RE Future

Mumblin Wind Farm

Application for Planning Permit

Appendix D – Ecological Assessment

October 2025

ecology & heritage partners

Final Report

Ecological Assessment for the Proposed Mumblin Wind Farm: Mumblin, Victoria

Prepared for

Mumblin Wind Farm Pty Ltd

May 2025

Ecology and Heritage Partners Pty Ltd

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DOCUMENT CONTROL

Assessment type	Ecological Assessment for the Proposed Mumblin Wind Farm
Address	Mumblin, Victoria
Project number	14554
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File name	14554_EHP_EA_Mumblin_Final_01052025
Client	Mumblin Wind Farm Pty Ltd
Bioregion	Victorian Volcanic Plain
Catchment Management Authority	Glenelg Hopkins ; Corangamite
Council	Corangamite Shire Council

VERSION CONTROL

Report versions	Comments	Comments made by:	Date submitted
Draft Report v1	Report sent to the client for review.	SLB	07/02/2022
Draft Report v2	Updated infrastructure footprint, response to DELWP RFI.	SLB, CL, AW	6/07/2022
Draft Report v3	Updates based on comments by Mumblin Wind Farm Pty Ltd. Review of microbat assessment sections.	SLB, CL.	28/07/2022
Draft Report v4	Update to cabling alignment in Figure 2. No changes to vegetation impacts.	SLB	19/08/2022
Draft Report v5	Minor updates to throughout report.	CL	18/09/2023
Final	Updated development footprint, turbine specs and impact assessment.	DH/SL	15/04/2025
Final v1	Updated site boundary.	DH/SL	01/05/2025

Acknowledgements

We thank the following people for their contribution to the project:

- Severin Staalesen, Pete Lausberg, Pete Higgins and David Shapiro (RE Future Pty Ltd) for project information and arranging access to the study area.
- The landowners who provided access to the study area and historical information on the property.
- The Victorian Department of Energy, Environment and Climate Action (DEECA) for access to ecological databases.

Ecology and Heritage Partners acknowledge the Traditional Owners of the country we live and work on, and we pay our respect to Elders past, present and emerging.

EXECUTIVE SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by Mumblin Wind Farm Pty Ltd to determine the ecological values present within, and inform the ecological planning and legislative implications of the proposed Mumblin Wind Farm, located in Mumblin, Victoria.

The assessment was undertaken to identify and characterise the vegetation on-site, determine the presence (or likelihood thereof) of any significant flora and fauna species and/or ecological communities, and address any implications under Commonwealth and State environmental legislation and policy.

Methods

The ecological field assessment program detailed in this report commenced in August 2021, and was completed in March 2025. The field assessments sought primarily to assess the extent and condition of native vegetation communities and potential flora and fauna habitat, with particular consideration given to significant ecological communities and species of conservation concern, such as threatened species. The survey program was designed to optimise the survey timing, methods and frequency to enable sampling of those flora and fauna species which occur seasonally.

Fauna surveys included:

- Bird Utilisation Surveys;
- Microbat surveys using Anabat detector and Songmeter units; and,
- Level 1 Brolga *Antigone rubicunda* Assessments to address the potential risk posed to the species by the proposed Wind Farm.

Results

The Project Area is highly modified due to current and historical agricultural land uses. The Assessment Area is generally comprised of pasture paddocks supporting native scattered trees, bordered by planted windrows and existing road reserves supporting native vegetation.

Flora

Native vegetation in the study area is representative of three EVCs: Plains Grassy Wetland (EVC 125), Herb-rich Foothill Forest (EVC 23) and Aquatic Herbland (EVC 653). The presence of these EVCs is generally consistent with the modelled pre-1750s and extant (2005) modelled native vegetation mapping.

A total of 228 Large Trees (LTs) in Herb-rich Foothills Forest patches were present. A total of 276 scattered trees were recorded within the study area, which consisted of 197 Large and 79 Small scattered trees.

No national or State significant flora species or vegetation communities were recorded, or are considered to occur within the Assessment Area.

Fauna

Based on the paucity of recent Brolga records within the locality and the absence of potential Brolga breeding and flocking habitat within the locality as determined through a detailed desktop database interrogation, on-ground assessments and liaison with local landowners (i.e. Level 1 Assessment), it was determined that a Level

Two Assessment is not required as the risk of impact to Brolga due to the proposed wind farm is low to negligible.

A total of 77 bird species were recorded, consisting of 2,863 individuals, during the fixed-point bird utilisation surveys undertaken. A total of 93% of bird observations made during the point counts were of individuals that were either on the ground or flying below the Rotor Swept Area (RSA = 64 metres – 252 metres). A further 5.8% did not have their height recorded as they were obscured from vision, while 1.1% of birds were recorded flying in or above the Rotor Swept Area.

Southern Bent-Wing Bat was recorded at a total of five sites as part of targeted bat surveys undertaken by Ecology and Heritage Partners for the Mumblin Wind Farm. The first survey event occurred between late-September and late-November 2021, while a second survey was undertaken from early-February until late-March 2022. During the first survey event, the species was recorded at three sites (2, 6 and 7) on five separate occasions. During the second survey event, Southern Bent-Wing Bat was recorded at three sites (1, 5 and 7) on eight separate occasions. The potential impacts to Southern Bent-wing Bat will be addressed by another consultant, and will be provided in a separate report.

Legislative and Policy Implications

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act - Commonwealth)

The proposed action is highly unlikely to have a significant impact on any matter of NES considered in this report. As such, a referral to the Commonwealth Environment Minister is not required regarding matters listed under the EPBC Act.

It is noted that investigations associated with the nationally significant Southern Bent-wing Bat are being undertaken by another consultant, with implications under the EPBC Act for this species provided separately.

Flora and Fauna Guarantee Act 1988 (FFG Act - Victoria)

Permits under the FFG Act for impacts to protected flora species removed for construction related activities are only required for members of the Orchidaceae family, due to being declared general protected flora.

No impacts to orchids are proposed.

Planning and Environment Act 1987

In accordance with Clause 61.01 of the Corangamite Shire Planning Scheme, the Minister for Planning is the Responsible Authority for the use and development of land for a Wind Energy facility or Solar facility.

The impact assessment has determined that the study area is within Location 2, with 0.427 hectares of native vegetation (comprising a total of 0.241 hectares of native vegetation patches, three Large Trees in patches and four Scattered Trees) proposed to be removed. As such, the permit application falls under the Intermediate assessment pathway.

The offset requirement for native vegetation removal is 0.166 General Habitat Units and 5 Large Trees.

A planning permit from the Corangamite Shire Council is required to remove, destroy or lop any native vegetation under Clause 52.17.

A permit is required under Clause 52.32 of the Corangamite Shire Planning Scheme to use and develop a wind energy facility. This report satisfies the relevant ecological application requirements listed in Clause 52.32-4. Implications relating to other legislation and policy are detailed in Section 6.

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SUMMARY OF CLAUSE 52.17 APPLICATION REQUIREMENTS

Table S1. Application requirements for a permit to remove native vegetation under the Intermediate assessment pathway (Victoria Planning Provisions Clause 52.17; DELWP 2017)

No.	Application Requirement	Response
Application requirements under the Intermediate Assessment Pathway		
1	Information about the native vegetation to be removed, including: • The assessment pathway and reason for the assessment pathway; • A description of the native vegetation to be removed; • Maps showing the native vegetation and property in context; and • The offset requirement that will apply if the native vegetation is approved to be removed.	Refer to Section 3.2, Section 3.4 and Appendix 3
2	Topographic and land information relating to the native vegetation to be removed, showing ridges, crests and hilltops, wetlands and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion, as appropriate.	Refer to Section 1.3 and Figure 2.
3	Recent dated photographs of the native vegetation to be removed.	Refer to Section 3
4	Details of any other native vegetation that was permitted to be removed on the same property with the same ownership as the native vegetation to be removed, where the removal occurred in the five years before the application to remove native vegetation is lodged.	No removal of native vegetation has been removed by the proponent within the property within the past five years
5	An avoid and minimise statement. The statement describes any efforts to avoid the removal of and minimise the impacts on the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.	Refer to Section 3.4.1
6	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987* that applies to the native vegetation to be removed.	Not applicable
7	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary. This statement must have regard to other available bushfire risk mitigation measures. This statement is not required when the creation of defendable space is in conjunction with an application under the Bushfire Management Overlay.	Not applicable as the vegetation clearance is not for defendable space
8	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations at decision guideline 8.	Not applicable as the application responds to Clause 52.17
9	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines.	Refer to Section 3.4.4.

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Mumblin Wind Farm Pty Ltd to undertake an Ecological Assessment for the Proposed Mumblin Wind Farm at Mumblin, Victoria.

Mumblin Wind Farm Pty Ltd is proposing to develop a eight (8) turbine windfarm approximately 10 kilometres west of the township of Cobden.

The wind farm parcel boundary is located adjacent to Curdies-Leichfield Road across multiple private properties situated between Walsh's Road to the north, and Cobden-Warrnambool Road to the south (Figure 1).

The purpose of this assessment was to identify the extent and type of native vegetation present within the wind farm development boundary, determine the likely presence of significant flora and fauna species and/or ecological communities.

This report presents the results of the assessments undertaken to date and discusses the potential ecological and legislative implications associated with the proposed action.

1.2 Objectives

The objectives of the ecological assessments were to:

- Identify flora and fauna values within the 'Assessment Area' of the proposed wind farm;
- Review the relevant flora and fauna databases, and available literature;
- Conduct field assessments to identify the extent and quality of native vegetation within the wind farm development boundary;
- Provide maps showing any areas of native vegetation and locations of any significant flora and fauna species, and/or fauna habitat (if present);
- Classify any flora and fauna species, and vegetation communities identified or considered likely to occur within the wind farm development boundary in accordance with Commonwealth and State legislation;
- Document relevant environmental legislation and policy; and,
- Document any opportunities and constraints associated with the proposed works.

Where areas of native vegetation were present, the following tasks were completed to address requirements under the 'Guidelines for the removal, destruction or lopping of native vegetation' (Guidelines) (DELWP 2017a):

- A habitat hectare assessment of any areas of native vegetation within the wind farm development footprint; and,

- Recommendations to address requirements under the Guidelines to minimise impacts to remnant vegetation.

1.3 Wind Farm Study Area Definitions

1.3.1 Project Area

The wind farm development boundary (Project Area) is located across multiple private properties currently used for agricultural purposes.

Fauna surveys focused on values present within the broader Project Area. The extent of the Project Area is shown in Figure 1.

The Project Area is generally flat with no ridges, crests or waterways within or immediately adjacent to the development footprint. The Project Area contains several minor drainage lines that intersect the development footprint. However, many of these appear to be artificially constructed, and were dry at the time of the field assessments (Figure 2). Lake Elingamite is located approximately two kilometres to the east of the development footprint (Figure 1)

Surrounding land use is consistent with the wind farm development boundary, being predominately agricultural (grazing and dairy farming), with scattered dams, sheds and rural dwellings present.

According to the Victorian Department of Energy, Environment and Climate Action (DEECA) NatureKit Map (DEECA 2025a), the Assessment Area is located within the Victorian Volcanic Plain bioregion, Glenelg Hopkins and Corangamite Catchment Management Authorities (CMA) and Corangamite Shire Council municipality.

1.3.2 Assessment Area

The assessment area is defined as the on-ground area assessed as part of the vegetation assessments. Specifically, the Assessment area comprises:

- All areas within 100 metres of the proposed turbine locations, 25 metres either side of access tracks and reticulation, and 25 metres from all other areas of infrastructure.
- The location of Project Area access locations and associated swept path intersections, specifically:
    - Entrance points to the Project Area off Curdies-Leichfield Road (Figure 2b, 2h and Figure 2i);
    - Entrance point to the Project Area off Cobden-South Ecklin Road (Figure 2e);
    - Intersection of Curdies-Leichfield Road and Cobden-South Ecklin Road (Figure 2g); and,
    - Intersection of Curdies-Leichfield Road and Cobden-Warrnambool Road (Figure 2i).

1.4 Wind Farm Turbine Specifications

The project is basing the application on four turbine model configurations, namely the V162 HH150 and HH166 and V172 HH150 and HH166. For the purpose of this report and potential impact investigations; the shortest and tallest RSA heights are V172 HH150 (bottom RSA of 64 metres) and V172 HH166 (upper RSA of 252 metres).

2 METHODS

2.1 Relevant Commonwealth and State Legislation

Throughout the assessment process, consideration has been given to the following Commonwealth and Victorian environmental policy and legislation.

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Environmental Effects Act 1978* (EE Act);
- *Flora and Fauna Guarantee Act 1988* (FFG Act);
- *Planning and Environment Act 1987* (P&E Act);
    - The Guidelines for the removal, destruction and lopping of native vegetation (DELWP 2017a);
- Development of Wind Energy Facilities in Victoria: Policy and Planning Guidelines (DELWP 2021);
- Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population (DSE 2012);
- Corangamite Shire Planning Scheme; including,
    - Clause 52.17 Native Vegetation; and,
    - Clause 52.32 Wind Energy Facility.
- *Wildlife Act 1975* (Wildlife Act); and,
- *Catchment and Land Protection Act 1994* (CaLP Act).

2.2 Desktop Assessment

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DEECA NatureKit Map (DEECA 2025a) and Native Vegetation Regulation Map (NVRM) Tool (DEECA 2025b) for:
    - Modelled data for location risk, native vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DEECA 2025c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DEECA 2025d);

- Birdlife New Atlas Bird Data for additional Brolga records within 10 kilometres of the wind farm development boundary (BirdLife Australia 2025);
- South West Brolga Flocking Database (Sheldon 2004);
- AusWEA (2005) Wind Farms and Birds: Interim Standards for Risk Assessment;
- Atlas of Living Australia (ALA) for Brolga records within 10 kilometres of the wind farm development boundary (ALA 2025);
- Guidelines for bat surveys in relation to wind farm developments (Lumsden 2007);
- The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DCCEEW 2025a);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened (DEECA 2025f) and Protected (DELWP 2019a) Lists; and,
- The online VicPlan Map (DTP 2025) to ascertain current zoning and environmental overlays in the study area; and,
- Aerial photography of the study area.

Database searches covered a minimum search radius of 10 kilometers from the project area boundaries.

2.3 Flora Assessment

Flora assessments were undertaken on 14-15 October, 1 December – 3 December 2021, and 17 May 2022, with additional assessments undertaken along the current development footprint on 20 and 22 May 2024, by ecologists accredited in the VQA Assessment methodology (DSE 2004) to obtain information on ecological values.

Commonly observed vascular flora species were recorded, significant records mapped, and the overall condition of vegetation and habitats noted. Ecological Vegetation Classes (EVCs) were determined with reference to DEECA pre-1750 and extant EVC mapping (DEECA 2025a) and their published descriptions (DEECA 2025c).

Where native vegetation was identified a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (Department of Sustainability and Environment (DSE) 2004).

2.4 Fauna Assessment

Concurrently with the flora assessments, a fauna assessment was undertaken to obtain information on terrestrial fauna values within the wind farm development boundary. The wind farm Assessment Area surrounds was visually assessed and active searching under and around ground debris for small mammals, reptiles and frogs was undertaken. Binoculars were also used to scan the area for birds, and observers listened for calls and searched for other signs of fauna such as nests, remains of dead animals, droppings and footprints.

Potential habitat for fauna was assessed, with a particular emphasis on habitats that may provide shelter, food or other resources for significant species.

The surveys sought primarily to assess the extent and condition of native vegetation communities and potential flora and fauna habitat, with particular consideration given to significant ecological communities and species of conservation concern, such as threatened and migratory species.

All fieldwork was carried out under the appropriate licences, including a Research Permit (10010929) and Scientific Procedures Fieldwork Licence (SPFL 20005) issued by DEECA under the *Wildlife Act 1975,* and an Animal Research permit issued by the Wildlife and Small Institutions Animal Ethics Committee (05.17).

2.4.1 Level 1 Brolga Assessment

Due to the potential risk posed to Brolga *Antigone rubicunda* by wind farms in Victoria, DEECA developed the *Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population* (DSE 2012) (herein referred to as the Interim Guidelines). The Interim Guidelines outline a conservative approach to assessing and managing the effects of both individual wind farms and the cumulative impacts of the wind industry on the Victoria Brolga population. The objective of the Interim Guidelines is to ensure that there is no 'net effect' of wind farms on the Brolga, with the goal of achieving a positive effect for the population as a whole. The guidelines identify key habitat features for Brolga which require consideration and protection—these being breeding sites and flocking sites (DSE 2012).

The study area is located on the southern extent of the Victorian distribution range (as indicated in DSE 2012). As such, a Level 1 Assessment was triggered.

The Level 1 Assessment provides a preliminary determination of whether a proposed wind farm development represents any level of risk to the Victorian Brolga population. The findings of the Level 1 Assessment are used to decide whether a Level 2 Assessment is required as per the Interim Guidelines (DSE 2012).

Desktop Interrogation

Relevant literature, online-resources and databases were reviewed to provide an assessment of Brolga breeding, flocking, and sighting records associated with the study area and Radius of Investigation (ROI), which for Brolga is a minimum 10-kilometre radius of the project area (See Section 2.2).

Accuracy of records

A number of Brolga breeding records within biological databases (i.e. VBA) are not associated with wetlands due to the inaccuracy of the record. DEECA provide a protocol for addressing historical Brolga breeding records that have an inaccuracy greater than 100 metres where the co-ordinates are not at a wetland. The following steps are to be applied in these circumstances:

- Attempt to confirm the record location using the location and observer details;
- Buffer the record according to the accuracy field;
- Attribute the record to the closest wetland within the accuracy buffer;
- If there are no wetlands within the accuracy buffer, disregard the record; and,

- If the accuracy attribute is greater than one kilometre, disregard the record.

Flocking site definitions

The Interim Guidelines (DSE 2012) identify that a flock roost site must meet three required criteria (Table 1).

Table 1. Criteria used to identify a flock roost site. The site should meet all three criteria (DSE 2012).

Criteria	Justification
More than one year of recording	To ensure the selection of traditional regularly used sites
One or more records of counts equal to or greater than 10 birds	To include sites which have been used often or traditionally by flocking Brolgas. The assumptions is made that if more than 10 birds are recorded on a wetland, flocking behaviour is likely.
Recorded in more than one month	To include sites where Brolgas flock for periods greater than one day or one week, i.e. to include sites traditionally for the majority of the flocking or non-breeding season.

Sites that had recorded 10 or more Brolga (including a site identified through Landowner consultation) were identified as possible flocking sites. Short-listed sites could be divided into two categories:

Traditional Flocking Sites

- Not specifically defined within the Interim Guidelines (DSE 2012), traditional flocking sites are described as a wetland to which 10 or more Brolga return each night to roost during the dry, flocking season 'year after year' (DSE 2012).

One-off Flocking Sites

- One-off flocking sites are defined in the Interim Guidelines as a site where 10 or more Brolga have been observed on a single occasion, but the site is not a regularly used (traditional) site (DSE 2012).

One-off flocking records may correspond to daytime foraging away from traditional flocking sites and can often be associated with non-wetland habitats (i.e. pasture and cropped land). Therefore, traditional flocking sites are considered to have greater value for Brolga than one-off flocking sites, the former representing a key habitat resource that provides overnight roosting potential. Importantly, Brolga movement and dispersal to and from one-off flocking sites are likely to be indicators of typical movements by Brolga during the migration season. Such movements can be considered in determining the residual risk of the proposed development to the Brolga population (DSE 2012).

Breeding site definitions

A breeding site is defined as the nest of a Brolga breeding pair and the surrounding wetland. Breeding sites also include wetlands with historic records of Brolga breeding, noting that a wetland remains a breeding site unless it has been permanently drained and/or planted with trees (DSE 2012).

Monogamous breeders, Brolga pairs return annually to wetlands during the onset of the breeding season to re-establish territories. The typical breeding period for Brolga spans from July to December. However, the specific timing of their breeding efforts can be influenced by local and seasonal variations in climatic and wetland conditions.

Typically, a nest is constructed on the perimeter of a shallow herb- or sedge-dominated freshwater wetland.

Landholder Liaison and Community Consultation

Round One

In August-September 2021, Ecology and Heritage Partners consulted with a total of six local landowners within and adjacent to the vicinity (three kilometres) of the Windfarm Development Boundary (as provided by Mumblin Wind Farm Pty Ltd), Birdlife Australia, Corangamite Catchment Management Authority, and local Landcare and friends groups to ascertain the historical and current utilisation of habitats within the broader locality. Where no response was received by telephone, these groups were contacted via email.

Round Two

The purpose of the Round Two stakeholder/landowner consultation was to enable the detection of additional Brolga breeding and/or flocking habitat across the entire ROI, as well as other relevant ecological features that has not been documented within the available databases.

A copy of the Landowner Consultation Questionnaire and accompanying Letter is provided in Appendix 1.

All residents, excluding townships, located within a 10-kilometre radius of the wind farm boundary were invited to participate to respond to the Landowner Consultation Questionnaire in between 8 November and 6 December 2024. However, all responses received after this date were also included. A total of 768 Landowner Consultation Questionnaires were mailed out.

Field Assessment

A roaming survey was undertaken between 29 September – 1 October and on 19 October 2021 to visit locations within 20 kilometres of the study area where the species has previously been recorded, or sites that have the potential to support flocking or breeding habitat (Figure 6). The 2021 roaming surveys were undertaken during the known breeding season of the Brolga, which is a period of high detectability for the species.

On 25 March 2025, a drone survey was undertaken at select wetlands where potential Brolga breeding habitat was identified during community consultation.

2.4.2 Operational Impacts to Birds and Bats

The Clean Energy Association has developed *Best Practice Guidelines for Implementation of Wind Energy Projects in Australia* (Clean Energy Association 2013). The guidelines suggest a structured approach for ecological assessments that includes potential operational impacts on birds and bats. This approach was followed for the assessment and includes:

- Desktop review;
- Field surveys;
- Species-specific studies, if required;

- Development of avoidance, mitigation and offset strategies to minimise impacts on species if required; and;
- Development and implementation of monitoring programs for the construction and operational phases of the wind farm development.

2.4.3 *Bird Assessments*

Bird Utilisation Surveys

Bird utilisation surveys are the most commonly used method for generating quantitative data on bird use of a potential wind farm site. The methods employed for the proposed Mumblin Wind Farm bird utilisation surveys have been designed to comply with the guidelines described in *AusWEA – Wind Farms and Birds: Interim Standards for Risk Assessment (2005)*. According to these guidelines, bird utilisation surveys are undertaken to ascertain:

- The species composition of birds that use the study area;
- The frequency with which each of those species use the study area;
- The height at which each of the species fly in the study area; and,
- The distribution of these species across the landscape.

Bird utilisation surveys are a minimum requirement for all wind farm sites and are used to inform the design of higher-level investigations, if required.

AusWEA Wind Farms and Birds: Interim Standards for Risk Assessment

The Australian Wind Energy Association (AusWEA 2005) has developed interim standards for risk assessment of birds for wind farm developments in Australia. This document outlines the type of investigations required, the order in which they should be undertaken and a systematic approach for assessing risk of bird impact at wind farms. This process allows for more detailed studies should a potentially significant risk be identified during preliminary studies.

The AusWEA (2005) interim standards recommend three levels of investigations, with each level involving increasing levels of detail. These levels include:

- Level 1 investigations provide an initial assessment of the risk of significant bird impacts from the operation of the proposed wind farm; Level One investigations involve a regional overview, review of existing data, and indicative bird utilisation surveys and roaming surveys.
- Level 2 investigations refine the risk assessment from the Level One investigation, using more intensive methods. Level Two investigations involve roaming surveys and risk modelling.
- Level 3 investigations are initiated if the results of the Level Two investigations indicate a greater than low level of residual risk of significant bird impacts from the operation of the proposed wind farm. Level Three investigations involve population assessment and population viability analysis.

The interim standards also recommend consultation with the wind farm developer and key representatives of agencies that assess and approve development to:

- Agree on the issues, questions and objectives of bird impact risk assessment studies;
- Agree on the consequence and, where relevant, likelihood criteria that apply to the results of the studies; and,
- Where required, agree on the nature and effectiveness of mitigation measures.

Fixed Point Bird Counts

Field zoologists, experienced in bird identification, undertook the fixed-point count surveys to the specifications outlined below. 10 × 42 binoculars were used to identify the bird to species, or for some species, generic level (e.g. non-calling Raven species).

The following was undertaken as part of the fixed-point bird counts:

- Six locations were established at which to undertake fixed point counts, with two of these located outside of the windfarm development footprint. The locations chosen were to ensure that the entire range of habitats within close proximity to the windfarm development boundary were sampled and that a range of habitat types represented in that sample (Figure 3);
- The search radius from the point was at least 100 metres for small birds and up to 800 metres for large birds (e.g. birds of prey, waterbirds), or further, if accurate identification to species level was achievable, using prominent landmarks;
- The duration of each fixed-point count was 20 minutes;
- The height at which each bird flew through the survey area was estimated to the nearest 10 metres;
- The direction of flight of each bird was recorded to the nearest 45 degrees of the compass;
- Each point was surveyed at different times of day (e.g. early morning, late morning, early afternoon and late afternoon) to account for diurnal differences in bird activity; and,
- Each point was surveyed five times over the course of each survey period. A total of three Bird Utilisation surveys were conducted at Mumblin Wind Farm (Table 2).

Table 2. Bird utilisation survey dates

Survey #	Survey dates
Survey #1 (Winter)	9-11 August 2021
Survey #2 (Spring)	22-24 November 2021
Survey #3 (Summer)	31 January – 3 February 2022

Incidental observations and roaming surveys

In addition to bird species recorded during the fixed-point count surveys, incidental observations of bird species were recorded while travelling between point counts and during other field based activities. Birds seen adjacent to the study area were also recorded.

Statistical Analyses

Species accumulation curves were generated from the point count data and are presented as graphs. This, along with a measure of completeness provides an overall account of the survey efficacy in predicting the species likely to occur within the study area.

Completeness follows the methods of Watson (2003) which is widely used in the manufacturing industry and ecology-based projects (Watson 2003) and is calculated as the actual richness (A) divided by the predicted richness *(P)* expressed as a percentage. The predicted species richness was calculated with the EstimateS 9.1.0 program, using the Michaelis–Menten richness estimator (MMMeans) using 1000 runs and estimates of 85, which uses the ratio of species seen once (singletons) to the species seen more than once (doubletons) to predict species richness (Raaijmakers 1987; Colwell 2004; Colwell 2013).

2.4.4 Microbat Surveys

Bat surveys were undertaken in accordance with the *Survey guidelines for Australia's threatened bats* (DEWHA 2010b) and the Guidelines for bat surveys in relation to wind farm developments (Lumsden 2007).

A particular focus of the microbat survey was the detection of the nationally significant Southern Bent-Wing Bat *Miniopterus orianae bassanii*. Southern Bent-wing Bat is currently recognised as a subspecies of the Common Bent-wing Bat *Miniopterus schreibersii*.

Southern Bent-wing Bat

As a cave-dwelling species, the distribution of the Southern Bent-wing Bat is largely associated with the distribution of caves in south-west Victoria and south-east South Australia. The current known distribution comprises the area between Robe, Naracoorte and Port MacDonnell in South Australia, as well as eastwards across south-west Victoria.

Southern Bent-Wing Bat mating occurs in late autumn-early winter, however the implantation of the fertilised egg is delayed until spring, resulting in a gestation period of six to seven months.

Females do not commence breeding until the second year of their life (Dwyer 1963). In early spring most of the population begins moving to one of two highly frequented maternity caves (Warrnambool and Naracoorte) via transition caves (Churchill 2008). Breeding females, and a proportion of the males and non-breeding females, congregate in these maternity caves.

Females typically give birth to a single young between mid-November to mid-December, although sometimes as late as January (Kerr and Bonifacio 2009). The young are born furless and are left in clusters in the cave while the adult females forage at night. High temperatures in the maternity chamber help to keep the young warm while they are still unable to thermoregulate. The young begin to fly at seven weeks of age, reach adult size at 10 weeks, and are weaned and independent by February-March (Dwyer 1963). At this point, most adults disperse to non-breeding roosting caves. However, some individuals remain in the maternity caves over winter, especially at the Warrnambool site.

Given that the Southern Bent-wing Bat is known to be dependent on one of two known maternity caves located near Warrnambool, with the Warrnambool cave located approximately 35 kilometres to the south-west of the proposed wind farm, the species was considered to potentially utilise habitat within the Wind Farm

Development Boundary on a regular basis, given that foraging range of the species is known to be up to 70 kilometres on any given night (van Haarten *et. al.,* 2022).

Survey Method

DEECA was consulted by Mumblin Wind Farm Pty Ltd throughout the pre-application process to inform the development of the project and discuss the survey design relating to Southern Bent-wing Bat to ensure that a full understanding of potential impacts can be ascertained.

DEECA provided feedback to Mumblin Wind Farm regarding the survey expectations relating to the species on 21 July 2020, and as such, the survey effort employed as part of the ecological assessments for the project has adhered to these survey guidelines.

Song Meter SM4 (Wildlife Acoustics™) sound recorders were the main equipment used to survey microbat species. The SM4's recorded audible sounds from 10kHz hz-55kHz which is the calling acoustic frequency for microbats. These instruments record the high frequency calls or echolocation, produced by the bats when they are in flight, and save these calls directly to a memory card. Different bat species produce distinguishable calls; therefore, detectors were used to identify the species present in a given area. It is important to note that although detectors may give an index of overall bat activity levels, they cannot be used to determine bat abundance, as the number of individuals making the calls is not known.

During the second round of surveys, in addition to Song Meter units, two Anabat bat detectors linked to CF Storage Zcaims (Titley Electronics, Ballina NSW) were also used.

All call identification needs to be undertaken by qualified personnel who have access to reference calls for that region and experience in identifying call characteristics.

Songmeters were deployed throughout the study area (Figure 3) during the following two survey periods:

- Survey 1: Nine Songmeters (1-9 in Figure 3) deployed between 29 September and 1 October 2021 and retrieved between 24 November and 2 December 2021; and,
- Survey 2: A total of 11 Songmeters and two AnaBat detectors (#1-13 in Figure 3) were deployed between 31 January and 3 February 2022 and were retrieved the week of 28 March 2022.

Units were placed in areas likely to be utilised by foraging bats, for example adjacent to farm dams, near native vegetation (e.g. along waterways) and planted windrows. Weller and Zabel (2002) found detectors placed at a height of 1.4 metres recorded 30% more calls than those placed on the ground. This method was adopted at all locations within the study area, with all units placed within the forks of trees or branches at a height of at least 1.8 metres to allow call detectability over a greater height.

Call Analysis

Bat calls collected throughout the Mumblin Wind Farm site were downloaded to a laptop and Kaleidoscope Pro 5.4 software (Wildlife Acoustics) was used to convert the WAV (and W4V) files into zero crossing (ZC) files, with the outputs saved in nightly subdirectories. The default Kaleidoscope Pro feature was used to filter 'Noise' into a separate subfolder.

Identification of bat calls collected was undertaken by recognised expert Rob Gration from EcoAerial Consulting Services. Rob Gration has analysed over 2 million microbat calls and has collated an extensive microbat call reference library for Victorian bat species.

Call analysis only focuses on the detection of significant species that had the potential to be present within the Assessment Area such as Southern Bent-Wing Bat. The call analysis did not attempt to confirm the presence of any other microbat species that are not significant (i.e. or count the number of calls for species other that significant species. Where calls of significant species were recorded, each call was documented with the date and time of recording.

Call identification was completed using Anabat Insight sound analysis software (Titley Scientific) with reference to the EcoAerial microbat call reference library for Victoria.

The microbat call analysis was conducted in accordance with the *Standards for reporting bat detector surveys (Australian Bat Society Incorporated undated)*.

The call analysis protocol utilised by EcoAerial is presented in Table 3.

Table 3. Bat Detector survey dates

Season	Staff	Company	Analysis Protocol

Spring 2021	Rob Gration	EcoAerial Environmental Services	• Files passed a Decision Tree analysis based on a combination of pulse characteristics, such as:
			  ○ Characteristic frequency;
			  ○ Time between calls; and,
			  ○ Pulse curvature
			• Pulse characteristics used to assign identifications to calls
			• Call identification focused solely on Yellow-bellied Sheath-tailed Bat, and Southern Bent-wing Bat
			• All calls assigned by the Decision Tree analysis were manually inspected to confirm

Summer/Autumn 2022	Rob Gration	EcoAerial Environmental Services	• Files passed a Decision Tree analysis based on a combination of pulse characteristics, such as:
			  ○ Characteristic frequency;
			  ○ Time between calls; and,
			  ○ Pulse curvature
			• Pulse characteristics used to assign identifications to calls
			• Call identification focused solely on Yellow-bellied Sheath-tailed Bat, and Southern Bent-wing Bat
			• All calls assigned by the Decision Tree analysis were manually inspected to confirm

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

Under the *Planning and Environment Act 1987,* Clause 52.17 of the Corangamite Shire Planning Scheme requires a planning permit from the Responsible Authority to remove, destroy or lop native vegetation. The assessment process for the clearing of vegetation follows the '*Guidelines for the removal, destruction or lopping of native vegetation*' (the Guidelines) (DELWP 2017). The '*Assessor's handbook: Applications to remove, destroy or lop native vegetation*' (Assessor's handbook) (DELWP 2018) provides clarification regarding the application of the Guidelines (DELWP 2017a).

2.5.1 Assessment Pathway

The Guidelines manage the impacts on biodiversity from native vegetation removal using an assessment-based approach. Two factors – extent risk and location category – are used to determine the risk associated with an application for a permit to remove native vegetation. The location category (1, 2 or 3) has been determined for all areas in Victoria and is available on DEECA's NVRM Tool (DEECA 2025b). Determination of assessment pathway is summarised in Table 4.

Table 4. Assessment pathways for applications to remove, destroy or lop native vegetation (DELWP 2017a).

	Extent	Location		
		1	2	3
Native Vegetation	Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
	Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
	0.5 hectares or more	Detailed	Detailed	Detailed

Notes: For the purpose of determining the assessment pathway of an application to remove native vegetation the extent includes any other native vegetation that was permitted to be removed on the same contiguous parcel of land with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before an application to remove native vegetation is lodged.

2.5.2 Vegetation Assessment

Native vegetation (as defined in Table 5) is assessed using two key parameters: extent (in hectares) and condition. For the purposes of this assessment, both condition and extent were determined as part of the habitat hectare assessment.

Table 5. Determination of a patch of native vegetation (DELWP 2017a).

Category	Definition	Extent	Condition
Patch of native vegetation	An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; OR An area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy;	Measured in hectares. Based on hectare area of the native patch.	Vegetation Quality Assessment Manual (DSE 2004). Modelled condition for *Current Wetlands*.

Category	Definition	Extent	Condition
	OR any mapped wetland included in the *Current Wetlands map*, available in DEECA systems and tools.		
Scattered tree	A native canopy tree that does not form part of a native patch.	Measured in hectares. Each Large scattered tree is assigned an extent of 0.071 hectares (15m radius). Each Small scattered tree is assigned a default extent of 0.031 hectares (10 metre radius)	Scattered trees are assigned a default condition score of 0.2 (outside a patch).

Notes: Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'.

2.5.3 *Impact Avoidance and Minimisation*

All applications to remove native vegetation must demonstrate the three-step approach of avoid, minimise and offset. This is a precautionary approach that aims to ensure that the removal of native vegetation is restricted to what is reasonably necessary, and that biodiversity is appropriately compensated for any native vegetation removal that is approved.

2.5.4 *Offsets*

Biodiversity offsets are required to compensate for the permitted removal of native vegetation. Offset obligations and offset site criteria are determined in accordance with the Guidelines (DELWP 2017a) and are divided into two categories, being General Habitat Units and Species Habitat Units.

The offset requirements for native vegetation removal are calculated by DEECA and presented in a Native Vegetation Removal (NVR) Report, which are based on the vegetation condition scores determined during the biodiversity assessment.

2.6 Likelihood of Occurrence Assessment

Relevant biological databases, literature (listed in Section 2.1) and expert advice were used to identify all species records of national, State and regional conservation significance within 10 kilometres of the project area. The proximity, number, dispersion and date of known locality records (assuming over-dispersed and random patterns of locality records being more likely to occur in the project area) were considered to determine a species' likelihood of occurrence within the project area.

Additional factors also taken into consideration include: the known biogeographical distribution of the species; underlying geology of existing locality records; and, vegetation and habitat associations. The decision guidelines for determining the likelihood of occurrence of flora and fauna species are presented in Table 6 and Table 7 respectively.

The results of the likelihood of occurrence assessment for listed flora and fauna species are provided in Appendices 1.3 and 2.1, respectively.

Table 6. Decision guidelines for determining a flora species likelihood of occurrence within the wind farm development boundary.

Likelihood of occurrence	Decision guidelines
1 – Known occurrence	Recorded within the project area recently (i.e. within 10 years).
2 - High	Previous records of the species in the local vicinity; and/or, the project area contains areas of high-quality habitat.
3 – Moderate	Limited previous records of the species in the local vicinity; and/or, the project area contains some characteristics of the species' preferred habitat.
4 – Low	Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a low likelihood of presence.
5 – Unlikely	No potential habitat and/or outside the species range.

Table 7. Decision guidelines for determining a fauna species likelihood of occurrence within the wind farm development boundary.

Likely presence or use of the project area	Decision guidelines
1 – Known occurrence	Recorded within the project area recently (i.e. within 10 years).
2 - High	Likely resident in the project area based on database records, or expert advice; and/or, recent records (i.e. within 10 years) of the species in the local area; and/or, the project area contains the species' preferred habitat.
3 - Moderate	The species is likely to visit the project area regularly (i.e. at least seasonally); and/or, previous records of the species in the local area; and/or, the project area contains some characteristics of the species' preferred habitat.
4 - Low	The species may visit the project area occasionally or opportunistically whilst en route to more suitable sites; and/or, there are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, the project area contains few or no characteristics of the species' preferred habitat.
5 - Unlikely	No previous records of the species in the local area; and/or, the species may fly over the project area when moving between areas of more suitable habitat; and/or, out of the species' range; and/or, no suitable habitat present.

2.7 Assessment Qualifications and Limitations

2.7.1 Site Assessment

This report has been written based on the quality and extent of the ecological values and habitat observed to be present or absent at the time of the desktop and/or field assessments being undertaken.

Data and information held within the ecological databases and mapping programs reviewed in the desktop assessment (e.g. VBA, PMST, Nature Kit Maps etc.) are unlikely to represent all flora and fauna observations within, and surrounding, the wind farm development boundary. It is therefore important to acknowledge that a lack of documented records does not necessarily indicate that a species or community is absent.

The 'snapshot' nature of a standard biodiversity assessment meant that migratory, transitory or uncommon fauna species may have been absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent.

Only the land within 100 metres of the proposed development footprint as shown in Figure 2 were assessed as part of the flora assessment.

Ecological values identified within the wind farm development boundary were recorded using a hand-held GPS or tablet with an accuracy of +/-3 metres. This level of accuracy is considered to provide an accurate assessment of the ecological values present within the wind farm development boundary; however, this data should not be used for detailed surveying purposes.

2.7.2 *Bird Utilisation Surveys*

The fixed-point bird counts may have suffered from some biases because of the use of estimation in determining the distance of birds from the observer. Horizontal distances became increasingly difficult to judge as the distance between the observer and the bird increased.

Vertical distances were also difficult to judge, depending on structures and other landmarks that could be used as a reference. However, the higher the bird the greater the likelihood of error. In addition, this difficulty was not consistent across species, with small and large species biasing the results in unknown directions.

To attempt to overcome these potential errors, and to calibrate the estimations of the observers, at each point count 200 metres was measured to use as a reference for the estimations that followed. To calibrate height, a landmark of known height (such as wind anemometer tower, power line poles etc.) was used as a reference point. Whilst these precautions alleviated some of the bias in this process, the height and distance data need to be interpreted in a cautious manner, given the probability of a high degree of error in the data-set.

A further bias in the data-set is the over-representation of large birds. As the distance between the observer and the bird increases, smaller species are increasingly likely to be overlooked. This effect is also likely to be exacerbated by weather conditions with overcast, windy or wet conditions having a negative impact on the detectability of some birds.

2.7.3 *Brolga*

It is noted that the quality of Landowner survey data is likely to vary due to Landowner interest and length of residency. However, the data provided to date through the consultation process has added additional information to the assessment not previously available via desktop sources. Detailed desktop interrogation via aerial imagery, field observations, and investigations as part of the Brolga Assessment will appropriately consider the potential for any additional areas to support these habitats.

2.7.4 *Microbats*

Call analysis only focuses on the detection of significant species that had the potential to be present within the Assessment Area. The call analysis did not attempt to confirm the presence of any other microbat species that are not significant (i.e. or count the number of calls for species other that significant species).

Bat detector recording devices, such as the devices used in this survey, occasionally experience technical difficulties, and may be impacted by weather, particularly severe storms. In this instance, short periods of time may fail to be successfully recorded by the device.

The bat detectors used during this survey sample a limited airspace approximately 30 metres from the microphone.

This report only summarises the method and results of the microbat surveys undertaken by Ecology and Heritage Partners. It should be noted that methodology, results and implications relating to the further assessments and potential impacts to Southern Bent-Wing Bat *Miniopterus orianae bassanii* have been undertaken by another consultant, and are not addressed in this report.

3 RESULTS

3.1 Overview

No significant flora species were recorded within the Assessment Area and no flora species of national or State significance are considered likely to occur due to the highly modified condition of vegetation.

Native vegetation in the wind farm Assessment Area is representative of three EVCs; Plains Grassy Wetland (EVC 125), Herb-rich Foothill Forest (EVC 23) and Aquatic Herbland (EVC 653). The remainder of the Assessment Area was highly modified and was actively grazed and/or cropped and comprised typically of improved pastures, with some areas showing outbreaks of noxious weed species.

3.2 Vegetation Condition

3.2.1 Patches of Native Vegetation

Native vegetation in the study area is representative of three EVCs: Plains Grassy Wetland (EVC 125), Herb-rich Foothill Forest (EVC 23) and Aquatic Herbland (EVC 653). The presence of these EVCs is generally consistent with the modelled pre-1750s and extant (2005) modelled native vegetation mapping (DEECA 2025c). Specific details relating to the observed EVCs are provided below.

The results of the habitat hectare assessment are provided in Appendix 1.2.

Herb-rich Foothills Forest

Herb-rich Foothills Forest (HrFF) generally occurs on relatively fertile and well drained soils on a range of geologies – usually on easterly and southerly facing lower slopes and gullies. It is comprised of a eucalypt overstory to 25 metres in height, with a variable shrub layer over a high cover and diversity of herbs and grasses in the ground layer (DEECA 2025c).

Within the Assessment Area, HrFF was generally present as relatively intact patches located within road reserves, as well as discrete patches located in agricultural land – usually in the form of an intact overstory with a modified understory component.

The overstory of HrFF patches was predominantly comprised of Manna Gum *Eucalyptus viminalis* subsp. *viminalis* and/or Swamp Gum *Eucalyptus ovata*, with occasional specimens of Messmate *Eucalyptus obliqua*(.

Within road reserves, the understory supported a mid-story layer of shrubs including Blackwood *Acacia melanoxylon*, Black Wattle *Acacia mearnsii*, Prickly tea-tree *Leptospermum continentale* and Prickly Moses *Acacia verticillata*, and a ground layer which included Austral Bracken *Pteridium esculentum*, Variable Sword-sedge *Lepidosperma laterale,* Common Raspwort *Gonocarpus tetragynus* and Spiny-headed Mat-rush *Lomandra longifolia* (Plate 1; Plate 2).

Plate 1. Good quality patch of Herb-rich Foothill Forest along Curdies-Leichfield Road (Ecology and Heritage Partners Pty Ltd 02/12/2021).

Plate 2. Good quality patch of Herb-rich Foothill Forest along Curdies-Leichfield Road (Ecology and Heritage Partners Pty Ltd 02/12/2021).

Within agricultural land, HrFF patches were typically comprised of a eucalypt overstory only, with the understory modified by agricultural land use, and supported few to no native species (Plate 3; Plate 4).

Overall, a total of 11 habitat zones of HrFF (HrFF1 – HrFF11) of differing quality were recorded during the site assessments. The main differences in habitat quality were generally due to the presence/absence of Large Trees and/or canopy cover, and the diversity of understory species. There were also minor differences in weed cover and recruitment of woody species within patches (Appendix 1.2).

Plate 3. Low quality patch of Herb-rich Foothill Forest located within agricultural land (Ecology and Heritage Partners Pty Ltd 01/12/2021).

Plate 4. Low quality patch of Herb-rich Foothill Forest located within agricultural land (Ecology and Heritage Partners Pty Ltd 02/12/2021).

Plains Grassy Wetland

Plains Grassy Wetland (PGWe) is typically a treeless EVC, although eucalypts and a shrub component can occur in low numbers or around the margin of this EVC. The EVC is typically dominated by grasses, small sedges and herbs that are tolerant of periodic inundation, and is usually species poor in the wetter, central areas and species rich in the drier, outer areas (DEECA 2025c).

Within the Assessment Area, PGWe was recorded around the edge of artificial waterbodies (farm dams), or within shallow, low-lying depressions that are likely to form ephemeral wetlands after sustained periods of rainfall.

This EVC was generally comprised of a cover of Common Swamp Wallaby-grass *Amphibromus nervosus*, with Common Spike-sedge *Eleocharis acuta* and Tall Spike Sedge *Eleocharis spathulata* also common in wetter areas (Plate 5).

Two habitat zones of differing quality were recorded, with PGWe1 exhibiting lower diversity than PGWe2.

Aquatic Herbland

Aquatic Herbland occurs in permanent to semi-permanent wetlands, and is usually dominated by sedges and/or aquatic herbs (DEECA 2025c).

Within the Assessment Area, Aquatic Herbland (AH) was occasionally recorded in farm dams where water was at least semi-permanent. The EVC was usually comprised of either Water Ribbons *Triglochin procerum*, Tall Spike-sedge, Duckweed *Lemna disperma* and/or Floating Pondweed *Potamogeton natans* (Plate 6).

Two habitat zones of differing quality were recorded, with AH2 exhibiting lower diversity than AH1.

Plate 5. A patch of Plains Grassy Wetland comprising Common Swamp Wallaby-grass (Ecology and Heritage Partners Pty Ltd 03/12/2021).

Plate 6. A patch of Aquatic Herbland with including Water Ribbons and Pale Rush (Ecology and Heritage Partners Pty Ltd 02/12/2021).).

3.2.2 Large Trees in Patches

A total of 228 Large Trees (LTs) in Herb-rich Foothills Forest patches were present (Figure 2). Most of these specimens were Manna Gum and Swamp Gum, with occasional Brown Stringybark *Eucalyptus baxteri* and Messmate also present (Plate 3; Plate 4; Appendix 1.3).

3.2.3 Scattered Trees

A total of 276 scattered trees were recorded within the study area, which consisted of 197 Large and 79 Small scattered trees (Figure 2; Appendix 1.3). These trees mostly comprised Manna Gum and Swamp Gum, as well as lower numbers of Brown Stringybark *Eucalyptus baxteri*, Messmate and Stags, and would have once formed

part of the HrFF EVC; however, the understorey vegetation contained predominantly introduced species (mainly exotic pasture grasses) and the trees no longer formed a patch of native vegetation (Plate 7; Plate 8).

Plate 7. A large Manna Gum within the Assessment Area (Ecology and Heritage Partners Pty Ltd 03/12/2021).

Plate 8. A large Manna Gum within the Assessment Area (Ecology and Heritage Partners Pty Ltd 02/12/2021).

3.2.4 Introduced and Planted Vegetation

Areas not supporting native vegetation had a high cover (>95%) of exotic grass species, many of which were direct-seeded for use as pasture. Scattered native grasses or herbs were occasionally present in these areas, however they did not have the required 25% relative cover to be considered a patch.

Non-native areas were dominated by environmental weeds such as Sweet Vernal-grass *Anthoxanthum oderatum,* Toowoomba Canary-grass *Phalaris aquatica*, Rye-grass *Lolium* spp., Cocksfoot *Dactylis glomerata* and Yorkshire Fog *Holcus lanatus* (Plate 9).

Noxious weeds, as defined under the CaLP Act, were present within the study area, with Blackberry *Rubus fruticosus* spp. agg. mainly located along the dam fringes and road reserves and Spear Thistle *Cirsium vulgare* present in limited numbers along farm fences and gates (Plate 10). Blackberry is also a Weed of National Significance (WoNS).

Plate 9. Agricultural paddock dominated by exotic pasture grasses (Ecology and Heritage Partners Pty Ltd 03/12/2021).

Plate 10. Spear Thistle specimens located adjacent to farm gate (Ecology and Heritage Partners Pty Ltd 03/12/2021).

3.3 Fauna Habitat

Plains Grassy Wetland and Aquatic Herbland within the Assessment Area provides low to moderate quality habitat to native fauna. The vegetation in these patches has been disturbed and is present predominantly as recent regrowth. Nevertheless, the sedgy and grassy vegetation provides suitable foraging and nesting habitat for a variety of waterbirds (i.e. ducks) and frogs.

The scattered trees, patches of HrFF, and windrows are of low to moderate habitat value for fauna. While the majority of the remnants within the Assessment Area are structurally deficient, lacking key mid-storey and understorey components, they are likely to act as 'stepping stones' of habitat for more mobile species (principally birds). Trees (native and non-native) are also likely to facilitate fauna movement throughout the otherwise cleared landscape, and provides habitat for diurnal raptors (e.g., Wedge-tailed Eagle *Aquila audax,* Nankeen Kestrel *Falco cenchroides*, Black-shouldered Kite *Elanus axillaris*), which use trees for perching, roosting and foraging activities.

The remainder of the site is comprised of exotic grassland, dominated by a range of introduced pasture grasses and herbaceous weeds, likely to be used as a foraging resource by common generalist bird species that are tolerant of modified open areas.

Fauna observed using this habitat included Australian Magpie *Cracticus tibicen*, Little Raven *Corvus mellori*, Galah *Eolophus roseicapilla*, Red Fox *Vulpes vulpes* and European Rabbit *Oryctolagus cuniculus*. The European Rabbit and Red Fox are listed as pest animals under the CaLP Act.

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

The below clearing scenario is based on the development footprint as provided to Ecology and Heritage Partners by Mumblin Wind Farm Pty Ltd on 25 June 2024, with minor amendments to the cabling alignment provided on 4 July 2024 and swept path alignment on 22 October 2024.

All infrastructure has a buffer included around the perimeter to compensate for any unintended impacts during construction. The development footprint and associated impacts to native vegetation are shown in Figure 2. Where cabling is proposed to be located within close proximity to native vegetation, cabling infrastructure will be bored to avoid any direct or indirect impacts to native vegetation. The directional bore will be at least 600 millimetres deep for works within the TPZ to mitigate any encroachment.

The impact assessment also takes into consideration site entry locations and associated swept path impacts.

3.4.1 Avoid and Minimise Statement

The land within the Assessment Area has not been subject to any strategic level planning process.

Due to the nature of the proposed development, and the objective to maximise the wind potential of the site, it is not possible to avoid impacts to native vegetation due to the requirement to create access tracks and site entry points for construction and maintenance and facilitate the turning circle of vehicles. However, Mumblin Wind Farm Pty Ltd have minimised impacts through the reduction in the number of turbines from 15 down to eight, the micro siting of project infrastructure away from areas supporting native vegetation, and in instances where that is not feasible, will deploy construction techniques (i.e. directional boring) that avoid impacts. Site entry locations have been designed to take advantage of existing access points (although some widening of access locations will be required), or have been designed to avoid impacts to native vegetation where possible.

Further, where internal farm access tracks will be constructed as part of the dairy farm infrastructure, cabling and wind farm access will be located within these existing features, avoiding impacts to adjacent native vegetation (i.e. Figure 2g; Figure 2h), with the majority of native vegetation impacts being located at site entry locations, and/or associated with swept path impacts.

This has resulted in impacts being reduced from 1.788 hectares (comprising 0.198 hectares of native vegetation patches, 8 Large Trees in patches and 27 scattered trees (footprint dated 31 January 2022), down to 0.427 hectares (comprising 0.241 hectares of native vegetation patches, three Large Trees in patches and four Scattered Trees (2 Large and 2 Small) (current footprint).

Given the nature of the proposed project, and minimisation measures demonstrated as part of the current development layout, there are no feasible opportunities to further avoid and minimise impacts without undermining the key objectives of the project.

3.4.2 Vegetation proposed to be removed

The study area is within Location 2, with 0.427 hectares of native vegetation proposed to be removed. This comprises a total of 0.257 hectares of native vegetation patches, three Large Trees in patches and four Scattered Trees (2 large and 2 Small). As such, the permit application falls under the Intermediate assessment pathway (Table 8).

Condition scores for vegetation proposed to be removed are provided in Appendix 1.2.

Table 8. Removal of Native Vegetation (the Guidelines) (DELWP 2017).

Assessment pathway	Intermediate
Location Category	2

Total Extent (past and proposed) (ha)	0.427
Extent of past removal (ha)	0.00
Extent of proposed removal (ha)	0.427
Large Trees (scattered and in patches) to be removed (no.)	5
EVC Conservation Status of vegetation to be removed	Vulnerable (Herb-rich Foothills Forest)

3.4.3 *Offset Targets*

The offset requirement for native vegetation removal is 0.166 General Habitat Units and 5 Large Trees.

A summary of proposed vegetation losses and associated offset requirements is presented in Table 9 and the Native Vegetation Removal (NVR) report is presented in Appendix 3.

Table 9. Offset Targets.

General Offsets Required	0.166 General Habitat Units
Large Trees	5
Vicinity (catchment/council)	Glenelg Hopkins or Corangamite CMA / Corangamite Shire Council
Minimum Strategic Biodiversity Value*	0.3230

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

3.4.4 *Offset Statement*

According to DEECAs Native Vegetation Offset Register (DEECA 2025e), there are 20 offset sites within the Corangamite and Glenelg Hopkins CMA's that can be used to satisfy the General Habitat Unit offset requirements generated by the proposal.

An offset register search statement identifying the relevant offsite sites is provided in Appendix 4.

3.5 Significance Assessment

3.5.1 *Flora*

The VBA contains records of two nationally significant and 18 State significant flora species previously recorded within 10 kilometres of the study area (DEECA 2025a) (Figure 6). The PMST nominated an additional 15 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DCCEEW 2025a) (Appendix 1.4).

No national or State significant flora were recorded during the site assessment. Based on the modified condition of the study area, condition of potential habitats, landscape context and the proximity of previous records, significant flora species are considered unlikely to occur within the study area due to the high levels of disturbance and absence of suitable habitat.

3.5.2 Fauna

The VBA contains records of 16 nationally significant and 24 State significant fauna species previously recorded within 10 kilometres of the study area (DEECA 2025a) (Figure 7). The PMST nominated an additional 23 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DCCEEW 2025a) (Appendix 2.1).

The nationally significant Southern Bent-wing Bat was recorded during the microbat surveys. Implications relating to the potential impacts to significant microbat species are being undertaken by another consultant (Nature Advisory) and are not addressed in this report.

The nationally significant Blue-winged Parrot *Neophema chrysostoma* was recorded during the bird utilisation surveys. Two individuals were recorded on one occasion below the Rotor Swept Area at bird survey location 2 (Figure 3).

Based on consultation with Birdlife Australia, the nationally significant Australasian Bittern *Botaurus poiciloptilus* is known to utilise local wetland habitats (Figure 8), including Cobrico Swamp Wildlife Reserve and Lake Elingamite (Birdlife Australia 2025). As such, this species may fly through the Project Area when moving between these two wetland habitats.

Other nationally significant fauna may also opportunistically utilise habitat within the Project Area on occasion under optimal conditions, such as Gang-gang Cockatoo *Callocephalon fimbriatum*.

No additional nationally significant fauna species are considered likely to rely on habitat within the study area for foraging or breeding purposes due to the lack of suitable and/or important habitat features.

Microbats

The bat detector survey effort was carried out over two seasons. Southern Bent-wing Bat was recorded on at least five occasions during each of the survey efforts, albeit at very low levels (Table 10; Table 11) (Plate 11; Plate 12).

Table 10. Bat detector survey results

Season	Survey effort	Significant species results
Spring 2021	Nine Songmeters (1-9 in Figure 3) deployed 30 September 2021 and retrieved 30 November 2021	• Southern Bent-wing Bat call identified at: ○ Site 2 (one night) ○ Site 6 (two nights) ○ Site 7 (two nights)
Summer/Autumn 2022	Eleven Songmeters and two AnaBat detectors (1-13 in Figure 3) deployed 4 February 2022 and retrieved between 19-20 March 2022.	• Southern Bent-wing Bat call identified at: ○ Site 1 (three nights) ○ Site 5 (one night) ○ Site 7 (two nights)

Table 11. Southern Bent-Wing Bat recorded during microbat surveys at Mumblin Wind Farm

Site no.	Survey event	Date	Time	No. detections
2	Spring 2021	12/10/2021	11:17pm	1

Site no.	Survey event	Date	Time	No. detections
7	Spring 2021	22/10/2021	9:24pm	1
6	Spring 2021	27/10/2021	1:39am	1
6	Spring 2021	2/11/2021	7:52pm	1
7	Spring 2021	3/11/2021	10:13pm	1
7	Summer / autumn 2022	2/02/2022	9:41pm	1
1	Summer / autumn 2022	6/02/2022	9:30pm	1
7	Summer / autumn 2022	23/02/2022	9:05pm	1
1	Summer / autumn 2022	26/02/2022	8:51pm	1
1	Summer / autumn 2022	27/02/2022	8:59pm	2
5	Summer / autumn 2022	15/03/2022	8:56pm	2

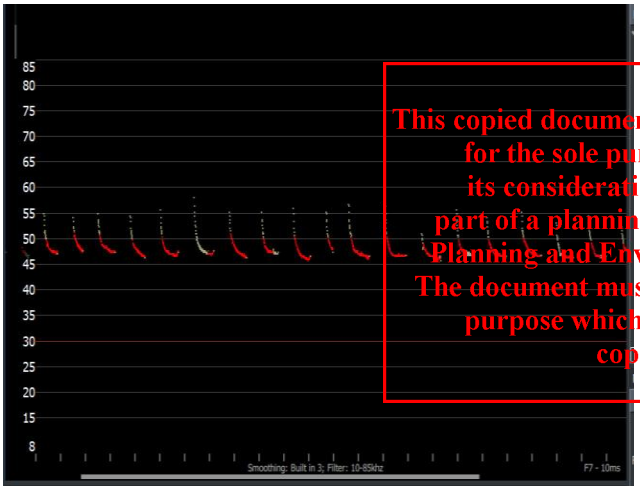


Plate 11 and 12: Southern Bent-wing Bat-Call identification at Mumblin Wind Farm based on key call identification characters; long characteristic section, number of pulses with drooping tail and characteristic frequency range between of 46-50 kHz range

A desktop assessment of potential roosting caves within 80 kilometres of the Wind Farm boundary was undertaken by Environmental Geosurveys (2021). The report identified a number of potential roosting caves within 20 kilometres of the site. Investigations by Rob Gration (EcoAerial 2022) assessed the suitability of 15 caves across five properties within 20 kilometres of the windfarm boundary in consultation with property owners. The assessment did not find any evidence of Southern Bent-wing Bat roosting at these sites and noted that all caves had restricted access (due to overgrown vegetation or other physical barriers) (EcoAerial 2022). No additional potential roosting sites were identified or are known to occur within the locality (EcoAerial 2022).

The location of individual roosting caves in Victoria is not published, in order to reduce the risk of increased visitation leading to disturbance. During over-wintering surveys of roost sites, undertaken in June 2011, not all individuals documented in the maternity sites over summer could be accounted for during any of the winter surveys (DELWP 2020a). This may indicate that there are unknown roost sites, or that bats are roosting in other structures at this time of the year. As such, the eastern extent of the species' distribution is not yet fully

understood. Monitoring has been undertaken in key roosting caves in Victoria since 2013, using bat detectors recording most nights, to investigate relative levels of activity and seasonal use of caves, while searches for new roosting caves and monitoring of population size in the main non-maternity caves, especially in Victoria, is ongoing (DAWE 2021; DELWP 2020). Further, it is acknowledged that additional undiscovered/reported sites may present within the subspecies' distribution range.

Recent research indicates that the species can forage at least 70 kilometres each night from its roosting cave (van Harten *et al*., 2022). Based on this, as well as recent advice provided by DELWP/DEECA, the Mumblin Wind Farm is located within a potential flight path of the species when undertaking nightly intercave movements between the Warrnambool maternity cave, and the Pomborneit roosting cave (unpublished data).

Implications relating to the potential impacts to significant microbat species are being undertaken by another consultant and are not addressed in this report.

Blue-winged Parrot

A partial migrant, Blue-winged Parrot was recently listed as Vulnerable under the EPBC Act (effective date 31 March 2023), due in part to significant decline in reporting rates across their core range in Tasmania and Victoria (DCCEEW 2023).

Blue-winged Parrot occupy a range of coastal, sub-coastal and inland environments, through to semi-arid zones. They favour grasslands and grassy woodlands and are often found near wetlands, but may occupy modified landscapes such as paddocks and golf courses (Higgins 1999; Holdsworth *et al.* 2021). Blue-winged Parrot use tree hollows or stumps to nest and lay eggs. This species primarily forage on/near the ground for seeds from a range of native and introduced grasses, herbs, and shrubs (Higgins 1999, DCCEEW 2023).

Such foraging behaviour is evident by way of 100% of Blue-winged Parrot observations (i.e. two out of two) was recorded below the rotor swept area (1-63 metres).

A review of bird and bat mortality across 15 Victorian wind farms between 2003 and 2018 (Moloney *et al.* 2019) did not identify any Blue-winged Parrot collisions, with parrot species in general only making up 0.88% of all bird collisions. Based on this, Blue-winged Parrot is considered unlikely to be significantly impacted by the proposed wind farm.

Significant Impact Assessment

A significant impact assessment for the Vulnerable Blue-winged Parrot is provided below in Table 12, which summarises that a significant impact is highly unlikely as a result of the proposed wind farm.

An important concept for determining the potential significance of an impact under the EPBC Act is that of 'habitat critical to the survival' of a species. The EPBC Act Significant impact guidelines 1.1 (DoE 2013) provides the following guidance for determining whether an action may affect habitat critical to the survival of a species:

- Habitat critical to the survival of a species or ecological community refers to areas that are necessary:
    - for activities such as foraging, breeding, roosting, or dispersal;
    - for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);

- to maintain genetic diversity and long term evolutionary development; or,
- for the reintroduction of populations or recovery of the species or ecological community.

Table 12. Significant impact assessment – Blue-winged Parrot

Significant Impact Criteria - will the activity:	Feature and Conservation Status
	Blue-winged Parrot (Vulnerable)
Lead to a long-term decrease in the size of an important population of a species	The Assessment Area is not considered to support an 'important population' as it is not a key source for breeding or dispersal, is not necessary for maintaining genetic diversity and is not at the limit of these species known range *. The project is unlikely to result in a significant disturbance to areas of suitable habitat for the species, as all native grasslands and wetlands have been avoided, while the majority of woodland habitat is avoided. Two Blue-winged Parrot were observed during Bird Utilisation surveys. The removal of 3 Large Trees in patches and 3 scattered trees will not result in a long-term decrease in the size of an important population as the habitat proposed for removal is not critical to an important populations persistence. Blue-winged Parrot is known to forage at the ground or canopy level, and as such, the risk of collision for the species is considered to be low. It is considered highly unlikely that the proposed activity will result in a long-term decrease to any important populations within, and immediate surrounds of the Project Area, as minimal impact to suitable habitat within and adjoining the Project Area is proposed to occur and the risk of direct impact to turbines is minimal for this species.
Reduce the area of occupancy of an important population	The Assessment Area is not considered to support an important population*. Any individuals occurring in the project footprint would not be classified as an important population.
Fragment an existing important population into two or more populations	Given the highly mobile nature of these species it is considered unlikely that the project would result in the fragmentation of any populations present within the Assessment Area.
Adversely affect habitat critical to the survival of a species	No critical habitat for these species is listed under the EPBC Act, nor is the project footprint critical to the survival of these species.
Disrupt the breeding cycle of an important population	Not applicable. Any individuals potentially occurring in the project footprint would not be classified as an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The project will remove small areas of potential habitat for the species, including potential foraging, roosting and breeding resources. Give the availability of higher quality habitat in the project locality and region, it is considered unlikely that the species would decline as a result of the proposed activity.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Assuming the implementation of appropriate mitigation measures, it is not likely that harmful invasive species would become further established as a result of the project.

Significant Impact Criteria - will the activity:	Feature and Conservation Status
	Blue-winged Parrot (Vulnerable)
Introduce disease that may cause the species to decline	It is not likely that disease would be introduced by the project causing the species to decline.

Note: * An important population is a population that is necessary for a species' long-term survival and recovery. This may include species identified in recovery plans and/or that are:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or;
- Populations that are near the limit of the species range.

Australasian Bittern

The Australasian Bittern is a large, stocky, partially nocturnal, heron-like bird that grows up to 76 centimetres in length and support up to a 1180 centimetre wingspan (TSSC 2019). The species is secretive and cryptic, and may blend into surrounding habitats by keeping perfectly still with the neck and bill pointing skyward. Australasian Bittern are generally solitary, but can occur in pairs or dispersed aggregations of up to 12 individuals (TSSC 2019). Previously thought to be primarily sedentary, recent studies have recorded extensive flights between wetlands of southeast Australia (Bitterns in Rice Project 2025).

Australasian Bittern occupy mainly freshwater wetlands, and are less commonly observed in estuaries or tidal wetlands (Marchant and Higgins 1993). The species favours wetlands with tall and dense vegetation, foraging on aquatic animals in shallow waters up to 0.3 metres deep.

Due to historic habitat and degradation across the core part of the species' range, all natural habitats in which the species is known, or is likely, to persist should be considered critical habitat for the survival of the species. Despite local records (Figure 8), and nearby suitable habitat for the species, the Project Area does not provide any critical habitat for Australasian Bittern. The species may, however, opportunistic fly through the Project Area when moving between Cobrico Swamp Wildlife Reserve and Lake Elingamite.

Australasian Bittern are listed as a species of 'Probable Concern' relevant to onshore wind energy facilities in Victoria, though no fatalities have been reported in Victoria (DEECA 2024).

Significant Impact Assessment

A significant impact assessment for the Endangered Australasian Bittern is provided below in Table 13, which summarises that a significant impact may occur as a result of the proposed wind farm.

An important concept for determining the potential significance of an impact under the EPBC Act is that of 'habitat critical to the survival' of a species. The EPBC Act Significant impact guidelines 1.1 (DoE 2013) provides the following guidance for determining whether an action may affect habitat critical to the survival of a species:

- Habitat critical to the survival of a species or ecological community refers to areas that are necessary:
    - for activities such as foraging, breeding, roosting, or dispersal;
    - for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);

- to maintain genetic diversity and long term evolutionary development; or,
- for the reintroduction of populations or recovery of the species or ecological community.

Table 13. Significant impact assessment – Australasian Bittern

Significant Impact Criteria - will the activity:	Feature and Conservation Status
	Australasian Bittern (Endangered)
Lead to a long-term decrease in the size of a population	Despite local records, and nearby suitable habitat for the species, the Project Area does not provide any critical habitat for Australasian Bittern. However, local sites Cobrico Swamp Wildlife Reserve (to the north-east) and Lake Elingamite (to the east) are known habitats for the species. Previously thought to be primarily sedentary, recent studies have recorded extensive flights between wetlands of southeast Australia (Bitterns in Rice Project 2025). Therefore, the species may opportunistically fly through the Project Area when moving between Cobrico Swamp Wildlife Reserve and Lake Elingamite. Based on the proximity of Cobrico Swamp Wildlife Reserve and Lake Elingamite, where the species is known to occur, coupled with Australasian Bittern listed as a species of 'Probable Concern' relevant to onshore wind energy facilities in Victoria, the proposed activity may result in a long-term decrease in the size of a population due to the risk of direct impact from turbines.
Reduce the area of occupancy of the species	Despite nearby suitable habitat for the species, the Project Area does not provide any suitable for Australasian Bittern, and is therefore unlikely to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	Given the recently recorded extensive flight behaviour of Australasian Bittern, it is considered unlikely that the project would result in the fragmentation of any populations present.
Adversely affect habitat critical to the survival of a species	Local sites Cobrico Swamp Wildlife Reserve (to the north-east) and Lake Elingamite (to the east) are likely critical habitats for the species, used for activities such as foraging, breeding and roosting. However, the Project Area does not provide any critical habitat for Australasian Bittern.
Disrupt the breeding cycle of a population	Based on the proximity of Cobrico Swamp Wildlife Reserve and Lake Elingamite, where the species is known to occur, coupled with Australasian Bittern listed as a species of 'Probable Concern' relevant to onshore wind energy facilities in Victoria, the proposed activity may result in a disruption to the breeding cycle of a population due to the risk of direct impact from turbines.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project Area does not provide any suitable habitat for Australasian Bittern. Any occurrence of the species within the Project Area would be individuals en route to more suitable habitat.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Assuming the implementation of appropriate mitigation measures, it is not likely that harmful invasive species would become further established as a result of the project.

Significant Impact Criteria - will the activity:	Feature and Conservation Status
	Australasian Bittern (Endangered)
Introduce disease that may cause the species to decline	It is not likely that disease would be introduced by the project causing the species to decline.
Interfere with the recovery of the species	Based on the proximity of Cobrico Swamp Wildlife Reserve and Lake Elingamite, where the species is known to occur, coupled with Australasian Bittern listed as a species of 'Probable Concern' relevant to onshore wind energy facilities in Victoria, the proposed activity may interfere with the recovery of the species due to the risk of direct impact from turbines.

3.5.3 Ecological Communities

No national or State-significant communities are predicted to occur, or were recorded within the Assessment Area.

3.6 Brolga Assessment

3.6.1 Desktop Assessment

According to the VBA (DEECA 2025d), the Sheldon Flocking Site Database (Sheldon 2004) and an interrogation of the Birdlife New Atlas dataset (Birdlife 2025), there are zero Brolga records within the ROI (Figure 4).

An investigation into the broader landscape revealed five Brolga records within 20 kilometres of the Project Area, and 271 Brolga records within 30 kilometres of the Project Area (Figure 4). The closest confirmed records of Brolga are approximately 15 kilometres north-east near Lake Bullen Merri (2009 and 2003) and 15 kilometres south-west at Bucknell Park, Timboon-Nullawarre Road (1995). A large cluster of Brolga records are present approximately 25-30 kilometres north and north-east of the study area, near the Hamilton Highway.

The Birdlife New Atlas dataset (Birdlife 2025) does not contain any Brolga records within 10 kilometres of the Wind Farm Development Boundary, and no historical breeding or flocking records are present within 20 kilometres of the Wind Farm Development Boundary.

Lake Elingamite is the closest waterbody to the study area. It is permanently inundated and would likely have provided suitable habitat for Brolga in the past. However, it is noted that there are no historical Brolga records within 15 kilometres of this site.

3.6.2 Field Assessment

Lake Elingamite, located approximately two kilometres east of the study area, was visited and potential habitat suitability assessed. Water levels were high at Lake Elingamite during the field assessment, with several water bird species present on site. However, no Brolga were observed and based on the location of previous records and landowner surveys, it is unlikely to provide breeding or flocking habitat for Brolga.

Lake Cobrico, located four kilometres north of the proposed wind farm, and Brucknell Swamp, 10 kilometres south-west of the wind farm were also visited with no Brolga sighted. Further, no historical breeding or flocking records are located at these sites.

No habitats within the study area or broader locality are considered to support moderate or high-quality breeding or flocking habitat for Brolga. No Brolga were observed during the surveys.

3.6.3 Landowner Liaison

Round One

All landowners indicated that they were not aware of any areas of potential habitat within the local area, nor provided information regarding any incidental sightings of Brolga occurring within the local area in the past 20 years. As such, no site visits to these landowner properties were undertaken (aside from those located within the development boundary).

Members of local Landcare groups recalled seeing Brolga historically in the region but have not sighted any in the past 20 years, with systematic draining of swamps for large-scale agriculture and significant droughts in recent times speculated to be important factors for the species' decline in the region.

Round Two

Landowners who participated in the consultation were questioned about the current and past land use of their property to provide a more complete picture of landscape. The surveys found the majority of participants had occupied their land for more than 10 years, with some multi-generational land managers. Grazing, residential, and dairy were the primary land uses, with cleared and/or arable land the dominant land type. Little to no recent changes to on-site waterbodies were documented in these responses.

Landowner Questionnaire

A total of 768 Landowner Questionnaires were mailed to residences within the ROI. From this, a total of 67 responses (8.7%) were received. Landowner observations of Brolga are summarised below:

- Sixty-one (61) responses (91%) reported not having seen a Brolga on their property;
- Six (6) responses (8.9%) reported seeing Brolga on their property or on adjacent property;
- Zero (0) responses reported Brolga breeding behaviour on their property;
- One (1) response (1.5%) reported Brolga breeding behaviour on adjacent property; and,
- Zero (0) responses reported a Brolga flocking site, as is defined in the Interim Guidelines (DSE 2012).

Brolga breeding wetland investigation

For the question *'Have you observed Brolga breeding on your property (i.e. nest sites)?'*, one response indicated "*not personally but across the road*" at a frequency of "*yearly*". This Landowner was subsequently contacted on 12 February 2025 for further information. The Landowner confirmed the wetland location, which is sited west of the Project Area, approximately 4.45 kilometres from the nearest turbine (Plate 13). The landowner was not able to provide any photographs or other evidence to substantiate their claim that the wetland has previously been or is regularly used by Brolga for breeding.

Plate 13. Project Area shown in blue, with wetland flagged during community consultation highlighted yellow and circled in red.

On 13 February 2025, another Landowner, who occupies a property adjacent to the potential Brolga breeding wetland, was contacted to verify the Brolga records. This Landowner advised that, despite familiarity with Brolga and other local avifauna, he had not observed a Brolga nest at this location, nor anywhere within the ROI.

On 14 March 2025, a letter request to contact Ecology and Heritage Partners was delivered to the property containing this wetland, with the letter also mailed to the business address that was publicly available for this site. To date, no response has been received.

On 25 March 2025, the wetland was investigated via drone to assess the suitability of the site for Brolga breeding. While the wetland was only partially visible from the roadside, the drone survey provided a clear view of the wetland (Plate 14; Plate 15). Although dry at time of the drone assessment, there was an absence of fringing or emergent vegetation that Brolga require for nest building (Plate 14; Plate 15), with the wetland providing a watering point for stock within the property.

A review of historical aerial imagery also illustrates an absence of suitable fringing and emergent vegetation for nest building (Plate 16; Plate 17). It also evident from the images (Plates 16-19) that no nests have been present in the wetland within the 2015, 2016, 2018 and 2023 breeding seasons.

Based on the desktop assessment, site investigation, drone survey, review of historical images, and consultation with adjacent landowner, coupled with the absence of any evidence to substantiate the claim made in the questionnaire (despite Ecology and Heritage Partners following up with the landowner and requesting this information), this waterbody is not considered to be a Brolga breeding wetland.

Plate 14. Waterbody identified as a potential Brolga breeding location during through the Landowner Questionnaire. Site was dry during the time of the drone survey (March 2025).

Plate 15. Waterbody identified as a potential Brolga breeding location during through the Landowner Questionnaire. Site was dry during the time of the drone survey (March 2025).

Plate 16. Google Earth image of waterbody identified during through the Landowner Questionnaire dated 27 October 2023.

Plate 17. Google Earth image of waterbody identified during through the Landowner Questionnaire dated 16 January 2018.

Plate 18. Google Earth image of waterbody identified during through the Landowner Questionnaire dated 25 December 2016.

Plate 19. Google Earth image of waterbody identified during through the Landowner Questionnaire dated 31 December 2015.

Other notable species

The Landowner Questionnaires also reported other species potentially present within the ROI. The most common reporting was Wedge-tailed Eagle *Aquila audax*, with 52 responses (77.6%) observing this species. This finding is to be expected due to the species' impressive size and high soaring behaviour making them easy visible. Species less frequently reported included Australasian Bittern, Eastern Great Egret *Ardea alba modesta*, Musk Duck *Biziura lobata*, Powerful Owl *Ninox strenua,* Grey-headed Flying-fox *Pteropus poliocephalus*, Gang-gang Cockatoo, Latham's Snipe *Gallinago hardwickii*, and Yellow-billed Spoonbill *Platalea flavipes*. These observations are consistent with the historical significant fauna sightings illustrated in Figure 7 (DEECA 2025d).

3.6.4 Summary

The triggers for a Level 2 Brolga Assessment (DSE 2012) and corresponding justification for the Mumblin Wind Farm are described in Table 13.

Table 14. Triggers used to determine if a Level 2 Brolga Assessment is required (DSE 2012).

Trigger	Justification
Records of breeding or flocking habitats within the radius of investigation	Based on our assessments, no confirmed records of Brolga breeding or flocking within the ROI were identified through biological databases, field investigations or community consultation.
The proposed development is located in an area which may be used by Brolgas moving seasonally between breeding and foraging sites, and may potentially create a barrier effect reducing movements between these habitats	Over 99.5% of all Brolga records occur at least 18 kilometres to the north of the study area. The proposed development is highly unlikely to be situated between seasonal movement sites, and therefore has a very low likelihood to create a barrier effect for the species.
The proposed development is located in an area which may be used by Brolgas for diurnal movements between foraging and roosting sites	Given the absence of Brolga records within biological databases within the ROI, it is highly unlikely that the species enters the study area for diurnal movements between foraging and roosting sites. Further, it is highly unlikely that the proposed works pose a collision risk to the species.
The proposed location of new powerlines associated with the development may create new collision risks for Brolga.	

Overall, no Brolga records (sighting, breeding, or flocking) exist within online biological databases for the ROI. Further, no confirmed breeding or flocking records were identified through community consultation or desktop assessment. Based on the results of the Level 1 Brolga Assessment, the proposed development does not trigger a Level 2 Brolga Assessment.

3.7 Bird Utilisation Surveys

3.7.1 Overview

A total of 77 bird species were recorded, consisting of 2,863 individuals, during the fixed-point bird counts undertaken. Five introduced species were recorded: Common Starling *Sturnus vulgaris*, Common Blackbird *Turdus merula*, Eurasian Skylark *Alauda arvensis*, European Goldfinch *Carduelis carduelis*, and House Sparrow

Passer domesticus. One nationally significant species - Blue-winged Parrot - was recorded within the study area, and one State significant species was recorded: Musk Duck.

The most frequently recorded species were Australian Magpie *Gymnorhina tibicen*, Little Raven *Corvus mellori*, and Eurasian Skylark.

A total of 93% of bird observations made during the point counts were of individuals that were either on the ground or flying below the Rotor Swept Area. A further 5.8% did not have their height recorded as they were obscured from vision, while 1.1% of birds were recorded flying in or above the Rotor Swept Area.

A variety of other bird species were also recorded, including:

- Generalist bird species common in modified landscapes, such as open paddocks, including Magpie Lark *Grallina cyanoleuca*, Willie Wagtail *Rhipidura leucophrys* and Australasian Pipit *Anthus novaeseelandiae;*
- Woodland bird species using linear patches of native and non-native vegetation along roadsides and other bushland in the study area, such as Brown Thornbill Acanthiza pusilla, Golden Whistler *Pachycephala pectoralis,* Spotted Pardalote *Pardalotus punctatus* and White-plumed Honeyeater *Lichenostomus penicillatus;*
- Water bird species using wetlands, dams and streams in the study area including Australian Shelduck *Tadorna tadornoides*, Great Cormorant *Phalacrocorax carbo* and Musk Duck*;*
- Raptors foraging over paddocks, roadsides and waterbodies, including Black-shouldered Kite *Elanus axillaris*, Brown Goshawk *Accipiter fasciatus*, Nankeen Kestrel *Falco cenchroides*, Wedge-tailed Eagle and Whistling Kite *Haliastur sphenurus*; and,
- Parrot species feeding on sowed crops and using large hollow-bearing gums, including Crimson Rosella *Platycercus elegans,* Eastern Rosella *Platycercus eximius*, Blue-winged Parrot, and Purple-crowned Lorikeet *Glossopsitta porphyrocephala.*

3.7.1 Raptors

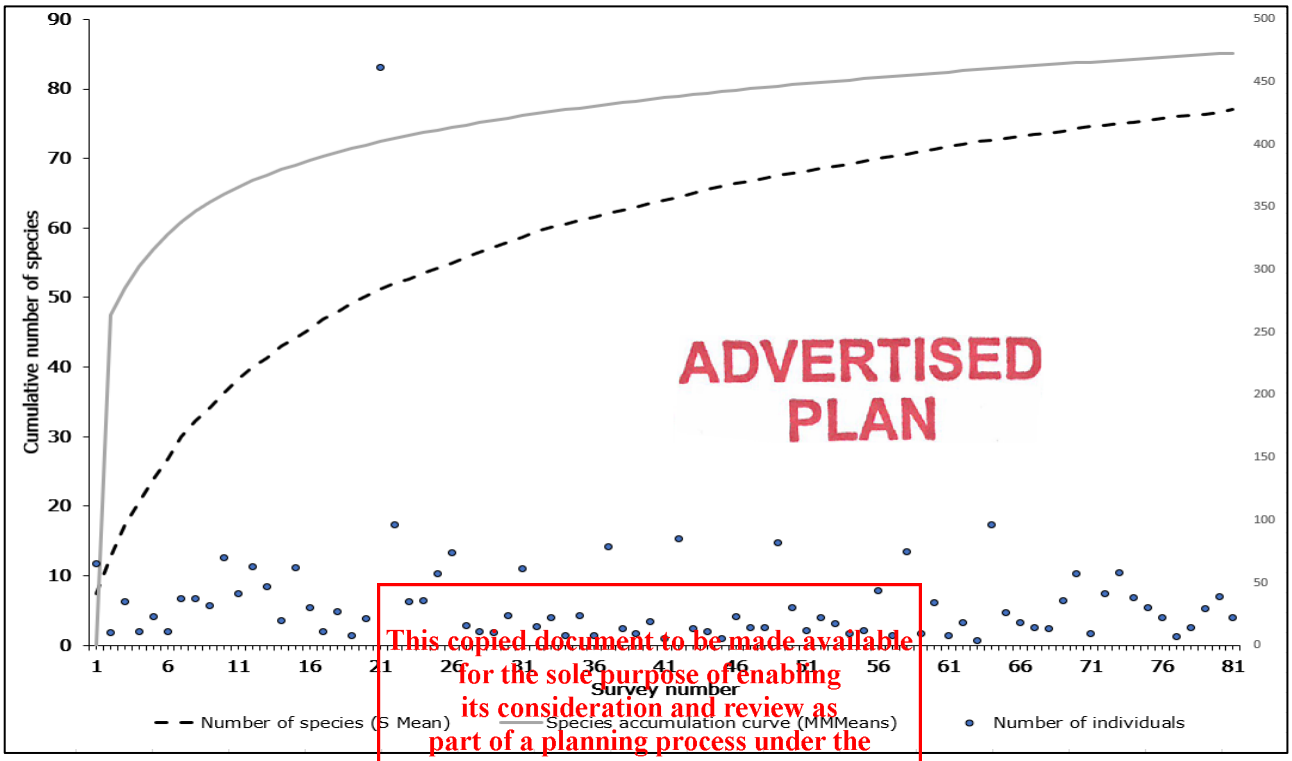
Eight raptor species were observed flying in the study area. Two species (Wedge-tailed Eagle and Whistling Kite) were recorded in the Rotor Swept Area. Wedge-tailed Eagle was recorded at four sites (1, 5, 6 and 3). However, no active nests were observed for the species.

Raptors in general accounted for a low percentage (<1%) of birds recorded within and adjacent to the wind farm during the bird surveys.

3.7.2 Species Richness

The predicted species richness estimate for the point count surveys was 85 species, which converts to a completeness of over 90% and means that an additional 7-8 species are predicted to occupy the study area but were not recorded. A greater number of predicted species relative to actual species is an indication that while survey effort was high and covered a range of conditions and seasons, several possibly more cryptic species are likely to be present but were not recorded. The study appears to reach asymptote (or plateau)

after six months of survey. The results show a clear relationship between effort and the number of species detected (Graph 1).



Graph 1. Species accumulation curve across the entire survey period. Source: Species accumulation curve produced using EstimateS (Colwell 2013)

3.7.3 Flight Heights

Nearly all birds observed (93%) during the point counts were either recorded on the ground or flying below the Rotor Swept Area (Table 15). Seven species were recorded flying in or above the Rotor Swept Area (Australian White Ibis *Threskiornis moluccus*, Little Raven, Purple-crowned Lorikeet, Straw-necked Ibis *Threskiornis spinicollis*, Wedge-tailed Eagle, Whistling Kite, and Yellow-tailed Black-Cockatoo *Zanda funerea*). Several other species were observed flying close to the Rotor Swept Area – at 50 metres or greater – including Australian Raven *Corvus coronoides*, Long-billed Corella *Cacatua tenuirostris*, Pacific Black Duck *Anas superciliosa* and White-faced Heron *Egretta novaehollandiae*.

Bird point count survey locations were assigned to capture a representative sample of vegetation and habitat type. Given much of the study area comprises open paddocks, most bird point count survey locations are situated in these areas. However, several sites were situated to capture any woodland and waterbird habitats in the study area.

Table 15. Summary of birds recorded at the varying flight heights

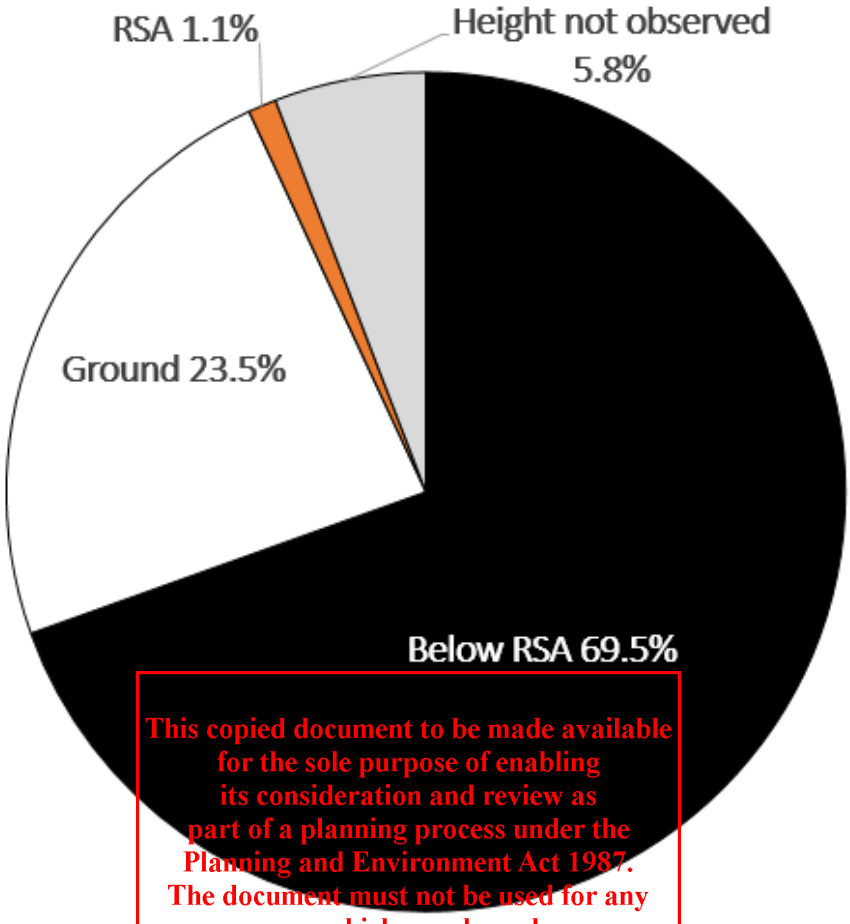
Flight Height	# of birds	% of birds
Height not observed	167	5.8%
Ground (0 metres)	673	23.5%

Flight Height	# of birds	% of birds
Below RSA (1-63m)	1987	69.5%
RSA (64-252m)	31	1.1%
Above RSA (>252m)	0	0.0%

While seven species were recorded flying in or above the Rotor Swept Area, several parrot, waterbird and raptor species are also likely to utilise heights within and above RSA on occasion. Large parrots, including several recorded below the Rotor Swept Area during surveys such as Galah and Long-billed Corella, may fly in the Rotor Swept Area as they move daily between roosts and feeding areas.

One large wetland (Lake Elingamite) is present within the study area. Several waterbird species recorded during point count surveys including – Australian White Ibis, Great Cormorant, Pacific Black Duck, Straw-necked Ibis, and White-faced Heron – may fly in the Rotor Swept Area when moving between habitat areas. The study area was driven extensively with Australian White Ibis, Pacific Black Duck, Straw-necked Ibis and White-faced Heron having the potential to fly in the Rotor Swept Area.

Generally, non-passerine birds such as raptors, wetland/waterbirds and parrots have flight characteristics that make them prone to collisions with wind turbines. These species are usually larger, less mobile, occur in flocks (particularly parrots) and forage in more open areas. Some minor changes in local distribution and abundance of these species may be expected as a consequence of ongoing operation of the turbines, and although these impacts are not expected to be significant and minimal in line with the stated AusWEA (2005), collision potential and post construction monitoring should be established to further assess the impact of the project on bird species and populations.



Graph 2. Percentage of birds recorded below (RSA), at rotor swept area (RSA) height (64 – 252 metres), during the survey period.

Table 9. Number of instances of bird species recorded in Point Count Surveys classified according the RSA at which they were detected (excluding incidental records).

Species (Common Name)	Height not observed	Below RSA	Ground	RSA	Total
Australasian Pipit	0	2	1	0	**3**
Australasian Reed Warbler	0	53	0	0	**53**
Australasian Shelduck	0	1	0	0	**1**
Australian Hobby	0	1	0	0	**1**
Australian Magpie	15	96	182	0	**293**
Australian Pelican	0	0	1	0	**1**
Australian Raven	0	10	0	0	**10**
Australian Shelduck	0	2	13	0	**15**
Australian White Ibis	0	38	0	10	**48**
Australian Wood Duck	0	32	69	0	**101**
Black Swan	0	0	14	0	**14**

Species (Common Name)	Height not observed	Below RSA	Ground	RSA	Total
Black-faced Cuckoo Shrike	0	5	0	0	**5**
Black-shouldered Kite	0	2	0	0	**2**
Blue-winged Parrot	0	2	0	0	**2**
Brown Falcon	0	1	0	0	**1**
Brown Goshawk	0	1	0	0	**1**
Brown Songlark	1	2	0	0	**3**
Brown Thornbill	3	7	0	0	**10**
Brown-headed Honeyeater	1	0	0	0	**1**
Common Blackbird	1	0	2	0	**3**
Common Starling	3	293	20	0	**316**
Crimson Rosella	0	28	0	0	**28**
Eastern Rosella	0	26	1	0	**27**
Eurasian Coot	0	0	10	0	**10**
Eurasian Skylark	13	4	33	0	**50**
European Goldfinch	0	6	0	0	**6**
Fan-tailed Cuckoo	6	0	0	0	**6**
Galah	0	16	0	0	**16**
Golden Whistler	0	1	0	0	**1**
Golden-headed Cisticola	0	17	0	0	**17**
Great Cormorant	0	0	20	0	**20**
Grey Butcherbird	8	2	0	0	**10**
Grey Fantail	7	7	0	0	**14**
Grey Shrike Thrush	5	12	0	0	**17**
House Sparrow	0	20	0	0	**20**
Intermediate Egret	0	3	0	0	**3**
Jacky Winter	0	1	0	0	**1**
Laughing Kookaburra	2	2	0	0	**4**
Little Black Cormorant	0	2	0	0	**2**
Little Grassbird	1	6	0	0	**7**
Little Pied Cormorant	0	10	22	0	**32**
Little Raven	9	112	252	3	**376**
Long-billed Corella	2	558	2	0	**562**
Magpie-lark	12	11	13	0	**36**
Masked Lapwing	3	0	2	0	**5**
Musk Duck	0	5	4	0	**9**
Nankeen Kestrel	0	2	0	0	**2**
Noisy Miner	16	24	0	0	**40**
Pacific Black Duck	0	60	1	0	**61**

Species (Common Name)	Height not observed	Below RSA	Ground	RSA	Total
Purple-crowned Lorikeet	0	0	0	1	**1**
Purple Swamphen	3	3	2	0	**8**
Red Wattlebird	9	5	1	0	**15**
Red-browed Finch	0	3	0	0	**3**
Red-rumped Parrot	0	6	0	0	**6**
Rufous Whistler	1	0	0	0	**1**
Sacred Kingfisher	2	1	0	0	**3**
Spotted Pardalote	0	1	0	0	**1**
Straw-necked Ibis	0	0	0	2	**2**
Striated Pardalote	15	13	0	0	**28**
Stubble Quail	0	0	7	0	**7**
Sulphur-crested Cockatoo	3	9	0	0	**12**
Superb Fairywren	6	72	0	0	**78**
Swamp Harrier	0	2	0	0	**2**
Tree Martin	0	12	0	0	**12**
Wedge-tailed Eagle	0	4	0	13	**17**
Weebill	2	14	0	0	**16**
Welcome Swallow	0	32	0	0	**32**
Whiskered Tern	0	240	0	0	**240**
Whistling Kite	0	1	0	1	**2**
White-browed Scrubwren	1	0	0	0	**1**
White-faced Heron	0	5	1	0	**6**
White-naped Honeyeater	0	27	0	0	**27**
White-plumed Honeyeater	1	0	0	0	**1**
White-throated Treecreeper	9	3	0	0	**12**
Willie Wagtail	3	16	0	0	**19**
Yellow faced Honeyeater	4	26	0	0	**30**
Yellow-tailed Black Cockatoo	0	9	0	1	**10**

Note. Ground – 0 metres; Below RSA – 1-63 metres; RSA 64-252 metres; Above RSA > 252 metres.

4 LEGISLATIVE AND POLICY IMPLICATIONS

4.1 *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a Commonwealth process for the assessment of proposed actions likely to have a significant impact on any matters of National Environment Significance (NES), described in Table 16.

Table 16. Potential impacts to matters of National Environmental Significance (NES)

Matter of NES	Potential Impacts
World Heritage properties	The proposed action will not impact any properties listed for World Heritage.
National heritage places	The proposed action will not impact any places listed for national heritage.
Ramsar wetlands of international significance	The nearest Ramsar wetland is the Western District Lakes – approximately 21 kilometres north-east of the proposed wind farm). The proposed action is highly unlikely to impact the ecological character of any Ramsar wetland, or other downstream waterbodies.
Threatened species and ecological communities	No nationally significant flora or ecological communities were recorded during the assessment. The broader area is known to be utilised as foraging habitat for the nationally significant Southern Bentwing Bat. Implications relating to the potential impacts to this species are being undertaken by another consultant and are not addressed in this report. The nationally significant Blue-winged Parrot was recorded during the bird utilisation surveys. However, the windfarm development boundary would not be classed as an 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2013), and the project is unlikely to result in a significant impact to the species (Table 12). Based on the proximity of Cobrico Swamp Wildlife Reserve and Lake Elingamite, where the nationally significant Australasian Bittern is known to occur, the proposed activity may result in a significant impact to the species due to the risk of direct impact from turbines (Table 13).
Migratory and marine species	Several Migratory and/or Marine species have previously been recorded within 10 kilometres of the windfarm development boundary (DEECA 2023a). However, the windfarm development boundary would not be classed as an 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2013).
Commonwealth marine area	The proposed action will not impact any Commonwealth marine areas.
Nuclear actions (including uranium mining)	The proposed action is not a nuclear action.
Great Barrier Reef Marine Park	The proposed action will not impact the Great Barrier Reef Marine Park.
Water resources impacted by coal seam gas or mining development	The proposed action is not a coal seam gas or mining development.

A referral has been submitted to the Commonwealth Environment Minister for assessment and has been assessed as a Controlled Action (EPBC # 2024/10068).

4.2 *Flora and Fauna Guarantee Act 1988* (Victoria)

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' threatened and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (e.g. within road reserves, drainage lines and public reserves/parks). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

On 10 September 2019, Section 4B was incorporated into the *Flora and Fauna Guarantee Act 1988*. Section 4B now requires a decision, policy, program or process by a Minister or public authority to "give proper consideration to" the objectives of the Act, as well as Victoria's Biodiversity Strategy, Action Statements and other determinations or plans under the Act.

4.2.1 Implications

Permits under the FFG Act for impacts to protected flora species removed for construction related activities are only required for members of the Orchidaceae family, due to being declared general protected flora.

No impacts to orchids are proposed.

With the implementation of the measures proposed within the Construction Environment Management Plan (CEMP), the Project is not expected to result in the introduction of any threatening processes, or contribute to long-term impacts to significant matters.

4.3 *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 requires a planning permit from the relevant local Council to remove, destroy or lop native vegetation, unless an exemption at Clause 52.17-7 of the Victoria Planning Provisions applies.

4.3.1 Local Planning Scheme

The study area is located within the Corangamite Shire Council. The following zoning and overlays apply (DTP 2024):

- Farming Zone (FZ)
- Bushfire Management Overlay (BMO) (partial)

4.3.2 *The Guidelines*

The State Planning Policy Framework and the decision guidelines at Clause 12.01 Biodiversity and Clause 52.17 Native Vegetation require Planning and Responsible Authorities to have regard for the Guidelines (DELWP 2017).

4.3.3 *Implications*

In accordance with Clause 61.01 of the Corangamite Shire Planning Scheme, the Minister for Planning is the Responsible Authority for the use and development of land for a Wind Energy facility or Solar facility.

The impact assessment has determined that the study area is within Location 2, with 0.427 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Intermediate assessment pathway.

The offset requirement for native vegetation removal is 0.166 General Habitat Units and 5 Large Trees.

A planning permit from the Corangamite Shire Council is required to remove, destroy or lop any native vegetation under Clause 52.17.

A permit is required under Clause 52.32 of the Corangamite Shire Planning Scheme to use and develop a wind energy facility. This report satisfies the relevant ecological application requirements listed in Clause 52.32-4.

4.4 *Catchment and Land Protection Act 1994* (Victoria)

Several weeds listed as noxious under the *Catchment and Land Protection Act 1994* were recorded during the assessment. Similarly, there is evidence that the study area is currently occupied by pest fauna species listed under the CaLP Act. Weed management controls must be included in the Construction Environment Management Plan prepared for the project.

4.5 *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 DEECA.

4.6 Policy and Planning Guidelines – Development of Wind Energy Facilities in Victoria

Wind energy facilities should not lead to unacceptable impacts on critical environmental, cultural or landscape values. These values include those protected under Commonwealth and State legislation, those recognised through planning schemes such as the State Planning Policy Framework.

The Responsible Authority and applicants must consider a range of environmental values (for example: flora, vegetation and fauna) and risks when identifying suitable sites for wind energy facility development.

4.6.1 Implications

Impacts on flora and fauna species and habitats from wind energy facilities and associated infrastructure can be minimised through facility placement and design measures at the project planning stage. Minimisation of impacts to native vegetation patches, scattered trees, and significant impacts to environmental values at the site can be further achieved by focusing construction and other project activity in agricultural areas.

A Construction Environmental Management Plan (CEMP) will be required to detail how the site will be managed throughout the life of the Project, and across all environmental components. The CEMP should include a bat and avifauna management plan (DELWP 2021).

5 POTENTIAL IMPACTS

The project footprint has been finalised with reference to the findings of this assessment to avoid and minimise impacts on ecological values where possible. Likely impacts associated with the project footprint and operation of the proposed wind farm are discussed in the following sections.

5.1 Construction Related Impacts

Prior to construction, a Construction Environmental Management Plan (CEMP) (or similar document) will be developed. This document will include particular provisions for the protection of areas of native vegetation.

- The CEMP will also include a Construction and Site Works Management Plan;
- The CEMP should include specific species/vegetation conservation strategies, daily monitoring, sedimentation management, site specific rehabilitation plans, weed, pest and pathogen management measures, etc.; and,
- Fencing and/or bunting erection requirements around works areas in proximity to areas of native vegetation and ecological significance.

All construction staff on site (i.e. the area of construction) will be made aware of the project specific CEMP (or similar document) and their responsibilities regarding environmental management. All staff will attend an environmental site induction, which will inform contractors of the requirements of the CEMP. All main contractors undertaking construction works will be provided with a copy of the CEMP prior to commencement of works. The main contractors must issue sub-contractors with a copy of the document prior to commencement of works to allow time to become familiar with the document and guidelines/procedures.

Following the induction, all persons working on site are required to sign the induction form and a log will be kept of all staff that have completed the environmental site induction. All construction personnel will hold appropriate competencies/ qualifications for their intended role. A summary of actions and timings of the induction will be provided.

The induction will include the following:

- Information about the environmental values present within and surrounding the Project Area.
- A site plan will be provided for viewing in order to become informed on environmental values.
- The legislative context of the development.
- The key objectives and measures outlined in the CEMP.
- The duty of care of all persons to protect the environmental values within and surrounding the Site; ensure that their actions are in accordance with the relevant environmental legislations and policies, and the CEMP; and report any faults, issues or actions with the potential (even if remote) to impact upon the environment.
- The hierarchy of environmental responsibility and the lines of reporting.
- The reprimand and penalties of non-compliance.

- The requirement for all persons inducted to sign a logbook of induction.
- A log is to be kept of all staff that have completed the environmental site induction.
- All site changes that affect environmental protection, whether they are a directly or indirectly as a result of development will be logged at each toolbox meeting.

In the absence of suitable mitigation measures, construction-related impacts are likely to include:

- The introduction and spread of weeds and soil pathogens due to on-site activities;
- Disturbance to wildlife from increased human activity and noise during construction; and,
- Indirect impacts on adjacent areas if construction activities, erosion and drainage are not appropriately managed.

The Project Area is located within a relatively flat farmland landscape with interspersing ephemeral drainage lines which are unlikely to hold water for any length of time. Due to the absence of a permanent natural water source and sparse vegetation, the development footprint is unlikely to support habitat relied on by significant species identified as occurring within the locality that would be affected by construction activities. Therefore, the potential construction related impacts are considered to be low to negligible.

5.2 Operational Impacts

There are likely to be bird and bat mortalities as a result of turbine collision and barotrauma associated with the operation of the wind farm.

5.2.1 Birds

The impact of bird mortality as a result of turbine collisions on a population level will affect certain species in different ways. Species that are short-lived and with high annual reproduction rates are likely to be able to absorb additional mortality with insignificant impacts to their overall population size at a regional or national level (Chamberlain *et al*. 2006). By contrast, long-lived, slowly reproducing species are more vulnerable to this type of additive mortality and may be less able to maintain their population size when faced by such stresses (Sæther and Bakke 2000).

Given that raptors are long-lived and are a slowly reproducing species, they are distributed in low densities compared to other birds and are therefore exposed to increased risk of local population declines. The loss of a single breeding individual could potentially adversely impact the local population. However, it is well known based on published literature that certain raptors adapt their behaviour in the presence of wind turbines (Farfán *et al.* 2009), although detailed avoidance rates for most species worldwide is not known (Chamberlain *et al.* 2006). Particular raptor species have been identified as being 'of concern' due to their proneness to collision with operational wind turbines, although these species do appear to become conditioned to the presence of wind turbines after an extended period of time, and adjust their foraging behaviour to avoid wind turbines (i.e. up to 99% avoidance rates for most species).

Overall, the quality of habitat in the study area, the small size of the wind farm and the ability of birds to actively avoid collisions, means that the impact of the proposed wind farm on local avifauna is expected to be low.

5.2.2 Bats

Bats are susceptible to collision with wind turbines (Arnett 2005; Kunz *et al.* 2007). In some habitats high numbers are struck by wind turbines, especially those bat species that undertake large scale annual migrations (Kunz *et al.* 2007; Kuvlesky *et al*. 2007; Cryan and Barclay 2009). Furthermore, bats may be attracted to wind turbines following vortices created by the blade tips and have been observed investigating all parts of the turbine (Horn *et al.* 2008; Cryan and Barclay 2009). Bat mortality as a result of barotrauma, which is caused by changes in pressure produced by the rotating turbines, has also been documented (Cryan and Barclay 2009).

Collisions with turbine blades are understood to be the most frequent interaction causing mortality or injury, although the cause of these collisions is poorly known. General observations to date indicate that bats do not typically collide with turbine towers, transmission structures, guy wires, or meteorological towers (i.e. stationary structures); however current understanding of how and why bats come into contact with turbines is lacking. This is due to the limited ability to observe how bats behave at night around these structures as they move across the landscape between patches of vegetation and during foraging activities (MNR 2007, Horn *et al.* 2008).

A recent assessment of bird and bat mortality (Moloney *et. al.,* 2019) found that bats account for 44% of wind farm mortalities (445 total bat carcasses found from data available to February 2018). The majority of these mortalities were from White-striped Freetail Bat (67%). Carcass surveys undertaken as part of the Studland Bay and Bluff Point Wind Farms in Tasmania revealed that the majority of the carcasses were Gould's Wattled Bat (a high-flying, open-air foraging species) with the remaining being *Vespadelus* spp. (Hull and Cawthen 2012).

There are four main factors that contribute to bat mortality at wind farm sites:

- Bat species and abundance in the area;
- Season (i.e. time of year) and weather conditions (e.g. clear, warm nights with low wind). Such factors are likely to influence the level of bat activity and thus mortality at wind power sites (MNR 2007);
- Habitat/landscape features in the area (e.g. migration routes, forested ridges, and hibernacula/swarming sites may be important features). High levels of bat activity have been documented in forested ridge habitats, and areas where the woodland patches have been cleared for wind turbine placement also offer attractive foraging habitat for some species of bats. Edges of remnant woodlands and scattered remnant trees in paddocks provide favourable foraging areas where bats can easily capture airborne insect prey, creating areas of concentrated bat activity (Lumsden and Bennett 2000, 2005; Kunz *et al*. 2007, Horn *et al*. 2008); and,
- The number of turbines contained within the wind farm.

Bat Species in the Locality

The nationally significant Southern Bent-wing Bat is an insectivorous cave-roosting bat that forages at and around canopy height in treed areas, and close to the ground in grassy areas. Ecology and Heritage Partners understands that eight Southern Bent-wing Bat mortalities due to collisions with turbines have been reported

during post-construction surveys at operational wind farm (as per publicly available data up to 2019) (Moloney *et al*. 2019, Symbolix 2020).

The potential impacts to Southern Bent-wing Bat will be addressed by another consultant, and will be provided in a separate report.

Two additional bat species are considered to have a moderate to high risk of collision due to their flight that have a high likelihood of utilising habitat within the Project Area, namely the White-striped Freetail Bat and Gould's Wattled Bat. These bats (not significant at a State or national level) have recorded the highest and second highest number of collision incidents respectively from a sub-sample of turbines across 15 Victorian Wind Energy Facilities between 2003 and 2018 (Moloney *et. al.,* 2019). A Bat and Avifauna Management (BAM) Plan will be prepared to provide greater detail regarding proposed mitigation of impacts to potentially impacted birds and bats (Section 6.2).

5.3 Cumulative Biodiversity Impacts

The largest impact to biodiversity in the locality and encompassing bioregion is likely to have stemmed from increased European settlement around the 1940s and the subsequent land clearance for agriculture. Future disturbance associated with human activities in the bioregion is likely to be associated with ongoing agricultural activities and development.

The impacts from the project must be considered together with the biodiversity impacts that have resulted from historic and predicted future human disturbances.

In addition to cumulative impacts associated with construction of the Mumblin Wind Farm, operational activities have the potential to lead to incremental and cumulative impacts (e.g. barrier effects, changes to bird/bat behaviour etc.). Nearby operating wind farms within the vicinity of the Project area include:

- Timboon Wind Farm (operating) - 3 turbines located approximately 25 kilometres south of the Project area;
- Ferguson Wind Farm (operating) - 3 turbines located approximately 32 kilometres south-east of the project area; and,
- Mortlake South Wind Farm (operating) - 35 turbines located approximately 20 kilometres north-west of the project area.

The operation of the proposed Mumblin Wind Farm is considered unlikely to significantly increase cumulative pressures within the broader landscape due to the development footprint being located in a setting within a predominantly cleared and uniform landscape.

Despite this, ongoing monitoring of bird and bat populations following commissioning of the Project will enable the proponent to identify and mitigate cumulative impacts as other renewable energy projects are brought on-line.

5.4 The Impact of Climate Change

Climate change is likely to have an impact on both the flora and fauna of the Project area. There has been recent speculation about the movement of wetlands south as the interior of Australia becomes increasingly arid. This conjecture is not supported by empirical data and it is likely that changes in Australia's climate will have unpredictable impacts on Australia's biodiversity, including birds (Pittock 2003). Changes that have already occurred as a result of the effect of climate change on birds include changes to distribution, phenology, morphology and physiology, behaviour, and abundance and population dynamics (Chambers *et al.* 2005).

As climate change is better understood it may be that developments such as wind farms need to be mindful of the impacts of this phenomenon, however at present, this is not possible. It should also be noted that wind farms are a 'clean' energy source with relatively very low carbon emissions.

6 MITIGATION MEASURES

6.1 Best Practice Mitigation Measures

Recommended measures to mitigate impacts upon terrestrial values present within the Assessment Area may include:

- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation. If indeed necessary, trees should be lopped or trimmed rather than removed. Similarly, soil disturbance and sedimentation within waterbodies should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats;
- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Native vegetation (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Tree Protection Zones (TPZs) should be implemented to prevent indirect losses of native vegetation during construction activities (DSE 2011). A TPZ applies to a tree and is a specific area above and below the ground, with a radius 12 x the Diameter at Breast Height (DBH). At a minimum standard a TPZ should consider the following:
    - A TPZ of trees should be a radius no less than two metres or greater than 15 metres;
    - Construction, related activities and encroachment (i.e. earthworks such as trenching that disturb the root zone) should be excluded from the TPZ;
    - Where encroachment is 10% or more of the total area of the TPZ, the tree should be considered as lost and offset accordingly (unless an arboricultural report specifies otherwise);
    - Directional drilling may be used for works within the TPZ without being considered encroachment. The directional bore should be at least 600 millimetres deep;
    - The above guidelines may be varied if a qualified arborist confirms the works will not significantly damage the tree (including stags / dead trees). In this case the tree would be retained, and no offset would be required; and,
    - Where the minimum standard for a TPZ has not been met an offset may be required.
- Removal of any habitat trees or shrubs (particularly hollow-bearing trees or trees/shrubs with nests) should be undertaken between February and September to avoid the breeding season for most fauna species. If any habitat trees or shrubs are proposed to be removed, this should be undertaken under the supervision of an appropriately qualified zoologist to salvage and translocate any displaced fauna. A Fauna Management Plan may be required to guide the salvage and translocation process;
- Where possible, construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation, Large Trees and/or wetlands;

- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Authority guidelines (EPA 1991; EPA 1996; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands; and,
- As indigenous flora provides valuable habitat for indigenous fauna, it is recommended that any landscape plantings that are undertaken as part of the proposed works are conducted using indigenous species sourced from a local provenance, rather than exotic deciduous trees and shrubs.

6.2 Bat and Avifauna management (BAM) Plan

A Bat and Avifauna Management (BAM) Plan will be prepared prior to construction in consultation with DEECA to provide greater detail regarding proposed mitigation of impacts to potentially impacted birds and bats as part of the Mumblin Wind Farm. The BAM Plan will incorporate the following scope of works:

An Impact Risk Assessment will be undertaken to assess the potential risks and impacts to target species due to the proposed action, and is proposed to include the following:

- A description of the relevant components of the Mumblin Wind Farm;
- An assessment of the potential impacts (including direct mortality) to all target species during the construction and operational phases of the Mumblin Wind Farm, with consideration for potential changes to their utilisation of the site; and,
- Consideration of listing advice, conservation advice, recovery plans, and threat abatement plans for each target species to inform their potential impacts.

A statement of the long-term objectives and strategy for minimising bird and bat strike risk within the Mumblin Wind Farm will be prepared, including but not limited to objectives such as:

- An improved understanding of site utilisation changes for target species throughout project phases; and,
- The development of corrective actions to promote a long-term reduction in turbine collision risk (e.g. via a Bird and Bat adaptive management framework).

Standards for post-commissioning monitoring and mitigation will be prepared, responding to the scale and environmental risks of the Mumblin Wind Farm.

An Adaptive Management Framework will be prepared to ensure achievement of environmental outcomes. The Adaptive Management Framework is intended to provide a dynamic approach to mitigation for target species through all project phases, and will deliver corrective actions, informed by site-utilisation and CRM data (where appropriate), monitoring and existing mitigation measures, to ensure environmental outcomes are achieved.

7 RECOMMENDATIONS

Based on the quality and extent of ecological values known to, or considered likely to occur, it is recommended that Mumblin Wind Farm Pty Ltd:

1. Prior to construction, develop a Construction Environmental Management Plan (CEMP) with specific management actions to mitigate against potential impacts to areas of ecological value;
2. Develop a Weed Management Plan, which should be incorporated into the CEMP;
3. Before commencement of construction, the preparation of a Bat and Avifauna Management Plan to the satisfaction of the Responsible Authority, in consultation with the DEECA. When approved, the BAM Plan must be endorsed by the Responsible Authority. The BAM Plan must include:
   a) A strategy for managing and mitigating bird and bat strike arising from the wind energy facility operation. The strategy must include procedures for the regular removal of carcasses likely to attract raptors to areas near wind turbines;
   b) A procedure for addressing significant impacts of birds and bat populations caused by the wind farm. This procedure must provide that the operator of the wind energy facility immediately investigates the possible causes of any significant impacts on bird and bat populations, and thereafter designs and implement measures to mitigate those impacts in consultation with the Responsible Authority and DEECA;
   c) A monitoring period of not less than one year to record, by species, any bird and bat strikes; and,
   d) A strategy to manage and/or monitor the wind farm beyond the designated period depending upon the results of the monitoring period referred to above. The strategy must include provisions to take account of any changes to weather patterns during the initial one-year monitoring period.
4. If there are changes to the layout through the process of preparing the final development plans, confirmation of any potential impacts (or lack thereof) to native vegetation must be undertaken.

8 SUMMARY OF REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 17.

Table 17. Further requirements associated with development of the study area.

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	The proposed action may result in a significant impact to the nationally significant Australasian Bittern. The proposed action is highly unlikely to have a significant impact on any other matter of NES considered in this report. A referral to the Commonwealth Environment Minister has been prepared and assessed as a Controlled Action (EPBC Number 2024/10068). It is noted that investigations associated with microbat species are being undertaken by another consultant.	A referral has been submitted to the Commonwealth Environment Minister for assessment and has been assessed as a Controlled Action (EPBC # 2024/10068).
Flora and Fauna Guarantee Act 1988	Permits under the FFG Act are required to impact protected flora species removed for construction related activities are also required for members of the Orchidaceae family due to being declared general protected flora. No impacts to orchids are proposed. With the implementation of the measures proposed within the Construction Environment Management Plan (CEMP), the Project is not expected to result in the introduction of any threatening processes, or contribute to long-term impacts to significant matters. Implications relating to significant microbat species are being addressed by another consultant, and are not considered further in this report.	No further action required
Planning and Environment Act 1987	The study area is within Location 2, with 0.427 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Intermediate assessment pathway. The offset requirement for native vegetation removal is 0.166 General Habitat Units and 5 Large Trees. A planning permit from the Corangamite Shire Council is required to remove, destroy or lop any native vegetation under Clause 52.17. A permit is required under Clause 52.32 of the Corangamite Shire Planning Scheme to use and develop a wind energy facility.	Prepare planning application for the removal of native vegetation.
Catchment and Land Protection Act 1994	Noxious weed species and pest fauna species listed under the CaLP Act were recorded within the Assessment Area. To meet requirements under the CaLP Act, listed noxious weeds and/or pests should be appropriately controlled throughout the study area.	Incorporate weed and pest animal management actions into the CEMP.
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation 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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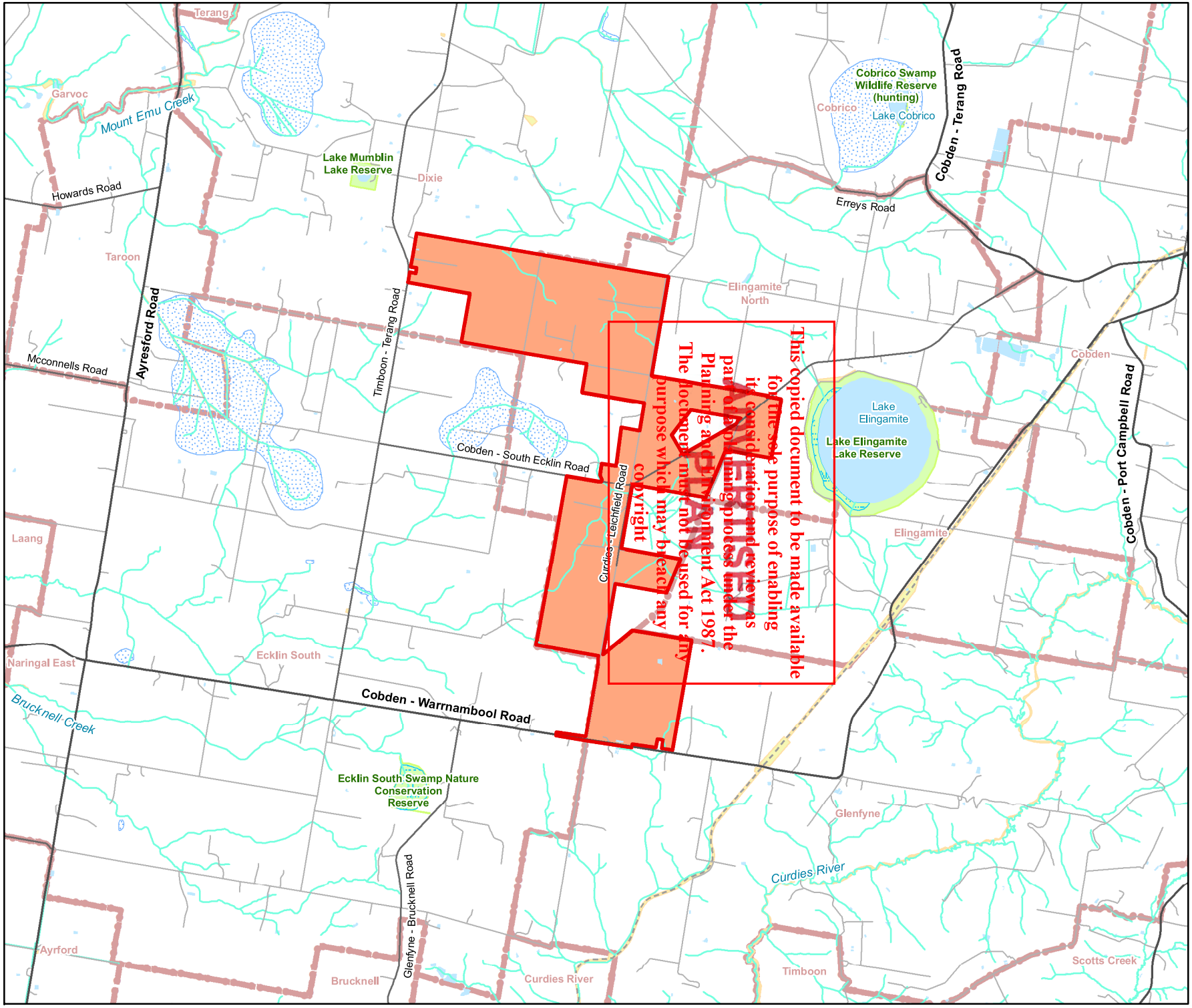
FIGURES



Legend

- Wind Farm Development Boundary
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities

Figure 1

Location of the study area

Ecological Assessment, Mumblin Wind Farm, Ecklin South

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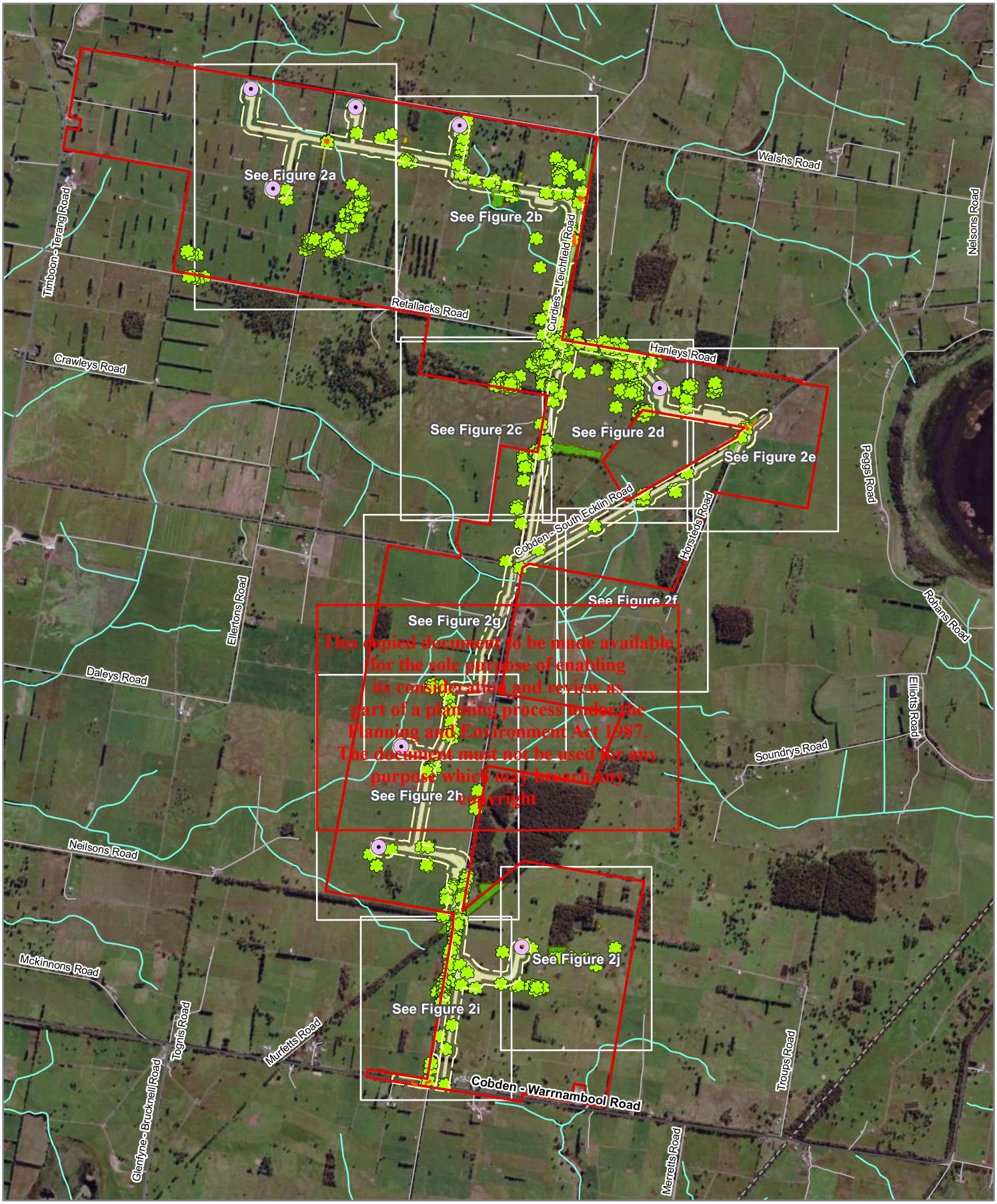

Figure 2 Overview

Ecological features

Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Turbines
- Trees

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)
- Herb-rich Foothill Forest (EVC 23)
- Plains Grassy Wetland (EVC 125)
- Impacted vegetation

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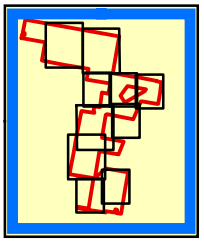

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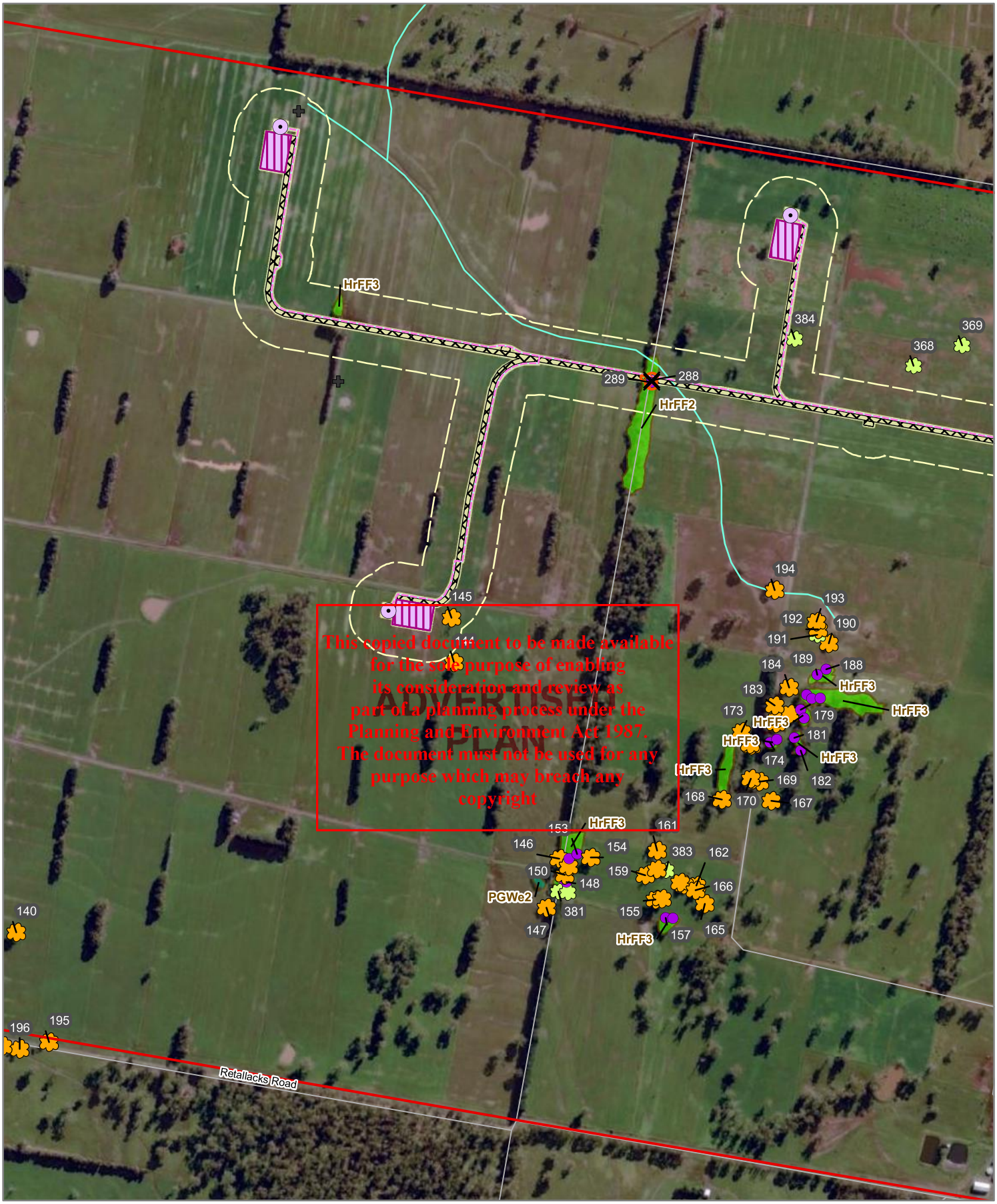

Figure 2a

Ecological features

Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Turbines
- Underground cable
- Access Track
- Hardstands
- Cabling Trench
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Weed / Other points
- Tree impacted

Ecological Vegetation Classes

- Herb-rich Foothill Forest (EVC 23)
- Plains Grassy Wetland (EVC 125)
- Impacted vegetation

N

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Metres

VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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Figure 2b

Ecological features

Ecological Assessment, Mumblin Wind Farm, Ecklin South

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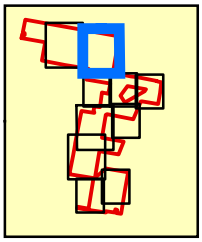
Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Turbines
- Directional borehole
- Underground cable
- Access Track
- Hardstands
- Laydown Area
- Watertanks
- Cabling Trench
- Swept path
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Noxious weed
- Tree impacted

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)
- Herb-rich Foothill Forest (EVC 23)
- Impacted vegetation



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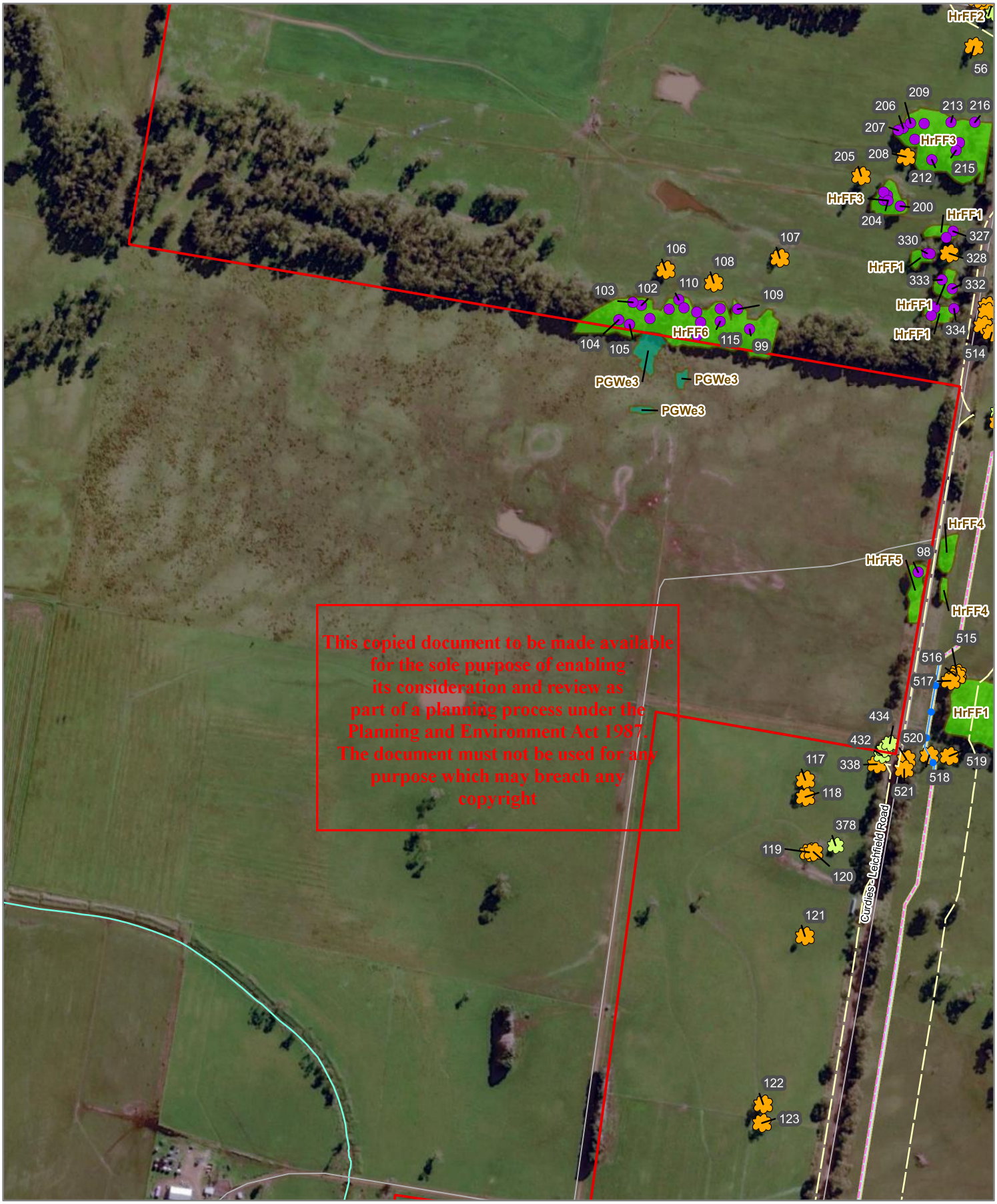


Figure 2c

Ecological features

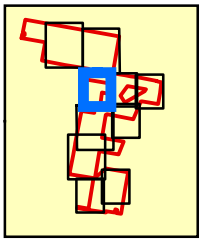
Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Directional borehole
- Underground cable
- Cabling Trench
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch

Ecological Vegetation Classes

- Herb-rich Foothill Forest (EVC 23)
- Plains Grassy Wetland (EVC 125)



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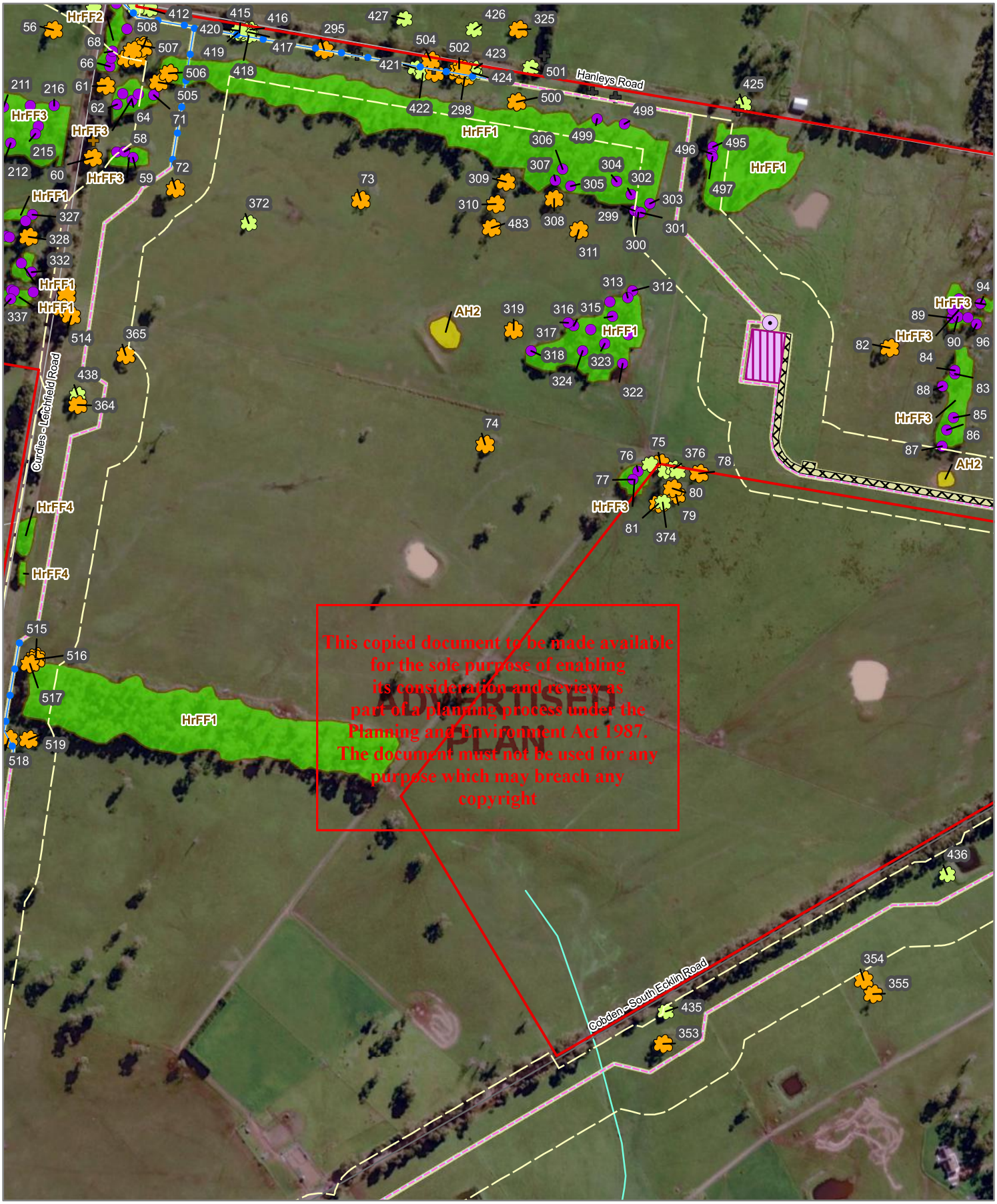

Figure 2d

Ecological features

Ecological Assessment, Mumblin Wind Farm, Ecklin South

ecology & heritage partners

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Turbines
- Directional borehole
- Underground cable
- Access Track
- Hardstands
- Cabling Trench
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Noxious weed
- Weed / Other points

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)
- Herb-rich Foothill Forest (EVC 23)

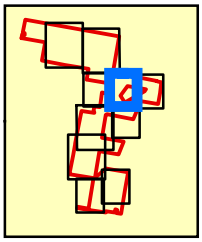

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Figure 2e

Ecological features

Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Directional borehole
- Underground cable
- Access Track
- Laydown Area
- MUM Site Office
- Watertanks
- Cabling Trench
- Swept path
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Noxious weed
- Tree impacted

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)
- Herb-rich Foothill Forest (EVC 23)
- Plains Grassy Wetland (EVC 125)
- Impacted vegetation

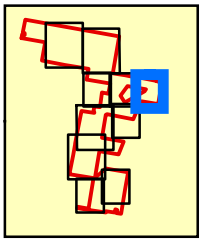

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Figure 2f
Ecological features
Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend
- Wind Farm Development Boundary
- Impact area
- Activity area
- Underground cable
- Cabling Trench
- Scattered Large Tree

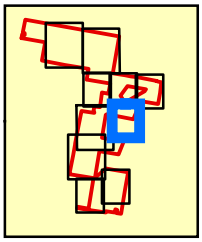

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Figure 2g
Ecological features
Ecological Assessment, Mumblin Wind Farm, Ecklin South

ecology & heritage partners

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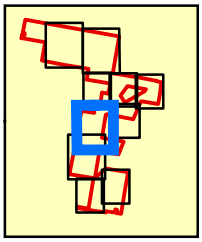
Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Turbines
- Directional borehole
- Overhead
- Underground cable
- Access Track
- Hardstands
- Cabling Trench
- Swept path
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Noxious weed
- Weed / Other points

Ecological Vegetation Classes

- Herb-rich Foothill Forest (EVC 23)
- Plains Grassy Wetland (EVC 125)



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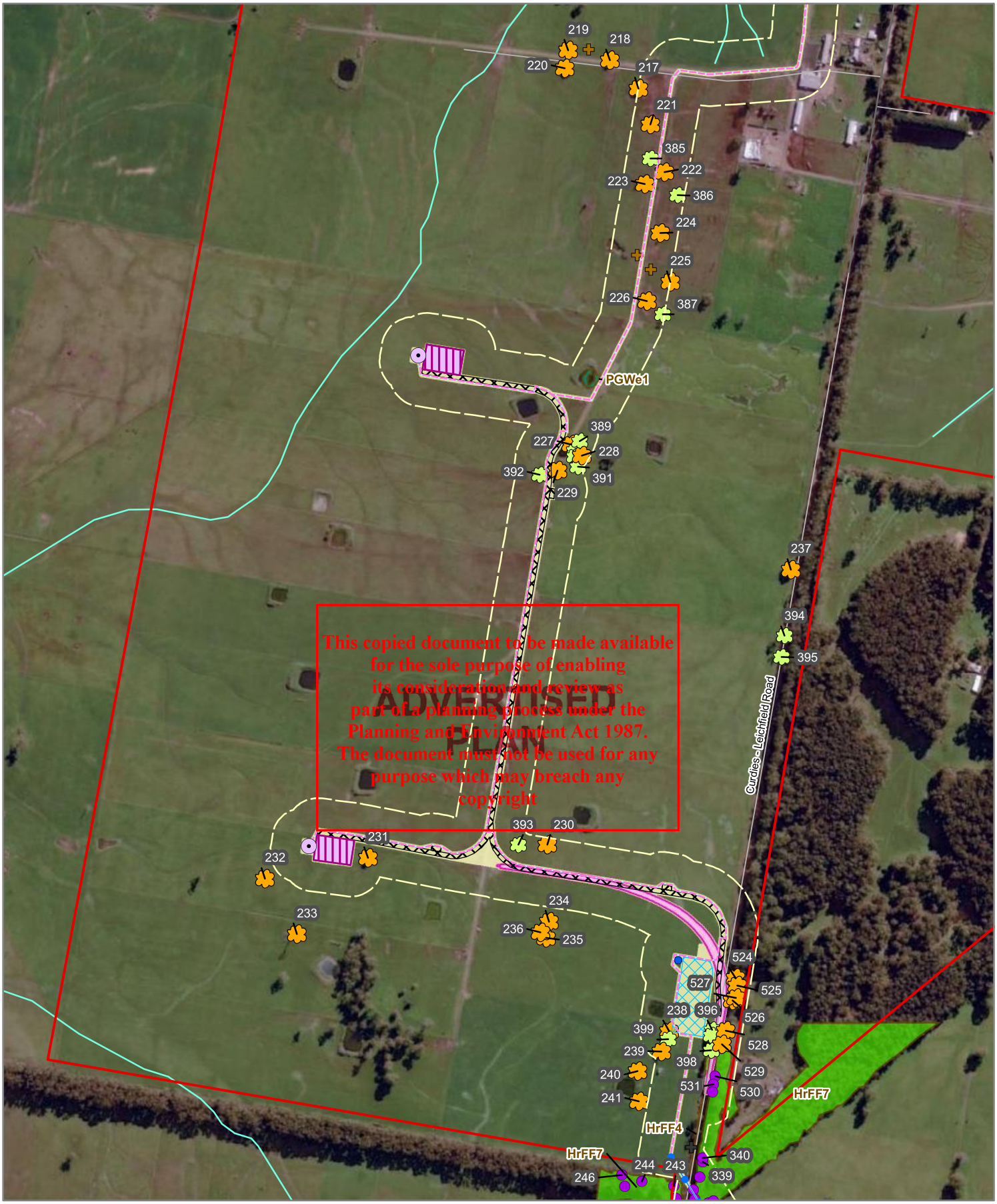

Figure 2h

Ecological features

Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Turbines
- Directional borehole
- Underground cable
- Access Track
- Hardstands
- Laydown Area
- Watertanks
- Cabling Trench
- Swept path
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Noxious weed
- Weed / Other points

Ecological Vegetation Classes

- Herb-rich Foothill Forest (EVC 23)
- Plains Grassy Wetland (EVC 125)

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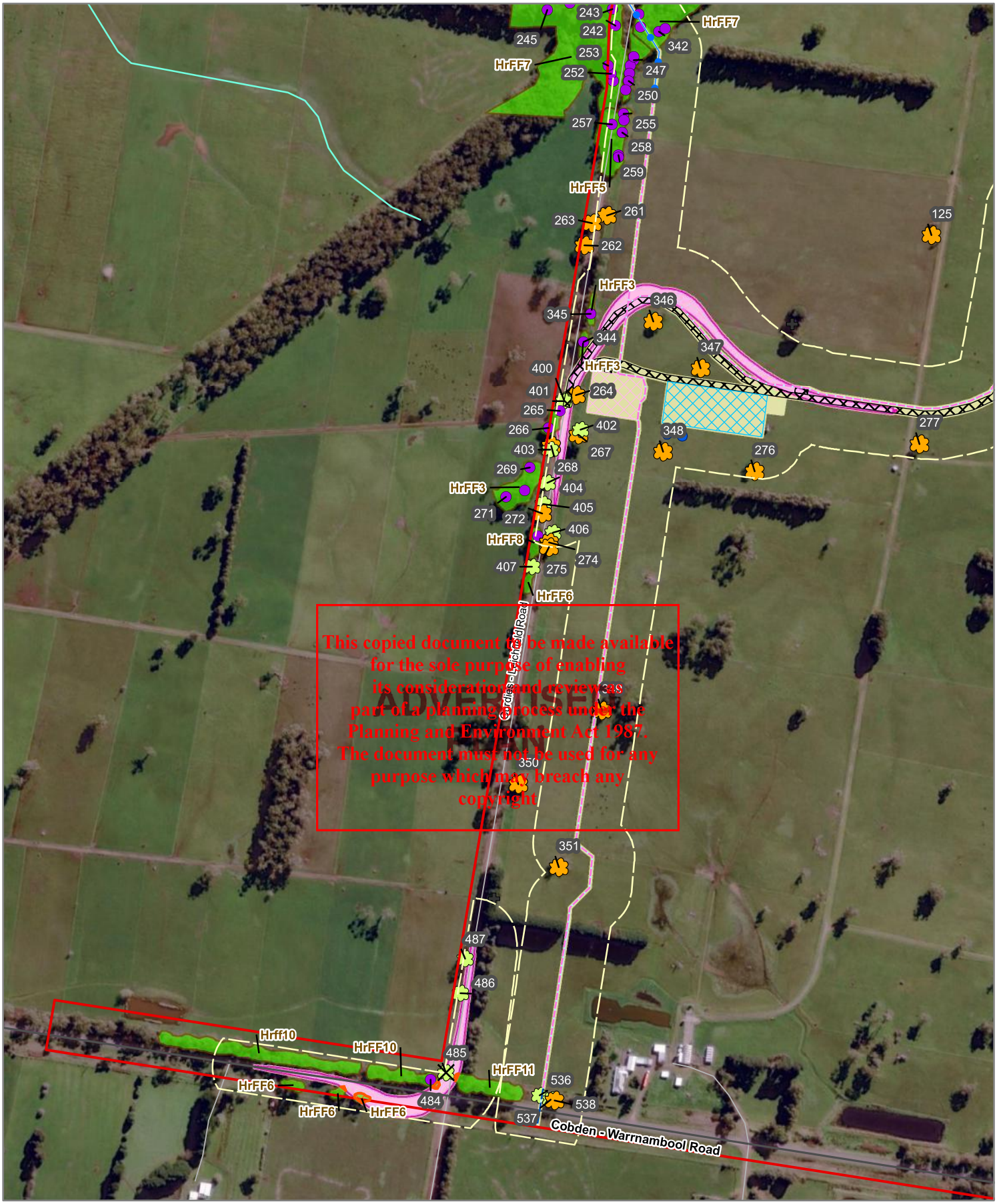


Figure 2i

Ecological features

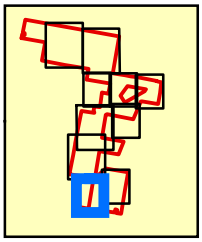
Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Directional borehole
- Overhead
- Underground cable
- Access Track
- Laydown Area
- Watertanks
- Cabling Trench
- Substation
- Swept path
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Weed / Other points
- Tree impacted

Ecological Vegetation Classes

- Herb-rich Foothill Forest (EVC 23)
- Impacted vegetation



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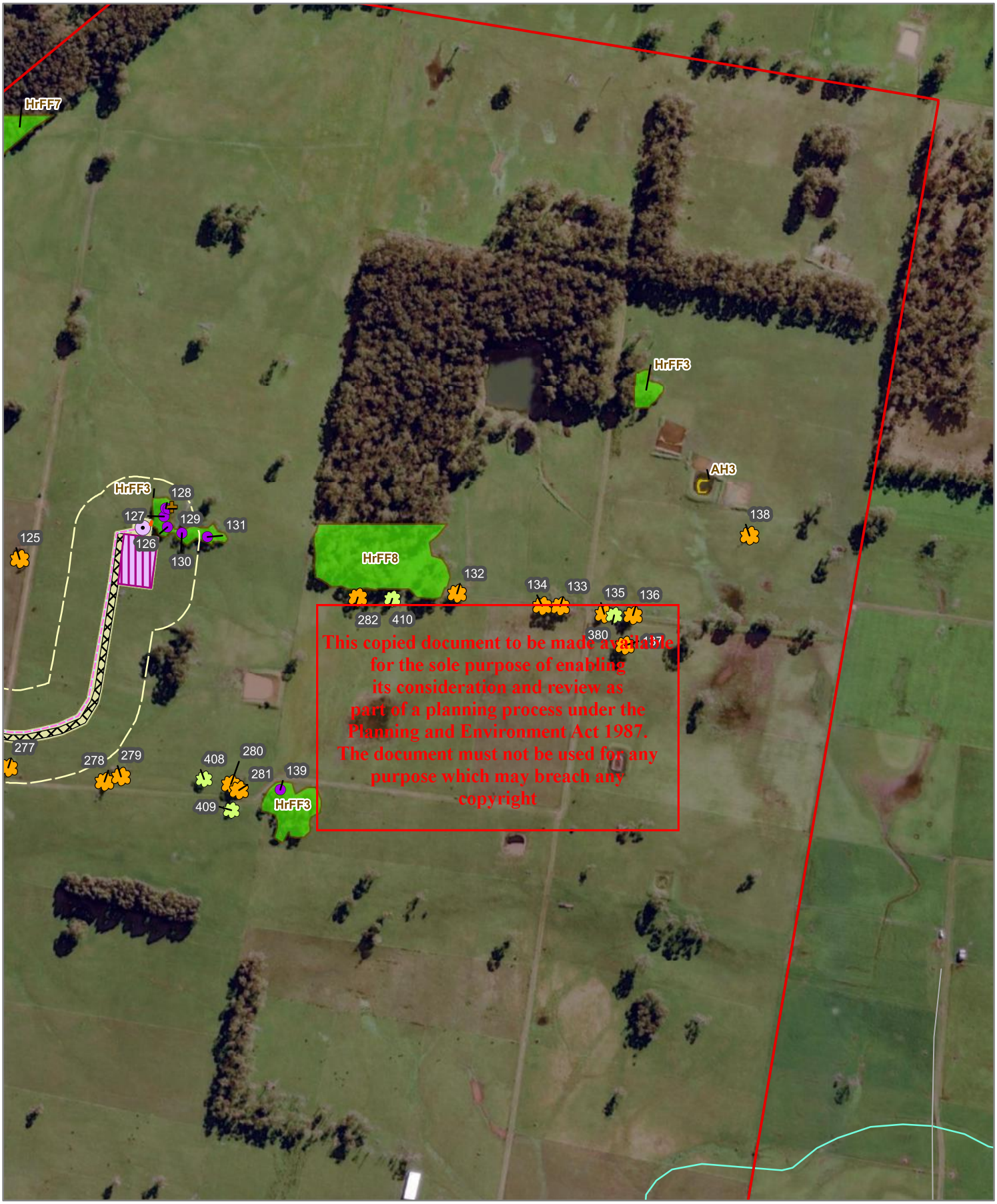


Figure 2j

Ecological features

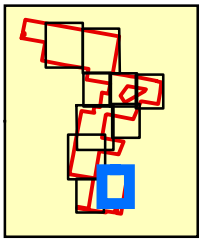
Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Impact area
- Activity area
- Turbines
- Underground cable
- Access Track
- Hardstands
- Cabling Trench
- Scattered Large Tree
- Scattered Small Tree
- Large Tree in patch
- Noxious weed

Ecological Vegetation Classes

- Aquatic Herbland (EVC 653)
- Herb-rich Foothill Forest (EVC 23)
- Impacted vegetation



N

0 30 60
Metres

ecology & heritage partners

14554_Fig02_EcolFeat_PMB 30/04/2025 melsley

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

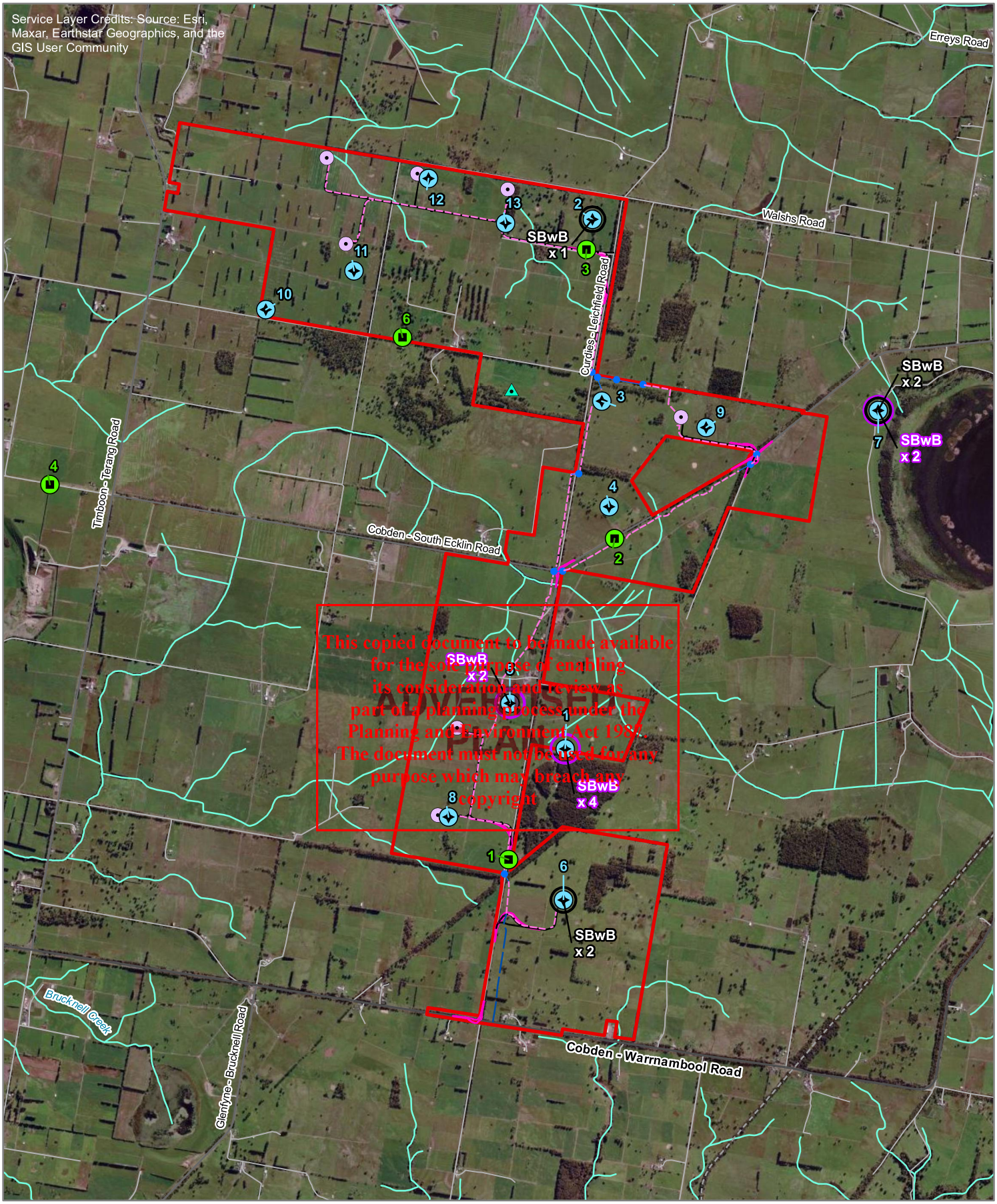


Figure 3

Fauna survey effort

Ecological Assessment, Mumblin Wind Farm, Ecklin South

Legend

- Wind Farm Development Boundary
- Turbines
- 140m Met Mast
- Swept path
- Access tracks
- Directional Boring
- Overhead
- Underground
- Bird survey location
- Songmeter location

Southern Bent-wing Bat generalised locations to within 1km:

- Oct/Nov 2021 survey
- Feb/Mar 2020 survey

N

0 475 950
Metres

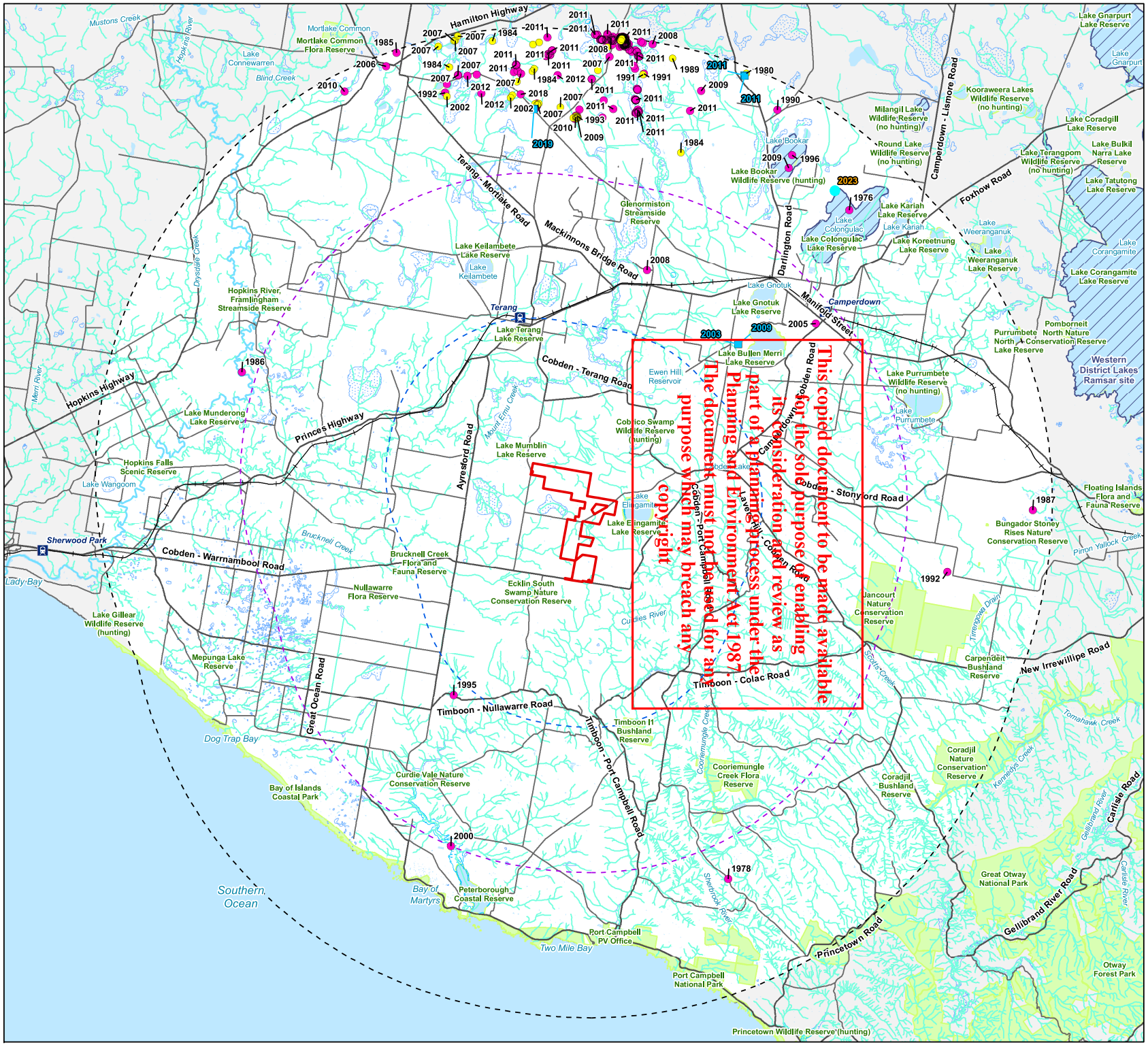


Figure 4

Previously documented Brolga records within 30km of the study area

Ecological Assessment, Mumblin Wind Farm, Ecklin South

ecology & heritage partners

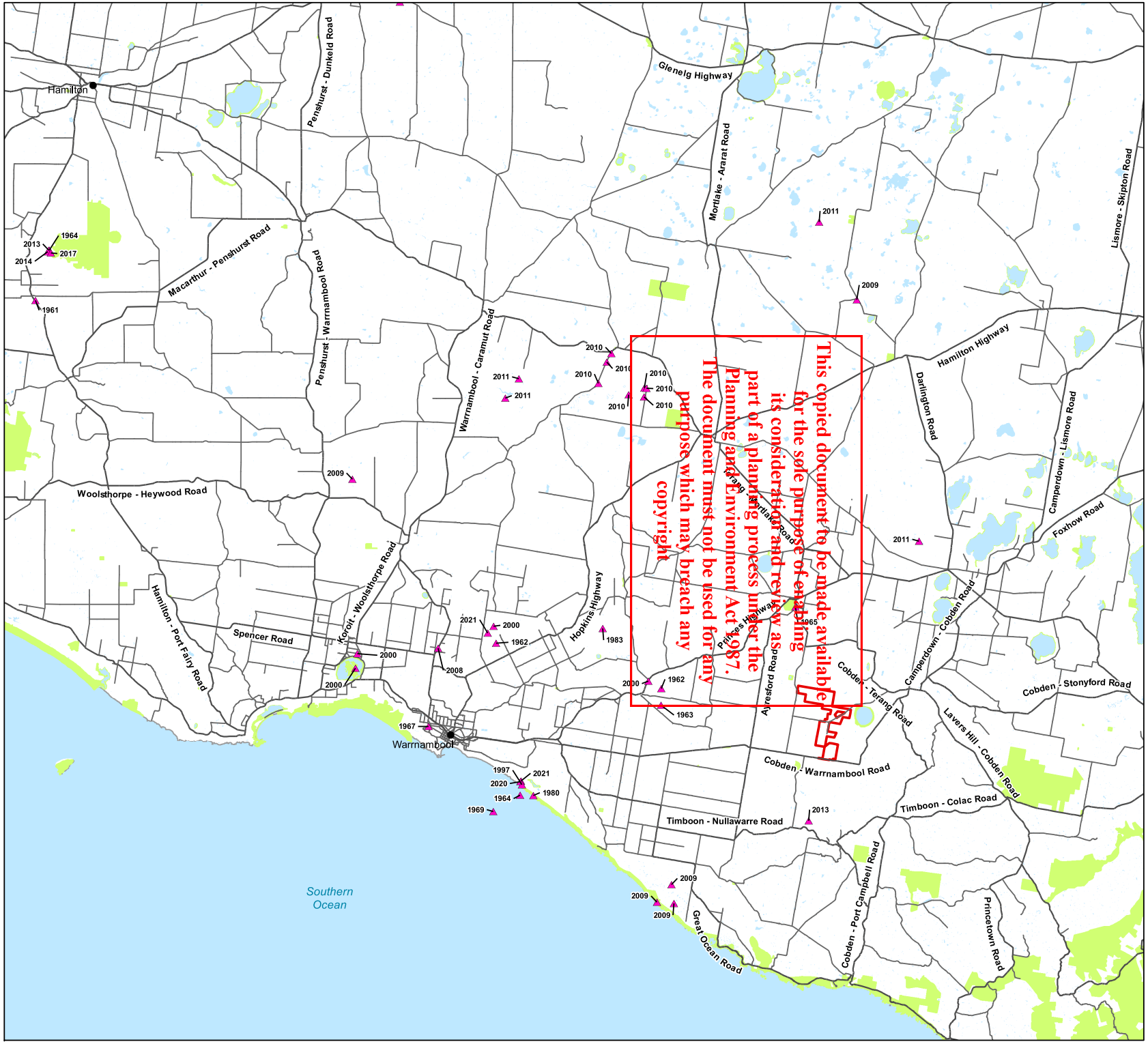


Figure 5

Previously documented Southern Bent-winged Bat recorded across Victoria

Ecological Assessment, Mumblin Wind Farm, Ecklin South

ecology & heritage partners

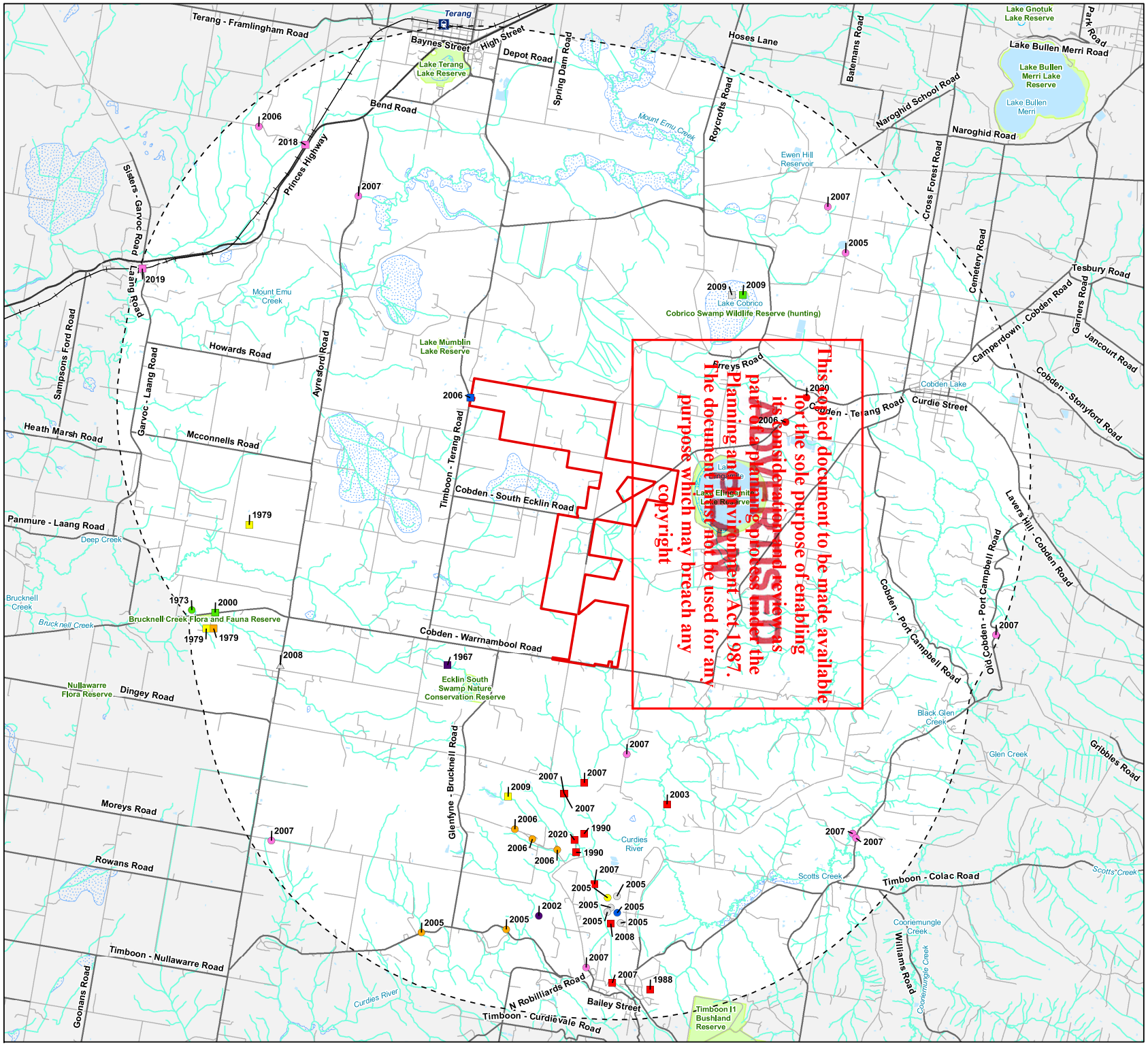
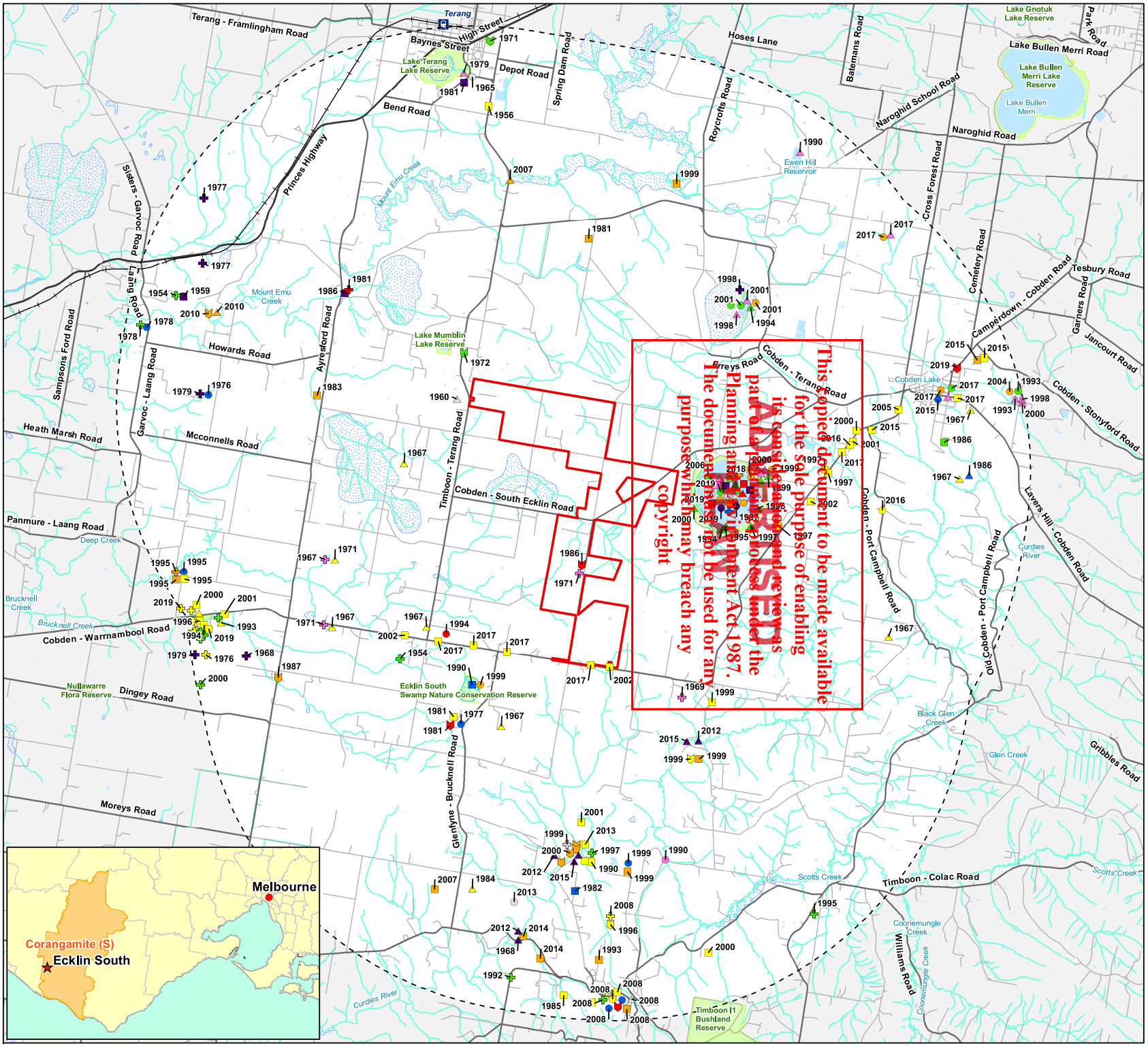


Figure 6

Previously documented significant flora within 10km of the study area

Ecological Assessment, Mumblin Wind Farm, Ecklin South



Legend

Wind Farm Development Boundary

Significant fauna

- Southern Bent-winged Bat
- Australasian Bittern
- Australasian Shoveler
- Black Falcon
- Blue-billed Duck
- Blue-winged Parrot
- Caddisfly
- Caspian Tern
- Common Greenshank
- Eastern Great Egret
- Gang-gang Cockatoo
- Grey Goshawk
- Grey-headed Flying-fox
- Growling Grass Frog
- Hooded Plover
- Latham's Snipe
- Little Eagle
- Little Egret
- Little Galaxias
- Long-nosed Potoroo
- Magpie Goose
- Masked Owl
- Musk Duck
- Narracan Corrugated Mussel
- Otway Bush Yabby
- Platypus
- Plumed Egret
- Powerful Owl
- Rufous Bristlebird (Otway)
- Sharp-tailed Sandpiper
- Southern Brown Bandicoot
- Southern Toadlet
- White-bellied Sea-Eagle
- White-throated Needletail
- Yarra Pygmy Perch
- Yellow-bellied Glider
- squeak beetle

Figure 7

Previously documented significant fauna within 10km of the study area

Ecological Assessment, Mumblin Wind Farm, Ecklin South

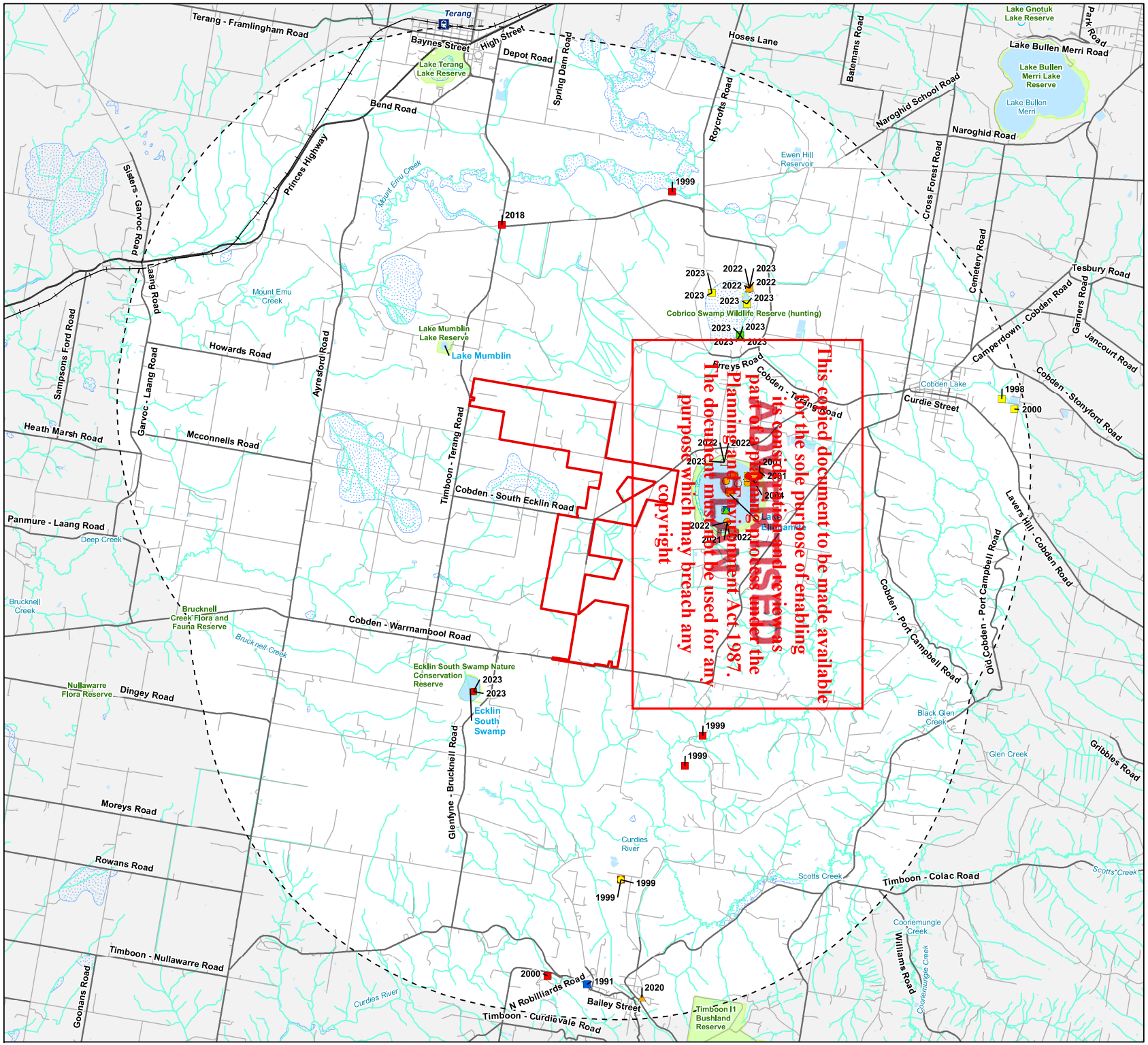
0 3 6

Kilometres

Map Scale: 1:103,000 @ A3

Coordinate System: GDA 1994 MGA Zone 54

ecology & heritage partners



Legend

Wind Farm Development Boundary

Significant and migratory birds (Birdlife Australia 2025)

- Australasian Bittern
- Australasian Shoveler
- Blue-billed Duck
- Blue-winged Parrot
- Caspian Tern
- Common Greenshank
- Curlew Sandpiper
- Freckled Duck
- Gang-gang Cockatoo
- Glossy Ibis
- Hardhead
- Latham's Snipe
- Little Eagle
- Little Egret
- Marsh Sandpiper
- Red-necked Stint
- Rufous Fantail
- Sharp-tailed Sandpiper
- White-bellied Sea-Eagle
- White-winged Black Tern
- Wood Sandpiper

Figure 8

Previously documented significant and migratory Birdlife records within 10km of the study area

Ecological Assessment, Mumblin Wind Farm, Ecklin South

N

0 3 6

Kilometres

Map Scale: 1:103,000 @ A3
Coordinate System: GDA 1994 MGA Zone 54

ecology & heritage partners

APPENDIX 1 FLORA

Appendix 1.1 - Flora Results

Legend:

CR/EN/VU Listed as Critically Endangered/Endangered/Vulnerable under the EPBC Act;
***** Listed as a noxious weed under the CaLP Act;
w Weed of National Significance;
****** Planted indigenous species in the study area;
+ Planted indigenous species that also occur in native vegetation in the study area;
# Planted Victorian and non-Victorian species.

Table A1.1. Flora within the study area.

Appendix 1.2 - Habitat Hectare Assessment

Table A1.2. Habitat Hectare Assessment Table.

Note: HrFF = Herb-rich Foothills Forest; PGWe = Plains Grassy Wetland; AH = Aquatic Herbland; Vu = Vulnerable; En = Endangered; VVP = Victorian Volcanic Plain.

Vegetation Zone		HrFF1	HrFF2	HrFF3	HrFF4	HrFF5	HrFF6	HrFF7	HrFF8	HrFF9	PGWe1	PGWe2	AH1	AH2
Bioregion		VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC		HrFF	HrFF	HrFF	HrFF	HrFF	HrFF	HrFF	HrFF	HrFF	PGWe	PGWe	AH	AH
EVC Number		23	23	23	23	23	23	23	23	23	125	125	653	653
EVC Conservation Status		Vu	Vu	Vu	Vu	Vu	Vu	Vu	Vu	Vu	En	En	En	En
Patch Condition	Large Trees /10	9	10	9	0	7	0	9	8	2	0	0	0	0
	Canopy Cover /5	5	5	4	0	4	4	5	4	2	0	0	0	0
	Under storey /25	5	15	0	10	10	5	15	5	10	10	20	20	10
	Lack of Weeds /15	2	6	0	0	0	4	0	0	4	4	9	13	13
	Recruitment /10	1	6	0	1	3	0	5	1	3	5	6	6	6
	Organic Matter /5	3	3	0	3	4	2	3	3	3	0	0	0	0
	Logs /5	2	3	0	0	2	0	4	2	5	0	0	0	0
	Treeless EVC Multiplier	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.36	1.36	1.36	1.36
	Subtotal =	27.00	48.00	13.00	14.00	30.00	15.00	41.00	23.00	29.00	25.84	47.60	53.04	39.44
Landscape Value /25		3	4	3	3	3	3	3	3	3	3	3	3	3
Habitat Points /100		30	52	16	17	33	18	44	26	32	29	51	56	42
Habitat Score		**0.30**	**0.52**	**0.16**	**0.17**	**0.33**	**0.18**	**0.44**	**0.26**	**0.32**	**0.29**	**0.51**	**0.56**	**0.42**

Appendix 1.3 - Scattered Trees and Large Trees in Patches

Table A1.3. Scattered Trees and Large Trees in Patches.

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
1	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	141	Large	Scattered		Retained
2	Swamp Gum	*Eucalyptus ovata*	144	Large	Scattered		Retained
3	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Patch		Retained
4	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	100	Large	Patch		Retained
5	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	76	Large	Patch		Retained
6	Swamp Gum	*Eucalyptus ovata*	88	Large	Patch		Retained
7	Swamp Gum	*Eucalyptus ovata*	76	Large	Patch		Retained
8	Messmate	*Eucalyptus obliqua*	103	Large	Patch		Retained
9	Stag		95	Large	Scattered		Retained
10	Messmate	*Eucalyptus obliqua*	99	Large	Scattered		Retained
11	Messmate	*Eucalyptus obliqua*	77	Large	Patch		Retained
12	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	90	Large	Scattered		Retained
13	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	102	Large	Scattered		Retained
14	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	126	Large	Scattered		Retained
15	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	143	Large	Scattered		Retained
16	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	146	Large	Scattered		Retained
17	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	98	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
18	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	98	Large	Patch		Retained
19	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	115	Large	Patch		Retained
20	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Patch		Retained
21	Swamp Gum	*Eucalyptus ovata*	98	Large	Patch		Retained
22	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	78	Large	Patch		Retained
23	Swamp Gum	*Eucalyptus ovata*	91	Large	Scattered		Retained
24	Swamp Gum	*Eucalyptus ovata*	103	Large	Scattered		Retained
25	Swamp Gum	*Eucalyptus ovata*	71	Large	Scattered		Retained
26	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Scattered		Retained
27	Swamp Gum	*Eucalyptus ovata*	76	Large	Scattered		Retained
28	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Patch		Retained
29	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Patch		Retained
30	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Patch		Retained
31	Swamp Gum	*Eucalyptus ovata*	131	Large	Scattered		Retained
32	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
33	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		**Removed**
34	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
35	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
36	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	90	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
37	Swamp Gum	*Eucalyptus ovata*	93	Large	Scattered		Retained
38	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
39	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
40	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
41	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	102	Large	Scattered		Retained
42	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
43	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
44	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
45	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
46	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
47	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
48	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
49	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
50	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
51	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
52	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
53	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Scattered		Retained
54	Brown Stringybark	*Eucalyptus baxteri*	71	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
55	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Scattered		Retained
56	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	77	Large	Scattered		Retained
57	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
58	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
59	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
60	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Scattered		Retained
61	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Scattered		Retained
62	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	95	Large	Patch		Retained
63	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	102	Large	Patch		Retained
64	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Patch		Retained
65	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	98	Large	Patch		Retained
66	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	97	Large	Patch		Retained
67	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	87	Large	Patch		Retained
68	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	89	Large	Patch		Retained
69	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	77	Large	Scattered		Retained
70	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	77	Large	Scattered		Retained
71	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	86	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
72	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	112	Large	Scattered		Retained
73	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	101	Large	Scattered	Hollow	Retained
74	Swamp Gum	*Eucalyptus ovata*	86	Large	Scattered		Retained
75	Swamp Gum	*Eucalyptus ovata*	124	Large	Scattered		Retained
76	Swamp Gum	*Eucalyptus ovata*	80	Large	Patch		Retained
77	Swamp Gum	*Eucalyptus ovata*	82	Large	Patch		Retained
78	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	81	Large	Scattered		Retained
79	Swamp Gum	*Eucalyptus ovata*	74	Large	Scattered		Retained
80	Swamp Gum	*Eucalyptus ovata*	70	Large	Scattered		Retained
81	Swamp Gum	*Eucalyptus ovata*	71	Large	Scattered		Retained
82	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	112	Large	Scattered	Hollow	Retained
83	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Patch		Retained
84	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
85	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
86	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
87	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
88	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
89	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
90	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
91	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
92	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
93	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
94	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
95	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
96	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
97	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
98	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	101	Large	Patch		Retained
99	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Patch		Retained
100	Stag		74	Large	Patch		Retained
101	Swamp Gum	*Eucalyptus ovata*	70	Large	Patch		Retained
102	Swamp Gum	*Eucalyptus ovata*	70	Large	Patch		Retained
103	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
104	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
105	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
106	Swamp Gum	*Eucalyptus ovata*	93	Large	Scattered		Retained
107	Swamp Gum	*Eucalyptus ovata*	91	Large	Scattered	Hollow	Retained
108	Stag		84	Large	Scattered	Hollow	Retained
109	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
110	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
111	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
112	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
113	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
114	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
115	Stag		< 70	Large	Patch		Retained
116	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
117	Swamp Gum	*Eucalyptus ovata*	86	Large	Scattered		Retained
118	Swamp Gum	*Eucalyptus ovata*	88	Large	Scattered		Retained
119	Swamp Gum	*Eucalyptus ovata*	71	Large	Scattered		Retained
120	Swamp Gum	*Eucalyptus ovata*	74	Large	Scattered		Retained
121	Swamp Gum	*Eucalyptus ovata*	88	Large	Scattered		Retained
122	Swamp Gum	*Eucalyptus ovata*	92	Large	Scattered	Hollow	Retained
123	Swamp Gum	*Eucalyptus ovata*	88	Large	Scattered	Hollow	Retained
124	Swamp Gum	*Eucalyptus ovata*	70	Large	Patch		Retained
125	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Scattered		Retained
126	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Patch		Retained
127	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	92	Large	Patch		Retained
128	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	104	Large	Patch		Retained
129	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	77	Large	Patch		Retained
130	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	72	Large	Patch		Retained
131	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	76	Large	Patch		Retained
132	Swamp Gum	*Eucalyptus ovata*	98	Large	Scattered		Retained
133	Swamp Gum	*Eucalyptus ovata*	101	Large	Scattered		Retained
134	Swamp Gum	*Eucalyptus ovata*	95	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
135	Swamp Gum	*Eucalyptus ovata*	86	Large	Scattered		Retained
136	Swamp Gum	*Eucalyptus ovata*	77	Large	Scattered		Retained
137	Swamp Gum	*Eucalyptus ovata*	87	Large	Scattered		Retained
138	Swamp Gum	*Eucalyptus ovata*	88	Large	Scattered	Hollow	Retained
139	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
140	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	95	Large	Scattered		Retained
141	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	93	Large	Scattered		Retained
142	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	108	Large	Scattered		Retained
143	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	101	Large	Scattered		Retained
144	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	95	Large	Scattered		Retained
145	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Scattered		Retained
146	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	112	Large	Scattered		Retained
147	Swamp Gum	*Eucalyptus ovata*	88	Large	Scattered		Retained
148	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	81	Large	Patch		Retained
149	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
150	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	96	Large	Scattered		Retained
151	Stag		88	Large	Scattered		Retained
152	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	79	Large	Patch		Retained
153	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	87	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
154	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	104	Large	Scattered		Retained
155	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	90	Large	Scattered		Retained
156	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	93	Large	Scattered		Retained
157	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	77	Large	Patch		Retained
158	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Patch	Nest	Retained
159	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	78	Large	Scattered		Retained
160	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
161	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	77	Large	Scattered		Retained
162	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Scattered		Retained
163	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
164	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
165	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
166	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	77	Large	Scattered		Retained
167	Swamp Gum	*Eucalyptus ovata*	111	Large	Scattered		Retained
168	Swamp Gum	*Eucalyptus ovata*	120	Large	Scattered		Retained
169	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	106	Large	Scattered		Retained
170	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	132	Large	Scattered		Retained
171	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	135	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
172	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	127	Large	Scattered		Retained
173	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	92	Large	Scattered		Retained
174	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
175	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	81	Large	Patch		Retained
176	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	94	Large	Scattered		Retained
177	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	95	Large	Scattered		Retained
178	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	100	Large	Scattered		Retained
179	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	85	Large	Patch		Retained
180	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Patch		Retained
181	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	111	Large	Patch		Retained
182	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	99	Large	Patch		Retained
183	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	106	Large	Scattered		Retained
184	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	124	Large	Scattered		Retained
185	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	124	Large	Patch		Retained
186	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	110	Large	Patch		Retained
187	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	136	Large	Patch		Retained
188	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	73	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
189	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	87	Large	Patch		Retained
190	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	73	Large	Scattered		Retained
191	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	58	Large	Scattered		Retained
192	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	76	Large	Scattered		Retained
193	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	94	Large	Scattered		Retained
194	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	109	Large	Scattered		Retained
195	Swamp Gum	*Eucalyptus ovata*	77	Large	Scattered		Retained
196	Swamp Gum	*Eucalyptus ovata*	95	Large	Scattered		Retained
197	Swamp Gum	*Eucalyptus ovata*	113	Large	Scattered		Retained
198	Swamp Gum	*Eucalyptus ovata*	103	Large	Scattered		Retained
199	Swamp Gum	*Eucalyptus ovata*	90	Large	Scattered		Retained
200	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	86	Large	Patch		Retained
201	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	80	Large	Patch		Retained
202	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	73	Large	Patch		Retained
203	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	75	Large	Patch		Retained
204	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	75	Large	Patch		Retained
205	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	102	Large	Scattered		Retained
206	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	91	Large	Patch		Retained
207	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
208	Swamp Gum	*Eucalyptus ovata*	84	Large	Scattered		Retained
209	Swamp Gum	*Eucalyptus ovata*	79	Large	Patch		Retained
210	Swamp Gum	*Eucalyptus ovata*	79	Large	Patch		Retained
211	Swamp Gum	*Eucalyptus ovata*	71	Large	Patch		Retained
212	Swamp Gum	*Eucalyptus ovata*	75	Large	Patch		Retained
213	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	81	Large	Patch		Retained
214	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Patch		Retained
215	Stag		98	Large	Patch		Retained
216	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Patch		Retained
217	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	111	Large	Scattered	Hollow	Retained
218	Swamp Gum	*Eucalyptus ovata*	107	Large	Scattered	Hollow	Retained
219	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	99	Large	Scattered	Hollow	Retained
220	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	95	Large	Scattered	Hollow	Retained
221	Stag		71	Large	Scattered		Retained
222	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	113	Large	Scattered		Retained
223	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	94	Large	Scattered	Hollow	Retained
224	Swamp Gum	*Eucalyptus ovata*	91	Large	Scattered	Hollow	Retained
225	Stag		78	Large	Scattered	Hollow	Retained
226	Stag		99	Large	Scattered	Hollow	Retained
227	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	89	Large	Scattered		Retained
228	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered	Hollow	Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
229	Swamp Gum	*Eucalyptus ovata*	97	Large	Scattered		Retained
230	Stag		76	Large	Scattered	Hollow	Retained
231	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Scattered		Retained
232	Swamp Gum	*Eucalyptus ovata*	85	Large	Scattered	Hollow	Retained
233	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	105	Large	Scattered	Hollow	Retained
234	Stag		97	Large	Scattered	Hollow	Retained
235	Stag		88	Large	Scattered	Hollow	Retained
236	Stag		90	Large	Scattered		Retained
237	Swamp Gum	*Eucalyptus ovata*	102	Large	Scattered		Retained
238	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Scattered		Retained
239	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	71	Large	Scattered		Retained
240	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered	Hollow	Retained
241	Stag		76	Large	Scattered	Hollow	Retained
242	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	73	Large	Patch		Retained
243	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	86	Large	Patch		Retained
244	Brown Stringybark	*Eucalyptus baxteri*	72	Large	Patch		Retained
245	Brown Stringybark	*Eucalyptus baxteri*	74	Large	Patch		Retained
246	Brown Stringybark	*Eucalyptus baxteri*	71	Large	Patch		Retained
247	Swamp Gum	*Eucalyptus ovata*	81	Large	Patch		Retained
248	Swamp Gum	*Eucalyptus ovata*	71	Large	Patch		Retained
249	Swamp Gum	*Eucalyptus ovata*	74	Large	Patch		Retained
250	Swamp Gum	*Eucalyptus ovata*	84	Large	Patch		Retained
251	Swamp Gum	*Eucalyptus ovata*	80	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
252	Swamp Gum	*Eucalyptus ovata*	80	Large	Patch		Retained
253	Swamp Gum	*Eucalyptus ovata*	75	Large	Patch		Retained
254	Swamp Gum	*Eucalyptus ovata*	82	Large	Patch		Retained
255	Swamp Gum	*Eucalyptus ovata*	77	Large	Patch		Retained
256	Swamp Gum	*Eucalyptus ovata*	79	Large	Patch		Retained
257	Swamp Gum	*Eucalyptus ovata*	89	Large	Patch		Retained
258	Swamp Gum	*Eucalyptus ovata*	72	Large	Patch		Retained
259	Brown Stringybark	*Eucalyptus baxteri*	88	Large	Patch		Retained
260	Swamp Gum	*Eucalyptus ovata*	93	Large	Patch		Retained
261	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	106	Large	Scattered		Retained
262	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	99	Large	Scattered		Retained
263	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
264	Swamp Gum	*Eucalyptus ovata*	75	Large	Scattered		Retained
265	Swamp Gum	*Eucalyptus ovata*	74	Large	Patch		Retained
266	Swamp Gum	*Eucalyptus ovata*	76	Large	Patch	Hollow	Retained
267	Swamp Gum	*Eucalyptus ovata*	77	Large	Scattered		Retained
268	Swamp Gum	*Eucalyptus ovata*	82	Large	Scattered		Retained
269	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	103	Large	Patch	Hollow	Retained
270	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	103	Large	Patch	Hollow	Retained
271	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	106	Large	Patch	Hollow	Retained
272	Swamp Gum	*Eucalyptus ovata*	78	Large	Scattered		Retained
273	Brown Stringybark	*Eucalyptus baxteri*	108	Large	Patch		Retained
274	Brown Stringybark	*Eucalyptus baxteri*	74	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
275	Brown Stringybark	*Eucalyptus baxteri*	94	Large	Scattered		Retained
276	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Scattered		Retained
277	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	83	Large	Scattered	Hollow	Retained
278	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered	Hollow	Retained
279	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	81	Large	Scattered	Hollow	Retained
280	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	80	Large	Scattered	Hollow	Retained
281	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	81	Large	Scattered	Hollow	Retained
282	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	86	Large	Scattered		Retained
283	Stag		80	Large	Scattered		**Removed**
284	Swamp Gum	*Eucalyptus ovata*	84	Large	Scattered		Retained
285	Swamp Gum	*Eucalyptus ovata*	81	Large	Patch		Retained
286	Swamp Gum	*Eucalyptus ovata*	75	Large	Patch		Retained
287	Swamp Gum	*Eucalyptus ovata*	78	Large	Patch		Retained
288	Swamp Gum	*Eucalyptus ovata*	95	Large	Patch		**Removed**
289	Swamp Gum	*Eucalyptus ovata*	89	Large	Patch		**Removed**
290	Swamp Gum	*Eucalyptus ovata*	93	Large	Patch		Retained
291	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
292	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
293	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Patch		Retained
294	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	86	Large	Scattered		Retained
295	Swamp Gum	*Eucalyptus ovata*	70	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
296	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	98	Large	Scattered		Retained
297	Swamp Gum	*Eucalyptus ovata*	70	Large	Scattered		Retained
298	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	73	Large	Scattered		Retained
299	Bundy	*Eucalyptus goniocalyx*	90	Large	Patch		Retained
300	Bundy	*Eucalyptus goniocalyx*	88	Large	Patch		Retained
301	Bundy	*Eucalyptus goniocalyx*	85	Large	Patch		Retained
302	Bundy	*Eucalyptus goniocalyx*	78	Large	Patch		Retained
303	Bundy	*Eucalyptus goniocalyx*	78	Large	Patch		Retained
304	Bundy	*Eucalyptus goniocalyx*	88	Large	Patch		Retained
305	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	101	Large	Patch		Retained
306	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Patch		Retained
307	Bundy	*Eucalyptus goniocalyx*	77	Large	Patch		Retained
308	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	96	Large	Scattered		Retained
309	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	94	Large	Scattered		Retained
310	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	79	Large	Scattered		Retained
311	Stag		98	Large	Scattered		Retained
312	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
313	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
314	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
315	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
316	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
317	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
318	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
319	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	80	Large	Scattered		Retained
320	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
321	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
322	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
323	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
324	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
325	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	90	Large	Scattered		Retained
326	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
327	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
328	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	111	Large	Scattered		Retained
329	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	81	Large	Patch		Retained
330	Swamp Gum	*Eucalyptus ovata*	80	Large	Patch		Retained
331	Swamp Gum	*Eucalyptus ovata*	73	Large	Patch		Retained
332	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
333	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
334	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
335	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
336	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
337	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Patch		Retained
338	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	118	Large	Scattered		Retained
339	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	75	Large	Patch		Retained
340	Brown Stringybark	*Eucalyptus baxteri*	71	Large	Patch		Retained
341	Brown Stringybark	*Eucalyptus baxteri*	85	Large	Patch		Retained
342	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Patch		Retained
343	Swamp Gum	*Eucalyptus ovata*	77	Large	Patch		Retained
344	Swamp Gum	*Eucalyptus ovata*	79	Large	Patch		Retained
345	Swamp Gum	*Eucalyptus ovata*	75	Large	Patch		Retained
346	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	129	Large	Scattered		Retained
347	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	78	Large	Scattered		Retained
348	Stag		98	Large	Scattered	Hollow	Retained
349	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	86	Large	Scattered		Retained
350	Swamp Gum	*Eucalyptus ovata*	92	Large	Scattered		Retained
351	Swamp Gum	*Eucalyptus ovata*	89	Large	Scattered		Retained
352	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Scattered		Retained
353	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
354	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	80	Large	Scattered		Retained
355	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Scattered		Retained
356	Swamp Gum	*Eucalyptus ovata*	98	Large	Patch		Retained
357	Swamp Gum	*Eucalyptus ovata*	88	Large	Scattered		Retained
358	Swamp Gum	*Eucalyptus ovata*	84	Large	Scattered		Retained
359	Swamp Gum	*Eucalyptus ovata*	88	Large	Patch		Retained
360	Stag		74	Large	Scattered		Retained
361	Stag		80	Large	Scattered		Retained
362	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	101	Large	Scattered		**Removed**
363	Swamp Gum	*Eucalyptus ovata*	74	Large	Scattered		Retained
364	Swamp Gum	*Eucalyptus ovata*	88	Large	Scattered		Retained
365	Swamp Gum	*Eucalyptus ovata*	71	Large	Scattered		Retained
366	Swamp Gum	*Eucalyptus ovata*	66	Small	Scattered		Retained
367	Swamp Gum	*Eucalyptus ovata*	24	Small	Scattered		Retained
368	Swamp Gum	*Eucalyptus ovata*	58	Small	Scattered		Retained
369	Swamp Gum	*Eucalyptus ovata*	35	Small	Scattered		Retained
370	Brown Stringybark	*Eucalyptus baxteri*	67	Small	Scattered		Retained
371	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	29	Small	Scattered		Retained
372	Swamp Gum	*Eucalyptus ovata*	63	Small	Scattered		Retained
373	Stag		40	Small	Scattered		Retained
374	Swamp Gum	*Eucalyptus ovata*	32	Small	Scattered		Retained
375	Stag		43	Small	Scattered		Retained
376	Stag		34	Small	Scattered		Retained
377	Stag		42	Small	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
378	Swamp Gum	*Eucalyptus ovata*	51	Small	Scattered		Retained
379	Swamp Gum	*Eucalyptus ovata*	68	Small	Scattered	Nest	Retained
380	Swamp Gum	*Eucalyptus ovata*	48	Small	Scattered		Retained
381	Stag		28	Small	Scattered		Retained
382	Stag		41	Small	Scattered		Retained
383	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	66	Small	Scattered		Retained
384	Stag		41	Small	Scattered	Hollow	Retained
385	Stag		66	Small	Scattered	Hollow	Retained
386	Stag		58	Small	Scattered	Hollow	Retained
387	Swamp Gum	*Eucalyptus ovata*	61	Small	Scattered	Hollow	Retained
388	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	66	Small	Scattered	Hollow	Retained
389	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	33	Small	Scattered	Hollow	Retained
390	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	66	Small	Scattered	Hollow	Retained
391	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	51	Small	Scattered		Retained
392	Stag		44	Small	Scattered		Retained
393	Stag		67	Small	Scattered	Hollow	Retained
394	Swamp Gum	*Eucalyptus ovata*	46	Small	Scattered		Retained
395	Swamp Gum	*Eucalyptus ovata*	49	Small	Scattered		Retained
396	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	48	Small	Scattered		Retained
397	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	53	Small	Scattered		Retained
398	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	13	Small	Scattered		Retained
399	Stag		65	Small	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
400	Swamp Gum	*Eucalyptus ovata*	46	Small	Scattered		Retained
401	Swamp Gum	*Eucalyptus ovata*	43	Small	Scattered		Retained
402	Swamp Gum	*Eucalyptus ovata*	43	Small	Scattered		Retained
403	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	34	Small	Scattered		Retained
404	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	16	Small	Scattered		Retained
405	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	41	Small	Scattered		Retained
406	Stag		46	Small	Scattered		Retained
407	Brown Stringybark	*Eucalyptus baxteri*	46	Small	Scattered		Retained
408	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	64	Small	Scattered	Hollow	Retained
409	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	15	Small	Scattered		Retained
410	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	16	Small	Scattered		Retained
411	Stag		44	Small	Scattered		**Removed**
412	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	22	Small	Scattered		Retained
413	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	56	Small	Scattered		Retained
414	Stag		44	Small	Scattered		Retained
415	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	24	Small	Scattered		Retained
416	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	38	Small	Scattered		Retained
417	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	9	Small	Scattered		Retained
418	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	19	Small	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
419	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	25	Small	Scattered		Retained
420	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	28	Small	Scattered		Retained
421	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	8	Small	Scattered		Retained
422	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	20	Small	Scattered		Retained
423	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	18	Small	Scattered		Retained
424	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	14	Small	Scattered		Retained
425	Brown Stringybark	*Eucalyptus baxteri*	40	Small	Scattered		Retained
426	Stag		44	Small	Scattered		Retained
427	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	66	Small	Scattered		Retained
428	Swamp Gum	*Eucalyptus ovata*	9	Small	Scattered		Retained
429	Swamp Gum	*Eucalyptus ovata*	24	Small	Scattered		Retained
430	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	18	Small	Scattered		Retained
431	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	9	Small	Scattered		Retained
432	Brown Stringybark	*Eucalyptus baxteri*	21	Small	Scattered		Retained
433	Brown Stringybark	*Eucalyptus baxteri*	57	Small	Scattered		Retained
434	Swamp Gum	*Eucalyptus ovata*	32	Small	Scattered		Retained
435	Swamp Gum	*Eucalyptus ovata*	67	Small	Scattered		Retained
436	Swamp Gum	*Eucalyptus ovata*	55	Small	Scattered		Retained
437	Stag		47	Small	Scattered		Retained
438	Swamp Gum	*Eucalyptus ovata*	68	Small	Scattered		Retained
483	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
484	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	78	Large	Patch		Retained
485	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	31	Small	Scattered		Retained
486	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	25	Small	Scattered		Retained
487	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	28	Small	Scattered		Retained
488	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	88	Large	Patch		Retained
489	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Patch		Retained
490	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	86	Large	Patch		Retained
491	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	78	Large	Patch		Retained
492	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	119	Large	Patch		Retained
493	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	80	Large	Patch		Retained
494	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	72	Large	Patch		Retained
495	Messmate	*Eucalyptus obliqua*	76	Large	Patch		Retained
496	Messmate	*Eucalyptus obliqua*	74	Large	Patch		Retained
497	Messmate	*Eucalyptus obliqua*	76	Large	Patch		Retained
498	Messmate	*Eucalyptus obliqua*	77	Large	Patch		Retained
499	Messmate	*Eucalyptus obliqua*	78	Large	Patch		Retained
500	Messmate	*Eucalyptus obliqua*	85	Large	Scattered		Retained
501	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	68	Small	Scattered		Retained
502	Swamp Gum	*Eucalyptus ovata*	< 70	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
503	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Scattered		Retained
504	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	< 70	Large	Scattered		Retained
505	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	89	Large	Scattered		Retained
506	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	84	Large	Scattered		Retained
507	Swamp Gum	*Eucalyptus ovata*	76	Large	Scattered		Retained
508	Swamp Gum	*Eucalyptus ovata*	80	Large	Scattered		Retained
509	Swamp Gum	*Eucalyptus ovata*	85	Large	Scattered		Retained
510	Swamp Gum	*Eucalyptus ovata*	80	Large	Patch		Retained
511	Swamp Gum	*Eucalyptus ovata*	85	Large	Scattered		Retained
512	Swamp Gum	*Eucalyptus ovata*	77	Large	Scattered		Retained
513	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	80	Large	Scattered		Retained
514	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	79	Large	Scattered		Retained
515	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	70	Large	Patch		Retained
516	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	72	Large	Patch		Retained
517	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	79	Large	Patch		Retained
518	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	75	Large	Scattered		Retained
519	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	79	Large	Scattered		Retained
520	Messmate	*Eucalyptus obliqua*	75	Large	Patch		Retained
521	Messmate	*Eucalyptus obliqua*	72	Large	Patch		Retained
522	Swamp Gum	*Eucalyptus ovata*	84	Large	Scattered		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
523	Swamp Gum	*Eucalyptus ovata*	82	Large	Scattered		Retained
524	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	83	Large	Scattered		Retained
525	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
526	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
527	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	75	Large	Scattered		Retained
528	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	76	Large	Scattered		Retained
529	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	74	Large	Scattered		Retained
530	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	76	Large	Patch		Retained
531	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	76	Large	Patch		Retained
532	Manna Gum	*Eucalyptus viminalis* subsp. *viminalis*	76	Large	Patch		Retained
533	Messmate	*Eucalyptus obliqua*	72	Large	Patch		Retained
534	Messmate	*Eucalyptus obliqua*	74	Large	Patch		Retained
535	Messmate	*Eucalyptus obliqua*	74	Large	Patch		Retained
536	Swamp Gum	*Eucalyptus ovata*	9	Small	Scattered		Retained
537	Swamp Gum	*Eucalyptus ovata*	54	Small	Scattered		Retained
538	Swamp Gum	*Eucalyptus ovata*	72	Large	Scattered		Retained
539	Swamp Gum	*Eucalyptus ovata*	84	Large	Patch	Nest	Retained
540	Swamp Gum	*Eucalyptus ovata*	72	Large	Patch		Retained
541	Swamp Gum	*Eucalyptus ovata*	80	Large	Patch		Retained
542	Swamp Gum	*Eucalyptus ovata*	92	Large	Patch		Retained
543	Swamp Gum	*Eucalyptus ovata*	71	Large	Patch		Retained

Tree ID (Figure 2)	Common Name	*Species Name*	DBH (cm)	Size Class	Tree Type	Notes	Status
544	Messmate	*Eucalyptus obliqua*	77	Large	Patch		Retained
545	Swamp Gum	*Eucalyptus ovata*	72	Large	Patch		Retained
546	Swamp Gum	*Eucalyptus ovata*	74	Large	Patch		Retained
547	Swamp Gum	*Eucalyptus ovata*	70	Large	Patch		Retained
548	Swamp Gum	*Eucalyptus ovata*	90	Large	Patch		Retained
549	Swamp Gum	*Eucalyptus ovata*	71	Large	Patch		Retained

Appendix 1.4 - Significant Flora Species

Significant flora within 10 kilometres of the study area is provided in the Table A1.4.3 at the end of this section, with Tables A1.4.1 and A1.4.2 below providing the background context for the values in Table 1.4.3.

Table A1.4.1 Conservation status of each species for each Act/policy. The values in this table correspond to Columns 5 to 7 in Table A1.4.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):		FFG (*Flora and Fauna Guarantee Act 1988*):	
EX	Extinct	e	Endangered in Victoria
CR	Critically endangered	v	Vulnerable in Victoria
EN	Endangered	r	Rare in Victoria
VU	Vulnerable		
#	Listed on the Protected Matters Search Tool		

Table A1.4.2 Likelihood of occurrence rankings: Habitat characteristics assessment of significant flora species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 8 in Table A1.4.3.

1	**Known Occurrence**	• Recorded within the study area recently (i.e. within ten years).
2	**High Likelihood**	• Previous records of the species in the local vicinity; and/or, • The study area contains areas of high-quality habitat.
3	**Moderate Likelihood**	• Limited previous records of the species in the local vicinity; and/or, • The study area contains poor or limited habitat.
4	**Low Likelihood**	• Poor or limited habitat for the species, however other evidence (such as lack of records or environmental factors) indicates there is a very low likelihood of presence.
5	**Unlikely**	• No suitable habitat and/or outside the species range.

Table A1.4.3 Significant flora recorded within 10 kilometres of the study area.

Scientific Name	Common Name	Last Documented Record (VBA)	Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the assessment area	Rationale for likelihood of occurrence
NATIONAL SIGNIFICANCE							
Amphibromus fluitans #	River Swamp Wallaby-grass	-	-	VU	-	4	No suitable habitat
Dianella amoena #	Matted Flax-lily	-	-	EN	CR	4	No suitable habitat
Glycine latrobeana #	Clover Glycine	-	-	VU	VU	5	No suitable habitat
Haloragis exalata var. exalata	Square Raspwort	1900	2	VU	-	4	No suitable habitat
Lachnagrostis adamsonii #	Adamson's Blown-grass	-	-	EN	-	4	No suitable habitat
Lepidium aschersonii #	Spiny Peppercress	-	-	VU	EN	5	No suitable habitat

Scientific Name	Common Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the assessment area	Rationale for likelihood of occurrence
Lepidium hyssopifolium #	Basalt Pepper-cress	-	-	EN	-	5	No suitable habitat
Poa sallacustris #	Salt-lake Tussock-grass	-	-	VU	-	5	No suitable habitat
Prasophyllum spicatum #	Dense Leek-orchid	-	-	VU	CR	4	No suitable habitat
Prasophyllum suaveolens #	Fragrant Leek-orchid	-	-	EN	CR	4	No suitable habitat
Pterostylis chlorogramma #	Green-striped Greenhood	-	-	VU	EN	4	No suitable habitat
Pterostylis cucullata #	Leafy Greenhood	-	-	VU	-	4	No suitable habitat
Pterostylis tenuissima	Swamp Greenhood	2009	7	VU	-	4	No suitable habitat
Rutidosis leptorhynchoides #	Button Wrinklewort	-	-	EN	EN	4	No suitable habitat
Senecio macrocarpus #	Large-fruit Fireweed	-	-	VU	-	4	No suitable habitat
Senecio psilocarpus #	Swamp Fireweed	-	-	VU	-	4	No suitable habitat
Thelymitra epipactoides #	Metallic Sun-orchid	-	-	EN	EN	4	No suitable habitat
Thelymitra matthewsii #	Spiral Sun-orchid	-	-	VU	EN	4	No suitable habitat
Thelymitra orientalis #	Hoary Sun-orchid	-	-	CR	CR	4	No suitable habitat
Xerochrysum palustre #	Swamp Everlasting	-	-	VU	CR	4	No suitable habitat
STATE SIGNIFICANCE							
Acacia nanodealbata	Dwarf Silver-wattle	1973	1	-	VU	4	No suitable habitat
Billardiera scandens s.s.	Velvet Apple-berry	1967	1	-	EN	4	No recent records
Bossiaea cordigera	Wiry Bossiaea	2008	1	-	EN	4	Highly modified habitat
Cladium procerum	Leafy Twig-sedge	2009	1	-	EN	4	No suitable habitat
Comesperma polygaloides	Small Milkwort	1903	2	-	CR	4	No suitable habitat
Corybas sp. aff. diemenicus (Coastal)	Late Helmet-orchid	2002	1	-	CR	4	Highly modified habitat
Dianella callicarpa	Swamp Flax-lily	2019	3	-	EN	4	No suitable habitat
Eucalyptus globulus subsp. globulus	Southern Blue-gum	2006	1	-	EN	4	Not present on site

Scientific Name	Common Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the assessment area	Rationale for likelihood of occurrence
Eucalyptus kitsoniana	Bog Gum	2020	2	-	CR	3	Not present on site
Lachnagrostis rudis subsp. rudis	Rough Blown-grass	1979	1	-	EN	4	Highly modified habitat
Lobelia beaugleholei	Showy Lobelia	2009	3	-	VU	4	Highly modified habitat
Melaleuca armillaris subsp. armillaris	Giant Honey-myrtle	2007	10	-	EN	4	Not present on site
Monotoca glauca	Currant-wood	2006	5	-	EN	4	Not present on site
Oxalis rubens	Dune Wood-sorrel	2005	1	-	EN	4	Highly modified habitat
Pneumatopteris pennigera	Lime Fern	2020	12	-	EN	4	Highly modified habitat
Pterostylis lustra	Small Sickle Greenhood	2009	2	-	EN	4	Highly modified habitat
Senecio glomeratus subsp. longifructus	Annual Fireweed	2005	7	-	VU	4	Highly modified habitat
Senecio linearifolius var. gariwerdensis	Fireweed Groundsel (Grampians variant)	2005	1	-	EN	5	Outside species distribution

Data Sources: Victorian Biodiversity Atlas (DEECA 2025d); Protected Matters Search Tool (DCCEEW 2025a)

APPENDIX 2 FAUNA

Appendix 2.1 Significant Fauna Species

Significant fauna within 10 kilometres of the study area is provided in the Table A2.1.3 at the end of this section, with Tables A2.1.1 and A2.1.2 below providing the background context for the values in Table 2.1.3.

Table A2.1.1 Conservation status of each species for each Act/policy. The values in this table correspond to Columns 5 to 8 in Table A2.1.3.

EPBC (*Environment Protection and Biodiversity Conservation Act 1999*):		FFG (*Flora and Fauna Guarantee Act 1988*):	
EX	Extinct	CR	Critically endangered in Victoria
CR	Critically endangered	EN	Endangered in Victoria
EN	Endangered	VU	Vulnerable in Victoria
VU	Vulnerable	NT	Near threatened in Victoria
CD	Conservation dependent		
#	Listed on the Protected Matters Search Tool		

Table A2.1.2 Likelihood of occurrence rankings: Habitat characteristics assessment of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area to determine their likelihood of occurrence. The values in this table correspond to Column 9 in Table A2.1.3.

Likely presence or use of the project area	Decision guidelines
1 – Known occurrence	Recorded within the project area recently (i.e. within 10 years).
2 - High	Likely resident in the project area based on database records, or expert advice; and/or, recent records (i.e. within 10 years) of the species in the local area; and/or, the project area contains the species' preferred habitat.
3 - Moderate	The species is likely to visit the project area regularly (i.e. at least seasonally); and/or, previous records of the species in the local area; and/or, the project area contains some characteristics of the species' preferred habitat.

Likely presence or use of the project area	Decision guidelines
4 - Low	The species may visit the project area occasionally or opportunistically whilst en route to more suitable sites; and/or, there are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or, the project area contains few or no characteristics of the species' preferred habitat.
5 - Unlikely	No previous records of the species in the local area; and/or, the species may fly over the project area when moving between areas of more suitable habitat; and/or, out of the species' range; and/or, no suitable habitat present.

Table A2.1.3. Significant fauna within 10 kilometres of the study area.

Scientific Name	Common Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
		NATIONAL SIGNIFICANCE					
Antechinus minimus maritimus #	Swamp Antechinus (mainland)	-	-	VU	VU	4	No suitable habitat within Assessment Area
Anthochaera phrygia #	Regent Honeyeater	-	-	CR	CR	4	No suitable habitat within Assessment Area
*Apheloceph*ala *leucopsis #*	Southern Whiteface	-	-	VU	-	4	No suitable habitat within Assessment Area
Arenaria interpres #	Ruddy Turnstone	-	-	VU	EN	4	No suitable habitat within Assessment Area
Botaurus poiciloptilus	Australasian Bittern	1994	1	EN	CR	4	No suitable habitat within Assessment Area
Calidris ferruginea #	Curlew Sandpiper	-	-	CR	CR	4	No suitable habitat within Assessment Area
Calidris acuminate	Sharp-tailed Sandpiper	1991	1	VU	-	4	No suitable habitat within Assessment Area
Callocephalon fimbriatum	Gang-gang Cockatoo	2015	16	EN	EN	3	May be an occasional visitor

Scientific Name	Common Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Climacteris picumnus victoriae #	Brown Treecreeper	-	-	VU	-	4	No suitable habitat within Assessment Area
Dasyurus maculatus maculatus (SE mainland population) #	Spot-tailed Quoll	-	-	EN	-	4	No suitable habitat within Assessment Area
Delma impar #	Striped Legless Lizard	-	-	VU	EN	4	No suitable habitat within Assessment Area
Eulamprus tympanum marnieae #	Corangamite Water Skink	-	-	EN	EN	4	No suitable habitat within Assessment Area
Falco hypoleucos #	Grey Falcon	-	-	VU	VU	5	Outside species range
Galaxiella pusilla #	Dwarf Galaxias	-	-	VU	EN	4	No suitable habitat within Assessment Area
Gallinago hardwickii	Latham's Snipe	2021	6	VU	-	4	No suitable habitat within Assessment Area
Grantiella picta #	Painted Honeyeater	-	-	VU	VU	4	No suitable habitat within Assessment Area
Hirundapus caudacutus	White-throated Needletail	2019	7	VU	VU	4	May be an occasional visitor en-route to other areas of suitable habitat
Isoodon obesulus obesulus	Southern Brown Bandicoot	1974	8	EN	EN	4	Local records approximately 50 years old. Limited habitat present.
Lathamus discolor #	Swift Parrot	-	-	CR	CR	4	No suitable habitat within Assessment Area
Lissolepis coventryi #	Swamp Skink	-	-	EN	EN	4	No suitable habitat within Assessment Area
Litoria raniformis	Growling Grass Frog	1990	2	VU	VU	4	No suitable habitat within Assessment Area
Mastacomys fuscus mordicus #	Broad-toothed Rat	-	-	EN	VU	4	No suitable habitat within Assessment Area
Melanodryas cucullata cucullata #	South-eastern Hooded Robin	-	-	EN	VU	4	Limited suitable habitat

Scientific Name	Common Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Miniopterus orianae bassanii	Southern Bent-winged Bat (southern ssp.)	2013	3	CR	CR	1	Recorded during site surveys
Nannoperca obscura	Yarra Pygmy Perch	2010	10	VU	VU	4	No suitable habitat
Neophema chrysostoma	Blue-winged Parrot	2013	12	VU	-	3	Recorded during site surveys. Likely to be an occasional visitor en-route to other areas of suitable habitat
Numenius madagascariensis #	Eastern Curlew	-	-	CR	CR	4	No suitable habitat within Assessment Area
Pedionomus torquatus #	Plains-wanderer	-	-	CR	CR	5	Outside species range
Petaurus australis	Yellow-bellied Glider	1991	2	VU	VU	4	Limited suitable habitat
Potorous tridactylus trisulcatus	Long-nosed Potoroo	2010	150	VU	VU	4	Known to occur in large woodland reserves. Limited suitable habitat within Assessment Area
Prototroctes maraena #	Australian Grayling	-	-	VU	EN	4	No suitable habitat within Assessment Area
Pseudomys novaehollandiae #	New Holland Mouse	-	-	VU	EN	4	No suitable habitat within Assessment Area
Pteropus poliocephalus	Grey-headed Flying-fox	1986	1	VU	VU	4	No known camps in close proximity
Rostratula australis	Australian Painted-snipe	1918	1	EN	CR	4	No suitable habitat within Assessment Area
Stagonopleura guttata	Diamond Firetail	-	-	VU	VU	4	No suitable habitat within Assessment Area
Sternula nereis nereis #	Australian Fairy Tern	-	-	VU	-	4	No suitable habitat within Assessment Area
Synemon plana #	Golden Sun Moth	-	-	VU	VU	5	No suitable habitat within Assessment Area

Scientific Name	Common Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Thinornis cucullatus cucullatus	Hooded Plover	2019	1	VU	VU	5	No suitable habitat within Assessment Area
Tringa nebularia #	Common Greenshank	2019	2	EN	EN	4	No suitable habitat within Assessment Area
		STATE SIGNIFICANCE					
Accipiter novaehollandiae	Grey Goshawk	2019	54	-	EN	3	May occasionally forage
Anseranas semipalmata	Magpie Goose	2003	31	-	VU	4	No suitable habitat within Assessment Area
Ardea alba modesta	Eastern Great Egret	2024	6	-	VU	4	No suitable habitat within Assessment Area
Ardea intermedia plumifera	Plumed Egret	2024	2	-	CR	4	No suitable habitat within Assessment Area
Biziura lobata	Musk Duck	2024	60	-	VU	1	Recorded during surveys
Dasyornis broadbenti caryochrous	Rufous Bristlebird (Otway)	2008	23	-	VU	3	Suitable habitat features present
Egretta garzetta	Little Egret	2005	2	-	EN	4	No suitable habitat within Assessment Area
Engaeus sericatus	Hairy Burrowing Crayfish	2008	10	-	VU	3	No suitable habitat within Assessment Area
Falco subniger	Black Falcon	2016	3	-	CR	3	May utilise project area for foraging
Galaxiella toourtkoourt	Little Galaxias	2010	4	-	EN	4	No suitable habitat within Assessment Area
Geocharax tasmanicus	Otway Bush Yabby	1999	1	-	EN	4	No suitable habitat within Assessment Area
Haliaeetus leucogaster	White-bellied Sea-Eagle	2019	4	-	EN	4	No suitable habitat within Assessment Area
Hieraaetus morphnoides	Little Eagle	2008	4	-	VU	4	No suitable habitat within Assessment Area

Scientific Name	Common Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG Act	Likelihood of occurrence in the study area	Rationale for likelihood of occurrence
Hydroprogne caspia	Caspian Tern	2019	3	-	VU	4	No suitable habitat within Assessment Area
Hygrobia australasiae	Squeak Beetle	1972	4	-	EN	4	No suitable habitat within Assessment Area
Hyridella narracanensis	Narracan Corrugated Mussel	2011	9	-	EN	4	No suitable habitat within Assessment Area
Ixobrychus dubius	Australian Little Bittern	1913	1	-	EN	4	No suitable habitat within Assessment Area
Leptocerus souta	Caddisfly	1990	2	-	VU	4	No suitable habitat within Assessment Area
Ninox strenua	Powerful Owl	2012	16	-	VU	3	Known to occur in large woodland reserves. May forage within habitat within Assessment Area
Ornithorhynchus anatinus	Platypus	1981	1	-	VU	4	No suitable habitat within Assessment Area
Oxyura australis	Blue-billed Duck	2024	17	-	VU	3	No suitable habitat within Assessment Area
Pseudophryne semimarmorata	Southern Toadlet	1998	41	-	EN	3	No suitable habitat within Assessment Area
Spatula rhynchotis	Australasian Shoveler	2019	36	-	VU	3	No suitable habitat within Assessment Area
Tyto novaehollandiae	Masked Owl	1986	1	-	CR	3	No suitable habitat within Assessment Area

APPENDIX 3 - NATIVE VEGETATION REMOVAL (NVR) REPORT

Native Vegetation Removal Report

NVRR ID: 315_20250402_B3E

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines). This report is **not an assessment by DEECA** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Report details

Date created: 02/04/2025

Local Government Area: CORANGAMITE SHIRE

Shapefile name:
EHP14554_MumblinWF_Patches_VG20_02042025.shp
EHP14554_MumblinWF_Trees_VG20_02042025.shp

Site assessor name: Shannon LeBel

Registered Aboriginal Party: Eastern Maar

Coordinates: 142.96743, -38.33910

Address:
760 TIMBOON-TERANG ROAD DIXIE 3265
1430 COBDEN-WARRNAMBOOL ROAD GLENFYNE 3266
112 RETALLACKS ROAD ELINGAMITE NORTH 3266

Regulator Notes

Removal polygons are located:

Summary of native vegetation to be removed

Assessment pathway	**Intermediate Assessment Pathway**		
Location category	Location 2 The native vegetation extent map indicates that this area is typically characterised as supporting native vegetation. Additionally, it is modelled as encompassing an endangered Ecological Vegetation Class, sensitive wetland or sensitive coastal area. The removal of less than 0.5 hectares of native vegetation in this area will not require a Species Offset.		
Total extent including past and proposed removal (ha) *Includes endangered EVCs (ha): 0*	**0.427**	*Extent of past removal (ha)*	*0*
		Extent of proposed removal - Patches (ha)	*0.241*
		Extent of proposed removal - Scattered Trees (ha)	*0.186*
No. Large Trees proposed to be removed	**5**	*No. Large Patch Trees*	*3*
		No. Large Scattered Trees	*2*
No. Small Scattered Trees	2		

Offset requirements if approval is granted

Any approval granted will include a condition to secure an offset, before the removal of native vegetation, that meets the following requirements:

General Offset amount [1]	**0.164 General Habitat Units**
Minimum strategic biodiversity value score [2]	0.3230
Large Trees	5
Vicinity	Glenelg Hopkins CMA, Corangamite CMA or CORANGAMITE SHIRE LGA

NB: values within tables in this document may not add to the totals shown above due to rounding

The availability of third-party offset credits can be checked using the Native Vegetation Credit Register (NVCR) Search Tool - https://nvcr.delwp.vic.gov.au

1. The General Offset amount required is the sum of all General Habitat Units in Appendix 1.
2. Minimum strategic biodiversity value score is 80 per cent of the weighted average score across habitat zones where a General Offset is required.
3. The Species Offset amount(s) required is the sum of all Species Habitat Units in Appendix 1.

Application requirements

Applications to remove, destroy or lop native vegetation must include all the below information. If an appropriate response has not been provided the application is not complete.

Application Requirement 1 - Native vegetation removal information

If the native vegetation removal is mapped correctly, the information presented in this Native Vegetation Removal Report addresses Application Requirement 1.

Application Requirement 2 - Topographical and land information

This statement describes the topographical and land features in the vicinity of the proposed works, including the location and extent of any ridges, hilltops, wetlands and waterways, slopes of more than 20% gradient, low-lying areas, saline discharge areas or areas of erosion.

Application Requirement 3 - Photographs of the native vegetation to be removed

Application Requirement 3 is not addressed in this Native Vegetation Removal Report. All applications must include recent, timestamped photos of each Patch, Large Patch Tree and Scattered Tree which has been mapped in this report.

Application Requirement 4 - Past removal

If past removal has been considered correctly, the information presented in this Native Vegetation Removal Report addresses Application Requirement 4.

Application Requirement 5 - Avoid and minimise statement

This statement describes what has been done to avoid and minimise impacts on native vegetation and associated biodiversity values.

Application Requirement 6 - Property Vegetation Plan

This requirement only applies if an approved Property Vegetation Plan (PVP) applies to the property
Does a PVP apply to the proposal?

Application Requirement 7 - Defendable space statement

Where the removal of native vegetation is to create defendable space, this statement:

- Describes the bushfire threat; and

- Describes how other bushfire risk mitigation measures were considered to reduce the amount of native vegetation proposed for removal (this can also be part of the avoid and minimise statement).

This statement is not required if, If the proposed defendable space is within the Bushfire Management Overlay (BMO), and in accordance with the 'Exemption to create defendable space for a dwelling under Clause 44.06 of local planning schemes' in Clause 52.12-5.

Application Requirement 8 - Native Vegetation Precinct Plan

This requirement is only applicable if you are removing native vegetation from within an area covered by Native Vegetation Precinct Plan (NVPP), and the proposed removal is not identified as 'to be removed' within the NVPP.
Does an NVPP apply to the proposal?

No

Application Requirement 9 - Offset statement

This statement demonstrates that an offset is available and describes how the required offset will be secured. The Applicant's Guide provides information relating to this requirement.

Next steps

Applications to remove, destroy or lop native vegetation must address all the application requirements specified in the Guidelines. If you wish to remove the mapped native vegetation you are required to apply for approval from the responsible authority (e.g. local Council). This Native vegetation removal report must be submitted with your application and meets most of the application requirements. The following requirements need to be addressed, as applicable.

Application Requirement 3 - Photographs of the native vegetation to be removed

Recent, dated photographs of the native vegetation to be removed **must be provided** with the application. All photographs must be clear, show whether the vegetation is a Patch of native vegetation, Patch Tree or Scattered Tree, and identify any Large Trees. If the area of native vegetation to be removed is large, provide photos that are indicative of the native vegetation.

Ensure photographs are attached to the application. If appropriate photographs have not been provided the application is not complete.

Application Requirement 6 - Property Vegetation Plan

If a PVP is applicable, it must be provided with the application.

Appendix 1: Description of native vegetation to be removed

General Habitat Units for each zone (Patch, Scattered Tree or Patch Tree) are calculated by the following equation in accordance with the Guidelines

General Habitat Units = extent without overlap x condition score x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The General Offset amount required is the sum of all General Habitat Units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant							Information calculated by NVR Map				
Zone	Type	DBH (cm)	EVC code	Bioregional conservation status	Partial Removal	Condition score	Large Tree(s)	Polygon extent (ha)	Extent without overlap (ha)	SBV score	General Habitat Units
1-b	Patch	-	VVP_0023	Vulnerable	no	0.160	-	0.000	0.000	0.300	0.000
10-f	Patch	-	VVP_0023	Vulnerable	no	0.240	-	0.002	0.002	0.340	0.000
11-c	Patch	-	VVP_0023	Vulnerable	no	0.180	-	0.014	0.014	0.350	0.003
2-a	Patch	-	VVP_0023	Vulnerable	no	0.320	-	0.095	0.095	0.360	0.050
3-d	Patch	-	VVP_0023	Vulnerable	no	0.320	-	0.000	0.000	0.350	0.000
4-d	Patch	-	VVP_0023	Vulnerable	no	0.320	-	0.017	0.017	0.350	0.006
5-d	Patch	-	VVP_0023	Vulnerable	no	0.320	-	0.000	0.000	0.350	0.000
6-a	Patch	-	VVP_0023	Vulnerable	no	0.520	1	0.061	0.061	0.740	0.041
7-a	Patch	-	VVP_0023	Vulnerable	no	0.520	2	0.047	0.047	0.320	0.024
8-c	Patch	-	VVP_0023	Vulnerable	no	0.180	-	0.001	0.001	0.350	0.000

Information provided by or on behalf of the applicant							Information calculated by NVR Map				
Zone	**Type**	**DBH (cm)**	**EVC code**	**Bioregional conservation status**	**Partial Removal**	**Condition score**	**Large Tree(s)**	**Polygon extent (ha)**	**Extent without overlap (ha)**	**SBV score**	**General Habitat Units**
9-e	Patch	-	VVP_0023	Vulnerable	no	0.370	-	0.004	0.004	0.340	0.002
1-tl	Scattered Tree	86	VVP_0023	Vulnerable	no	0.200	1	0.070	0.058	0.350	0.012
2-ts	Scattered Tree	44	VVP_0023	Vulnerable	no	0.200	-	0.031	0.027	0.350	0.005
3-tl	Scattered Tree	101	VVP_0023	Vulnerable	no	0.200	1	0.070	0.070	0.350	0.014
4-ts	Scattered Tree	31	VVP_0023	Vulnerable	no	0.200	-	0.031	0.031	0.340	0.006

Appendix 2: Images of mapped native vegetation

1. Property in context

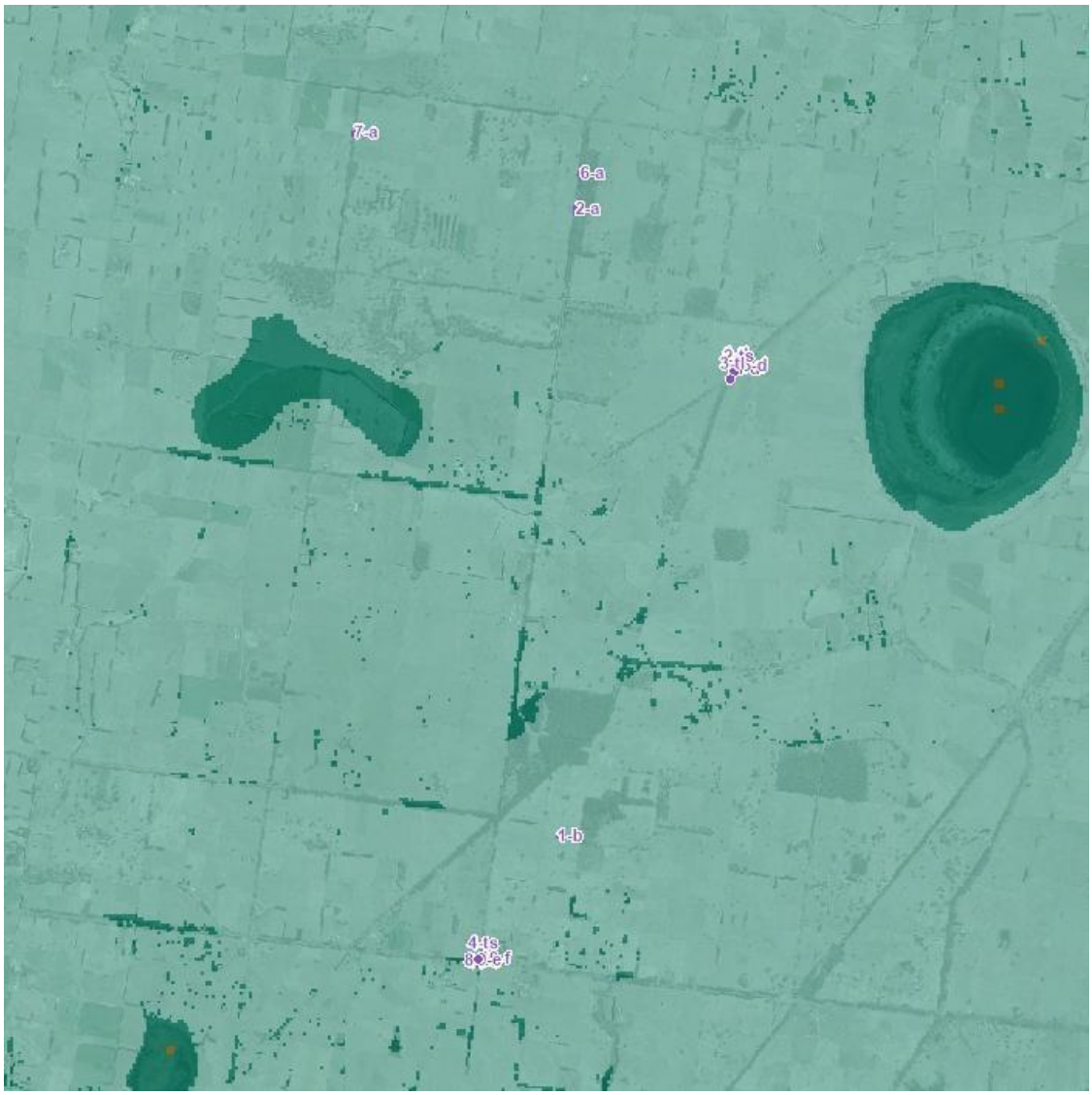
2. Aerial photograph showing mapped native vegetation

Proposed Removal
Past Removal
Partial Removal

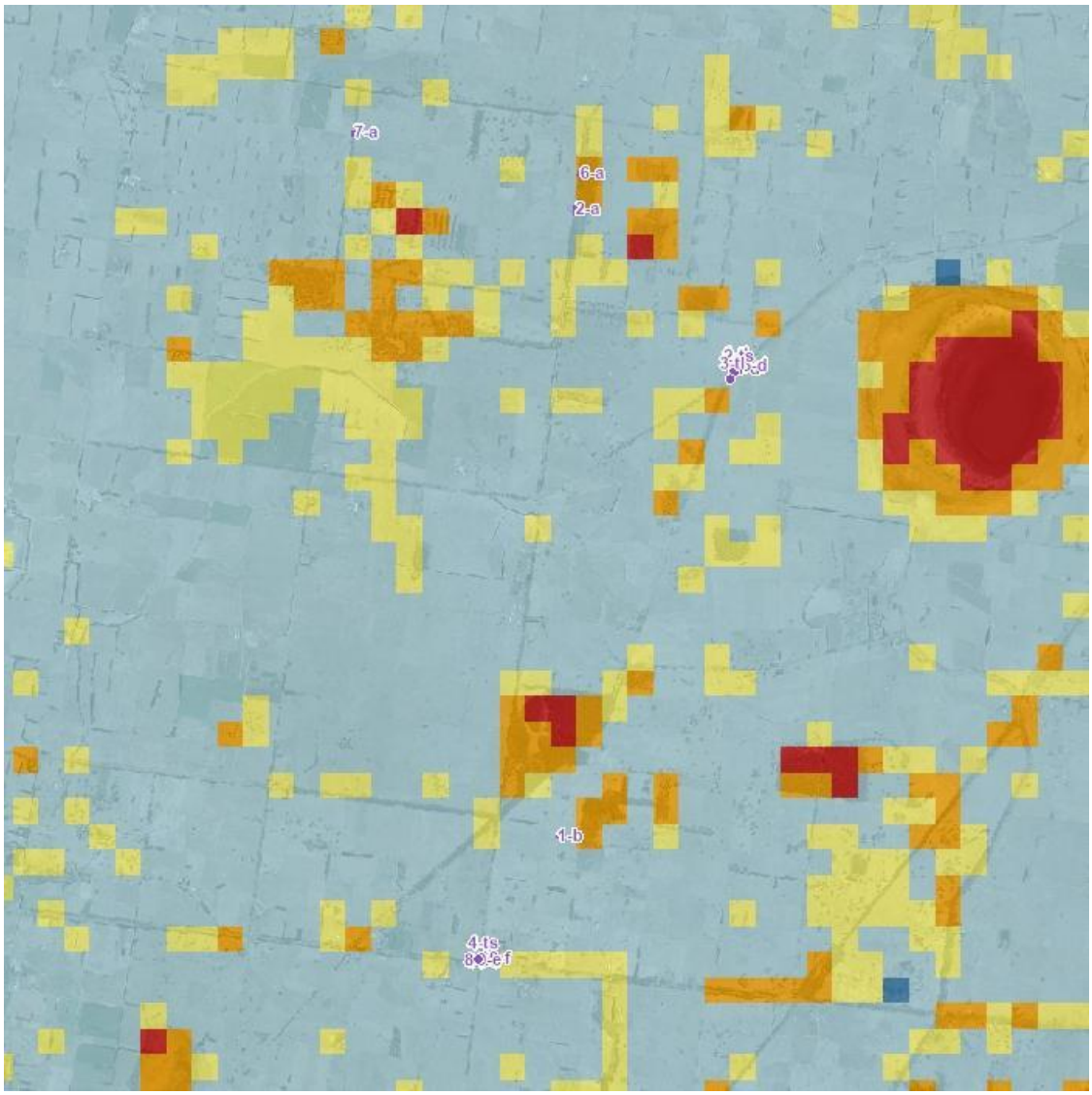
N

850 m

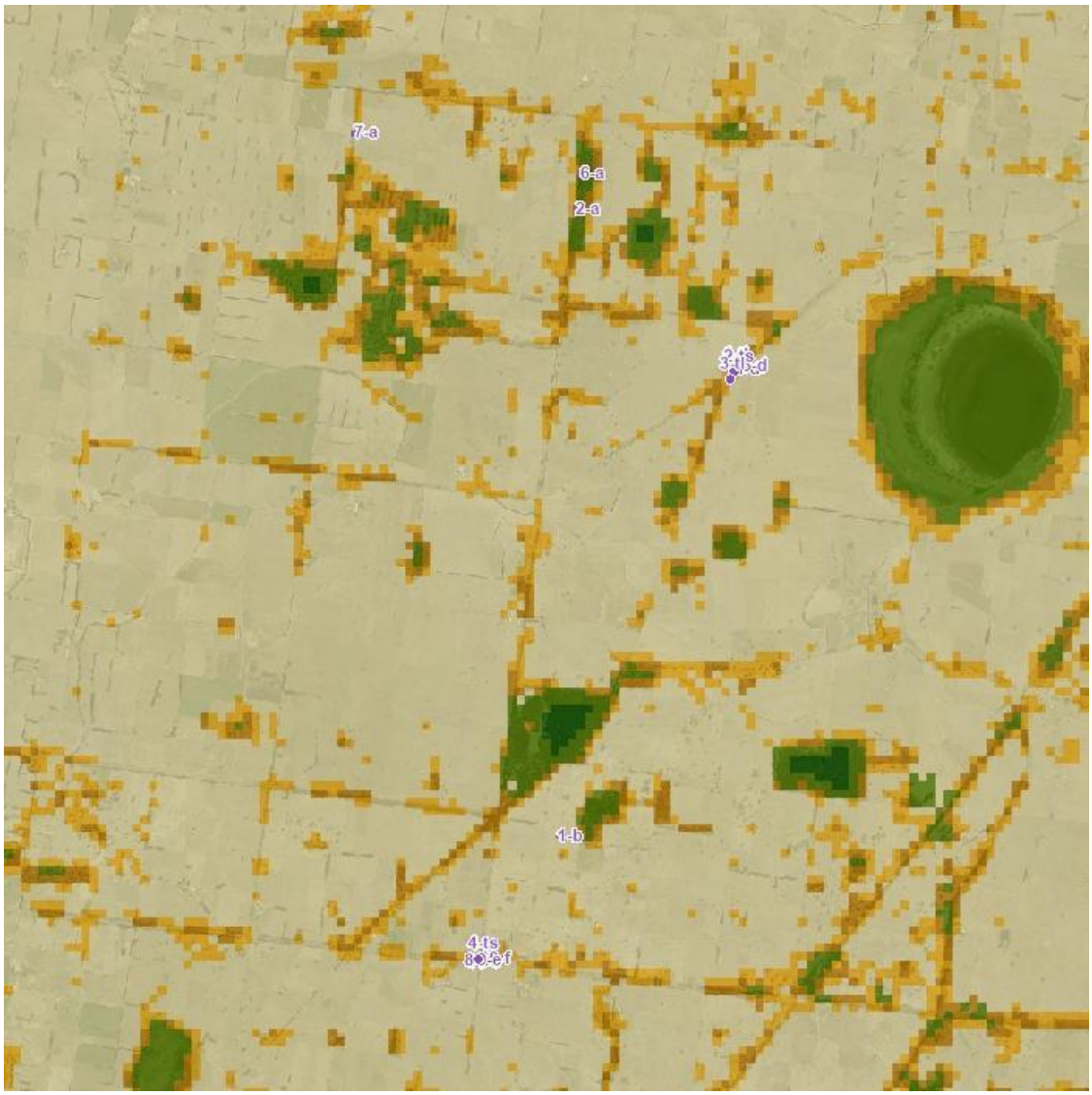
3. Location Risk Map



4. Strategic Biodiversity Value Score Map



5. Condition Score Map



Proposed Removal
Past Removal
Partial Removal

0.81 - 1.00
0.61 - 0.80
0.41 - 0.60
0.21 - 0.40
0.00 - 0.20

N

850 m

6. Endangered EVCs

Not Applicable

APPENDIX 4 - AVAILABLE NATIVE VEGETATION CREDITS

Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 02/04/2025 01:15 **Report ID: 29194**

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)
0.164	0.323	5	CMA: Glenelg Hopkins or CMA: Corangamite or LGA: Corangamite Shire

Details of available native vegetation credits on 02 April 2025 01:15

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0114	0.536	180	Corangamite	Colac Otway Shire	Yes	Yes	No	VegLink
BBA-2088	0.193	5	Glenelg Hopkins	Southern Grampians Shire	Yes	Yes	No	VegLink
BBA-2467	0.236	11	Glenelg Hopkins	Glenelg Shire	No	Yes	No	Contact NVOR
BBA-3027	1.231	267	Glenelg Hopkins	Pyrenees Shire	Yes	Yes	No	VegLink
BBA-3041	0.286	252	Glenelg Hopkins	Moyne Shire	Yes	Yes	No	VegLink
TFN-C0140	0.292	30	Corangamite	Greater Geelong City	Yes	Yes	No	TFN
TFN-C0543	0.407	7	Glenelg Hopkins	Southern Grampians Shire	No	Yes	No	Bio Offsets
VC_CFL-3080_01	4.594	94	Corangamite	Golden Plains Shire	Yes	Yes	No	Bio Offsets
VC_CFL-3693_01	2.179	600	Glenelg Hopkins	Ararat Rural City	Yes	Yes	No	VegLink
VC_CFL-3699_01	1.594	30	Corangamite	Colac Otway Shire	Yes	Yes	No	Contact NVOR
VC_CFL-3718_01	7.557	895	Corangamite	Corangamite Shire	Yes	Yes	No	Bio Offsets

VC_CFL-3727_01	12.307	24	Glenelg Hopkins	Ararat Rural City	Yes	Yes	No	VegLink
VC_CFL-3739_01	4.963	274	Corangamite	Colac Otway Shire	Yes	Yes	No	Bio Offsets
VC_CFL-3763_01	3.246	266	Glenelg Hopkins	Glenelg Shire	Yes	Yes	No	VegLink
VC_CFL-3786_01	0.402	528	Corangamite	Corangamite Shire	Yes	Yes	No	VegLink
VC_CFL-3787_01	9.579	895	Corangamite	Colac Otway Shire	Yes	Yes	No	VegLink
VC_CFL-3798_01	1.656	212	Corangamite	Colac Otway Shire	Yes	Yes	No	VegLink
VC_CFL-3812_01	19.980	4753	Corangamite	Colac Otway Shire	Yes	Yes	No	VegLink
VC_CFL-3814_01	12.719	526	Glenelg Hopkins	Southern Grampians Shire	Yes	Yes	No	VegLink
VC_TFN-C2046_01	7.438	1446	Glenelg Hopkins	Southern Grampians Shire	Yes	Yes	No	Ecocentric, Ethos, VegLink

These sites meet your requirements using alternative arrangements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements when applying the alternative arrangements as listed in section 11.2 of the Guidelines for the removal, destruction or lopping of native vegetation.

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
VC_CFL-3807_01	5.606	62	Glenelg Hopkins	SOUTHERN GRAMPIANS SHIRE	Yes	Yes	No	Contact NVOR

LT - Large Trees *CMA - Catchment Management Authority* *LGA - Municipal District or Local Government Authority*

Next steps

If applying for approval to remove native vegetation
Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

If you have approval to remove native vegetation
Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
	Fully traded			
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@deeca.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 8578 4250 or 1300 834 546	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

For more information contact the DEECA Customer Service Centre 136 186 or the Native Vegetation Credit Register at nativevegetation.offsetregister@delwp.vic.gov.au