To whom it may concern,

Re: Submission Regarding the Biodiversity Assessment of the Proposed Uungula Wind Farm

I write this submission in the form of a peer review, as an impartial expert Ecologist with interest in maintaining the balance between biodiversity conservation and economic development in the central west of New South Wales.

I do not object to the wind farm in principal, however, I do object to the wind farm project as presented in this EIS. The reason for my objection is the grossly inadequate biodiversity assessment produced by Eco Logical Australia (ELA) who implemented the Framework for Biodiversity Assessment (FBA) in accordance with the *Threatened Species Conservation Act 1995*, and also carried out Assessments of Impact Significance (AoS) in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

In this submission, I review the FBA (Appendix G of the EIS) produced by ELA (Eco Logical Australia 2020a) and the Commonwealth AoS (Appendix H of the EIS) also produced by ELA (Eco Logical Australia 2020b) and identify areas of contention which I believe must be addressed as a matter of priority before this EIS and Windfarm project is approved.

I address my contentions in dot point form for ease of reading and address. Each dot point relates to a numbered section/subsection from the FBA report. In preparing this submission I have only addressed the sections/subsections of the FBA which I feel require address in relation to terrestrial biodiversity.

Contentions Regarding EIS Appendix G – Framework for Biodiversity Assessment Uungula Wind Farm (Eco Logical Australia 2020a)

3.1 Vegetation mapping

i. ELA states " *Due to the size of the Study Area, the scale of vegetation mapping undertaken by ERM is coarse and may require further refinement on the final Development Footprint. This would be achieved through pre-clearing ecological surveys and would be used to inform the final design and micro-siting of infrastructure*."

It is inadequate to present an FBA report with an EIS without a complete and thorough vegetation map. The attempt to rely on future 'pre-clearing surveys' to produce fine-scale mapping is not standard practice and does not allow adequate assessment of the biodiversity impacts of the project.
The vegetation mapping must be mapped to as fine level of scale as practicably possible before the FBA is approved. The 'Biodiversity offset credits' that the windfarm proponent needs to retire can only be accurately calculated if the vegetation mapping is accurate.

ii. ELA states: " *Detailed survey and vegetation mapping for the length of the proposed upgrade to Twelve Mile Road and Ilgingery Road was undertaken by ELA in July 2019, led by ecologists Lily Gorrell and Tomas Kelly. Further field vegetation validation was undertaken by ELA in January 2020 to address select gaps in the vegetation mapping from the revised Development Footprint, led by ecologist Tomas Kelly. ELA vegetation assessment methodology included rapid assessments to determine vegetation type, extent and condition. Rapid assessments were undertaken against the listing criteria for Threatened Ecological Communities (TECs) under both the NSW Biodiversity Conservation Act 2016 (BC Act) and the EPBC Act. Rapid assessments involved describing the vegetation structure, topographic position, soils and any other relevant abiotic factors*."
ELA wrote this FBA report but did not sample any plot transects. The BBAM plot-transect data used for the FBA is from 2013. This data is 7 years old. The condition of vegetation across the entire study area has likely changed since this time. Plots should be resampled to obtain more relevant contemporary data. These plots should be sampled after sufficient rainfall such as during the year 2020 so that an adequate representation of the vegetation floristic attributes can be met.

iii. Why did the BBAM assessment rely on plots sampled outside of the development footprint? Why did ELA not sample more plots within the development footprint? Budget constraint is not an adequate reason to avoid sampling the appropriate number of BBAM plot-transects in a development site.

3.1.1 Threatened Ecological Communities

i. ELA state: "*Further assessment and refinement of EEC/CEEC mapping will be undertaken for the detailed design. The assessment of impacts to the TEC has been undertaken on an assumption that the area may increase by up to 25%, to 30 ha (14 ha of the CEEC), under the detailed design; however, this has not been included in the credit calculation as it is unable be assigned to a particular vegetation zone.* "

ii. ELA state:

"*Approximately 24.3 ha of the vegetation has been mapped as TEC listed under the BC Act:*
- *White Box Yellow Box Blakely's Red Gum Woodland - listed as an Endangered Ecological Community (EEC*)."

The ELA estimate of 24.3 hectares is a gross underestimate of the total area of impact of White Box Yellow Box Blakely's Red Gum Woodland caused by the windfarm. A more realistic estimate is in the order of 137.57 hectares (see **Table 1 of this document**).

In Table 3.1 and Table 8.1 ELA have listed several BVT including BVT which qualify as White Box Yellow Box Blakely's Red Gum EEC, yet are not identified by ELA as corresponding to this EEC. When all BVT that qualify as this EEC are included in the total area of impact, a more accurate estimate of impact to White Box Yellow Box Blakely's Red Gum EEC is expected to be around 137.57 hectares .

iii. ELA place a reliance on further mapping (after approval) to identify the final extent of impact upon TEC. ELA state:

iv.

v. "*Further assessment and refinement of EEC/CEEC mapping will be undertaken for the detailed design."*

vi.

vii. This approach is unsatisfactory. An accurate assessment of total impact to EEC is essential in order to determine a complete and representative offset requirement before projects of this scale are approved.

Table 1. Vegetation Zones Impacted by the Proposed Uungula which Qualify as White Box Yellow Box Blakely's Red Gum Woodland -under the BC Act

Vegetation zone	BVT	BVT Description	Condition	Approx Area (ha)	Identified by ELA as White Box Yellow Box Blakely's Red Gum Woodland under BC Act?
1	CW112	Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion	Moderate/ Good_Medium	3.57	Yes
2	CW112	Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion	Moderate/ Good_Poor	64.72	No
8	CW211	White Box - Rough-barked Apple alluvial woodland on the NSW western slopes	Moderate/ Good_Medium	7.68	Yes
9	CW211	White Box - Rough-barked Apple alluvial woodland on the NSW western slopes	Moderate/ Good_Poor	48.55	No
10	CW212	White Box - Tumbledown Gum woodland on fine-grained sediments on the NSW central western slopes	Moderate/ Good_ Moderate	13.05	Yes
Total area of White Box Yellow Box Blakely's Red Gum Woodland EEC listed under the BC Act to be impacted by the Uungula Wind Farm				**137.57 Hectares**	

4. Threatened Species

4.1.1 Threatened Species Survey Effort

i. The BioNet search area is only 10km wide. A search buffer of 10km is too small for a regional location such as this. A minimum 20km buffer should be used.

ii. This study is reliant on targeted survey data collected as long as 8 years ago. This data is old and not representative. More contemporary data is required.

iii. ELA provide no detail or data from their bird 'utilisation survey' efforts. They provide no analysis into bird habitat usage. Where were the birds and what were they doing? Were they flying, migrating etc.? This level of information is necessary in order to determine if proposed turbine location could impact upon bird movement, particularly in relation to migratory species. The abundance of each species and their height and direction of movement is necessary for this type of study. Where is this data and analysis? A map showing bird movement is needed. This map must be based on legitimately sourced field data, not estimates, inference or desktop mapping.

iv. The level of survey effort undertaking for microbats is grossly insufficient. Two of the main target threatened species are extremely difficult if not impossible to survey using passive acoustic devices, 'daytime searches' and 'active watching' alone, these being *Nyctophilus corbeni* and *Vespadelus troughtoni.* Harp trapping in suitable breeding habitat is necessary to detect these species. These species are practically impossible to detect with any accuracy without these mechanisms. The lack of adequate survey for these two species is a significant flaw in the EIS.

4.2 Species Credit Species

i. ELA state that no survey for Booroolong Frog were undertaken because there is no suitable habitat. This is incorrect. There is suitable stony creek habitat throughout the study area. Booroolong Frog are not restricted to 'permanent watercourses' they can occur on flowing ephemeral watercourses. Adequate survey effort is required along all stone/pebble-bed watercourses to be undertaken for these species in summer, before/after rainfall.

ii. ELA contradict themselves in relation to the potential for several threatened species to occur in the impact area. In table 4.2 of Appendix G ELA identify Brush-tailed Rock Wallaby as requiring further assessment however in Table 7.2 they say this species requires no further assessment, then fail to mention it in Appendix H. This obvious mistake/oversight is a significant flaw in the EIS study. Later in section 4.5 ELA state:

'*Further assessment may be required to determine presence of the following threatened fauna species:*

- *Brush-tailed Rock Wallaby*
- *Eastern Pygmy Possum*
- *Regent Honeyeater*

This statement by ELA is a declaration of the inadequacy of the survey effort undertaken for threatened species across the study area.
All of the above three species, and many more require much more detailed survey effort before this Project is approved.

iii. In order to survey for Brush-tailed Rock Wallaby, cameras should be installed in all areas of rocky habitat, with focus on areas of macropod tracks. Cameras should be deployed with a suitable bait such as 'universal marsupial bait mix' and lucerne or carrots in order to lure any Brush-tailed Rock Wallaby that may be in the area. Survey should be undertaken of all rocky habitat located within the development footprint.

iv. In order to survey for Eastern Pygmy Possum, 'pitfall trap lines' should be run through areas of suitable, low shrubby woodland. Further to this, automated cameras should be deployed in front of trees/flower-bearing shrubs. A honey-water mix can be sprayed on the tree to act as a lure for Pygmy Possums.

v. Regent Honeyeater are extremely rare and easy to miss, therefore, it is recommended that a recognised expert in Regent Honeyeater is commissioned to undertake a detailed study for Regent Honeyeater over the entire project area. This study should take place over a minimum of one year and should be informed by field survey and scientific literature review. Multiple recognised experts in Regent Honeyeater should be contacted to provide comment on the level of impact from the proposal upon these species.

vi. The presence of a potential breeding population of Superb Parrot in the study area has been made known. Superb Parrot have been present in the area between Gulgong and Wuuluman for the last two years, and evidence suggests that breeding may be occurring. A recognised expert in Superb Parrot should be commissioned to conduct study into this species at this location.

4.5 Species Polygons

ELA state:

> "*No threatened flora species have been recorded within the Study Area from or since the ERM surveys which were undertaken in accordance with the 2011 DGRs. Five (5) threatened flora candidate species were identified as having the potential to occur in the Development Footprint based on the associated BVTs, presence of suitable habitat and nearby previous records:*
>
> • *Acacia ausfeldii (Ausfeld's wattle)*
>
> • *Dichanthium setosum (Bluegrass)*
>
> • *Swainsona sericea (Silky Swainson-pea)*
>
> • *Swainsona recta (Small Purple-pea)*
>
> • *Zieria obcordata.*
>
> *Whilst none of the above flora species have been recorded in the Study Area, the Proponent will commit to undertaking pre-clearing surveys in areas of suitable habitat prior to vegetation clearing and micro-siting of infrastructure will be employed to avoid any impact to previously unrecorded threatened flora species.* "

The lack of records of any of the above flora species within the development footprint should not be taken without suspicion, particularly when considering the extent of suitable habitat available in the impact area, and the proximity of large populations of many of these species.

There are strong concerns that the survey effort or timing of survey undertaken by ERM and ELA was not suitable to detect those species. It is also considered possible that the Ecologists involved in the targeted survey were not suitably experienced in the identification of some/all of the above species and their habitat. The FBA (EIS Appendix G) contains no detail about the precise timing that targeted surveys were undertaken, neither is there any mention of the visitation of known reference populations to inform survey timing suitability.

It is strongly recommended that each of the above species is surveyed-for during the year 2020 now that sufficient rainfall across the region has been experienced. Reference should be made to current NSW Flora Survey Guidelines. Only Ecologists/Botanists with experience in identifying these species should be commissioned to undertake surveys for these species.

It is not standard practice, nor appropriate to rely on 'pre-clearing surveys' to avoid impacts to threatened flora that may occur in the zone of a development impact. While pre-clearing surveys are necessary, if a species cannot be adequately surveyed for, it must be assumed present and offset.

If no additional targeted survey is undertaken for these species, their presence should be assumed and the proponent must retire the appropriate number of biodiversity offset credits for each species impacted including, *Acacia ausfeldii, Dichanthium setosum, Swainsona sericea, Swainsona recta and Zieria obcordata,* plus *Diuris tricolor* and any other threatened flora species known to occur within 20km of the proposed development that has not been adequately surveyed for in accordance with current, NSW best-practice guidelines.

The ELA reports have overlooked several species that have strong potential to occur in the study area:

- ***Diuris tricolor*** **(Pine Donkey Orchid) – vulnerable** - This sensitive herb species is likely to occur in the impact area. This sensitive herb must be surveyed for across the entire development footprint (all pads, tracks, generators, powerlines, laydown areas, compounds and substations) in spring when the species is known to flower. Outside of this time the species is undetectable. Insufficient searches have been undertaken by ELA and ERM to date and those that were undertaken cannot be relied upon as they were undertaken during a severe drought year. There is a significant population associated with similar elevations and geologies (on granite and sediments) to the proposed windfarm at several locations along Ulan Road and in the vicinity of Moolarben and Ulan Coal mines. It is highly likely that *Diuris tricolor* would occur in the area of the proposed windfarm. Surveys must be undertaken only when conditions are suitable (i.e. after sufficient rainfall) when a nearby population is in full flower. Any surveys for this species undertaken between 2017-2019 cannot be relied upon because the severe drought conditions were non-conducive to detecting the species.

- ***Chalinolobus dwyeri*** **(Large-eared Pied Bat)** – this vulnerable microbat is known to breed in the area around Gulgong including Ulan and the Goulburn River National Park. Suitable cavernous habitat occurs for this species throughout the study area of the proposed windfarm. More suitable survey effort is necessary to rule this species out.

Contentions Regarding EIS Appendix H - Assessments of Significance (Eco Logical Australia 2020b)

It is understood that the proposed windfarm will be assessed in accordance with the Bilateral Process through adoption of the Framework for Biodiversity Assessment under the former NSW *Threatened Species Conservation Act 1995*. However, it is not the intention of this Bilateral Process to assess impacts from activities/actions upon all Matters of National Environmental Significance (MNES) that are known to occur, or likely to occur in a given impact area, this is because some MNES are not duly listed under the NSW conservation legislation and thus, must be assessed separately. This includes some MNES threatened species and most of the MNES migratory species. Further to his, the bilateral process does not circumvent the need to undertake a Referral to the Commonwealth.

On page 1 of the FBA, ELA stated: "*It is noted that bird and bat strike associated with wind farm developments are not required to be assessed consistent with Section 2.3 of the FBA.*" This may be true for species listed under the NSW TSC Act, however, it is not true for species listed under the EPBC Act. These species must be assessed of complete and total impacts of the development including from the effects of direct land clearing and indirect impacts from the windfarm, in particular, from obvious potential impacts such as turbine strike.

The omission of adequate assessment into direct and indirect effects of the proposed windfarm are noticeable. This omission erodes away at the validity of the arguments put forward by ELA who suggest that the proposed action will not cause any significant impact to any MNES entity.

The "*Australian Government Department of Environment Matters of National Environmental Significance Significant Impact Guidelines 1.1* state:

> *"To be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility.*
>
> *If there is scientific uncertainty about the impacts of your action and potential impacts are serious or irreversible, the precautionary principle is applicable. Accordingly, a lack of scientific certainty about the potential impacts of an action will not itself justify a decision that the action is not likely to have a significant impact on the environment."*

In this section of my review, I highlight several MNES that have been inadequately studied and assessed by ELA (2020a; 2020b) some of these MNES have been ignored entirely, while others have been addressed to such a low level of detail that the assessment of impact is noticeably inadequate and therefore inconclusive.

These observations prove that the precautionary principal applies and a Referral to the Commonwealth must by sought for this project particularly in relation to the following MNES I address in this document.

The two ELA studies (both Appendix G and Appendix H) have inadequately assessed and in some situations, completely overlooked a diverse suite of MNES threatened species that occur or are likely to occur in the impact area have not been adequately assessed. The following MNES species have either been inadequately surveyed for or overlooked altogether. Each of these species have been previously recorded within 50km surrounding the development. The proposed EIS and windfarm must not be undertaken until these species have been adequately surveyed and assessed of impact from the windfarm:

- ***Leucochrysum albicans var. tricolor*** **(Hoary Sunray)** - vulnerable - This sensitive herb species is likely to occur in the impact area. Hoary Sunray was completed ignored by ELA during their assessments, therefore a revised assessment must be undertaken before this EIS is approved. There is a significant population associated with similar elevations and geologies (on granite, sediment and metasediment) around Mudgee Township and at Ulan and Cope Road near Gulgong. This herb must be surveyed for across the entire footprint in spring when the species is known to flower. Outside of this time the species is undetectable.
  Insufficient searches have been undertaken by ELA and ERM to date and those that were undertaken cannot be relied upon as they were undertaken during a severe drought year. This species is not listed under the TSC Act, therefore the bilateral process is insufficient to assess this species. A separate assessment in accordance with the Commonwealth EPBC Act is required.

- ***Swainsona recta*** **(Small Purple Pea)** - vulnerable - This sensitive herb species is likely to occur in the impact area. This sensitive herb must be surveyed for across the entire footprint in spring when the species is known to flower. Outside of this time the species is undetectable. Insufficient searches have been undertaken by ELA and ERM to date and those that were undertaken cannot be relied upon as they were undertaken during a severe drought year. There is a significant population associated with similar elevations and geologies (on sediments and metasediments) to the proposed windfarm at Mount Arthur and Burrendong Dam. It is highly likely that *Swainsona recta* would occur in the area of the proposed windfarm. Surveys must be undertaken only when conditions are suitable (i.e. after sufficient rainfall) when a nearby population is in full flower. Any surveys for this species undertaken between 2017-2019 cannot be relied upon because the severe drought conditions were non-conducive to detecting the species. The species did emerge and flower during those years, but in substantially smaller numbers (as little as 1% -5% of each population flowered) than during a non-drought year. ELA (2020a) state: *"It is unlikely that a previously undiscovered important population of any of these species occurs within the Development Footprint"* This statement by ELA holds little weight since the majority of the proposed windfarm is proposed upon private landholdings which have received little if any previous attention from learned Botanists, least of all at a time when this sensitive, annual-flowering species could be detected.

- ***Dasyurus maculatus*** **(Spotted-tailed Quoll)** - vulnerable - This species is known occur in the impact area. Its presence was completely ignored during the FBA and EPBC Act Assessment by ELA. Spotted-tailed Quoll was completed ignored by ELA during their assessments, therefore a revised assessment must be undertaken before this EIS is approved. Local landholders in the 12 Mile – Wuuluman area have reported Quolls in their chicken pens (N.Smith pers. comm.). The proposed construction of tracks and wind turbines could cause loss of important habitat for this species. Increased road traffic could cause road deaths of Spotted Quoll.

- ***Hirundapus caudacutus*** **(White-throated Needletail)** - vulnerable & migratory - This species is known to occur in the impact area. ELA (2020b) incorrectly disregarded this species stating: '*There are no areas of habitat within the Development Footprint which are considered unique or particularly important for migratory species. No large aggregations of migratory species have been recorded within the Development footprint, nor are they expected to occur based on the available habitat within the development footprint. The proposed works is unlikely to modify, destroy or isolate any habitat that is important to a migratory species*.'
  This statement by ELA is dangerous as it is simply untrue. Respected Ornithologist David Geering reported a large flock of White-throated Needletail near Goolan (32 16S 149 03E) on the Gulgong - Goolma - Dubbo road. " *There were about 40-50 birds here many of which were foraging just metres above the ground. From what I could gather although birds were feeding above the grass they were also feeding above the strip of roadside trees and it seemed that these birds, spread over 1-2 km, were distributed along the road rather than across the cleared landscape*."

  Impacts from wind turbine strike are likely as identified in an extensive study by Biosis Research (2005) identified the White-throated Needletail as being highly likely to suffer significant mortality and impact as a result of wind turbine strike.
  The potential impacts to White-throated Needletail from this windfarm have not been assessed to any level of adequacy and therefore, it is recommended that an expert on the species is commissioned to undertake a thorough study into the effects of the windfarm on this species, particularly from wind turbine strike.

- ***Lathamus discolor*** **(Swift Parrot)** - critically endangered - This species is likely to occur in the impact area. The loss of foraging habitat and the potential for wind turbine strike warrant the need for further assessment into the potential impacts to this species.
  The potential impacts to Swift Parrot from this windfarm have not been assessed to any level of adequacy and therefore, it is recommended that an expert on the species is commissioned to undertake a thorough study into the effects of the windfarm on this species, particularly from wind turbine strike.

- ***Anthochaera phrygia*** **(Regent Honeyeater)** - critically endangered - This species is severely threatened with extinction as the entire global population is as low as 350 birds. Owing to the small size of the remaining population the impact of the loss of any birds from the remaining population is significant to the on-going survival of the species. The Regent Honeyeater is known to occur in the impact area.
  On page 3 of Appendix H of the EIS, ELA incorrectly states: "*There is no known population of either of these species in the locality*". The Regent Honeyeater occurs as a single population across south-eastern Australia with birds migrating between Victoria, New South Wales and Queensland.
  The loss of foraging habitat and the potential for turbine strike are highly likely. The Regent Honeyeater undertakes migration and utilises ridgelines for navigation. The proposed wind turbines will be placed on ridgelines that honeyeaters use for migration. It is entirely possible that individual Regent Honeyeaters could succumb to turbine strike as a result of this windfarm project. The proponent and their consultant, ELA has not undertaken any mapping nor have they consulted enough scientific literature to rule-out this risk. Even if as a few as five individual Regent Honeyeaters are killed by wind turbine strike over the lifetime of this wind farm, that is a loss of approximately 1.5% of the entire population of this species.

The potential impacts to Regent Honeyeater from this windfarm have not been assessed to any level of adequacy and therefore, it is recommended that an expert on the species is commissioned to undertake a thorough study into the effects of the windfarm on this species, particularly from wind turbine strike.

The Regent Honeyeater is a migratory honeyeater species that migrates between Victoria and Southern Queensland during March to July with a major stopover in Goulburn River – Hunter Valley area (Hindwood 1956; Munro & Munro 2008). This Critically Endangered Honeyeater utilises ridgelines when migrating, like the related *Anthochaera carunculata* (Red Wattlebird), *Calligavis chrysops* (Yellow-faced Honeyeater) and *Melithreptus lunatus* (White-plumed Honeyeater) which undertakes a similar migratory pathway.

It is entirely possible that large numbers of Yellow-faced Honeyeaters and White-plumed Honeyeaters will be killed as they undertake migration along the ridgelines where the proposed wind turbines are proposed.

A study by Munro and Cooke (2000) identified that Regent Honeyeaters show a strong natural tendency to migrate in a north-easterly direction between April and May. This means that birds foraging in the central west of NSW and western Victoria may be more likely to pass through the area of the subject land during these months. The flowering of major food resources, particularly *Eucalyptus melliodora* (Yellow Box) takes place in the local area, most commonly between September and December. The Regent Honeyeater may breed in the local area during this time.

- ***Grantiella picta* (Painted Honeyeater) –** vulnerable – The Painted Honeyeater occurs as one population that moves across New South Wales in response to fruiting of mistletoe. On page 3 of Appendix H of the EIS, ELA incorrectly states: "*There is no known population of either of these species in the locality*". The species is regularly recorded from the locality of Burrendong to the west and Ulan to the east of the proposed windfarm. It is known to make high flights across open country and is susceptible to impacts from turbine strike, as well as impact from loss of habitat.

- ***Polytelis swainsonii* (Superb Parrot)** - vulnerable - Superb Parrot have been known from the area between Wellington and Gulgong for many decades. Recent observations of multiple Superb Parrots have been made in the area between Ben Buckley and Wuuluman particularly along 12 Mile Road and its connecting roads. Superb Parrots were photographed along Twelve Mile Road in August 2019. Later that same year a flock of adult and immature (first year) Superb Parrots were observed foraging in flowering *Eucalyptus melliodora* at the corner of Twelve Mile Road and Uamby Road) during October and November 2019 within the proposed windfarm project area (extremely close to the location of proposed high voltage overhead powerlines. The breeding season for this species is September to December (Baker-Gabb 2011). On page 3 of Appendix H of the EIS, ELA incorrectly states: "*There is no known population of either of these species in the locality*".Further to this, ELA state: "*There is limited potential for mortality due to rotor collisions as this species typically flies below Rotor Swept Area (RSA) height*." However, ELA provide no observational data nor any peer-reviewed references to support this claim.
  The most recent sightings of Superb Parrots were made in the vicinity of Twelve Mile Road in Yellow Box woodlands where at least three pairs of Superb Parrot were observed inspecting hollows in *Eucalyptus melliodora* and *Angophora floribunda* during late June 2020. It is likely that Superb Parrot breed in the vicinity of the proposed windfarm since begging juvenile birds were observed in October 2019 and pairs inspecting hollows were observed in late June 2020. Superb Parrot occurs as population that move between Cowra-Molong-Twelve Mile – Gulgong – Narrabri. There is insufficient knowledge and understanding of the breeding biology of Superb Parrot in the vicinity of the windfarm. If it is confirmed beyond any reasonable doubt that Superb Parrot breed at this location, this would be the fourth known breeding location in Australia and the most northerly breeding population of the species. The significance of the habitat in the locality to the Superb Parrot is high. Therefore, the effects of the proposed windfarm including vegetation clearing for roads and infrastructure, as well as the effects of on-going operation of the wind turbines could form a significant impact to the species or a viable local population of the species.
  The Superb Parrot was an Ecosystem Credit under the TSC Act BioBanking Scheme, therefore, the Bilateral Process is not suitable to offset any impacts to this species under the EPBC Act. It is strongly recommended that a recognised expert in Superb Parrot is commissioned to study the local Superb Parrot population over a minimum of one to two years in order to ascertain significance of impact from the windfarm upon this species. Radio/satellite tracking should be considered to track movements of the species in relation to turbine positioning. The precautionary principal applies and a significant impact must be assumed from the project upon this species, until this is disproven through adequate research. In the absence of such, appropriate offsets must be sought.

- ***Chalinolobus dwyeri* (Large-eared Pied Bat)** - vulnerable - This species is likely to occur in the impact area. On page 5 of Appendix H of the EIS, incorrectly state: "*No cliff lines, caves and rocky outcrops occur within Development Footprint. Therefore, it is unlikely that the proposed works would disrupt the breeding cycle of an important population of Large eared Pied Bat.*". There are multiple areas of rock outcrop, cliffline and escarpment that may be utilised by Large-eared Pied Bat.
  Large-eared Pied Bat is known to occur in the Ulan – Dunnedoo – Gulgong area. There is extensive roosting/breeding (rocky caves/crevices) and foraging habitat for this species across the impact area. An appropriate expert in this species should be commissioned to undertake a thorough study of all potential nest and roost habitat within 10km of the proposed wind turbines. If the species is recorded, a detailed study into the effects of wind strike on the species should be undertaken.

- ***Nyctophilus corbeni* (Corben's Long-eared Bat)** - vulnerable - This species is likely to occur in the impact area. Corbens Long-eared Bat is known to occur in the Ulan – Gulgong - Dunnedoo – Wellington area. It is commonly found in Box, Ironbark, Bulloke and Casuarina habitat. There is extensive roosting/breeding (large hollow-bearing trees and bark crevies) and foraging habitat for this species across the impact area. It is not believed that Eco Logical Australia engaged any staff/personnel who have sufficient knowledge of this species to adequately survey for it and detect it if present. The species cannot be identified using ultrasonic acoustic recorders, it can only be surveyed through harp trapping. ELA carried out no harp trapping during the undertaking of this study. An appropriate expert in this species should be commissioned to undertake a thorough study of all potential nest and roost habitat within 10km of the proposed wind turbines. If the species is recorded, a detailed study into the effects of wind strike on the species should be undertaken.

- ***Gallinago hardwickii* (Latham's Snipe)** - Migratory
  ELA (2020a; 2020b) have completely overlooked the presence of the international Migratory Latham's Snipe in the study area. Latham's Snipe is known to forage along the edges of the Cudgegong River and its tributaries on an annual basis during the austral summer after it returns from its breeding grounds in Hokkaido Japan. The species is recorded from Putta Bucca Wetlands (Cudgegong River) on an annual basis, and has been recorded foraging in large numbers around ephemeral wetlands (n>10) in the Ulan – Goulburn River area.
  A study by Biosis Research (2005) identified that windfarms could cause significant impact to Lathams Snipe because the species migrates at night and is therefore unable to see wind turbines or their rotating blades.

  The personnel who prepared the FBA and EPBC Act assessments hold inadequate knowledge of this species to form a valid opinion on the extent of potential impact. This is made clear through their blatant omission of the species from their assessments. It is recommended that a recognised expert in Latham's Snipe is commissioned to carry-out an appropriate survey for Latham's Snipe in relation to the proposed windfarm.

- ***Litoria booroolongensis* (Booroolong Frog**) -vulnerable- suitable stony creek habitat occurs throughout the study area. Booroolong Frog are not restricted to 'permanent watercourses' they can occur on flowing ephemeral watercourses across western fall areas. Populations of this species still occur in isolated locations and are still being discovered. Adequate survey effort is required along all stone/pebble-bed watercourses dissected by the proposed infrastructure to be undertaken for these species in summer, before/after rainfall. Until adequate survey is undertaken, the presence of this small, cryptic frog species cannot be ruled-out.

- ***Pteropus poliocephalus* (Grey-headed Flying-fox**) – vulnerable -it is expected that large numbers of this migratory and nomadic threatened flying-fox would forage in and around the proposed project area when White Box or Yellow Box trees (in particular) are in flower. A study by Biosis Research (2005) identified Grey-headed Flying-fox among the most at-risk species from windfarms owing to their night-time movement patterns which can lead to increased risk of collision with turbines. ELA have not adequately assessed potential or significance of impacts from the proposed wind turbines upon foraging Grey-headed Flying-fox.

Effect of Wind Turbine Strike and Positioning upon Flying/Migratory Birds and Bats that are Matters of National Environmental Significance

ELA (Appendix H of EIS) have stated " *The siting of the wind farm has considered known migratory flight patterns and bird utilization, and field surveys did not record species migrating over the Development Footprint*".

This statement is false and misleading. No mapping of migratory bird flight paths have been made public during any part of the EIS for this project, in particular for the flight of the following MNES species which are known to undertake migration through the region. It is important to note that only some of these species are formerly listed 'Migratory' under the EPBC Act, the remaining species are migratory but only listed as threatened under the EPBC Act:

1. Superb Parrot
2. Regent Honeyeater
3. Swift Parrot
4. Painted Honeyeater
5. Latham's Snipe
6. White-throated Needletail
7. Grey-headed Flying-fox
8. Large-eared Pied Bat
9. Corben's Long-eared Bat

Recognised, relevant experts in each of the above MNES should be engaged to conduct adequate studies into the:

- Local population size
- Extent of local population
- The use of all areas of suitable habitat within 1km of each of the proposed wind turbines
- Movements of an adequate representation of the population over the course of whole year (as an absolute minimum) but preferably two years
- The effects of wind-strike on each species
- The effects of habitat loss (including vegetation loss, as well as alterations to wetlands or overland flow in relation to the Latham's Snipe).

Summary of Recommendations from this Review

The following recommendations put forward reasonable levels of study/research that the proponent should commission before this project is approved/finalised and constructed. Timing or budgetary constraints are not an adequate reason to avoid undertaking appropriate targeted survey or population studies such as this, particularly in light of the inadequacy of the biodiversity impact assessments undertaken to date. We recommend all of the following to be undertaken before this project is approved:

- A recalculation of the extent of impact of the proposed action upon White Box – Yellow Box – Blakely's Red Gum Grassy Woodland as listed under the TSC Act/BC Act is necessary, as the extent put forward by ELA (24.3 hectares) appears to be a gross underestimate of the total impacted area which is likely to be around 137.57 hectares. It is recommended that a third party with experience in identifying and mapping of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland EEC as listed under the TSC Act/ BC Act is engaged to conduct an audit of the mapping by ERM/ELA and identify the actual extent of impact of the Uungula wind farm upon this EEEC.

- The proponent must commission a thorough targeted survey of all potentially occurring threatened flora listed in this submission, in accordance with current, best-practice NSW Flora Survey Guidelines. Reference populations must be observed to confirm survey timing suitability.

- The proponent should commission a more thorough, contemporary targeted survey into all potentially occurring threatened fauna species detailed in this submission. In the absence of such information, the species should be assumed present and appropriate offsets sought, wither that is the retirement of Biodiversity Offset Credits for TSC/BC Act listed species, or implementation of the EPBC Act Environmental Offset Policy for MNES or a combination of both. This is important since many of the potentially impacted species are MNES that are not duly listed under state legislation.

- The proponent should commission an adequate informed expert study into the movement of migratory diurnal honeyeaters through the study area over a minimum of one year. Undertake point surveys at each proposed turbine location during the autumn and spring honeyeater migration. Such a survey should not be attempted until it is confirmed that the migration is underway. Recognised ornithological experts must be consulted to advise on this. In addition, radio/satellite track a group of no less than 20 individual Yellow-faced Honeyeaters and 20 Red Wattlebirds in order to map their movements in relation to the proposed turbines. This must be carried out over a minimum of one full year, preferably two. This information will provide an understanding of how honeyeater movements take place over the landscape and the windfarm company can utilise this information to inform the proposed micrositing of wind turbines. This is particularly important to avoid impact to the Critically Endangered Regent Honeyeater.

- The proponent should commission an adequate informed expert study into the local population movement of Eastern Long-eared Bat and Large-eared Pied Bat in relation to the proposed wind turbines.. An appropriately recognised expert on each of these species should be engaged to assess the presence and level of impact to these species from the proposed windfarm construction and operation. Targeted surveys must be undertaken for both species by deploying harp traps around suitable roosting/breeding habitat. Further survey intensity undertaken for Large-eared Pied Bat using passive sound recorders near all cavernous rock

outcrops located within 1 km of each of the proposed turbines. If either species is found, appropriate radio tracking should be undertaken to observe movement by the species. The information from this study must then inform a more thorough EPBC Act Impact Assessment or offset proposal than has been undertaken to date

- The proponent should commission an adequate study into the local population breeding and movements of Superb Parrot around the proposed windfarm impact area. This study must be undertaken by a person who is a recognised expert in the species. Superb Parrot in the Twelve Mile – Wuuluman area should be observed by an Ornithologist over the course of no less than one full year. This study should be used to inform whether the windfarm is approved, and as to how many wind turbines are approved, and where they are erected.

- The proponent should commission an adequate targeted survey for the following EPBC Act and BC Act listed threatened flora (only when known populations are in full flower) *Leucochrysum albicans var. tricolor* (Hoary Sunray), *Swainsona recta* (Small Purple Pea), *Swainsona sericea*, and *Diuris tricolor*. The information from this study must then inform a more thorough EPBC Act Impact Assessment than has been undertaken to date

- The proponent should commission a recognised expert in each of the Aerial/Migratory Species listed in this review to conduct a field-based study over a minimum of one year into each of the aerial/migratory species listed.

- There are too may uncertainties regarding the significance of impact of the proposed windfarm upon MNES species and communities, therefore, a Referral to the Commonwealth is considered necessary. All MNES that are not listed under the TSC Act/BC Act cannot be assessed in accordance with the Bilateral Process, therefore, a separate offset schedule may be required to address the impacts of the proposed wind farm upon these MNES.

About the Reviewer

The person who wrote this review holds a Bachelor in Science majoring in Biodiversity Conservation with Honours in Ecology. They have nearly 20 years of experience in fauna and flora survey and have worked as a professional Ecologist for 12 years, this includes 8 years as a full-time employment as an Ecologist consultant across eastern Australia. During this time the reviewer has undertaken impact assessments on behalf of dozens of resources and renewable energy projects in New South Wales. The reviewer has also acted as an Expert Witness in the Land and Environment Court and acted on behalf of regulatory authorities in the undertaking of independent assessments of development impacts. The reviewer specialises in both fields of Zoology and Botany and holds an extensive knowledge and familiarity with the vegetation, flora and fauna of the central-west of NSW, particularly the northern part of the South Western Slopes IBRA7 bioregion where this proposed wind farm is located.

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