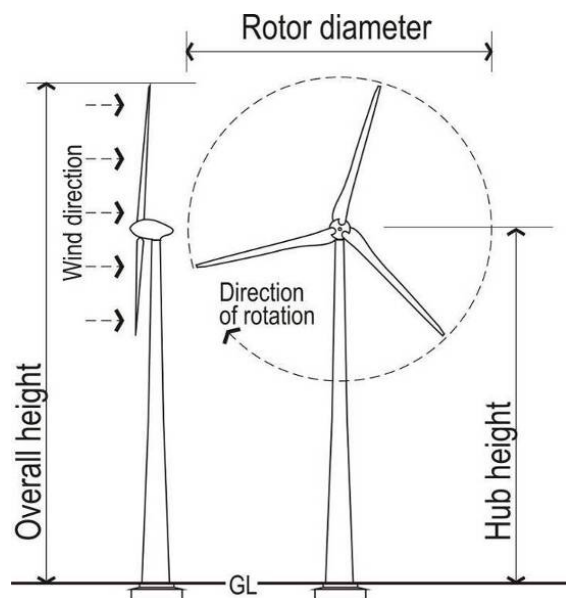
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The Stockyard Hill Wind Farm will involve the installation of approximately 242 turbines and associated infrastructure (including substations, cabling, powerlines, terminal station and access roads).

The anticipated turbine dimensions are presented in Figure 2.

Figure 2: Anticipated Turbine Dimensions



Turbine Dimensions (approximate):

Max Height: 132 metres

Hub Height: 80 metres

Rotor Diameter: 104 metres

The turbines will be bolted to a reinforced concrete base approximately 16 metres in diameter (about 0.02 hectares).

In addition to the installation of wind turbines, the project will also involve supporting infrastructure including maintenance facilities, cabling (predominantly underground), access tracks, substation / switchyard facilities and wind anemometers. The location of these was determined following the detailed technical assessments.

During construction a temporary hard standing area adjacent to each turbine will be used to assemble the turbine. This will be about 40 metres by 25 metres (about 0.1 hectares) and will be made from crushed rock.

The wind turbines will be connected to the local road network via a network of internal access tracks. These will be approximately five meters wide and will also be constructed from crushed rock.

Temporary concrete batching plants will be provided within the staging areas, during the construction phase only. There will be a total of three staging areas. Typically, the area required for the plants and storage of materials is one hectare.

A permanent maintenance facility will be developed in a central location on the wind farm site and will cover an area of approximately 100 metres by 40 metres (0.4 hectares).

There will be five 33 / 132 kV substations required on the wind farm site. These will be located within the north, south, east and west turbine clusters, with another situated in the central area.

The wind turbines will be connected to an on-site electrical kiosk and substations via underground cabling which will run beside the access tracks.

The electricity output will be distributed to the national grid via the 132 kV powerline connecting a terminal station and then to the 500 kV transmission line. This will be achieved via 59 kilometres of double circuit, single pole 132 kV overhead transmission line. The terminal station will occupy approximately 200 metres by 450 metres with a landscape buffer outside the perimeter fence of 50 metres. Structures of note to be built within the terminal station area will include towers of approximately 30 metres in height, a number of Bird Utilisation Survey (BUS) posts at approximately 8 metres in height, a number of transformers with cooling systems and appropriate foundations for each of these. Access tracks will be constructed throughout the area.

1.6 Limitations

Where possible, field surveys should be scheduled in the optimal time of year for the species targeted. However, some species may be overlooked or under-recorded for various reasons, including the seasonal absence or undetectability of some species, and short survey duration when rare or cryptic species are often missed. All surveys have been conducted using standard methodologies from relevant literature, and have been undertaken during the appropriate season, and weather conditions, wherever this has been possible. If this was not possible, we have discussed the reasons and commented on the effect this has on the final results.

Methods used to undertake the surveys followed standard methodologies obtained from relevant literature. Surveys were undertaken during seasons and weather conditions appropriate for detecting the species or group of species under investigation.

Taking the above into consideration, and understanding that access to some properties was limited, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the occurrence or likelihood of occurrence of a species, it is assumed that it could be in an area of habitat, if suitable, and the implications under legislation and policy are considered accordingly.

CHAPTER 2

VEGETATION AND FLORA ASSESSMENT

Key Findings

- Eleven listed threatened flora species (FFG Act and EPBA Act) are thought to be present or potentially present in the study area: Small Milkwort, Australian Anchor Plant, Clover Glycine, Ben Major Grevillea, Adamson's Blown-grass, White Sunray, Spiny Rice-flower, Salt-lake Tussock-grass, Hairy Tails, Button Wrinklewort and Swamp Everlasting. Clover Glycine was recorded within the study area, as was Golden Cowslips at Habitat Zones K and N, a species listed as Endangered on the DSE Advisory List of Threatened Flora and Fauna.
- 21 habitat zones were identified as belonging to the following EVCs: Grassy Woodland (CVU), Grassy Woodland/Heathy Dry Forest Complex (CVU), Heathy Dry Forest (CVU), *Heavier-soils* Plains Grassland (VVP), Plains Grassy Wetland (VVP), Plains Grassy Woodland (CVU), Stony Rises Woodland (VVP).
- Two listed vegetation communities were identified. Western (Basalt) Plains Grassland was identified as being present in habitat zones W and Y and Western Basalt Plains (River Red Gum) Grassy Woodland Floristic Community in Habitat Zone X.
- There is not likely to be any significant impact on any Matters of National Environmental Significance under the EPBC Act.
- Initial scoping (Phase 1) was used to site turbines and infrastructure away from areas of native vegetation, wherever possible. This was not possible in all cases. Further micro-siting of turbines was done during more detailed Phase 2 surveys, to avoid impacts on the highest quality vegetation, in particular, wherever possible, on native grassland.
- The residual consequence is an estimated 5.31 hectares of native vegetation to be removed, which can be offset by 3.09 habitat hectares, equivalent to 16 hectares of remnant vegetation of equivalent EVCs.
- Ten trees were assessed in the development footprint. Of these, one was very large from Heathy Dry forest, two are large from Valley Grassy Forest, four are small from Heathy Dry Forest and three are small from Plains Grassy Woodland. The two large trees from Valley Grassy Forest were situated in Habitat Zone Q, whilst the remaining trees were scattered. The two large identified as requiring removal in Habitat Zone Q can be offset by protecting four trees and recruiting (planting) 20 trees. The scattered large tree can be offset by recruiting 10 new trees, whilst the seven scattered small trees do not require offsetting.