

**RYAN CORNER WIND FARM  
AMENDMENT APPLICATION**

**EXPERT WITNESS STATEMENT  
OF BERNARD O'CALLAGHAN**

**Ryan Corner Development Pty Ltd**



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## 1. WITNESS INFORMATION

### 1.1. Expert witness information

#### 1.1.1. *Name and address*

Bernard Thomas O’Callaghan  
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Suite 5, 61-63 Camberwell Road  
Hawthorn East, Vic. 3123

#### 1.1.2. *Area of expertise*

Bernard has extensive expertise in ecology and related legislation and policies. He has particular expertise and experience in assessing and monitoring the impacts of wind farms on birds and bats. This has included:

- Bird and bat risk assessments to inform pre-feasibility studies for wind farm developments;
- Detailed bird and bat impact assessments, including on a range of bird and bat species of concern, for wind farm feasibility studies and development applications under both Commonwealth and state laws and regulations;
- Assessments of the effects on changes in wind turbine technology on birds and bats;
- Development and auditing of construction environmental management measures for wind farm projects;
- Design and execution of bird and bat impact monitoring programs at seven operating wind farms around Australia, including five in Victoria;
- Recognised as the expert technical advisor to five wind farms in NSW by the Government of NSW; and
- Biodiversity compliance monitoring for operating wind farms.

His qualifications and experience are summarised in Appendix 1.

### 1.2. Information of other significant contributors

The names, addresses and areas of expertise of other significant contributors to this report, and associated background reports, are presented in Table 1.

### 1.3. Role of Bernard O’Callaghan

I confirm that my role in the assessment of the Ryan Corner Wind Farm has been:

- Project Manager and internal peer reviewer for the flora assessments of the proposed wind farm (2015 - onwards);
- Project Manager and internal peer reviewer for the 2015 -2017 re-assessment of bird and bat impacts of the revised turbine design that is the subject of the exhibited amendment application;
- Visited the site to confirm the findings and familiarise myself with the site; and
- Preparation of this witness statement.

**Table 1: Details of other significant contributors**

Name of contributor	Address	Area of Relevant Expertise	Location of summary of qualifications and expertise
Alan Brennan	Brett Lane & Associates Pty Ltd Suite 5, 61-63 Camberwell Road, Hawthorn East, Vic. 3123	Ecological assessment, including native vegetation and flora.	Appendix 2
Justin Sullivan		Ecological assessment, including native vegetation and flora.	
Khalid Al-Dabbagh		Bird and bat utilisation surveys and data analysis	
Brett Lane		Principal Ecologist, Wind farm ecological impact assessments	

## 2. WORK UNDERTAKEN

Brett Lane & Associates Pty Ltd (BL&A) have completed bird and avifauna assessments of Ryan Corner since 2006. In addition, BL&A reviewed the impacts of modifications to the layout and turbine specifications of the Ryan Corner Wind Farm on biodiversity from 2015 to 2017.

These assessments were documented in a report (BL&A 2017a) which accompanied the planning permit application for the amendment. However, subsequent additional assessments have been undertaken. These included more recent native vegetation impact studies, documented in a new report (BL&A 2017b) that supplements and replaces the native vegetation elements of the report that accompanied the planning permit application.

The work undertaken and detailed in this witness statement is summarised below.

### 2.1. Biodiversity assessment that accompanied the planning permit application

The results of the assessment that accompanied the planning permit application for the amendment are presented in the following report:

- BL&A (2017a) ‘Ryan Corner Wind Farm – Biodiversity impact assessment on proposed modification.’ Report 14144 (8.4) to Ryan Corner Development Pty Ltd. April 2017.

This report considered the following biodiversity attributes:

- Native vegetation;
- Birds (including the Brolga); and
- Bats (including the Southern Bentwing Bat).

It compared impacts of the original permitted layout and turbine design on the biodiversity attributes listed above with the impacts of the proposed amended layout and turbine design.

However, the native vegetation assessment ‘Ryan Corner Wind Farm – Biodiversity impact assessment on proposed modification’ is now superseded as outlined in Section 2.2 and 2.3 below.

### 2.2. Bird and Avifauna assessment subsequent to the planning permit application

The bird impact assessments undertaken are summarised below. These assessments are based on the information listed below.

- BL&A 2007a. ‘Ryan Corner Wind Farm: Summer Bird Utilization Survey.’ Report No. 6114(2.1), January 2007.
- BL&A 2007b, ‘Ryan Corner Wind Farm: Bird Utilization and Brolga Breeding Season Surveys’, Report No. 6114 (3.0), Consultants’ Report to Gamesa Energy Australia Pty Ltd, May 2007;
- Greg Richards & Associates Pty Ltd 2007 ‘An assessment of the bat fauna and an assessment of regional migration patterns in relation to the Ryan Corner Wind Farm site in Victoria.’ Consultant’s Report to TME Australia Pty Ltd; and
- Information from Union Fenosa Wind Australia Pty Ltd summarising the proposed changes in height of the wind turbines at the wind farm.

The proposed amended turbine envelope will encompass the measurements listed in Table 2. Impacts on birds and bats have been assessed using these measurements.

**Table 2: The maximum measurements of new turbine models to be constructed at Ryan Corner Wind Farm.**

	Max Tip RSA Height (m)	Min Lower RSA Height (m)
Generic Turbine –55 turbines	180	40
Modified specifications – 1 turbine (B35)	160	30

During bird utilisation surveys at Ryan Corner Wind Farm site, detailed records were not kept of bird flight heights other than whether they were in the original proposed rotor swept area (RSA) height. The surveys were undertaken in 2006 and 2007, before we started recording in smaller height intervals. To provide additional information to inform an assessment of the impacts on birds of changed turbine dimensions, bird flight height data has been assembled from two other Union Fenosa Wind Australia Pty Ltd wind farms in south-western Victoria, namely Hawkesdale and Berrybank.

Bat impact work undertaken is summarised below:

A qualitative assessment of bat impacts from the amended wind farm design was undertaken based on a combination of raising the RSA for turbines and a reduction in the number of turbines. Consideration was also given to the species of bats recorded during the 2007 bat utilisation surveys and whether threatened species would be affected. It was useful that bat recordings obtained during the 2007 surveys were taken both at ground level and at height from a wind monitoring mast.

During the native vegetation assessment in July 2017, it was obvious that there had been no significant changes in land use, farming activities or revegetation works. For this reason, the original 2009 bat survey results were still considered representative of the bats on the site and, therefore, a valid basis for assessing the impacts on bats of the amended turbine layout and specifications.

### 2.3. Native vegetation assessment

Subsequent to the planning permit application for the amendment, BL&A were instructed to prepare a new assessment of the impacts of the proposed modification on native vegetation. The findings of this work are included in this witness statement.

The new assessment of the impacts of the proposed modification on native vegetation involved a survey of the full footprint of the Ryan Corner Wind Farm in July 2017 to record the presence of native vegetation. The impact of the proposed amendment was calculated and recommendations developed to avoid, minimize and offset any impacts on native vegetation.

### 2.4. Further bird and bat impact assessment

The impacts on birds and bats of the original and proposed amended turbine designs have been further compared in this witness statement using a more refined quantitative approach (see below). The turbine layouts and designs assessed in this statement are described below:

The original turbine specifications permitted for Ryan Corner Wind Farm were:

- Tower height of 78 metres;

- Rotor Swept Area (RSA) maximum height of 121.5 metres above the ground; and
- RSA minimum height of 34.5 metres above the ground.

On 12th August 2010, the Minister for Planning approved a minor amendment to the specifications of the wind turbines as outlined below:

- Tower height of 80 metres;
- Blade length of 46.25 metres;
- Rotor Swept Area (RSA) maximum height of 126.25 metres above the ground; and
- RSA minimum height of 33.75 metres above the ground.

The current amendment application is based on:

- Blade length up to 70 meters;
- Rotor Swept Area (RSA) maximum height of 180 metres above the ground; and
- RSA minimum height of 40 metres above the ground;
- These specifications will be used for all except one of the turbines (B35). For this turbine the specifications will be a proposed upper RSA of 160 metres and a lower RSA height of 30m above the ground.

In addition, it is proposed to microsite a number of turbines and realign access tracks and ultimately, reduce the Ryan Corner Wind Farm from the approved 68 turbines to 56 turbines.

## 2.5. Sources of information

The sources of information for this expert witness statement are:

### Native vegetation

- BL&A, 2017b, ‘Ryan Corner Wind Farm, Native Vegetation Assessment.’, Report No. 14144 [11.0], July, Consultants Report to Ryan Corner Development Pty Ltd. This involved a field assessment by a Senior Botanist of the entire footprint of Hawkesdale Wind Farm.

### Bird and bat assessment

Each of the above assessments involved reviewing the bird and bat utilisation survey data for the Ryan Corner Wind Farm as outlined in the reports listed in Section 2.2.

The data collected in 2006 and 2007 (BL&A 2007a, BL&A 2007b, GR&A 2007) is still considered valid as there have been no significant changes in agricultural practices in the area to indicate bird and bat species composition and activity would be substantially different. This was confirmed during the native vegetation assessment of the site in July 2017.

A comparison was made of the area of the RSA at different heights relative to bird activity at different heights to determine the percentage increase in number of bird flights potentially at risk from the modified turbine design.

### **Site visit**

In addition, I undertook a site visit in July 2017 to confirm site conditions and to understand the findings of the native vegetation assessment in relation to the validity and currency of the earlier bird utilisation data.

### **Submissions**

A summary of submissions on the amendment application provided by the proponent was reviewed and a response provided to issues listed in the summary of submissions.



### 3. FINDINGS

The findings from this work are summarised below.

#### 3.1. Native vegetation

Brett Lane & Associates Pty Ltd (BL&A) conducted a native vegetation assessment of the area to be developed as part of the Ryan Corner Wind Farm.

Vegetation in the study area consisted of pasture grasses and weeds of agricultural lands, with sparsely scattered native vegetation on stony rises and within seasonally inundated wetlands. Some extant native vegetation occurred along the roadsides within the study area, and in particular areas of farmland. The majority of the study area consists of highly modified vegetation, that has been impacted by changing drainage and land uses and is substantially altered. All areas have moderate to high levels of weed invasion.

Native vegetation in the study area occurred across 27 remnant patches comprising the following vegetation types:

- Plains Grassy Wetland (EVC 125);
- Stony Knoll Shrubland (EVC 649); and
- Damp Sand Herb Rich Woodland (EVC 3).

DELWP-mapped wetland areas occur throughout the study area. However, as the current field assessment was undertaken in the middle of winter during a wet year, the survey was considered to be adequate to detect any wetlands that occurred in the study area. While several areas of remnant wetland vegetation, namely Plains Grassy Wetland (EVC 125), were recorded during the field survey, a large proportion of the areas mapped by DELWP in the wetland layer were noted onsite as being dominated by introduced pasture grasses, and did not meet the threshold of 25% perennial native vegetation cover to be considered as a remnant patch, as defined in the *Biodiversity Assessment Guidelines* (DEPI 2013). Notwithstanding that they lacked wetland vegetation despite being well-watered and assessed at a time when they would have supported wetland vegetation, impacts to these areas have still been included as part of the impact assessment for the wind farm layout in accordance with DELWP’s direction (DELWP 2015). The DELWP-mandated approach to native vegetation impact assessment in this case has overestimated the overall impact of the project on biodiversity.

One ecological community listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was recorded in study area:

- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

Impacts to native vegetation have been determined based on a development footprint provided by the proponent on 20<sup>th</sup> July 2017.

- An initial assessment was based on the development footprint requiring a total of 1.096 hectares of native vegetation to be removed without the inclusion of DELWP mapped wetlands. The wind farm layout will not impact on the area of NTGVVP, hence no referral is required under the EPBC Act. This would require an offset of 0.180 general biodiversity equivalence units with a minimum strategic biodiversity score of 0.380 within the Glenelg Hopkins CMA area or the Moyne Council Area.
- However, as outlined above DELWP required that all DELWP mapped wetlands be included in the assessment of vegetation removal. This resulted in the development

footprint requiring a total of 3.768 hectares of native vegetation to be removed. The wind farm layout will not impact on the area of NTGVVP, hence no referral is required under the EPBC Act. This would require an offset of 0.845 general biodiversity equivalence units with a minimum strategic biodiversity score of 0.354 within the Glenelg Hopkins CMA area or the Moyne Council Area.

A planning permit under Clause 52.17 of the Moyne Planning Scheme is required for the removal of native vegetation. Given the amount of native vegetation to be removed, and the mapping of the Location Risk A throughout the areas of native vegetation to be removed, the application will be assessed under the Moderate Risk Pathway. The application would trigger a referral to DELWP given the removal of over 0.5 hectares of native vegetation.

However, the actual impact to native vegetation is likely to be significantly lower than this. This can be achieved by:

- Micro-siting of particular infrastructure (i.e. access tracks, power poles); and
- Relocation of road crossings and construction of powerlines to avoid impacts of native vegetation.

### 3.2. The assessment on birds and bats

The proposed change in turbine specifications used in this assessment are set out in Table 3.

**Table 3: Proposed modifications to turbine specifications**

Turbine specification	Currently permitted turbines	Modified Turbines	Total extent of change
Maximum RSA height (tip height)	126.25	180m	Overall 53.75 m blade tip height
Minimum RSA height (above ground)	33.75 m	40 m	6.25m increase in minimum RSA
Rotor radius	46.25 m	70 m	23.75 m rotor diameter increase
Total RSA m <sup>2</sup> / turbine	6,720 m <sup>2</sup>	15,394 m <sup>2</sup>	129% increase
Number of turbines	68	56	18% reduction

Note: These specifications will be used for all except for 55 of 56 turbines. For one turbine (B35) the specifications will be a proposed upper RSA height of 160 metres and a lower RSA height of 30m above the ground

In this report, RSA or the zone encompassing the area of an operating wind turbine within which the blades rotate, defined in terms of an upper “maximum” and lower “minimum” RSA height, and a total circular swept area of the RSA.

This assessment compares the change in risk to birds as a result of the turbine parameters indicated in Table 3 above. It considers the original bird utilisation surveys (BUS) conducted in 2009. These BUS surveys were based on turbines not exceeding 150 metres in height.

In summary, the proposed revised turbine dimensions are:

- The proposed minimum lower RSA height is:

- 40 meters above ground, which is 6.25 metres higher than the height in the amended approval for 55 of the 56 turbines; and
- 30 meters above ground, which is 3.75 metres lower than the height in the amended approval for 1 turbine (B35);
- The increase in the rotor diameter from 92.5 metres to 140 metres would also bring changes to the total extent of each RSA from 6,720 m<sup>2</sup> to 15,394 m<sup>2</sup>, which will increase the total RSA area by approximately 129%. The majority of this change (over 89%) occurs from 80 metres above the ground and higher.
- An increase in the upper maximum RSA height (tip height) from 126.25 to 180 metres.

These larger turbines will be installed at the same locations as the turbines in the approved wind farm layout, although some will be micro-sited in accordance with provisions of the permit. In line with increasing efficiency of wind turbines, it is now proposed that the number of turbines be reduced from the approved 68 turbines to 56 turbines representing a reduction of 18% in the number of turbines. Impacts on birds and bats from the proposed changes are discussed separately below.

### 3.3. Birds

During the bird utilisation survey for the Ryan Corner Wind Farm for 6 days in Spring 2006 and six days in summer 2007, the height of flying birds was recorded and documented in BL&A (2007a) in height zones corresponding with the then-proposed RSA height, as follows:

- Below rotor swept area height: <35 m above the ground;
- At rotor swept area height (35 to 120 m above the ground); and
- Above rotor swept area height (>120 m).

The split of birds between heights was:

- Below rotor swept area height: 96.3 percent;
- Within rotor swept area height: 3.7 percent; and
- Above rotor swept area height: 0.0 percent.

In summary, 96.3% of birds were recorded flying below 35 metres, 3.7 % of birds were recorded between 35-120 metres and no birds were recorded flying above 120 metres.

#### 3.3.1. Species recorded

The bird utilisation surveys at the Ryan Corner Wind Farm did not record species of birds over the wind farm that were rare or threatened and the site was found to be dominated by common farmland birds. The most commonly observed bird species at the Ryan Corner Wind Farm were:

- Skylark;
- Raven sp.;
- Australian Magpie;
- Common Starling; and
- Yellow-rumped Thornbill.

These species made up 73% percent of the birds recorded over the Ryan Corner Wind Farm site.

The list of birds seen flying at RSA height included common farmland birds and common birds of prey. The most common species were:

- Skylark;
- Raven sp.; and
- Long-billed Corella.

The above three species represented more than 75 percent of all birds flying at RSA height.

The number and diversity of birds observed flying at RSA height is comparable to data collected from other wind farm sites in coastal and agricultural settings (similar settings to the Ryan Corner Wind Farm) in southern Victoria and south-eastern South Australia (Brett Lane and Associates Pty Ltd, unpubl. data).

These species are common and widespread in southeastern Australia in agricultural landscapes and any collisions as a consequence of the increased rotor swept area from the larger wind turbines is unlikely to have a significant effect on their populations. None of the species recorded during the BUS surveys were *Flora and Fauna Guarantee Act 1988* (FFG Act) or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed species or otherwise listed as rare or threatened.

### **3.3.2. Birds and flight heights**

During bird utilisation surveys at Ryan Corner Wind Farm site, detailed records were not kept of bird flight heights other than whether they were in the proposed rotor swept area height. The surveys were undertaken in 2006 and 2007 before we started recording in smaller height intervals.

To inform an assessment of the impacts on birds of changed turbine dimensions, bird flight height data has been assembled from two other Union Fenosa Wind Australia Pty Ltd wind farms in south-western Victoria: namely Hawkesdale and Berrybank Wind Farms. These projects differed slightly in the height distribution of birds so provide a range of values to consider in this assessment. This information is summarized in Table 4 below together with the changes in RSA at various height intervals.

This data aligns with data collected during bird utilisation surveys for a range of wind farms in southern Australia (n = 11), BL&A (unpubl. data). This aggregated data indicates that, on average, 5.5% of birds were recorded usually between 40 and 120 metres above the ground, typically considered as rotor swept area (RSA) height. On average, 0.3% percent of birds were observed flying above RSA height.

**Table 4: Change in RSA areas at various heights at Ryan Corner Wind Farm**

Height range (m)	% flights Berrybank	% flights Hawkesdale	RSA of 46.25 m blade (33.75 - 126.25 metres) (m <sup>2</sup> )	RSA of 70 m blade (40 - 180 metres) (m <sup>2</sup> )	Change in total RSA (m <sup>2</sup> )	% Change in total RSA
Ground	71.0	74.0				
0-9	17.2	3.5				
10-20	5.3	6.6		-		
20-30	2.8	6.2	-	-	-	
30-40	0.8	3.8	196	-	-196	<b>-100</b>
40-60	1.2	2.3	1,373	1,349	-24	<b>-2</b>
60-80	0.3	1.2	1,791	2,280	490	<b>27</b>
80-100	0.5	1.5	1,791	2,672	882	<b>49</b>
100-120	0.7	0.2	1,373	2,790	1,417	<b>103</b>
120-140	0.0	0	196	2,672	2,476	<b>1262</b>
140-160	0.2	0.8	-	2,280	2,280	<b>large</b>
160-180			-	1,349	1,349	<b>large</b>
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>6,720</b>	<b>15,394</b>	<b>8,674</b>	<b>129</b>

The implications of the proposed changes are discussed below.

#### **Increase in lower minimum RSA height**

The proposed modification increases the lower minimum RSA height from modified turbines by 6.25 metres (i.e. from 33.75 to 40 metres) for 55 of the 56 turbines. This increase in the lower minimum RSA will lift the turbine from the area of 30-40 metres where between 0.8% and 3.8 % of the birds were recorded at Berry Bank Wind Farm and Hawkesdale Wind Farm respectively. This will reduce potential collision risk at these 55 turbines.

The proposed modification decreased the lower minimum RSA height for one of the modified turbines by 3.75 metres (i.e. from 33.75 to 30 metres). This increase will result in a small amount of extra RSA between 33.75 and 30 metres where 0.8% and 3.8 % of the birds were recorded at Berry Bank Wind Farm and Hawkesdale Wind Farm respectively. This will slightly increase the potential collision risk at this one turbine.

As most turbines will have a higher minimum RSA height and the total number of turbines will be reduced from the 68 turbines to 56 turbines representing a reduction of 18% in the number of turbines, the risk to birds from the proposed changes are is considered to be less than for the approved wind farm.

### Change in extent of RSA at various heights

As a result of the proposed modifications:

- The total area of RSA per turbine between 20-40 metres and 40-60 metres actually decreases. This will lead to a corresponding decrease in risk to the 4.8% and 6.1 % of birds recorded flying at Berry Bank Wind Farm and Hawkesdale Wind Farm respectively between 20-60 metres;
- The RSA area increased in the bands between 60-80 metres and above. This will present an increase in risk to the 1.7% and 3.7 % of the birds recorded at Berry Bank Wind Farm and Hawkesdale Wind Farm respectively above 60 metres;
- Above 120 metres is the height range where the fewest bird flights were recorded. The studies from 11 other wind farm sites indicates that less than 2% of bird flights were recorded above 80 metres and no bird flights were recorded above 140 metres (although 0.8% flight was recorded at Hawkesdale Wind Farm above this height). This would present an increased risk to high flying species such as raptors and the White-throated Needletail.

It is noteworthy that this potential increased collision risk affects common farmland birds, including a significant proportion of the observed movements that involved introduced, pest species. No threatened or endangered species were recorded during surveys and none is considered to occur regularly or in significant numbers due to a lack of suitable habitat on the wind farm site.

This analysis demonstrates the increase in RSA area at heights above 80 metres is more likely to impact on higher flying species. These include raptors as a group, and specifically the Wedge-tailed Eagle, and the White-throated Needletail.

### Change in maximum tip height from 140 meters to 180 meters

The change in tip height from 140 meters to 180 meters occurs at the height where the fewest bird flights were recorded (0.8% of flights). The studies from 11 other wind farm sites recorded no flights above 140 metres. Based on the foregoing results, the proposed increase in the maximum height to 180 metres will increase the risk to the small number of birds recorded flying above 140 metres. These include raptors as a group, and specifically the Wedge-tailed Eagle, as well as the White-throated Needletail.

#### 3.3.3. *Potential impacts of modification on Brolgas*

Brolga surveys were completed in the breeding season of 2006 on the Ryan Corner Wind Farm site and within a 10 km region of interest (BL&A, 2006). Brolga breeding and flocking records were provided in this report together with a discussion of Brolga at this site. In summary, one past breeding site was found in the south-east part of the site and a number of other breeding records well to the north-west of the site (8-10 km distant).

A search of the Victorian VBA for Brolgas was completed in July 2017 to 10km beyond the boundaries of the Ryan Corner Wind Farm. There were no major changes in Brolga distribution in the 10 Km range and few additional records. There is one 2007 breeding record of a pair of brolgas within 10 km of the Ryan Corner Wind Farm (over 9 km to the North-west of the site) and one sighting record to the north-north-east from 2009. There were no new records in the VBA within 5 km of the site since the BL&A 2007 report.

It is noted that Brolga fly more frequently below 30 metres (BL&A, unpublished data). Based on this, increasing the height of the lower level of the RSA from 33.75 metres to 40



metres above ground level for most of the turbines and setting a minimum 30 metres ground clearance for the one turbine (B35), while reducing the number of turbines from the 68 turbines to 56 turbines, will reduce the overall level of collision risk for this species if it is in the area compared with the original amended approval.

### 3.3.4. Summary of impacts on birds

This analysis indicates that the revised turbine design will result in a decrease in collision risk across the Ryan Corner Wind Farm site to low flying bird species, while increasing the risk to higher-flying species. The changes will not impact on listed or threatened species as they were not recorded at the Ryan Corner Wind Farm and the site lacks habitats suitable for the regular occurrence of important numbers of such species.

The results of the bird utilisation surveys together with the original and updated habitat assessment indicate that this increase in impact will affect common, widespread farmland-adapted bird species. The likelihood of the change in turbine design significantly increasing risks to threatened bird species is considered negligible. For this reason, for high-flying birds, the proposed change will have additional impacts that are not of any conservation concern as these species are common and widespread.

### 3.4. Impacts on Bats

Greg Richards and Associates Pty Ltd (2007) undertook detailed studies of both the bat fauna of the Ryan Corner Wind Farm and also the patterns of regional migration of bats in relation to the Ryan Corner Wind Farm and maternity and roosting caves in the region.

The survey in November 2006 of Ryan Corner Wind Farm and surroundings showed that the bat fauna was, in general, very depauperate and in low abundance. The highest level of activity for any species averaged 2.2 calls per night indicating that the habitat is largely unsuitable for bats. At the Blue Gum plantation that was external to the site the overall average number of calls per night was over 55. The average number of Southern Bentwing Bat calls per night was significantly lower at the Ryan Corner Wind Farm recording sites (0.5 – 1.1) compared with the better habitat at the Blue Gum plantation away from the site (8.9).

The study identified nine species of bats on the site. These species were mostly common species, except for the Southern Bent-wing Bat (*Miniopterus schreibersii bassiana*), which is listed as threatened in Victoria and is listed as critically endangered under the EPBC Act.

Records of bat calls above ground at Ryan Corner Wind Farm were achieved by lifting the detector microphone to heights of 40 metres on a wind monitoring mast. The number of bat calls recorded 40 metres above the ground was limited, with less than 1.4 calls/night recorded over 10 nights involving four common species compared with 2.8 calls per night involving 6 species at ground level. Calls that belonged to the Southern Bent-wing Bat complex were recorded from the ground level recorder but not from the recorder at height.

Recording at height elsewhere in south eastern Australia (BL&A, unpubl. data) shows that fewer species and many fewer calls are recorded 50 metres above the ground. At 50 metres, the number of bat calls falls to less than 15% of the number recorded from the ground (i.e. up to a height of c. 25 metres). Between 25 and 50 metres above the ground, call numbers represent about 25% of those recorded at ground level.

The proposed RSA envelope will raise the lower RSA at a minimum of 40 metres compared with the original permitted minimum RSA of 34.5 metres and the approved amended approved minimum RSA of 33.75 metres. Overall, the level of risk of collision to most bat

species that fly low will be reduced by this modification. However, for one turbine with the lower RSA reduced to 30 metres above the ground, there may be a small increase in potential impact on the small proportion of bats flying at between 30 and 35 metres in height.

However, the overall increase in area of RSA above 40 metres may have an impact on high-flying bat species such as White-striped Freetail Bat and Gould’s Wattled Bat. However, these species are not listed as threatened and impacts will not be of conservation concern given they are common and widespread species.

At the Ryan Corner Wind Farm, bat activity was comparatively very low, in particular when compared to surrounding areas, e.g. the eucalypt plantation to the north-west of the site. The incremental effect of the increase in RSA height range and extent are not considered to be significant, with most bat activity likely to remain below the lower RSA height and collisions, when they occur, will almost certainly involve common and widespread species. These impacts would not lead to any significant decline in their populations.

#### **3.4.1. Southern Bentwing Bat**

The status of the Southern Bentwing Bat has been changed under the EPBC Act from ‘conservation concern’ to ‘critically endangered’ since the original wind farm planning application.

Greg Richards (GR&A 2007) undertook a targeted survey of the site in Spring (November) 2006. This survey confirmed identified 8.9 Southern Bentwing Bat calls/ night at the Blue Gum Plantation about 1 km to the north-west of the Ryan Corner Wind farm turbines while identifying only 0.5 and 0.1 Southern Bentwing Bat calls for the two recording locations on Ryan Corner Wind Farm (South and North).

Greg Richards (GR&A 2007) conducted a further detailed assessment (January-March 2007) of the use of the wind site and the regional migration of the Southern Bentwing Bat with over 333 detector-nights of survey in the wider region, of which included over 120 survey nights on the wind farm. In summary, he identified:

- Very high number of Southern Bentwing Bat calls at the Starlight Cave (a maternity cave);
- Moderate to high number of Southern Bentwing Bat calls at Byaduk Cave and the Blue Gum plantation to the north-west of the Wind Farm; and
- Low number of calls at the two recording locations on Ryan Corner Wind Farm (South and North).

Dr. Greg Richards (GR&A 2007) reported:

*“The overall conclusion from these results is that when in the region of the wind farm, and attracted to (apparently) good quality foraging habitat such as dense eucalypts, there is no utilisation of the wind farm site that would cause conservation concern such as a high level of potential turbine collision impact.*

*As a final insight into the activity patterns of the Southern Bentwing Bat at the wind farm site, an analysis of the number of calls recorded during both assessments (late 2006 and early 2007) was conducted. Of a total of 94 nights of recording at the six sites in November 2006 and the two sites in Jan-March 2007 in the Ryan Corner Wind Farm site, Southern Bentwing Bats were not recorded at all on 49 nights (52%). Only one or two calls were recorded on 24 nights (26%). High numbers, that is, relative to the site and not*



*in comparison with high quality habitat as known elsewhere, were recorded on less than 10 of the 94 nights.*

*It was concluded that there would be very little impact upon the Victorian Southern Bentwing Bat population, if any, through collision with turbines if the Ryan Corner Wind Farm was to be constructed.”*

Raising the turbine blades from a minimum RSA height of 33.75 metres to 40 metres will further decrease the collision risk to the Southern Bentwing Bat. Having regard to Dr Richard’s findings above, the risk of a significant impact on this species is considered even lower than under the previous scenario. Although the single turbine with a lower RSA height of 30m above the ground will slightly increase the risk to bat species, it involves one out of 56 turbines and will not add to bat collision risk noticeably and overall there will be a reduction in the risk to the Southern Bentwing Bat.

### **3.4.2. Summary of impacts of modification on bats**

At Ryan Corner Wind Farm, overall bat activity was considered to be low. The impact of raising the turbine blades from a minimum RSA of 33.75 metres to 40 metres will further decrease the collision risk to most bat species including the Southern Bentwing Bat. However, the single turbine with a lower RSA height of 30m above the ground will slightly increase the risk to bat species.

However, the overall increase in area of RSA above 60 metres may have an impact on bat species such as White-striped Freetail Bats and Gould’s Wattled Bats that routinely fly higher. However, these species are relatively common in the wider landscape and are not listed as rare or threatened. Impacts on these species would not lead to any significant decline in their populations.

Overall, the proposed wind farm modifications will reduce risk the Southern Bentwing Bat.

### **3.1. Aviation Night Lighting**

Several studies have shown a high-level of foraging activity by bats around artificial lights. Lights on turbines may attract moths and other nocturnal insects, thus increasing the probability of bat collisions since bats feed on insects at night. Based on experience with lighting of wind farms and communication towers in the United States (Shire *et al.* 2000; Kerlinger and Kerns 2003) to minimize impacts on birds and bats, the shortest possible flash of light is preferable to a longer duration flash or constant illumination. For example, strobe (i.e. those that flash for a very short time) and LED red lights are more preferable than yellow or white lights that are illuminated constantly or for short periods of up to three seconds (Kerlinger *et al.* 2010). Similarly, Gehring *et al.* (2009) found that communication towers lit at night with only flashing red or flashing white lights had significantly fewer avian fatalities than towers lit with a combination of steady-burning and flashing lights.

However, several reviews of bat mortality at wind farms in the USA has not been able to identify a correlation between lighting of turbines for aviation with red lights and collisions with bats (Johnson *et al.* 2004; Jain *et al.* 2010; Baerwald & Barclay 2011, and Berthinussen *et al.* 2017).

Although the comparative level of bird and bat utilisation for the Ryan Corner Wind Farm is relatively low, and there were no species of threatened birds and only one record of an endangered bat at height, the preference remains for red lights in line with CASA

recommendations. However, given the evidence from other sources, flashing red lights would minimize the risk to bird species.

### 3.2. Bird and Avifauna Management Plan (BAM Plan)

The Minister for Planning issued a planning permit for the construction of a Wind Farm (Moyne Planning Scheme, Permit No.: 20060222). Under condition 16 of this permit, a BAM Plan must be prepared. This condition states that:

*“16. Before the development starts, a Bat and Avifauna Management Plan (“BAM Plan”) must be prepared, to the satisfaction of the Minister for Planning, in consultation with the Department of Sustainability and Environment, and must be submitted to and approved by the Minister for Planning. When approved, the Plan will be endorsed and will then form part of the permit. The use must be carried out in accordance with the endorsed plan.”*

A BAM Plan has been developed in conjunction with DSE and has been agreed between the proponent and DELWP (formerly DSE). It is proposed that this BAM Plan be updated to reflect the proposed modification. The proposed modification does not lead to a significant change in the risk of the wind farm to birds and bats. The monitoring protocols, impacts triggers and investigation and reporting requirements in that BAM Plan are still considered valid and it does not need to be amended.

### 3.3. Response to submissions

The proponent has provided me with a summary of the issues raised in submissions on the amendment application ( to July 2017). The table below lists the issues in submissions relevant to bird and bat impacts (based on the advice of the proponent) and includes my response.

Submitter and Issue	Response
Moyne Shire Council	
▪ Southern Bent-wing Bat seeks additional data	The surveys from the Ryan Corner bat Studies in 2006-2007 are included in this witness statement and impacts analysed.
▪ Seeks condition relating to BAM plans updated/reworded to improve clarity	A summary of the status of the Bird and Avifauna Management Plan is provided above. It is considered as satisfactory for addressing the change in impacts as a result of this modification.

#### 4. DECLARATION

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Signed



Bernard O'Callaghan  
Brett Lane & Associates Pty Ltd  
Suite 5, 61–63 Camberwell Road  
Hawthorn East, VIC 3123

1 August 2017

## 5. REFERENCES

- BL&A,. 2007a. Ryan Corner Wind Farm: Summer Bird Utilization Survey. Report No. 6114(2.1), January 2007.
- BL&A,. 2007b. Ryan Corner Wind Farm: Bird Utilisation and Brolga Breeding Season Surveys. Report No. 6114 (3.0); May 2007.
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- DEPI 2013, *Biodiversity assessment guidelines*, Department of Environment and Primary Industries, East Melbourne, Victoria.
- DoE 2015, *Environmental Protection and Biodiversity Conservation Act 1999, Protected Matters Search Tool*. Department of Environment, Canberra, viewed 25<sup>th</sup> August 2015, <http://www.environment.gov.au>
- ERM 2006, *Hawkesdale Wind Farm Ecological Assessment*, Environmental Resources Management Australia.
- Department of Sustainability and Environment (DSE) 2012. Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011, Revision 1 February 2012.
- Greg Richards & Associates Pty Ltd 2007 ‘An assessment of the bat fauna and an assessment of regional migration patterns in relation to the Ryan Corner Wind Farm site in Victoria. Consultants Report to TME Australia Pty Ltd; and
- Johnson, G.D., Erickson, W.P., Strickland, M.D., Shepard, M.F., Shepard, D.A. and Sarappo, S.A. 2003. Mortality of bats at a large-scale wind power development at Buffalo Ridge, Minnesota, *The American Midland Naturalist* 150: 332-342.

Kerlinger P & Kerns J 2003, 'FAA Lighting of wind turbines and bird collisions', Paper presented to National Wind Coordinating Committee, Wildlife Work Group Meeting, November 2003, Washington, USA.

Kerlinger P, Gehring J.L., Erickson W.P., Curry R., Jain A., and Guarnaccia J. 2010, 'Night migrant fatalities and obstruction lighting at wind turbines in North America', The Wilson Journal of Ornithology 122 (4): 744-754.

Shire GG, Brown K & Winegard G 2000, 'Communication Towers: A deadly hazard to birds', American Bird Conservancy.

## Appendix 1: Qualifications and experience of Bernard O’Callaghan



## BERNARD O'CALLAGHAN

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### SENIOR ECOLOGIST AND PROJECT MANAGER

#### Qualifications:

Bachelor of Science (Hons) – Zoology, Melbourne University

Graduate Diploma in Applied Sciences, (Envir. & Heritage Interpretation), Deakin University

Masters of Environmental Management – University of New England, Armidale

#### EXPERIENCE

Bernard has over 25 years experience in environmental and wildlife science and management, including a range of development and environment related initiatives. He has worked in the delivery of environmental management projects and consulting for over 20 years, including over 15 years involvement with non-government environment organisations such as the International Union for Conservation of Nature – IUCN. He has also advised development agencies including the Asian Development Bank and the World Bank.

Bernard has undertaken a range of impact assessments and review of potential impacts for over 10 planned or operating wind energy developments. He has also developed, reviewed and implemented Bird and Bat management plans for over 10 wind farms in Australia.

Bernard's project experience has included:

- Flora and fauna impact assessments, with particular emphasis on impacts of wind energy development on native vegetation, threatened flora and fauna species, birds and bats;
- Design, implementation and review of various post- construction bird and bat impact monitoring programs in over 10 wind farms;
- Development of 5 draft and final Bird and Bat Adaptive Management Programs (BBAMPs) in NSW;
- Currently overseeing implementation of 4 active BBAMPs;
- Strategic advice to wind energy development companies on regulatory, technical and community issues related to wildlife impacts of wind farms; and
- Supported regulatory processes, including the preparation of Referrals and Assessments under the EPBC Act and public forms and planning appeals within state planning regimes.

This experience has given him a well developed overview of overseas and local wind energy impacts on flora and fauna, as well as strategies for addressing related regulatory requirements.

#### EMPLOYMENT HISTORY

1993-1998	Senior Program Officer and Program Coordinator - Asian Wetland Bureau/ Wetlands International (Malaysia / Cambodia/ Mekong)
1998-2001:	International Independent Environmental Consultant – Asia
2001-2005:	Chief Technical Advisor - World Bank / IUCN (Vietnam)
2005- 2013:	Technical Program Director - IUCN (Vietnam and Oceania)
2013- 2015:	International Independent Environmental Consultant – Asia- Pacific
2015- present:	Brett Lane & Associates Pty Ltd. (Melbourne, Australia)



## Appendix 2: Qualifications and experience of significant contributors

# Alan Brennan

## Senior Ecologist and Project Manager

### Profile

Alan Brennan joined Brett Lane and Associates Pty Ltd, Melbourne in 2007. Alan's role involves developing solutions for projects experiencing issues with ecological matters. During his career in the biological sciences Alan has developed specialised skills and abilities in vegetation and land management along with a sound knowledge of relevant policies and legislation. Since 1997, he has worked to ensure sustainable development outcomes are achieved across a range of industry sectors. Prior to this, Alan worked in medical and agricultural research .

### Biography

**Employed in the biological sciences since 1986**

#### Qualifications

Graduate Diploma in Land Rehabilitation *University of Ballarat*  
Bachelor Applied Science (Applied Biology) *RMIT University*

#### Certificates and Licenses

Management Authorisation – Salvage and Translocation  
DELWP Certificate of Competency in Vegetation Quality Assessments Registration No. HH168  
Victorian Animal Ethics Approval

#### Employment History

2007 – Present  
Senior Ecologist / Project Manager, *BL&A*  
2005 – 2007  
Manager City Environment, *Hume City Council*  
2000 – 2005  
Environmental Services Manager,  
*Melton Shire Council*  
2000 – 2000  
Catchment Management Project Co-ordinator,  
*Melton Shire Council*  
1998 – 2000  
Grassland Project Officer, *DNRE (now DELWP)*  
1997 – 1998  
Catchment Management Officer, *DNRE (now DELWP)*  
1992 – 1995  
Cell Physiologist, *Monash University & Monash IVF*  
1988 – 1992  
Plant Pathologist, *Department of Agriculture ,*

### Key Skills

- Project Manager including budgeting, staffing, client liaison & production of high quality technical reports
- Flora and Fauna Assessments
- Biodiversity (habitat hectare) assessments
- Environmental impact assessments
- Expert witness for VCAT, Planning Panels, Magistrates Court, County Court & Supreme Court
- Ecological constraints analysis
- Scoping assessments
- Management plan preparation
- Offset Plan preparation
- Project design recommendation
- Preparation of mitigation measures
- EPBC Act and EES Referrals
- Preparation of assessment reports (preliminary documentation, public environmental report and environmental impact statement)
- Offset site selection
- Management of native vegetation management on-ground works

# Project Examples

## Property Development

Precinct Structure Plan 92 Westbrook, Wyndham Vale, Victoria — 550 hectares of land adjacent to the Werribee River: Initial and multiple targeted flora and fauna assessments, Submission to DSE Time Stamping review, liaison with DSE and GAA (2010 – 2012)

Brompton Lodge, Cranbourne West, Victoria — preparation of Expert Witness Statement of Evidence, flora and fauna assessment, preparation of Expert Witness Statement for Logical Inclusion Assessment Panel, net gain analysis and preparation of Native Vegetation Precinct Plan, preparation of Expert Witness Statement for rezoning Panel (2007 to 2016).

River Valley Estate, Sunshine North — 100+ hectare site adjacent to the Maribyrnong River, flora and fauna assessments, multiple targeted flora surveys, impact assessments and offset searches (2008 to 2016)

Harpley Estate, Werribee West, Victoria — biodiversity assessment, development of a conservation management plan, review of a landscape plan

Hodgkins Road, Hastings, Victoria, Initial and targeted flora and fauna assessments, net gain assessments, preparation of Expert Witness Statement of Evidence for VCAT, provision of evidence at VCAT, development of an offset management plan and a conservation management plan, assessment of and assistance with Planning Scheme infringements

## Renewable Energy

Portland Wind Energy Project Stage V, Portland, Victoria — flora and habitat hectare assessment and net gain analysis of development footprint (2008 – 2010).

Crookwell Wind Farm, Crookwell, New South Wales — flora and fauna assessment along with community consultation (2009)

Bulgana Wind Farm, Victoria — Detailed flora and fauna impact assessment, EPBC Referral (2015)

## Road and Rail Infrastructure

Second Crossing of the Murray at Echuca, Victoria — detailed biodiversity assessment of multiple alignments, targeted flora and fauna surveys, detailed habitat mapping, preparation of expert witness statement for EES and EPBC Referral. Preparation of reporting to enable assessment under NSW legislation (2008-2016)

Dingley Bypass, Victoria: flora and fauna assessments for multiple stages, impact assessments, threatened flora and fauna species targeted surveys, preparation of EES Referral, preparation of a response to letter of community concern, sourcing of offsets, preparation of offset management plan, client & regulator liaison and development of mitigation measures, construction phase advice and assessments (2008 - 2012)

Avalon Airport Rail Link, Victoria, Spiny Rice-flower and Striped Legless Lizard surveys, net gain assessments of three potential alignments and Department of Transport liaison (2012)

Bulla Bypass and Melbourne Airport Link to OMR, Victoria, overview flora and fauna assessments for multiple routes, impact assessment, threatened flora and fauna species targeted surveys, advice on preparation of EES Referral, development of mitigation measures and managing sub-contracting of aquatic surveys (2011- 2012)

Nagambie Northern Bypass, Victoria, flora and fauna assessments, net gain impact assessment and construction phase assessment and advice (2010 – 2011).

## Ecosystem Monitoring and Management

DSE Bushfire Vegetation Assessments, Victoria, undertook rapid field assessments of public and private land across large areas at a high risk from bushfire.

Deep Lead, Victoria, provision of advice on EPBC Act, assessment of impacts from rail rehabilitation project, preparation of weed management plan, implementation of weed management plan, search for offsets (2010 – 2013)

Maidstone Street Altona, Victoria, Spiny Rice-flower salvage and translocation plan preparation and development of an offset and conservation management plan

Northern Highway, Wallan to Kilmore, Victoria, Preparation and implementation of a fauna management plan

City of Greater Geelong Review of environmental programs, Victoria, Review of land and waterway programs involving review of existing information, staff interviews and benchmarking with other Councils.

# Dr. Khalid Al Dabbagh

## Senior Zoologist



## Profile

Khalid has over 35 years' experience in Zoology, specialising in ornithology and animal ecology. Khalid has extensive experience in identifying fauna species and their habitat as well as undertaking impacts assessments for a wide range of other projects types. Khalid is particularly experienced in assessing development impacts on birds and bats. He has helped to prepare environmental management plans and mitigation recommendations for numerous projects. Khalid has worked on over 50 wind farm projects, undertaking bird utilisation studies, bat surveys and bird and bat mortality estimates.

## Biography

### Working in industry since 1980

#### Qualifications

PhD (Animal Population Ecology), *University of Leicester, England*

MSc (Ornithology), *University of Baghdad*

BSc (Biology), *University of Baghdad*

#### Certificates and Licenses

Management Authorisation – Salvage and Translocation  
Construction Induction 'White Card'

#### Employment History

2002 – Present

Zoologist & Ecologist, *BL&A, Melbourne.*

1994– 2002

Section Editor, *Handbook of Australian, New Zealand and Antarctic Birds, Birds Australia, Melbourne*

1993 – 1994

Research assistant, *Arthur Rylah Institute for Environmental Research, Heidelberg, Victoria*

1980 – 1992

Senior lecturer, *University of Baghdad, Iraq.*

1983 – 1989

Senior research Scientist, *Iraqi Biological Research Centre*

1976 – 1983

Lecturer, *University of Basrah, Iraq*

## Key Skills

- Ornithologist
- Implementation of bird and bat management plans at wind farms
- Mortality assessment at wind farms
- Terrestrial Fauna Assessments
- Targeted surveys for listed flora and fauna species
- Bird and Bat Utilisation Surveys
- Scoping assessments
- Management plan preparation for listed fauna values and offset sites
- Striped Legless Lizard salvage protocol implementation
- Project design recommendation
- EPBC Act and EES Referrals
- Offset site selection



# Project Examples

## Property Development

Manor Lakes, Wyndham Vale, Victoria: Flora and fauna assessment and targeted fauna surveys (2010–2011).

Eynesbury, Victoria: Flora and fauna assessment and targeted fauna surveys (2008, 2011).

Somerfield Estate, Keysborough, Victoria: Flora, Fauna and Growling Grass Frog surveys (2008 – 2009)

## Renewable Energy

Wonthaggi Wind Farm, Vic. 2005–2007, bird and bat utilization studies; mortality studies.

Bald Hills Wind Farm 2004–2011, Bird and bat utilization surveys; Bird, Bat and Animal Pest Management Plans.

Stockyard Hill Wind farm 2008; bird and bat utilisation survey; Brolga Surveys.

Lal Lal Wind Farm, Vic. 2006-2007; bird and bat utilisation survey; Powerful and Barking Owls Surveys.

Ryan Corner Wind Farm, 2006-2007; bird and bat utilisation survey; Brolga and Southern Bentwing Bat Surveys.

Dundonnell Wind Farm, 2009; bird and bat utilisation survey; Brolga Surveys.

Ararat Wind Farm, 2008, 2012; bird and bat utilisation survey; Bird, Bat and Animal Pest Management Plans.

Rugby Wind Farm 2011; bird and bat utilization survey.

Taralga Wind Farm 2012; bird and bat utilization survey.

Woodlawn Wind Farm , NSW (20011–2012), Bird utilisation surveys; mortality studies.

Capital Wind Farm, NSW, (2010–2011), Bird utilisation surveys; mortality studies.

Granville Wind Farm, Tasmania 2012 – 2013, bat and threatened species surveys.

## Road and Rail Infrastructure

Second Murray River Crossing at Echuca – Moama –Flora, fauna and native vegetation assessment, Threatened flora and fauna surveys and Bat survey (2011–2012).

Dingley Bypass: Flora and fauna assessment and targeted fauna surveys (2010–2011).

Avalon Airport Rail Link: Flora and fauna assessment and targeted fauna surveys (2011–2012).

## Ecosystem Monitoring and Management

Warrambeen Monitoring, Victoria: Ecological Monitoring of threatened fauna species (2010).





Brett Lane & Associates Pty. Ltd.  
Ecological Research & Management

## Justin Sullivan Senior Ecologist

### Profile

Justin first joined BL&A in 2008 and currently is working in the role of Senior Ecologist. Since being at BL&A Justin has been highly involved in a broad range of work including impact assessments for residential development, environmental monitoring projects including River Red-gum monitoring on the Murray River, and impact assessments for major infrastructure projects including roads, powerlines and wind farms.

Between 2011 and 2014 Justin worked in the role of Project Manager at BL&A and demonstrated his knowledge of the environmental planning process in Victoria, as well as working towards positive environmental outcomes. Between 2015 and 2016 Justin worked as Biodiversity Officer at Yarra Ranges Council, where he was responsible for reviewing and assessing planning applications and oversaw the management of a number of Council bushland reserves in the Yarra Ranges Shire. Since early 2017, Justin has been working in the role of Senior Ecologist at BL&A. He has an excellent knowledge of Victoria's flora and fauna and provides high level reports for a broad range of assessment types.

### Biography

#### Working in industry since 2008

#### Qualifications

BSC (Honours in Botany), *La Trobe University*

#### Certificates and Licenses

DELWP Certificate of Competency in Vegetation Quality

Assessments Registration No.HH061

Construction Induction 'White Card'

First Aid Certificate HLTAID001-3

#### Employment History

2017 - current

Senior Ecologist, *BL&A, Melbourne*

2015 - 2016

Biodiversity Offsets Officer & Environmental Planner,  
*Yarra Ranges Shire Council*

2011 - 2014

Botanist and Project Manager, *BL&A, Melbourne*

2008 - 2011

Field Botanist, *BL&A, Melbourne*

2001

Assistant Ranger, *Point Cook Coastal Park, Point Cook, Vic.*

### Key Skills

- Specialist botanical knowledge of Victoria's flora
- Working knowledge of Victoria's Planning Scheme, namely particular provisions (i.e. Clause 52.17)
- Working knowledge of environmental regulations relevant Victoria (i.e. EPBC Act, FFG Act)
- Demonstrated ability in Habitat hectare and tree assessment
- Working fauna survey skills
- Experienced in undertaking targeted surveys for listed flora and fauna species
- Provided environmental planning advice to applicants, Council Officers and other regulators
- Regularly provides project design recommendations to applicants
- Experienced in preparation of a variety of reports, including Flora and Fauna Assessments, Native Vegetation Assessments, EPBC Act Referrals, Offset Management Plans, and Targeted survey Reports, always to a high standard
- Project Management including budgeting, staffing and client liaison



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Brett Lane & Associates Pty. Ltd.  
Ecological Research & Management

## Project Examples

### Property Development

Modeina Estate, Burnside, Victoria: Flora and Fauna Assessment, EPBC Act referral (2009 – present)

Somerfield Estate, Keysborough, Victoria: Flora, Fauna and Growling Grass Frog Survey and Offset Plan Preparation (2008 – 2014)

Harpley Estate, Black Forest Road, Werribee, Victoria: Striped Legless Lizard Salvage Plan, Eastern Kangaroo Management Plan and Environmental Management Plan (2012—present)

South Dudley Road, Wonthaggi Residential Development, Wonthaggi, Victoria: Flora, Fauna and Growling Grass Frog Survey (2011).

### Renewable Energy

Moorabool Wind Farm, Moorabool, Victoria: Native Vegetation Assessment of the Wind Farm and Transmission Line (present)

Ararat Wind Farm, Ararat, Victoria: Flora and Fauna Assessment of the Wind Farm and Transmission Line, Offset Plan, Native Vegetation and Pest Plans (2007 – 2014)

Bald Hills Wind Farm, South East Gippsland, Victoria: Native Vegetation Management Plan and preparation of Offset Plan (2008 – 2014)

Stockyard Hill Wind Farm, Beaufort, Victoria: Native Vegetation Assessment (2007 – 2011)

### Road and Rail Infrastructure

Second Murray River Bridge Crossing at Echuca-Moama: Detailed Flora and Fauna Assessment, Targeted Flora and Fauna Surveys, Bat Survey and Net Gain Assessment (2008 – 2014)

Burke Road, Glen Iris and North Road, Ormond Level Crossing Removal Project, Victoria: Flora and Fauna Assessment (2012)

Cardinia Road Upgrade, Pakenham, Victoria: Flora and Fauna Assessment (2012)

### Ecosystem Monitoring and Management

River Red Gum Monitoring Project, Murray River, Mildura Region, Victoria: Monitoring of River Red-gum health at various reaches along the Murray River system (2008 – 2013).

Wimmera River Monitoring Project, Wimmera River, Horsham Region, Victoria: Monitoring of River Red-gum and River health (2008 – 2009).

### Water and Pipeline Infrastructure

Altona Recycled Water Project Stage 2, Werribee to Altona, Victoria: Flora and Fauna Assessment (2011 – 2014)

Kurrak Rd to Browns Lane Outfall Sewer Development, Plenty, Victoria: Flora and Fauna Assessment (2008 –2014)

Bellbird Ridge Estate, Sewer Alignment Development, Diamond Creek, Victoria: Flora, Fauna and Native Vegetation Assessment (2010)

Point Cook Sustainable Alternative Water Scheme Project, Point Cook, Victoria: Native Vegetation Impact Assessment (2011)

Telstra Tower, Tinderbox Hills, Tasmania: Flora and Fauna Assessment (2012)



# Brett Lane

## Principal Consultant and Director

### Profile

Brett has over 35 years' experience in ecological research and management. He has worked in a range of positions with environmental consultancies in Melbourne and Brisbane and with non-government environmental groups in Australia and East Asia. He has specialist knowledge in birds and wetlands, and extensive experience in ecological impact assessment, including in the infrastructure, renewable energy, property development and mining industries. Brett has undertaken and managed many hundreds of ecological assessments and prepared and reviewed documents that have accompanied development applications on behalf of private companies, government infrastructure agencies and private individuals. His extensive experience has given him an excellent knowledge of the regulatory environment relevant to native vegetation, flora and fauna and he can advise on the scope of scientific information needed to inform the development assessment and decision-making process. He has also defended his scientific work as an expert witness in courts and tribunals. Brett founded BL&A in 2001.

### Biography

#### Working in industry since 1979

#### Qualifications

BA (Zoology & Physical Geography) *Monash University*

#### Certificates and Licenses

Management Authorisation – Salvage and Translocation  
Victorian Animal Ethics Approval

#### Employment History

2001 – present

Director, *Brett Lane & Associates Pty Ltd, Melbourne*

1999 – 2000

Natural Resource Specialist, *PPK Environment & Infrastructure Pty Ltd, Melbourne*

1996 – 1998

Senior Ecologist, *Ecology Australia Pty Ltd, Melbourne*

1993 – 1996

Principal Terrestrial Ecologist, *WBM Oceanics Australia, Brisbane*

1991 – 1993

Assistant Director (East Asia), *Asian Wetland Bureau, Kuala Lumpur, Malaysia*

1987 – 1991

Director, *Brett A Lane Pty Ltd (Melbourne)*

1980 – 1986

Wader Studies Co-ordinator, *Royal Australasian Ornithologists' Union (now Birdlife Australia, Melbourne)*

1979

Research Assistant, *Kinhill Planners Pty Ltd., Melbourne*

### Key Skills

- Experienced advisor on state and federal biodiversity legislation and policy
- EPBC Act and EES Referrals
- Preparation of environmental assessment reports (preliminary documentation, public environmental report and environmental impact statement)
- Preparation of native vegetation planning permit applications
- Design of developments to comply with biodiversity legislation and policies
- Expert witness for VCAT, planning panels and courts
- Ecological risk assessment
- Native vegetation assessment
- Terrestrial fauna assessment and wetland ecology
- Ornithologist specialising in wetland and migratory shorebirds
- Wind energy development specialist and minimizing impacts on wildlife including collision risk modelling



# Project Examples

## Property Development

Eynesbury Township, Eynesbury, Victoria: Flora, Fauna and Habitat Hectare Assessment, Targeted Flora Surveys, Growling Grass Frog Survey, Plains-wanderer Survey and Development of an Offset Tracking Tool. Net Gain Analysis for Planning Permit Applications of subsequent stages and advice on offset management (2003 – present)

Taylor's Rd, Sydenham, Victoria (Broadcast Australia): EPBC Act Referral, preparation of EPBC Act Public Environment Report (PER), Offset Site Search and Offset Management Plan, Spiny Rice-flower Propagation and Translocation Plans, Seed Collection (2006 – present)

Somerfield Estate, Keysborough, Victoria: Flora, Fauna and Growling Grass Frog Survey and Offset Plan Preparation, preparation of offset tracking reports for each stage of development (2008 – present)

Modena Estate, Burnside, Victoria: Flora and Fauna Assessment, targeted threatened species surveys, EPBC Act referrals and assessment approvals, development of offset and mitigation plans (2002 – present)

## Renewable Energy

Dundonnell Wind Farm, Dundonnell, Victoria: Overview and Targeted Assessments including Brolga, bat, migratory bird, Striped Legless Lizard, Flora Surveys, assessment of powerline route and road access options, EPBC Act Referral, Input to EES Referral, preparation of EES technical appendix on flora and fauna, Brolga impact assessment, collision risk modelling (2009 – present)

Granville Wind Farm, Granville Harbour, Tasmania: Overview Assessment, targeted surveys including Orange-bellied Parrot and bat surveys, EPBC Act Referral and advice for regulator negotiations (2011 – present)

MacArthur Wind Farm, MacArthur, Victoria: Overview assessment, detailed flora and fauna surveys, impact assessment, input to EPBC Act Referral and state EES, assessment of powerline and road route options, appearance at state Planning Panel hearings as expert witness, preparation of pre-construction and operational flora and fauna management plans, net gain analysis and identification of suitable offsets (2004 – 2012)

Cherry Tree Wind Farm, Victoria: Overview assessment, native vegetation and threatened flora surveys, targeted threatened fauna surveys, assessment of powerline and road route options, offset site sourcing and assessment, preparation of expert witness statement and appearance at VCAT (2010 - 2015)

Mt Gellibrand Wind Farm, Mt Gellibrand, Victoria: Overview assessment, detailed flora and fauna surveys, including targeted Brolga and migratory bird surveys, and Striped Legless Lizard tile grid surveys, input to state planning permit application, preparation of witness statement and appearance at state Planning Panel hearing, preparation and early implementation of pre-construction flora and fauna management plans, including bat and avifauna management plan, native vegetation mapping, offset mapping, development of Brolga monitoring and mitigation strategies (2004 – present).

## Road and Rail Infrastructure

Avalon Airport Rail Link, Little River, Victoria: Flora and Fauna Mapping, Constraint Analysis and Net Gain Analysis (2011 – 2013)

Dingley Bypass, Keysborough, Victoria: Flora and Fauna Assessment, including targeted flora surveys, habitat hectare assessment and Net Gain analysis, expert witness at VCAT case (approved) (2008 – 2014)

Nagambie bypass, Nagambie Victoria: Flora and Fauna Assessment, including habitat hectare assessment and Net Gain analysis (2008)

Second Murray River Bridge Crossing at Echuca-Moama: Detailed Flora Assessment, Targeted Flora Survey (2008 – present)

## Ecosystem Monitoring and Management

Scientific Review Panel, Kerang Lakes Bypass project (North Central Catchment Management Authority, Goulburn Murray Water): Scientific review of detailed technical reports to inform decisions of water savings plans and associated watering plans for five wetlands that form part of the Ramsar-listed Kerang Lakes wetlands system. (2013)

Northern Victoria Irrigation Renewal Program (NVIRP): Assessed the impact of a major federal water industry investment project on Matters of National Environmental Significance, including threatened flora, threatened fauna and listed migratory birds using wetlands located in the potential impact area. (2009-2011)

