To overcome the limitation of low Brolga breeding numbers for the breeding home range analysis the results of the Symbolix (2013b) have been compared and validated against other Brolga home range studies close to the Darlington. These other studies including Mortlake Wind farm (Brett Lane and Associates 2008b), Stockyard Hill Wind Farm (Brett Land and Associates 2008a), Penshurst Wind Farm (Biosis 2011). The results of this comparison are presented in Ecology and Heritage Partners (2013).

The comparison found that the brolga breeding home ranges are strikingly similar and that variability in home ranges between and during breeding seasons is low with home ranges similar for both periods, and across different years and environmental conditions (Ecology and Heritage Partners 2013b). This provides greater confidence in the home range results. For the Mortlake Wind Farm site, a brolga nest buffer distance of 800m was recommended and this buffer was also recommended to be placed on any high to very-high quality wetlands as these are likely to provide the best breeding habitat for future Brolga nests (Brett Lane and Associates 2008b). For the Stockyard Hill Wind Farm site, a 400-metre breeding buffer was recommended for all breeding sites and a three-kilometre buffer was recommended for suitable wetlands around these breeding sites (Brett Lane and Associates 2008a). For the Penshurst Wind Farm site brolga breeding home range was an average of 687 metres from the nest 99.9% of the time (Biosis 2011).

In 2021, the location of Brolga within and surrounding the study area and Brolga breeding were assessed in the field and the quality of wetland areas were assessed based on potential for Brolga breeding, and Brolga records from the VBA were added. Two Brolga breeding sites were confirmed in 2021, just south of the proposed wind farm Boundary off Castle Carey Road. Two additional 2021/22 breeding sites were confirmed (breeding pairs and two fledglings) in consultation with a landholder (G. Morrison pers. comm) in the east of the study area in their property that is located off the Darlington - Terang Road and adjoins the study area (Figure 6).

3.9.3 Brolga Wetland Habitat Assessment

In 2008 and 2009, 311 wetlands within 20 kilometres of the proposed wind farm were assessed to determine their use and their habitat quality for Brolga (Brett Lane and Associates 2009). From this assessment most wetlands were classed as low quality. Brolgas were nesting at four sites within the wind farm boundary (north of the Hamilton Highway) and a further two nesting sites were located within three kilometres of the proposed boundary (Brett Lane and Associates 2009).

In 2012, 236 wetlands within the proposed wind farm boundary and the surrounding five kilometres were identified (Ecology and Heritage Partners 2013). Of these wetlands 96 wetlands were assessed in terms of their Brolga habitat suitability, from this survey 16 wetlands were assessed as high quality, a further 16 wetlands were assessed as Medium Quality and 57 were low quality, seven were not suitable (Ecology and Heritage Partners 2013). A total of 140 wetlands were not assessed as they are located on private property with no access and were not visible from publicly accessible areas. With the exception of two wetlands (one each in the north-west and north-east corners of the proposed wind farm), all wetlands within the proposed wind farm boundary were assessed. In 2020 and 2021 Ecology and Heritage Partners assessed the wetlands that were not previously assessed.

Wetlands ranged in quality from low to high, with many partially inundated or having some standing water at the time of the current assessment. However, during previous assessment of wetlands in the study area (Ecology and Heritage Partners 2013), most wetlands were dry, suggesting that some wetlands within the study area do not provide year-round habitat for wetland dependent species.

In 2020, 134 wetlands were assessed during the field survey by Ecology and Heritage Partners (2021a) and found that the majority (118) were classified as being either absent, or containing low quality habitat (Table 7). Wetlands with high habitat suitability are grouped around the north-west of the proposed wind farm site (Figure 5). None of the wetlands assessed during this survey (Ecology and Heritage Partners 2021a) were observed to contain Brolga nesting sites.

The availability of suitable breeding habitat within and surrounding the proposed wind farm will depend on season rainfall (i.e. depth and duration of inundation), while the suitability of sites for breeding is known to vary over time and across the landscape (i.e. vary on temporal and spatial scales). In addition, several sites where Brolga has been recorded breeding historically have been drained or altered, and now currently do not support suitable breeding habitat for the species. Brolga breeding habitat areas require a 900-meter buffer under the draft Brolga standards (DELWP 2020) and Brolga breeding sites are recommended to have a 3.2-kilometre buffer under the Interim Brolga Standards (DSE 2012). Under the draft standards (DELWP 2020) a 900 metre buffer applies to all isolated breeding wetlands (including temporary wetlands that hold water for up to four months from July-November), or temporary wetlands that hold water for three months of the year July-November for groups of wetlands or any permanent wetlands with a breeding record.

3.9.4 Brolga Observations

In 2020, Brolga were observed at two sites during the roaming habitat assessments (Table 7, Ecology and Heritage Partners 2021), at sites number 3 and 137 (Figure 6b) where three individuals were observed at Site 3 which was classified as containing moderately suitable habitat. Four birds were recorded at Site 137 (south of the study area off Castle-Carey Rd) which contained highly suitable habitat. In the 2021/2022 surveys a pair of Brolga were again recorded at site 137 (Table 8).

Table 7 *Ratings for wetlands that occur within the proposed Darlington Wind Farm and surrounding five kilometres in 2012, 2013 and 2020 (Ecology and Heritage Partners 2012 and 2013).*

Overall habitat suitability category	Number of wetlands 2012	Number of wetlands 2021	Number of wetlands 2013
High	16	4	50
Moderate/Medium	16	12	27
Low	57	28	40
Absent	-	90	
Not Suitable	7		176
Not Suitable for Brolga breeding			
Not Assessed	140		39
Total	**236**	**134**	**332**

Table 8. Summary of Brolga observations during habitat surveys in 2020 and 2021/2022 by Ecology and Heritage Partners.

Year	Site number	Adjacent road	Number of Brolga	Habitat suitability	Location of bird	Nest present	Activity notes
2020	3	Woorndoo-Dundonnell Road	3	Moderate	Terrestrial habitat	No	Foraging
2020	137	Castle Carey Road	4	High	Terrestrial habitat	No	Foraging
2021	137	Castle Carey Road	2	High	Terrestrial habitat	Yes	Foraging

3.9.5 Collision Risk and Population Viability Analysis for Brolga

In 2009, Biosis analysed the risk of Brolga collision with turbines based on three turbine layouts and five turbine types and two different turbine heights within the proposed Darlington study area (Biosis, 2009). From this analysis Brolga turbine collision avoidance was estimated to be 95%, and across the different turbine layout, dimension and location scenarios assessed the annual average number of Brolga collisions was predicted to be between 0.178 and 2.710 collisions (Biosis 2009). This analysis was based on the previous proposal of up to 150 turbines, however, with the reduced number of turbines (up to 60 currently proposed) the probability of collision is likely to be reduced accordingly.

The University of Melbourne modelled and analysed the potential impact of the Darlington Wind Farm on the viability of Brolga populations over a 20-year period (McCarthy 2009) and concluded that there may be an additional annual mortality of 0.03-0.45% caused by collisions with turbines. The report also concluded that an increase in the fecundity of Brolga by 0.0045 to 0.295 would be sufficient to mitigate the increase in mortality of 0.45% (McCarthy 2009).

Collision risk for some bird species can be reduced further by modification of the design of turbines such as painting them black (Hudos 2003, May *et al* 2020) which reduced fatalities by over 70%, or by other operational and construction changes (Gartman *et al*. 2016a, 2016b).

Brolga pairs in the area of the proposed Darlington Wind Farm have been recorded nesting close to roads, (including within 50 metres of the Hamilton Highway), and houses and farm infrastructure and do not appear to be put off by human disturbance (Ecology and Heritage Partners, 2018). For the proposed Darlington Wind Farm a 900-metre buffer has been applied around all suitable wetlands either isolated or within groups, with a Brolga breeding record as outlined in the Draft Brolga Standards (DELWP 2020).

Both the study area (proposed wind farm boundary) and the proposed development footprint have been revised based on the results of the ecological surveys of the area. These revisions include the reduction of the northern area boundary to account for the Brolga breeding and flocking areas that occur outside of the wind farm boundary.

Based on the results of the habitat assessments wetlands varied significantly in their quality, with most of the high-quality wetlands being concentrated outside of the proposed wind farm. All wetlands in the study area where Brolgas have nested since 2007 were assessed as medium or high quality breeding habitat, which demonstrated that the habitat assessment method undertaken during the current assessments was an accurate measure of the suitability for Brolga breeding.

Not all wetlands rated as high, or which had Brolga breeding in the last five years, had a Brolga pair breeding in 2012. Several causes reasons for this lack of nesting at suitable wetland habitat may be;

- Brolgas may defend breeding territories which encompass more than one wetland (Arnol et al. 1994), and thus exclude other pairs from using suitable wetlands within their territory;
- Brolgas may not breed every year (Walkinshaw 1973) but maintain their territory in non-breeding years, excluding other Brolga from using the wetland for breeding;
- More optimal conditions elsewhere across the Brolga's Victorian range during the courtship and nest-prospecting periods may result in suitable wetlands being unoccupied if they become suitable only after pairs have established nests elsewhere; and
- The Victorian Brolga population may not being at carrying capacity, meaning that a number of suitable wetlands will not be occupied in any given year.

Wetland assessments were timed to occur in the middle-late period of the Brolga breeding season, which typically extends from June – November (Marchant and Higgins 1993). The 2012 season had average rainfall (Figure 4; 2012 rainfall – 547 millimetres, 18 year average – 580 millimetres, Bureau of Meteorology 2013), hence any wetland without water during surveys would be unlikely to provide suitable habitat long enough for Brolgas to successfully breed on the wetland. In seasons with above average rainfall, a larger number of wetlands are likely to be inundated, for a longer period and our habitat assessments during 2012 may have under-rated the quality of suitable breeding wetlands within the study area. In contrast, for seasons with lower than average rainfall, the assessments may have over-rated the quality of suitable breeding wetlands. While wetlands without water during the survey had lower habitat ratings than they would have if full, wetlands were rated as not suitable only if they had been drained or converted to plantation (this is consistent with the current Brolga guidelines: DSE 2012).

2.5 Implications

The results of the assessment of wetland suitability as Brolga breeding habitat are used to determine which wetlands that contain Brolga breeding records require a turbine-free buffer. The same buffer distance is required to be applied, independent of the habitat rating at that wetland.

- For wetlands that contain suitable breeding habitat (whether low, medium or high quality) turbine-free buffer zones are required only if the wetland is the site of a Brolga breeding attempt.
- For wetlands with suitable habitat without a record of Brolga breeding no turbine-free buffer is required.
- For wetlands that have been rated as not suitable no buffer is required, even if there is a Brolga breeding record from the wetland.
- For wetlands that were not assessed, these are treated as having suitable Brolga breeding habitat, and require a turbine-free buffer only if the wetland is the site of a Brolga breeding attempt.

Wetlands that contain low quality Brolga breeding habitat may be able to be rehabilitated (e.g. by additional planting or clearing of vegetation) to provide additional breeding sites for Brolgas. Wetland #22 may be appropriate for this approach; while there are recent breeding records from this site, the wetland is partially drained and has a large dam on the outflow. Filling in of the drainage lines and dams would significantly increase the likelihood of this wetland being used for breeding, especially in years of low to average rainfall.

It is also far enough from other regular breeding sites that competitive exclusion is unlikely from other nesting pairs.

Clusters of wetlands that contain high quality breeding habitat may have frequent Brolga movements between them for foraging or prospecting, and the turbine configuration can avoid these areas, or be designed to accommodate flight paths between wetlands. This would be appropriate for the north-east section of the proposed wind farm where there is a group of high quality wetlands (i.e. #22, #108, #109a, #111) and the Lake Barnie Bolac flocking site. The designation of this area as a turbine-free zone, or at least including turbine-free flight paths between these wetlands would demonstrate a commitment to minimising potential impacts of the proposed wind farm on the local Brolga population. This would be additional to the appropriate designation of turbine-free buffer zones. Since this recommendation was made the proposed wind farm development footprint and study area boundary have been reduced in the north-east to remove proposed turbines from this area.

The design and construction of the project will avoid potential impacts on Brolga breeding and flocking habitat by ensuring that turbines are placed sufficiently far from these areas to minimise disturbance. A model of population viability to assess the impacts of wind farms on the Victorian Brolga population was prepared (McCarthy 2008a) and mortality estimates from the collision risk analysis for the proposed wind farm were incorporated into the PVA model, to better understand the viability of the Brolga population over time.

From available information the potential for cranes, including Brolgas to collide with wind turbines is considered low, although a possibility (McCarthy 2008a). Based on data obtained during the detailed bird monitoring surveys for the proposed Mortlake East Wind Farm (Ecology Partners Pty Ltd 2008a, 2008b; Brett Lane and Associates Pty. Ltd. 2008c), it is expected that, based on a Victorian Brolga population of 600, <0.11 Brolgas will be killed annually through collision with operating turbines at the proposed Mortlake East Wind Farm (McCarthy 2008b). As such, this translates to <0.018% of additional mortality of the brolga population of per annum (McCarthy 2008b).

4 PROJECT IMPACTS

Potential significant effects on the environment criteria consider the significance of the environmental assets present, the potential magnitude, extent and duration of the effects on the assists, and the potential for extended effects through interacting effects (DSE 2006). The potential for significant impacts on Matters of National Environmental Significance (NES) will be determined by the type and extent of impacts to EPBC Act-listed species and ecological communities by the final infrastructure layout. The proposed layout is therefore currently flexible and this avoidance of environmental assets to reduce the potential impacts is possible given the low turbine density proposed by the current development.

From the potential environmental effects on the environment that may be considered significant and therefore require a referral (DSE 2006), there are unlikely to be significant effects on any threatened species or ecological communities within the study area due to the proposed wind farm development. DELWP modelled current wetlands will be impacted by the proposed development, however, and these impacts have been minimised where possible. Many of these modelled wetland areas are substantially modified and no longer function as a wetland or have been reduced in extent. Further revision of the proposed development footprint would also reduce these impacts as other areas of current wetlands could be avoided. The list below outlines potential impacts on ecological values identified during the ecological assessments.

- Loss of confirmed populations and habitat of threatened and listed flora and fauna and their habitat and loss of threatened ecological communities;
- Removal of two endangered EVCs in the Victorian Volcanic Plain bioregion (Plains Grassy Wetland, and Plains Grassy Woodland): 1.08 hectares.
- Disturbance to current wetlands (DELWP Modelled): 31.35 hectares.
- Fragmentation of native vegetation remnants of endangered EVCs;
- Loss and fragmentation of habitat and potential mortality for listed and non- listed fauna species
- Spread of weeds and soil pathogens due to on-site activities;
- Disturbance to wildlife from increased human activity and noise during construction and operation of the turbines; and,
- Mortality of fauna species including significant fauna species due to turbine collision impact.

Turbines and their associated infrastructure have largely been situated in areas that are devoid of native vegetation, based on detailed micro-siting following the ecological assessments, to minimise impacts on fauna species that use the wetlands. Similarly, wetlands and waterways, that occur in the low-lying areas, will be avoided where possible.

5 LEGISLATIVE AND POLICY IMPLICATIONS

This section identifies biodiversity policy and legislation relevant to the current assessment and principally addresses:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Environment Effects Act 1978* (EE Act); and
- *Flora and Fauna Guarantee Act 1988* (FFG Act) (Victoria).
- *Water Act 1989 (Victoria)*
- *Planning and Environment Act 1987 (Victoria)*
- *Wildlife Act 1975 and Wildlife Regulations 2013 (Victoria)*
- *Catchment and Land Protection Act 1994 (Victoria)*
- *Conservation Forests and Lands Act 1987*

5.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW), formally the Department of Agriculture, Water and the Environment (DAWE), and provides a national framework for the protection of heritage and the environment, and the conservation of biodiversity. The Act establishes a Commonwealth process for the assessment of proposed actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES), or on Commonwealth land. An action (i.e. project, development, undertaking, activity, or series of activities), requires approval from the Commonwealth Environment Minister if it is likely to have a significant impact on any MNES, including:

- World Heritage properties;
- National heritage places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;
- Migratory and marine species;
- Commonwealth marine area;
- Nuclear actions (including uranium mining);
- Great Barrier Reef Marine Park; or,
- Water resources impacted by coal seam gas or mining development.

5.1.1 *Implications*

Given the presence of seven nationally significant species (four flora and three fauna) and six migratory species, and two Nationally significant ecological communities identified within the study area, it is recommended that this project is referred to the Commonwealth as an EPBC referral. The Minister will decide whether the proposed action is a 'controlled action', and if so, will require further assessment to determine whether approval will be granted under the EPBC Act. However, as the proposed impact area has been revised to avoid all known records and known habitats of these matters of NES it is considered unlikely that the proposed wind farm will be a 'controlled action'.

The study area occurs within the same catchment (12.7 kilometres) as the Western District Lakes Ramsar wetlands (DoE 2014). The Ramsar site is unlikely to be impacted by the proposed wind farm as it is situated a considerable distance from the proposed action and separated from the study area by Mount Emu Creek, a major waterway in the region. Provided management practices and construction techniques minimise disturbance to ecological values it is highly unlikely that the project will impact the ecological character of the Ramsar wetland. The proposed development is not expected to impact migratory or marine species listed under the EPBC Act.

5.2 Environment Effects Act 1978 (Victoria)

The *Environment Effects Act 1978* (EE Act) provides the environmental assessment process for a proposed activity that may have a significant impact on State significant values. The proposed Darlington wind farm project has the potential for a range of significant environmental effects. A project with potential adverse environmental effects that, individually or in combination, could be significant in a regional or State context should be referred to the Victorian Minister for Planning. The criteria for an EES referral are outlined in the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (DSE 2006).

On behalf of TME Australia Pty Ltd, Tract lodged the original EES Referral submission on 23 November 2007 for a wind energy facility incorporating up to 150 wind turbines with supporting infrastructure between Mortlake and Darlington in south-west Victoria.

The site consisted of approximately 8,800 hectares and comprised nine different land holders. The northern area comprised of approximately 6,800 hectares of land north of the highway and the southern area comprised 2,000 hectares to the south of the highway. In addition to the turbines the project included:

- An on-site substation, small control area, and maintenance buildings.
- Power connection to the electricity grid via the 500kV transmission line which bisects the site.
- Wind monitoring towers (Anemometers).
- The potential for a temporary batching plant to service the wind farm construction.
- Internal vehicle access tracks.

A range of preliminary investigations were carried out to assess the flora and fauna, Aboriginal and cultural heritage, and landscape values.

The technical investigations accompanying the referral concluded the project would not result in any significant impacts to the environment. The project would have an impact on the local area, but these impacts were deemed minimal and as a result it was submitted that the project would not require an Environment Effects Statement under the EE Act.

5.2.1 Previous decision under the EE Act

On 9 January 2008, the Reasons for Decision under the Environment Effects Act 1978 was issued by the Minister for Planning. The Minister for Planning has decided that an EES is not required for the Darlington Wind Farm as described in the referral accepted on 23 November 2007, subject to the following condition:

> *'Targeted surveys of the movements and behaviour of Brolgas in the vicinity of the Darlington Wind Farm site during the breeding, migration and flocking seasons for the species are to be undertaken and documented to the satisfaction of the Department of Sustainability and Environment, prior to any statutory decision whether or not to approve the wind farm proposal'.*

The reasons for the decision were set out as follows:

> *'The project site mostly consists of cleared agricultural land, with considerable scope to adjust the siting of turbines and associated infrastructure to avoid adverse effects on indigenous flora and Aboriginal cultural heritage, if either listed species or significant heritage places are identified in detailed site investigations.*
>
> *The preliminary ecological investigations indicate that there are unlikely to be significant effects on threatened fauna, other than the Brolga. There are opportunities for avoiding or minimising potential effects on fauna on the basis of a bird utilisation survey and targeted surveys for significant fauna.*
>
> *Although there is uncertainty about the potential risk to the Brolga because of the proximity of the Lake Barnie Bolac flocking site, there are opportunities to provide setbacks for turbines based on the findings of targeted surveys during the breeding, migration, and flocking seasons.*
>
> *Potential effects on landscape values and residential amenity are likely to be of local significance only, with some potential for mitigation.*
>
> *The potential environmental effects of the project can be adequately assessed through the planning permit process under the Planning and Environment Act 1987, subject to further investigation of risks to Brolgas in the area'.*

This decision recognised that the significant size of the study area enables flexibility so that the location of the proposed turbines and associated wind farm infrastructure could be adjusted to avoid impacts to identified ecological features.

5.2.2 Implications

Additional detailed ecological investigations (outlined in this report) have been undertaken since the Minister for Planning's decision that an EES was not required. Based on the updated ecological assessment across the study area, the proposed development is not likely to have significant impacts on native vegetation, or significant flora and fauna species (including Brolga) and ecological communities.

A total of 32.43 hectares is proposed to be impacted by the proposed development, comprising 1.08 hectares of mapped native vegetation (Plains Grassy Wetland (1.04 ha)and Plains Grassy Woodland (0.04 ha)), and

approximately 31.35 hectares of current wetlands (i.e. DELWP's modelled wetland). Most of the modelled wetland areas are highly modified (i.e. have previously been drained and are now extensively cropped and grazed) and don't support native vegetation. Several wetlands mapped in previous studies in 2007 and 2014 have since been drained and ploughed and so are no longer considered remnant patches.

Following the ecological assessments of the study area and surrounds we now have a strong understanding of the ecological values within and surrounding the proposed study area. As the Ministers' decision (2008) outlined, potential significant impacts to significant species, ecological communities, migratory species, and Brolga can be avoided. This avoidance will be achieved through our awareness of the presence of these ecological values and by following the guidelines and conservation advice relevant to them when determining the proposed developments impact footprint. Best practice avoidance and minimisation practices will be used during the development construction to reduce potential ecological impacts.

The original project proposal has been modified, through a change in the proposed wind farm boundary, to include additional properties and exclude some previously included properties and avoid the brolga flocking no-go zone northeast of the study area. This has resulted in a decrease in the study area, and the proposed construction footprint from the original proposal. The lower density of turbines proposed, compared with 2007 (up to 150 in 2007; up to 61 in 2022), will ensure that the final turbine location avoids significant impacts on all significant environmental assets. This modification of the original proposal and the avoidance of significant environmental values reduces the potential environmental impacts of the proposed project. The reasons for the Ministers decision for the original proposal have now been adequately addressed, so any significant potential impacts of the proposed development on ecological values are minimal and can be addressed through the EPBC Act and the Planning Permit Application process.

Impacts to native vegetation (Plains Grassy Wetland and Plains Grassy Woodland) can be avoided through revision of the development footprint, and are based on the worst case scenario as they include large buffers applied to the proposed construction footprint. As such, the updated infrastructure layout will result in a reduced impact compared with the original development plan that was submitted as part EES referral and decision.

5.3 Flora and Fauna Guarantee Act 1988 (Victoria)

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) is the primary legislation dealing with biodiversity conservation and the sustainable use of native flora and fauna in Victoria. The provisions of the FFG Act bind all public agencies, public landowners and land managers. The Act contains lists of threatened flora and fauna species, 'protected flora species' and threatened ecological communities, as well as action statements to protect the long-term viability of these values. The FFG Act Threatened List was updated on 20 July 2022. The significant flora and fauna species recorded in the VBA) within 10 kilometres of the proposed Darlington Wind Farm are shown on Figure 3 (Flora) and Figure 4 (Fauna) and their likelihood of occurrence is outlined in Appendix 1.2 and 2.2.

The Act applies to the removal of listed threatened species and communities, as well as protected flora species. Protected flora species include any of the Asteraceae (Daisies) family, all orchids, ferns (excluding *Pteridium esculentum*) and Acacia species (excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon* and *Acacia paradoxa*); in addition to any taxa that forms a component of a listed FFG Act vegetation community. A species may be both listed and protected.

Although the FFG Act contains provisions for enforcement on private land, it is primarily applied to public land. Proponents are required to apply for an FFG Act permit to 'take' listed and/or protected flora species and listed vegetation communities. An FFG Act permit is generally not required for the removal of listed and/or protected flora species and communities on private land. There are currently no requirements for proponents to apply for a permit under the FFG Act where a proposed activity requires the removal of habitat for a listed terrestrial fauna species. The Act does however regulate the removal, salvage, temporary holding, translocation, taking, trading and keeping of FFG Act-listed fish species. Typically, DELWP may place conditions on a license or permit regarding the amount of flora to be removed or the collection method.

5.3.1 Implications

There are confirmed records and suitable habitat within the study area for three listed species (Pale Swamp Everlasting, Small Milkwort and Wavy Swamp Wallaby Grass) and several protected flora species (Black Wattle, Chocolate Lily, Small Vanilla Lily, Common Everlasting, Annual Cudweed *Euchiton sphaericus* and Common Onion-orchid *Microtis unifolia*) (See Appendix 1.1) under the FFG Act. The development footprint has been revised since the targeted surveys and flora surveys were conducted so not all of these species will be impacted and a final flora survey will be required to confirm impacts on listed or protected species.

There are confirmed records of eight significant fauna species (Brolga, Little Eagle, Musk Duck, Australasian Shoveler, Australian Gull-billed Tern, Common Greenshank, Wood Sandpiper, and Tussock Skink listed under the FFG Act.

Most of the study area is privately owned so a permit under the FFG Act is not required for those areas. The impact of the proposed development on species listed and protected under the FFG Act is expected to be low as the development footprint has been revised based on the results of targeted surveys to avoid known areas of habitat for significant flora and fauna species.

5.4 Water Act 1989 (Victoria)

Waterways, wetlands and drainage lines within the study area will be avoided where possible by the proposed development footprint. Some crossing of these may be required for infrastructure such as access roads to the turbines. A 'works on waterways' permit from the Glenelg Hopkins CMA may be required where any action impacts on waterways within the study area. However, as there are no named waterways, it may not be required for any action. Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DELWP with the Glenelg Hopkins CMA included for comment.

5.5 Planning and Environment Act 1987 (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes. All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation, unless an exemption under clause 52.17-7 of the Victorian Planning Schemes applies.

5.5.1 *Local Planning Scheme and guidelines*

The study area is located within the Moyne Shire Council Municipality and is zoned as Farming Zone (FZ) (DELWP 2022d). The State Planning Policy Framework and the decision guidelines at Clause 52.17 (Native Vegetation) and Clause 12.01 require Planning and Responsible Authorities to have regard for the Guidelines (DELWP 2017).

5.5.2 *Implications*

The offset requirements for this project will depend on the areas to be developed as part of the project. The offset requirements have not yet been calculated for this project as the development footprint is not yet finalised.

5.6 Guidelines for the Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

The Victorian Planning Provisions relating to biodiversity protection and native vegetation management were amended (Amendment VC138) on 12 December 2017 and are known as the Guidelines (DELWP 2017). The primary objective of the regulations is 'no net loss in the contribution made by native vegetation to Victoria's biodiversity'. The State Planning Policy Framework requires Planning and Responsible Authorities to have regard for the Guidelines (DELWP 2017). Vegetation losses associated with the proposed activity are required to be assessed and offset in accordance with the Guidelines (DELWP 2017).

5.6.1 *Vegetation proposed to be removed*

The study area is within Location 3, with 32.43 (inclusive of one small, scattered tree) hectares of native vegetation (including one small scattered tree) and no Large Trees proposed to be removed. As such, the project falls under the Detailed Assessment Pathway (Table 9). Condition scores for vegetation proposed to be removed are provided in Appendix 1.3.

Table 9. Removal of Native Vegetation (Guidelines) (DELWP 2017).

Assessment pathway	Detailed
Location Category	3
Total Extent (past and proposed) (ha)	32.43 (inclusive of one small, scattered tree)
Extent of past removal (ha)	0.00
Extent of proposed removal (ha)	32.43
Large Trees (scattered and in patches) to be removed (no.)	0
Small, scattered trees to be removed (no.)	1
EVC Conservation Status of vegetation to be removed	Endangered (Plains grassy Wetland) and Vulnerable (Current Wetlands DELWP modelled)

A total of 32.43 hectares is proposed to be impacted by the proposed development, comprising 1.08 hectares of mapped native vegetation (1.04 hectares of Plains Grassy Wetland and 0.04 hectares of Plains Grassy Woodland) and approximately 31.35 hectares of current wetlands (i.e. DELWP's modelled wetland). Total extent is 32.43 including one small scattered tree and the current wetlands.

Most of the modelled wetland areas are highly modified (i.e. have previously been drained and are now extensively cropped and grazed) and don't support native vegetation. For the purpose of determining the extent of impacts and the required offsets under the Guidelines these areas have been assessed as native vegetation (DELWP 2017). Several wetlands mapped in previous studies in 2007 and 2014 have since been drained and ploughed and so are no longer considered remnant patches.

5.6.2 Offset Targets

The offset requirement for native vegetation removal is 0.456 General Habitat Units and Species Habitat Units (SHU) for 15 species. A summary of proposed offset requirements is presented below (Table 10).

Table 10. General Habitat Unit Offset Targets.

General Offsets Required	0.456 General Habitat Units
Large Trees	0
Vicinity (catchment/council)	Moyne Shire Council
Minimum Strategic Biodiversity Value*	0.305

*The minimum Strategic Biodiversity Value is 80% of the weighted average score across habitat zones where a General offset is required.

5.7 Catchment and Land Protection Act 1994 (Victoria)

The *Catchment and Land Protection Act 1994* (CALP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. The Act provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

- Avoid causing or contributing to land degradation which causes or may cause damage to the land of another landowner;
- Protect water resources;
- Conserve soil;
- Eradicate regionally prohibited weeds;
- Prevent the growth and spread of regionally controlled weeds; and,
- Prevent the spread of, and as far as possible eradicate, established pest animals.

The CALP Act establishes a framework for the integrated management and protection of catchments and aims to ensure that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species to minimise their spread and impact on ecological values.

5.7.1 Implications

There are five weed species listed as noxious under the CaLP Act recorded during the assessment (Appendix 1.1). The management of these weeds should be considered as part of the rehabilitation plan for areas following the construction of the proposed wind farm. On private property weed management is the responsibility of the property owner.

There is evidence that the study area is currently occupied by two pest fauna species listed under the CaLP Act (European Rabbit *Oryctolagus cuniculus* and Red Fox *Vulpes Vulpes).* Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements listed noxious weeds should be appropriately controlled throughout the study area to minimise their spread and impact on ecological values. A Weed Management Plan may be required to fulfil these obligations. A pest fauna eradication plan may also be required.

5.8 *Wildlife Act 1975* and Wildlife Regulations 2013 (Victoria)

The *Wildlife Act 1975* (and associated Wildlife Regulations 2013) is the primary legislation in Victoria providing for protection and management of wildlife. Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*, issued by DELWP.

The purposes of the Wildlife Act are to establish procedures in order to promote:

- The protection and conservation of wildlife;
- The prevention of taxa of wildlife from becoming extinct; and
- The sustainable use of and access to wildlife.

With the exception of pest animals declared under the CaLP Act or wildlife declared to be unprotected wildlife, the Wildlife Act makes it an offence to hunt, take or destroy protected or threatened wildlife without authorisation.

5.8.1 Implications

Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*.

5.9 Water Act 1989 (Victoria)

The purposes of the *Water Act 1989* are manifold but relate to the orderly, equitable, efficient and sustainable use of water resources within Victoria. This includes the provision of a formal means of protecting and enhancing the environmental qualities of waterways and their in-stream uses as well as catchment conditions that may affect water quality and the ecological environments within them.

Under the Act, a licence is required to:

- Construct, alter, operate, remove, or decommission works (including a dam) on a waterway; and,
- Take or use water from a waterway.

Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities must be referred to DELWP with the Glenelg Hopkins CMA included for comment.

6 MITIGATION

6.1 Impact Avoidance and Minimisation

It is not possible to totally avoid impacts to remnant vegetation, with a small amount (1.08 hectares) likely to be impacted, however impacts to biodiversity have been minimised by:

- Locating the turbines in areas away from ecological features such as native vegetation wherever possible;
- Revisions of the development footprint following the ecological surveys;
- Confining the works to as close as possible to existing access paths and internal farm roads rather than creating new roads across the landscape;
- Locating the works as far as possible from dams, wetlands and watercourses;

Removing the north-east section of the proposed wind farm study area and development footprint to limit the potential of fatalities to birds given the presence of wetlands used by Brolga and Migratory birds beyond the study area boundary to the north-east. The impacts to native vegetation and current wetlands are a worst-case scenario as the development footprint has buffer areas applied that are counted in the impact areas but are unlikely to be impacted.

Potential impacts to significant flora and fauna species, ecological communities, migratory species, and native vegetation, associated with the proposed development have been reduced through revisions to the proposed development footprint. These revisions have occurred since the Minister's decision in 2008 have been made to prevent potential impacts on the local Darlington Brolga population. The updated site boundary is proposed to avoid the flocking no-go zone, which is located in the north-east, proximate to Lake Barnie Bolac. Similarly, the reduced number of turbines and the larger Site area, compared to the original development proposed in 2007, reflects GPGA's approach which is to consider the results of the ecological surveys and the principles of the Draft Brolga Standards to guide the proposed development layout.. Revisions to the indicative wind farm layout including the exclusion of the Lake Barnie Bolac flocking site from the project area, directly address the condition included within the 2008 EES Referral decision. As such, the proposed project changes continue to reduce the potential environmental impact associated with significant species, remnant vegetation, the Victorian Brolga since the Minister's decision was made.

Following the ecological assessments of the Darlington study area and surrounds we now have a strong understanding of the ecological values within and surrounding the proposed study area. As the Ministers' decision (2008) outlined, potential significant impacts to significant species, ecological communities, migratory species, and Brolga can be avoided. This avoidance will be achieved through our awareness of the presence of these ecological values and by following the guidelines and conservation advice relevant to them when determining the proposed developments impact footprint. Best practice avoidance and minimisation practices will also be used during the development construction to reduce potential ecological impacts.

The original project proposal has been modified, through changes to the proposed wind farm boundary, to include additional properties and exclude some previously included properties and avoid the brolga flocking no-go zone northeast of the study area. This has resulted in an overall increase in the study area, although the area proposed to contain turbines and associated infrastructure has reduced from the original proposal.

The lower number and therefore density of turbines proposed, up to 150 in 2007 compared with up to 61 in 2022, will enable micrositing to ensure that the final turbine location avoids significant impacts on all significant environmental assets. This modification of the original proposal and the avoidance of significant environmental values reduces the potential environmental impacts of the proposed project. The conditions contained in the Minister's decision for the original proposal have now been adequately addressed, so any significant potential impacts of the proposed development on ecological values are minimal and can be addressed through the EPBC Act and the Planning Permit Application process.

Under the worst-case scenario, the wind farm development will potentially be considered under the High-risk pathway, therefore the proponent will be required to demonstrate avoidance and minimisation of ecological values as part of the approval process. Although not a requirement for Low and Moderate Risk pathway applications, avoidance of impact to ecological values should also be considered, as it may result in lower native vegetation and significant species habitat offset requirements and costs associated with locating and managing such offsets. The general mitigation measures have been formulated to cover possible scenarios that may arise as part of the approval process, some of which may be addressed at the planning stage (infrastructure layout design) of the project.

6.2 Mitigation Measures

The following mitigation measures were considered as part of the project:

- Construction footprint for the development should be kept to a minimum and be located away from any areas supporting remnant native vegetation, thus reducing the requirement for any remnant native vegetation removal and subsequent offsets. Turbines, access tracks and other infrastructure should be located in areas devoid of remnant native vegetation where possible;
- Establish buffer/management zones of 50 metres around the EPBC Act-listed Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains to ensure that there is no significant impact to the ecological community;
- Protection of key ecological values (i.e. EPBC Act listed endangered ecological communities and flora species, EVCs, scattered trees). These sites should be avoided or impacts minimised where possible during the planning and design phase of the project. In addition, all retained areas should be fenced and identified as 'no go' areas to avoid disturbance during the construction phase;
- Tree Retention Zones (TRZs) should be implemented to prevent indirect losses of indigenous trees and native vegetation during construction activities (DSE 2010);
- Areas of ecological value (remnant trees and shrubs, and patches of remnant vegetation and wetland areas) adjacent to construction areas should be fenced and identified as 'no go' areas. These areas should be included in all relevant design and construction plans;
- All contractors should be informed of areas of ecological value and penalties should be imposed if vegetation is removed or disturbed without permission, or outside the approved area of works.
- Soil disturbance should be kept to a minimum, with weeds treated appropriately.
- The use of species consistent with the historical EVC within the study area should be used in any landscaping and/or rehabilitation works;

- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Agency guidelines (EPA 1991, EPA 1996, Victorian Urban Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands;
- Any construction stockpiles should be placed away from any drainage lines or water bodies; and,
- Significant habitat for key fauna species should be identified and appropriately buffered to minimise the impact on the avifauna by any development.

In addition to these measures, the following documents may be required by Council or DELWP to be prepared and implemented prior to any construction activities:

- Construction Environmental Management Plan (CEMP). The CEMP should include specific species/vegetation conservation strategies, daily monitoring, sedimentation management, site specific rehabilitation plans, weed and pathogen management measures, etc.;
- Weed Management Plan. This plan should follow the guidelines set out in the CaLP Act, and clearly outline any obligations of the project team in relation to minimising the spread of weeds as a result of this project. This may include a pre-clearance weed survey undertaken prior to any construction activities to record and map the locations of all noxious and environmental weeds;
- Bat and Avifauna Management (BAM) Plan. This would detail ongoing monitoring of birds and bats at the wind farm, to determine the effect, if any, of the wind farm's operation on those species. Monitoring should consider both direct impacts (i.e. bird or bat deaths following turbine strikes) and indirect impacts (e.g. avoidance of the area or a reduction in abundance or breeding success due to the presence of the turbines);
- Significant Species Conservation Management Plan (CMP). A CMP will be required if significant species or their habitats are proposed to be impacted (e.g. Brolga, Striped Legless Lizard, Southern Bent-wing Bat), and may include a salvage and relocation plan; and,
- Fauna Management Plan. This may be required if habitat for common fauna species (e.g. draining of wetlands, removal of fauna habitat) is likely to be impacted and salvage and translocation must be undertaken to minimise the risk of injury or death to those species.

7 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table9, below.

Table 9. Further requirements associated with development of the study area

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	Given the presence of seven nationally significant species (four flora and three fauna) and six migratory species, and two Nationally significant ecological communities identified within the study area, it is recommended that this project is referred to the Commonwealth as an EPBC referral. The Minister will decide whether the proposed action is a 'controlled action', and if so, will require further assessment to determine whether approval will be granted under the EPBC Act. However, as the proposed impact area has been revised to avoid all known records and known habitats of these matters of NES it is considered unlikely that the proposed wind farm will be a 'controlled action'.	Prepare an EPBC Act referral.
Flora and Fauna Guarantee Act 1988	There are confirmed records and suitable habitat within the study area for three listed species (Pale Swamp Everlasting, Small Milkwort and Wavy Swamp Wallaby Grass) and several protected flora species (Black Wattle, Chocolate *Lily,* Small Vanilla *Lily*, *Common* Everlasting, Annual *Cudweed Euchiton sphaericus* and Common Onion-orchid *Microtis unifolia*) (See Appendix 1.1) under the FFG Act. The development footprint has been revised since the targeted surveys and flora surveys were conducted so not all of these species will be impacted and a final flora survey will be required to confirm impacts on listed or protected species. There are confirmed records of eight significant fauna species (Brolga, Little Eagle, Musk Duck, Australasian Shoveler, Australian Gull-billed Tern, Common Greenshank, Wood Sandpiper, and Tussock Skink listed under the FFG Act. Most of the study area is privately owned so a permit under the FFG Act is not required for those areas. The impact of the proposed development on species listed and protected under the FFG Act is expected to be low as the development footprint has been revised based on the results of targeted surveys to avoid known areas of habitat for significant flora and fauna species.	No further action required unless road reserves will be impacted as part of the development, in which case an FFG Act permit will be required. GPG to confirm if any road reserves will be impacted by the proposed development.
Environment Effects Act 1978	The proposed Darlington wind farm has the potential to have adverse environmental effects that, individually or in combination, could be significant in a regional or State context.	Prepare and submit a referral under the EE Act to DELWP.
Planning and Environment Act 1987	A Planning Permit from Moyne Shire Council is required to remove, destroy or lop any native vegetation.	Prepare and submit a Planning Permit application. Planning Permit conditions are likely to include a requirement for a Construction Environmental Management Plan, a Bat and Avifauna Management Plan and Weed Management Plan.

Relevant Legislation	Implications	Further Action
Catchment and Land Protection Act 1994	Five weed species listed under the CaLP Act were recorded within the study area. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Planning Permit conditions are likely to include a requirement for a Weed Management Plan.
Wildlife Act 1975	Any persons engaged to conduct salvage and relocation, or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.

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