

Chapter 27: Matters of National Environmental Significance

Environment Effects Statement



27 Matters of National Environmental Significance

27.1 Introduction

This chapter summarises the potential impacts to Matters of National Environmental Significance (MNES) associated with the construction, operation and decommissioning of the Victoria to New South Wales Interconnector (VNI) West (Victorian Component) (the Project). This chapter is based on *Technical Appendix S: Ecology* and specifically Appendix K (Significant Impact Assessment) of that technical appendix.

MNES are crucial components of Australia's environmental protection framework identified under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act provides the legal framework to protect and manage nine MNES:

- World heritage properties
- National heritage places
- Wetlands of international importance (Ramsar wetlands)
- Listed threatened species and communities
- Listed migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions
- Water resources, in relation to coal seam gas and large coal mining development

On 13 June 2024 under delegated authority from the Minister for the Environment and Water, the National EPA which was known as the Department of Climate Change, Energy, the Environment and Water (DCCEEW) at the time, made the decision that the Project was a “controlled action” and, as such, would require assessment and a decision about whether approval should be given under the EPBC Act.

The Minister considered that the Project would likely have a significant impact on the following MNES:

- Ramsar wetlands
- Listed threatened species and communities
- Listed migratory species

Under section 45 of the EPBC Act, the Environment Effects Statement (EES) process is accredited under the bilateral (assessment) agreement and is the primary assessment process for the Project. This chapter informs the assessment of the Project under this agreement and focuses only on MNES.

Other impacts to biodiversity and habitat, including threatened species listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) and native vegetation, are presented in *EES Chapter 26: Ecology*.

Offset requirements have been identified, consistent with the requirements of the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012). A Draft Offset Strategy (the Offset Strategy) has been developed to describe the process for obtaining these offsets. The Offset Strategy is attached to the EES as *Attachment III: Draft Offset Strategy*.

27.2 Assessment scope

The scoping requirements provided by the Minister for Planning for the Project set out the specific environmental matters to be investigated and documented in this EES. The EES Scoping Requirements inform the scope of each EES technical study. The following issues were identified in the EES Scoping Requirements with respect to MNES:

- Direct or indirect loss, disturbance and/or degradation of terrestrial and aquatic biodiversity values, including listed flora and fauna species under the EPBC Act and nearby habitat that may support listed or other protected flora, fauna or ecological communities
- Potential for significant effects on listed threatened ecological communities (TEC), key threatened flora species and key threatened fauna species (including migratory species)
- Potential impact on the ecological character and limits of acceptable change of the Kerang Wetlands Ramsar site
- Disruption to the movement of fauna (both day and night) between areas of habitat across the broader landscape, including risk of collisions with transmission line infrastructure
- Potential cumulative effects on listed threatened flora and fauna species (including migratory species), from the Project in combination with other projects
- The availability of suitable offsets for the loss of native vegetation and habitat for listed threatened species under the EPBC Act

According to Section 4.2 of the EES Scoping Requirements, impacts on MNES were considered to be a high priority for assessment.

27.2.1 Avoidance and minimisation

The principles of avoidance and minimisation for the overall Project are outlined in *EES Chapter 6: Assessment framework*. This describes the evaluation framework which was developed for the Project and which was applied consistently throughout the route refinement process. A summary of the evaluation framework as it relates to ecology is provided in *EES Chapter 26: Ecology*.

Existing conditions assessments have been undertaken progressively since 2023 including both desktop and field assessments. These informed the route refinement process to select a Proposed Easement that would avoid and minimise impacts on TECs and habitat of threatened species, as far as practicable. Overall, the Project intersects 445 properties, of which 241 properties (approximately 54%) were field inspected for the ecology assessment. The inaccessible 46% of properties were assessed using a range of desktop and remote methods.



The [Ramsar Convention](#) is an international treaty adopted in 1971 in Ramsar, Iran, that provides a framework for the conservation and wise use of wetlands and their resources. Countries that are parties to the Convention commit to identifying and protecting wetlands of international importance and promoting their sustainable use.

A Ramsar site is a wetland of international importance that has been formally designated under the Ramsar Convention because it meets internationally recognised criteria for its ecological, biological or hydrological importance.

The key MNES feature in the landscape that was avoided through the route refinement process is the Kerang Wetlands Ramsar site.

The avoidance and minimisation approach prioritised during the route refinement process has resulted in the Proposed Easement traversing a landscape that has been largely cleared of native vegetation due to historical and ongoing agricultural land use.

Potential biodiversity impacts of the Project are, therefore, associated with the remaining biodiversity features such as native vegetation near rivers, within roadside reserves and scattered patches in agricultural land. These features are important in modified agricultural landscapes as they may represent the last remaining habitat for some species, including EPBC Act-listed threatened species, and serve as movement corridors for those species.

Detailed information on route refinement and the Proposed Easement identification process is presented in *EES Chapter 3: Project development and alternatives*. The Proposed Easement is shown in Figure 27-1.

The process undertaken by the Project to avoid and minimise impacts on ecological values as applicable to MNES is described in *EES Chapter 26: Ecology*.

In addition to the Kerang Wetlands Ramsar site (Figure 27-2), the Project also avoids the Patho Plains Important Bird Area/Key Biodiversity Area, which is the core re-introduction area for the EPBC Act-listed, critically endangered Plains-wanderer *Pedionomus torquatus*. At its closest point, Patho Plains is located approximately 25 km south-east of the Proposed Easement (see Figure 27-2).

As a consequence of the route refinement and tower siting process, the potential for direct impacts on MNES from the Project has been reduced. Further avoidance of vegetation and habitat removal would occur throughout the detailed design process.

Impact areas are subject to change once field surveys are conducted at the final design stage. As more areas are accessed for survey and the design is finalised it is anticipated that impacts would be reduced.

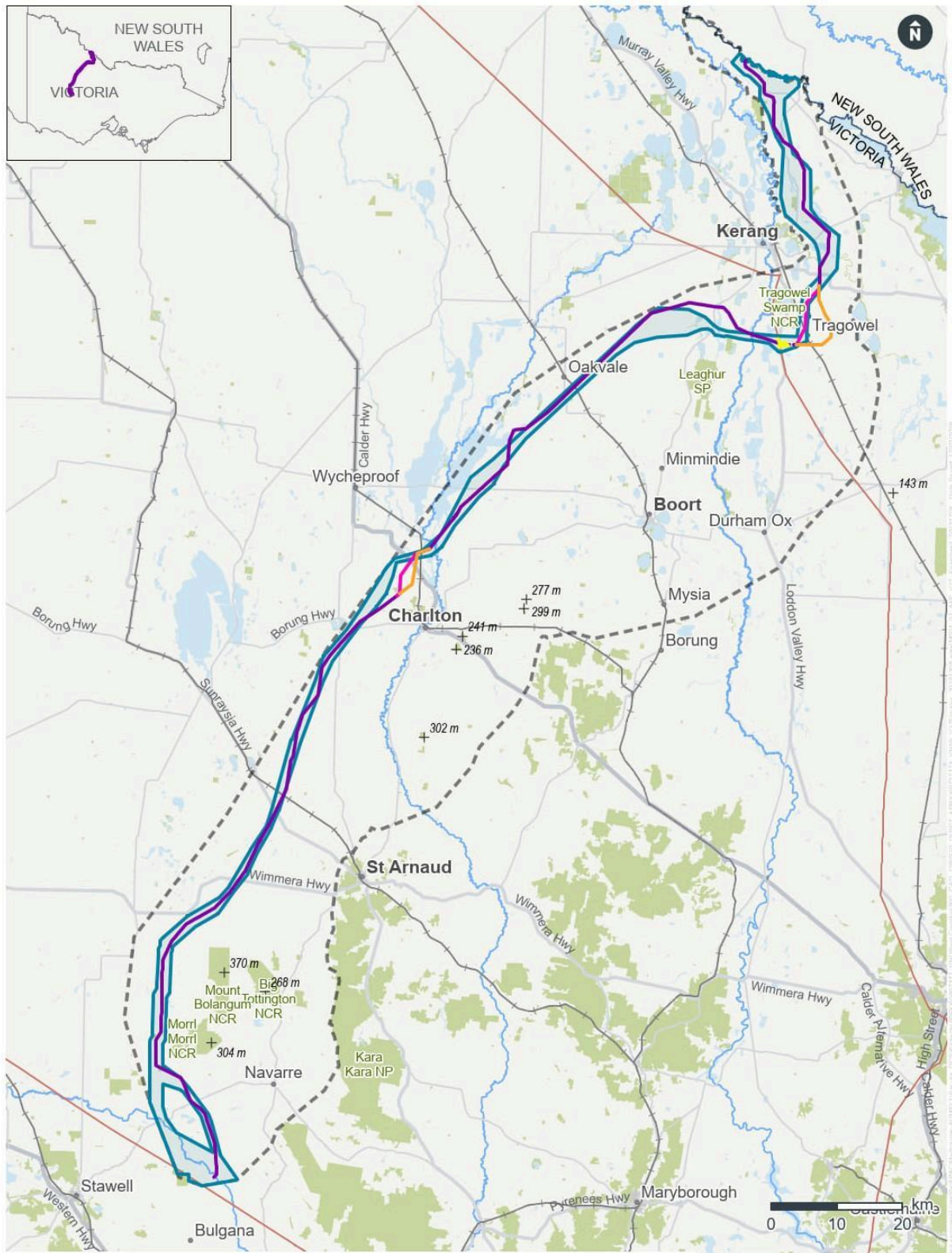
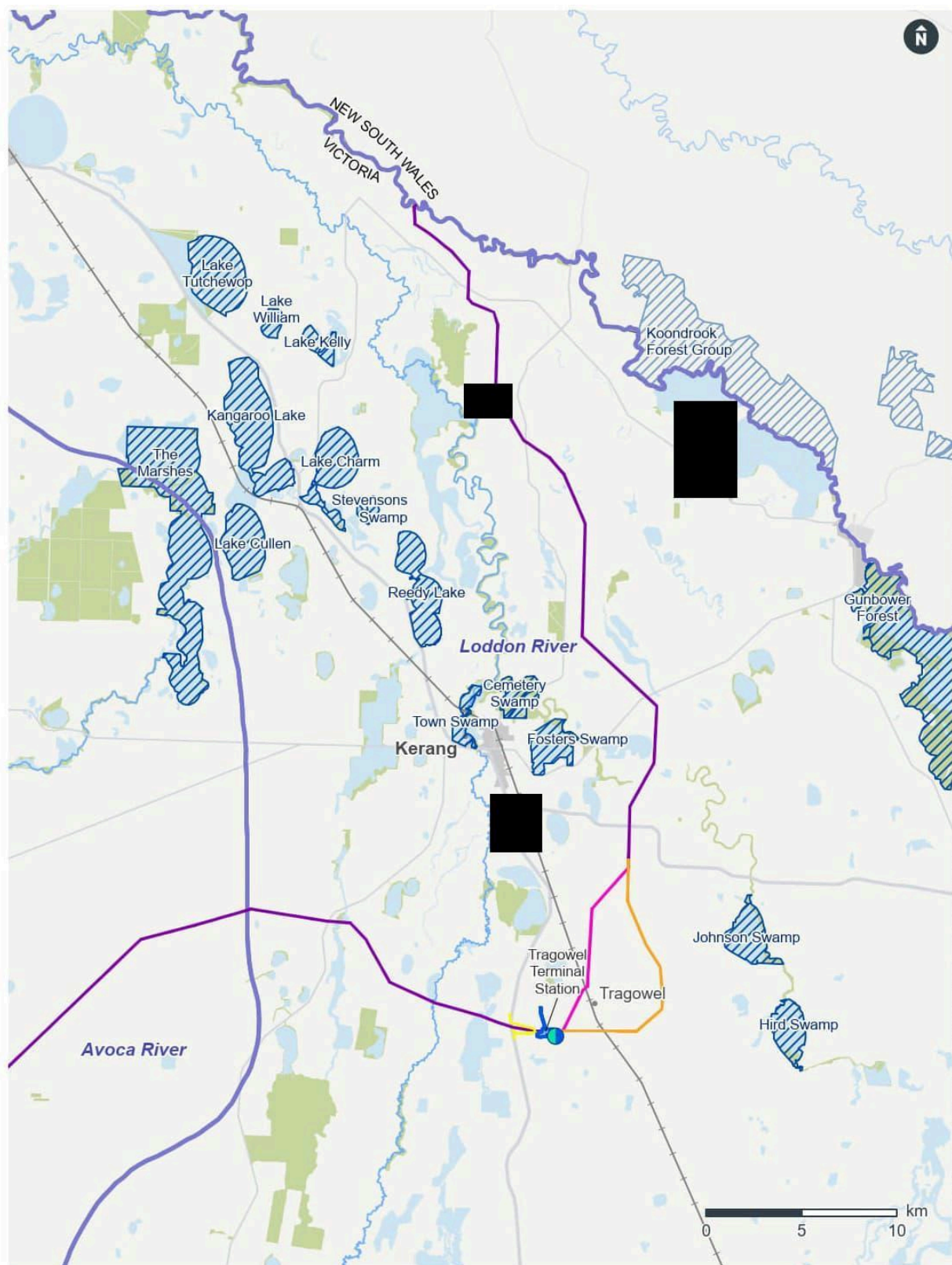


Figure 27-1 Proposed Easement



LEGEND

- Proposed Easement
- Proposed Easement Option
- Proposed Easement Option

- Proposed 220kV Easement
- Combined Laydown Area and Workforce Accommodation Site

- Laydown Area
- AWRC River Basin
- ▨ Ramsar Wetland

27.3 Methodology

This section summarises the methods adopted for the overall ecology impact assessment and the approach used to characterise existing conditions, identify ecological values, and assess the potential impacts of the Project on MNES.

The assessment was informed by the EES Scoping Requirements and was undertaken iteratively as the Project progressed through route refinement, with earlier desktop and field investigations informing avoidance and minimisation, and more detailed assessment supporting the EES impact assessment of the Proposed Easement and other Project areas.

To address the scoping requirements outlined in Section 27.1.1, the MNES impact assessment adopted the following methodology:

- Definition of an assessment area for relevant Project components for assessment, including the Proposed Easement, two Proposed Easement options, laydown areas, workforce accommodation areas, Tragowel Terminal Station and Bulgana Reactor Station (Section 27.4).
- Desktop reviews of ecological databases administered by the National Environmental Protection Agency (National EPA), together with other databases, websites, aerial photography and light detection and ranging (LiDAR) imagery for the Proposed Easement to characterise the landscape and identify known or potential biodiversity values.
- Field assessments including vegetation quality assessments (VQAs), assessments for potential TECs and habitat assessments to identify areas that may support threatened species. These assessments were undertaken in 2023, 2024 and 2025 in accessible areas along the Proposed Easement, including public land and private properties, where land access was granted.
- Using supplementary assessment methods for inaccessible areas, including aerial imagery, LiDAR, historical imagery and, where possible, field verification from adjacent accessible land, to identify areas with known or potential ecological value. These methods are discussed in detail in *Technical Appendix S: Ecology*.
- Assessment of the likelihood of occurrence of EPBC Act-listed threatened and/or migratory species and the likelihood of occurrence of EPBC Act-listed TECs.
- Targeted flora and fauna surveys for species with a greater than low likelihood of occurrence in the Proposed Easement. Transects were walked to search for threatened flora species and fauna surveys utilised a range of techniques including tile grids, diurnal bird surveys, acoustic detectors, spotlighting and call playback and eDNA sampling.
- Characterisation of land use and soil disturbance to provide context to the capacity of native vegetation and threatened species to persist in the broader agricultural landscape.
- Integration of community, landholder and agency feedback into the ecological assessment.
- Calculation of native vegetation loss based on the assumed construction footprint for the Proposed Easement and other Project components, including towers, access tracks, temporary conductor stringing hardstand areas, laydown and/or workforce accommodations areas, Bulgana Reactor Station and Tragowel Terminal Station.
- Calculation of the extent of TEC and threatened flora and fauna habitat loss for the Project and Proposed Easement options. Calculations of the extent were based on aerial imagery and corresponding ecological vegetation classes (EVCs) assigned as a proxy to calculate impacts for threatened flora and fauna habitat and TECs where field surveys could not be undertaken. Geographic range of threatened flora and fauna species also informed calculations of extent of EVCs as potential habitat.
- Undertaking an assessment of impacts on EPBC Act-listed threatened species and communities with a greater than low likelihood of occurrence in the Proposed Easement.

- Identifying and assessing the potential impacts to MNES potentially present within the Project area in line with the Matters of National Environmental Significance – Significant impact guidelines 1.1 (DoE, 2013) (the Significant Impact Guidelines) and species-specific guidelines where available. Assessment of potential impacts also consulted conservation advice, recovery plans, threat abatement plans, the Species Profile and Threats (SPRAT) database and other literature as needed.
- Assessment of potential impacts on migratory species, wetlands listed under the Ramsar Convention, threatening processes, and bird and bat collision risk (including identification of species of concern and areas where collision risk would be highest).
- Collision risk assessment for birds and bats drawing on DEECA's 'species of interest' developed in relation to collision risk with wind turbines (Lumsden et al., 2019; DEECA, 2024). The criteria used for that assessment are the same as would apply to risk of collision with transmission lines therefore, the likelihood and consequences for species were incorporated into the assessment of risk for the Project.
- Undertaking a cumulative impact assessment to consider the combined effects of the Project with other planned projects with spatial and temporal overlap.
- Identification of Environmental Performance Requirements (EPRs) to reduce the likelihood or consequence of impacts.
- Calculation of Commonwealth offsets required to compensate for unavoidable residual impacts.

The overall ecology assessment was iterative and evolved alongside the route refinement process. Existing conditions assessments were undertaken progressively from a broader Area of Interest and Draft Corridor through to the Proposed Easement and other Project areas (see *EES Chapter 3: Project development and alternatives*). Early desktop and field investigations informed route refinement and helped identify areas of ecological value to avoid, where practicable. As the Proposed Easement was refined, more detailed field assessment and targeted surveys were undertaken to support the EES impact assessment. Some vegetation and habitat assessments, and some fauna surveys, were therefore undertaken in locations that are no longer part of the Project; however, that information has informed the broader understanding of landscape context and the route refinement process.

Overall, the Project intersects 445 properties, of which 241 properties (approximately 54%) were field surveyed for the ecology assessment. The remaining 46% were assessed using desktop methods and conservative assumptions applied to enable impacts to be assessed.

In terms of physical area, approximately 47% of the Project area was accessed for field assessment. The proposed Tragowel Terminal Station, Bulgana Reactor Station and laydown and/or workforce accommodation areas were all able to be accessed. Approximately 32% of the Proposed Easement was able to be accessed and assessed for ecology (502 hectares (ha) of 1558 ha).

The 68% of the Proposed Easement that was inaccessible was assessed using a range of desktop and remote methods, including aerial imagery, LiDAR, and historical imagery. In addition, representative examples of aerial imagery indicating potential for native vegetation were ground-truthed in accessible areas to test the reliability of the desktop assessment approach. Of the 68% of the Proposed Easement not accessed, approximately 20% of that was able to have some level of field verification from vantage points on adjacent accessible land. The combination of field and desktop assessment enabled the Proposed Easement to be broadly characterised into dominant land uses as a means of identifying the proportion that was known or had potential to support ecological values.

This alternative assessment approach for inaccessible land was discussed with DEECA, National EPA and the Victorian Department of Transport and Planning (DTP). In inaccessible areas, a conservative approach was adopted so that potential impacts were not understated. This included relying on modelled ecological information, remotely sensed data and precautionary assumptions.

The results of the field and desktop methodologies have informed the existing conditions and impact assessment discussed in this chapter.

27.4 Stakeholder and community engagement

Stakeholder and community engagement activities have been ongoing since the Project's inception. *EES Chapter 7: Stakeholder and community engagement* details the key engagement activities undertaken for the Project. The purpose of this engagement was to keep stakeholders informed of key Project milestones, capture stakeholder feedback and respond to enquiries.

The outcomes of the stakeholder engagement process are described in *EES Chapter 26: Ecology* and are not repeated here, apart from those which specifically related to EPBC

Act-listed species:

- Two meetings were held with the Barapa Barapa Traditional Owner group in relation to microbat surveys and Corben's Long eared bat *Nyctophilus corbeni*
- Stakeholder feedback where observations of threatened species were provided was used to inform the ecological existing conditions assessment and to inform the significant impact assessment

Landholder and community feedback has reinforced the importance of protecting sensitive ecological areas and maintaining biodiversity across the Project area. This local knowledge has directly informed the route refinement process and targeted ecological surveys.

27.5 Study area

The study area for the ecological assessment of the Project has evolved since Project inception and a formal boundary for an ecological 'study area' was not defined.

The assessment of impacts on MNES is based on a Project area that comprised:

- The Proposed Easement, including towers and two Proposed Easement options, at Tragowel and Teddywaddy.
- The proposed Tragowel Terminal Station required to interface and connect the 500 kilovolt (kV) transmission line into the existing 220 kV Bendigo to Kerang transmission line (AusNet asset).
- Nine potential workforce accommodation and/or construction laydown areas to temporarily house the workforce during construction and/or temporarily receive and store materials, plant and equipment and the like at locations selected to enhance construction efficiency and accessibility.
- The proposed Bulgana Reactor Station to be constructed inside or adjacent to the proposed new WRL Bulgana Terminal Station being built by AusNet. Shunt reactors help control voltage levels and improve stability of electricity as it travels through transmission lines.
- Local access routes and road intersections where vegetation clearance or localised road modifications may be required to provide safe access for construction vehicles. Forty-five access points and intersections potentially requiring vegetation removal or trimming to provide safe intersection sight distances (SISDs) for drivers were identified by the traffic study.

These components have been assessed because they have the potential to result in vegetation clearance, habitat loss, or disturbance, either within the Proposed Easement or at discrete supporting infrastructure locations.

For the purposes of the EES, four temporary workforce accommodation areas were assessed, with the assumption that only three would ultimately be used. These are located in the northern portion of the Proposed Easement (at Kerang South and at the proposed Tragowel Terminal Station), in the middle of the Proposed Easement (near Charlton) and at the southern end of the Proposed Easement (near Greens Creek). Each of the potential workforce accommodation areas have been considered in *Technical Appendix S: Ecology* to identify ecological constraints and confirm suitability from an ecology perspective.



The **Protected Matters Search Tool (PMST)** is an official Australian Government online tool that identifies Matters of National Environmental Significance (MNES) and other protected matters under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that may occur in a selected area.

27.6 Existing environment

Identification of MNES within 10 km of the Draft Corridor was conducted using the EPBC Act Protected Matters Search Tool (PMST). The PMST results were then reviewed and, where relevant, refined using habitat assessment and field survey information.

Of the nine categories of MNES, three are relevant to the Project:

- Ramsar wetlands
- Listed threatened species and communities
- Listed migratory species

A detailed discussion and mapping of existing conditions is provided in *EES Technical Appendix S: Ecology* and *EES Chapter 26: Ecology* and is summarised in the following sections with respect to MNES.

27.6.1 Wetlands of international importance (Ramsar wetlands)

Ramsar sites are wetlands of international importance designated under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention). Australia is expected to manage Ramsar wetlands to maintain their ecological character.

The PMST identified that the Project is in proximity to two Ramsar sites - the NSW Central Murray State Forests and the Kerang Wetlands (see Figure 27-2). The PMST search also identified that the Project is within 10 km (downstream) of the Gunbower Forest Ramsar site and over 100 km upstream of several other Ramsar sites associated with the Murray River.

NSW Central Murray State Forests Ramsar site

The PMST search area extended into NSW by virtue of the buffer applied to the Proposed Easement which resulted in the NSW Central Murray State Forests Ramsar site being included in the search. However, no part of the Project is within the Ramsar site and the closest point of the Ramsar site to the Project is Campbells Island State Forest which is 6.5 km east of the Proposed Easement.

Kerang Wetlands Ramsar site

The Kerang Wetlands Ramsar site consists of a collection of 23 named lakes, marshes and swamps and occupies approximately 9,400 ha. The Ramsar site provides important feeding and nesting habitat for waterbirds including species threatened at the international, national or state level and/or listed as migratory under international migratory bird agreements.

The Proposed Easement at its closest point is approximately 2.5 km to the east of the Kerang Wildlife Reserve which contains Fosters Swamp (Figure 27-2). Foster Swamp is one of the wetlands that forms part of the Ramsar site. The Project would not intersect the Ramsar site at any point.

27.6.2 Threatened ecological communities

Threatened ecological communities are naturally occurring groups of native plants, animals, and other organisms that interact within a unique habitat. These communities are listed under the EPBC Act when they are at risk of collapse or extinction.

The PMST identified eight EPBC Act-listed TECs with potential to occur within the 10 km search area. These are listed in Table 27-1. PMST presence ratings are:

- Known – Confirmed presence in the searched area based on field surveys or reliable recent records
- Likely – Suitable habitat is present and the species/TEC is expected to occur
- Unlikely – Habitat absent or is highly fragmented

Five of those EPBC Act-listed TECs were recorded during EES field assessments or have the potential to occur in inaccessible areas.

The other three are considered unlikely to occur when assessed against conservation advice/community descriptions and the map of EPBC Act-listed Ecological Communities occurring in Victoria produced by the Environmental Resources Information Network (ERIN) (DSEWPac, 2013).

No EPBC Act-listed TECs occur within the proposed Tragowel Terminal Station, Bulgana Reactor Station or in the laydown and/or workforce accommodation areas. As such, impacts discussed in Section 27.6.2 relate to the Proposed Easement.



Plate 27-1 An area of Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions TEC

Table 27-1 EPBC Act-listed TECs identified by PMST search and their likelihood of occurrence based on surveys

TEC Name	EPBC Act Status	PMST Rating of potential occurrence in 10 km search area	Likelihood of occurrence based on habitat assessments
Natural Grasslands of the Murray Valley Plains	CR	Known	High^
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	EN	Likely	High^
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (Plate 27-1)	EN	Known	High^
Plains Mallee Box Woodland of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	CR	Known	High^

TEC Name	EPBC Act Status	PMST Rating of potential occurrence in 10 km search area	Likelihood of occurrence based on habitat assessments
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	CR	Likely	Unlikely – no corresponding vegetation was detected during surveys; suitable depressions absent in surveyed areas or unlikely to occur in unsurveyed areas
Mallee Bird Community of the Murray Darling Depression Bioregion	EN	Likely	Medium^^

Table notes:

^ Presence confirmed during surveys

^^ Presumed presence

EPBC Act Status: CR Critically endangered; EN Endangered

27.6.3 Threatened flora species

Threatened flora refers to native plant species listed under Section 178 of the EPBC Act that are at risk of extinction in the wild. They are classified into one of five categories based on assessment of their threat status - critically endangered, endangered, vulnerable, conservation dependent or extinct in the wild. There are five EPBC Act-listed threatened flora species with a greater than low likelihood of occurrence within the Proposed Easement, based on habitat assessment and following targeted flora surveys. These are listed in Table 27-2.

Table 27-2 EPBC Act-listed threatened flora species (greater than low likelihood of occurrence)

Scientific name	Common name	EPBC Act Status	PMST Rating of occurrence in 10 km search area	Current likelihood of occurrence
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	VU	Known	Medium Not detected during targeted surveys and is considered unlikely to occur within the surveyed areas. However, potential habitat in the form of wetlands/dams/seasonally wet /riparian habitats are present within the Proposed Easement on private land that was not accessible for survey. In these unsurveyed areas, the likelihood of occurrence cannot be discounted.
<i>Lepidium monoplacoides</i>	Winged Peppergrass	EN	Likely	Medium Winged Peppergrass was not detected during targeted surveys though there is some potential it could occur in surveyed areas and not have been detected due to being dormant. Potential habitat may also be present within the Proposed Easement on private land that was not accessible. In these areas, there is a greater than low likelihood of occurrence.
<i>Maireana cheelii</i>	Chariot Wheels	VU	Known	Medium Chariot Wheels was not detected during targeted surveys and is considered unlikely to occur within the surveyed areas. However, potential habitat may be present within the Proposed Easement on private land that was not accessible for survey. In these unsurveyed areas, there is some potential for the species to be present.
<i>Myriophyllum porcatum</i>	Ridged Water-milfoil	VU	Known	Medium

Scientific name	Common name	EPBC Act Status	PMST Rating of occurrence in 10 km search area	Current likelihood of occurrence
				Ridged Water-milfoil was not detected during targeted surveys and is considered unlikely to occur within the surveyed areas. However, potential habitat may be present within the Proposed Easement on private land that was not accessible for survey during the flowering period. In these areas, the species is assumed present (including for the purposes of the impact assessment).
<i>Sclerolaena napiformis</i>	Turnip Copperburr	EN	Known	High 75 plants were recorded in the Proposed Easement. Habitat for Turnip Copperburr occurs within the Proposed Easement on private property within unsurveyed areas that were restricted by land access, where species' presence cannot be discounted.

Table notes:

EPBC Act Status; CR Critically endangered; EN Endangered; VU Vulnerable

27.6.4 Threatened fauna species

Threatened fauna refers to native animal species that are facing extinction risk in the wild and classified as critically endangered, endangered, vulnerable, conservation dependent, extinct in the wild or extinct under Section 178 of the EPBC Act.

There are 18 EPBC Act-listed threatened fauna species with a greater than low likelihood of occurrence within the Proposed Easement. These are listed in Table 27-3.

Table 27-3 EPBC Act-listed threatened fauna species

Scientific name	Common name	EPBC Act Status	PMST Rating of potential occurrence in 10 km search area	Likelihood based on habitat assessment	Likelihood of occurrence based on targeted survey
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	VU	Likely	Medium	Low (revised from medium following targeted survey)

Scientific name	Common name	EPBC Act Status	PMST Rating of potential occurrence in 10 km search area	Likelihood based on habitat assessment	Likelihood of occurrence based on targeted survey
					Targeted survey undertaken from November 2025 to January 2026 with three surveys completed in three areas of representative habitat around Kerang. Species not detected during those surveys despite over 400 bats being captured in that time
<i>Hirundapus caudacutus</i>	White-throated Needletail	VU Mi	Known	Medium	Medium Not conducted due to intermittent occurrence of species (presumed presence)
<i>Lathamus discolor</i>	Swift Parrot	CR	Known	Medium (south region) Low (elsewhere)	Medium (south region, low elsewhere) Targeted survey not conducted due to intermittent occurrence of species (presumed presence)
<i>Lophochroa leadbeateri leadbeateri</i>	Pink Cockatoo	EN	Known	Medium	Medium Not detected during diurnal bird surveys but may occur in the north of the Project area
<i>Neophema chrysostoma</i>	Blue-winged Parrot	VU	Known	Medium	Medium Targeted survey not undertaken due to intermittent occurrence of species (presumed presence)
<i>Aphelocephala leucopsis</i>	Southern Whiteface	VU	Known	High	High However, not recorded during surveys (presumed presence)
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	VU	Known	High	High Recorded during surveys in areas of dry open woodland habitat along rivers and roadsides

Scientific name	Common name	EPBC Act Status	PMST Rating of potential occurrence in 10 km search area	Likelihood based on habitat assessment	Likelihood of occurrence based on targeted survey
<i>Apus pacificus</i>	Fork-tailed Swift	Mi	Likely	Medium	Medium Survey not undertaken species may only intermittently occur (presumed presence)
<i>Melanodryas cucullata</i>	Hooded Robin	EN	Known	Medium	Low-Medium Diurnal bird survey did not detect the species suggesting likelihood of occurrence may be lower (presumed presence)
<i>Stagonopleura guttata</i>	Diamond Firetail	VU	Known	High	High Although diurnal bird survey did not detect the species (presumed presence)
<i>Charadrius bicinctus</i>	Double-banded Plover	Mi	Known	Medium	Medium Survey not undertaken as primary areas of potential habitat avoided by Project and species is highly mobile (presumed presence)
<i>Gallinago hardwickii</i>	Latham's Snipe	VU Mi	Known	Medium	Medium Survey not undertaken as species is highly cryptic and mobile (presumed presence)
<i>Rostratula australis</i>	Australian Painted-snipe	EN	Known	Medium	Medium Survey not undertaken as species is highly mobile and primary areas of potential habitat avoided by Project (presumed presence)
<i>Delma impar</i>	Striped Legless Lizard	VU	Known	Medium	High Recorded during tile surveys at two locations in public roadsides around Glenloch and may occur in other areas of potential habitat.

Scientific name	Common name	EPBC Act Status	PMST Rating of potential occurrence in 10 km search area	Likelihood based on habitat assessment	Likelihood of occurrence based on targeted survey
<i>Crinia sloanei</i>	Sloane's Froglet	EN	Known	Medium	Low (revised from medium following targeted survey) Targeted survey did not detect species and Project area is west of the primary distribution
<i>Litoria raniformis</i>	Growling Grass Frog	VU	Known	High	Medium (reduced from high following targeted survey) Not recorded during targeted survey undertaken at locations in proximity to past records north of Kerang. Targeted surveys at the Tragowel Terminal Station in 2023 did not detect GGF. Advice from a local expert at the time suggested an unlikely presence of the species in the general area due to chemical treatment of the irrigation systems.
<i>Bidyanus bidyanus</i>	Silver Perch	EN	Known	High	High No survey as habitat avoided (presumed presence)
<i>Maccullochella peelii</i>	Murray Cod	VU	May occur	High	High No survey as habitat avoided (presumed presence)
<i>Synemon plana</i>	Golden Sun Moth	VU	Likely	High	High Potential grassland habitat occurs in the south. Targeted survey not undertaken due to access constraints (presumed presence)

Table notes:

EPBC Act status: CR Critically endangered; EN Endangered; VU Vulnerable; Mi Migratory

27.6.5 Migratory species

Migratory species are protected under international agreements to which Australia is a signatory. The bilateral agreements and conventions for the conservation of migratory birds are:

- Japan-Australia Migratory Bird Agreement (JAMBA)
- China-Australia Migratory Bird Agreement (CAMBA)
- Republic of Korea-Australia Migratory Bird Agreement (RoKAMBA)
- Bonn Convention which is the Convention on the Conservation of Migratory Species of Wild Animals

The route refinement process to select the Proposed Easement has avoided wetland areas of potential migratory shorebird habitat and other Project areas do not support suitable wetland habitat. Four migratory species that have a greater than low likelihood of occurrence are the Double-banded Plover, Latham's Snipe, White-throated Needletail and the Fork-tailed Swift. All have a medium likelihood of occurrence but surveys have not been conducted for the reasons identified in Table 27-3.

27.7 Impact assessment

This section assesses the potential for significant impacts on MNES, in accordance with the Significant Impact Guidelines, arising from construction and operation of the Project and identifies the EPRs proposed to avoid, minimise and manage those impacts. EPRs are outlined in this section as they relate to each impact and are also consolidated in Section 27.7.

Construction impacts relate primarily to removal of vegetation and habitat and may result in:

- Loss or degradation of areas of EPBC Act-listed TECs
- Loss or degradation of habitat for EPBC Act-listed threatened flora and fauna species
- Impacts on EPBC Act-listed migratory species

Operational impacts primarily relate to the ongoing presence of transmission infrastructure and associated risk of bird or bat collision with, or electrocution from, transmission infrastructure.

Potential impacts on MNES are associated with the Proposed Easement component of the Project. The ecological assessments of the laydown and/or workforce accommodation areas, the Tragowel Terminal Station and Bulgana Reactor Station did not identify potential for TECs or habitat for threatened species to be impacted. This conclusion was reached because the footprints for the facilities would avoid potential habitat and/or MNES were unlikely to occur at those locations. It has been assumed that vegetation clearance is not required to achieve safe sight lines for intersections of access tracks with public roads and, as such, this aspect of the Project is unlikely to affect MNES.

The impact estimates discussed below reflect the avoidance and minimisation of MNES already achieved through the route refinement process, as discussed in Section 27.1.2. The impact estimates have been assessed on a conservative basis. These assumptions are shown in Table 27-4.

Table 27-4 Vegetation clearance assumptions (Proposed Easement)

Proposed Easement construction activity	Assumed clearance	Rationale	Potential for refinement
Entire 240 km long, 70 m wide Proposed Easement (which is 170 m wide at two locations).	Total, permanent ¹ clearance of all vegetation with a mature height of >9.1 m ¹ . Vegetation with a mature height of <9.1 m can remain, unless part of the access tracks between towers (see below) ² .	Based on initial sag analysis	Assumes the lowest sag applies across the entire 70 m wide Proposed Easement and is therefore conservative. Once tower locations are determined at the detailed design stage, the sag and sway analysis ³ be used to determine whether treed vegetation or scattered trees closer to the towers, which are >9.1 m, can remain (EPR-EC01).
Towers and construction footprint required to construct the towers	Total, permanent ¹ clearance of all vegetation.	70 x 78 m area which includes the tower hard stand and construction laydown area outside of the hard stand area. This area is within the footprint of the 70 m wide Proposed Easement.	Potential for micro-siting at detailed design
Temporary construction access tracks between towers	Temporary clearance of all treeless areas of vegetation during construction in the 10 m wide access track corridor. Permanent ¹ clearance of all treed areas would have occurred as part of easement clearance above.	Based on a nominal 10 m wide corridor extending between tower construction footprints, defined by 5 m either side of the Proposed Easement centreline.	May be refined to a narrower corridor during detailed design. May be micro-sited to avoid areas of TEC or habitat during detailed design where possible.

¹ Each EVC (which is not a grassland) has a defined benchmark canopy tree height which is indicative of the height that trees can grow to in that EVC, at maturity.

² Of the 20 EVCs within the Proposed Easement, only one, Lignum Swamp has a mature height of less than 9.1 m.

³ Sag is defined as the height of the transmission lines at their lowest point (influenced by temperature) and sway is defined as the side-to-side movement of the lines in the wind. Treed vegetation outside the maximum sway limits may not need to be cleared despite being within the 70 m Proposed Easement. There may be opportunity for partial clearance where understorey may be able to be retained.

Proposed Easement construction activity	Assumed clearance	Rationale	Potential for refinement
Temporary construction access tracks (including entry/exit points) to the Proposed Easement from public roads, through private property	Unknown but native vegetation would be avoided where possible using EPR-EC01.	Locations are subject to landholder agreements.	Siting would be guided by EPR-EC01.
Stringing locations	Temporary clearance of all vegetation during construction.	40 x 25 m areas every 5 km along the Proposed Easement (~48). Most are within the 70 m footprint but 12 are “angled” and require a 40 x 25 m pad outside the Proposed Easement.	Potential for micro-siting at detailed design.

Table notes:

^ Permanent refers to the life-span of the Project.

For direct native vegetation removal (and therefore TECs), the impacts presented are effectively the residual impacts, as removal of vegetation cannot be mitigated once it occurs and would instead require offsets.

It is estimated that approximately 116 ha of native vegetation patches (including 475 large trees in patches) and 149 scattered trees (130 large and 19 small) would be removed for construction.

In many cases the impact estimates are conservative and are expected to reduce through detailed design as inaccessible areas are ground-truthed, access planning, sag and sway analysis, and micro-siting are undertaken. Offsets are required for residual native vegetation removal, but offsets are not a mitigation measure; rather, they compensate for impacts that remain after avoidance and minimisation have been applied. Full details of the significant impact assessments for TECs, flora and fauna are provided in Appendix K of *Technical Appendix S: Ecology* and are summarised in the following sections.

27.7.1 Rationale for inclusion in Significant Impact Assessment

An assessment has been undertaken of the likelihood of a significant impact occurring on relevant MNES protected under the EPBC Act, after avoidance, mitigation and management measures have been applied. Species that were considered as unlikely to occur were not included in the assessment. Other species that were considered as low were not considered further as they would not rely on the habitat within the Proposed Easement. Consequently, species with a greater than low likelihood of occurrence, or known, in the Proposed Easement were considered within this significant impact assessment if an impact remains after avoidance or the implementation of EPRs.

Silver Perch and Murray Cod have a high likelihood of occurrence in the Project area. However, as Project infrastructure would not be located directly in their habitat and because indirect impacts to the quality of the Murray and Loddon Rivers would be avoided by appropriate set-back distances and a Surface Water Management Plan (SWMP) (EPR-SW01) these species have not been considered in the significant impact assessment.

Likelihood of occurrence was undertaken using a range of information from published literature to habitat assessment and targeted survey, and are presented within the following appendices of *Technical Appendix S: Ecology*.

- Appendix B VNI West Ecology Likelihood TEC
- Appendix C VNI West Ecology Likelihood Flora
- Appendix D VNI West Ecology Likelihood Fauna

A significant impact is defined in DoE (2013, p. 7) as “an impact that is important, notable, or of consequence, having regard to its context or intensity”.

27.7.2 Threatened ecological communities

Of the five EPBC Act-listed TECs recorded during field assessments, or with potential to occur in part of the Proposed Easement, four are likely to be significantly impacted. The Mallee Bird Community of the Murray Darling Depression Bioregion is unlikely to be significantly impacted. A summary of the significant impact assessment for the likely TECs is provided in Table 27-6. Full details of the significant impact assessment are provided in *Technical Appendix S: Ecology*, (specifically Appendix K of that appendix). Direct construction impacts to EPBC Act-listed TECs within the Proposed Easement have been calculated based on conservative native vegetation clearance assumptions, which are detailed in Table 27-4.

Environmental performance requirements

Consistent with the approach adopted for native vegetation, the principal mitigation for impacts on EPBC Act-listed TECs has been avoidance and minimisation through route refinement. Where EPBC Act-listed TECs cannot be completely avoided, the Project would continue to seek opportunities through detailed design to minimise the extent of impact, including through micro-siting of infrastructure, refinement of access tracks and access points, and further assessment to better define the actual extent and condition of TEC occurrences.

EPRs are proposed to protect retained EPBC Act-listed TECs including the implementation of no-go zones (EPR-EC03) and construction controls to prevent inadvertent disturbance outside approved work areas. Reinstatement of disturbed areas with compatible local provenance species may also assist in reducing indirect effects on adjoining retained vegetation and would be conducted where practicable. However, where clearing of an EPBC Act-listed TEC is required for construction, the direct loss of that TEC extent would remain unavoidable. The primary mitigation is therefore to avoid impacts.

Residual impact

Residual impacts on EPBC Act-listed TECs are summarised in Table 27-5. These figures are based on the maximum extent of any of the four Proposed Easement option combinations and encompass confirmed occurrences and unconfirmed occurrences in inaccessible areas. In areas that could not be surveyed, representative or analogous EVCs have been used as a proxy for potential TEC occurrence and assessed using aerial imagery, with unconfirmed patches being ground-truthed once access becomes available. This means for some TECs the impact extent presented is conservative and may reduce as access is granted and design refinement is completed.

Table 27-5 EPBC Act-listed TEC impacts

TEC name	Total impact (ha)
Natural Grasslands of the Murray Valley Plains	13.7
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	37.5
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (Plate 27-1)	2.0
Plains Mallee Box Woodland of the Murray-Darling Depression, Riverina and Naracoorte Bioregions	3.9
Mallee Bird Community of the Murray Darling Depression Bioregion	4.3

Table 27-6 Significant impact assessments – TECs

Natural Grasslands of the Murray Valley Plains	Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Plains Mallee Box Woodland of the Murray-Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Mallee Bird Community of the Murray Darling Depression Bioregion
Summary				
Likely	Likely	Likely	Likely	Unlikely
Significant impact criteria (Endangered TEC): Reduce the extent of an ecological community				
Likely: Likely to be significant impact if assumed extent is confirmed, otherwise unlikely.	Likely: Likely to be significant impact if assumed extent is confirmed, otherwise unlikely.	Likely: Likely to be significant impact if assumed extent is confirmed, otherwise unlikely.	Likely: Likely to be significant impact if assumed extent is confirmed, otherwise unlikely.	Unlikely: Significance has been assessed on the basis of the Area of Occupancy (AOO) of the Mallee Bird Community. The AOO of three 'member' bird species is ~5,600,000 ha and therefore the removal of <4 ha is unlikely to be a significant impact.
Significant impact criteria (Endangered TEC): Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines				
Unlikely: Patches of the TEC occur along roadsides, as well as relatively large patches in private properties. A number of existing access points are present through or adjacent to roadside patches of the TEC. The existing access points are to be used by the Project where possible to reduce fragmentation. Areas of the TEC in private properties were all relatively degraded from historic and ongoing agricultural land uses, which includes numerous access tracks through mapped patches of	Likely: Since confirmed patches are already fragmented, it is likely that additional losses would either increase fragmentation or fragment linear sections. It is possible that micro-siting would be able to find existing gaps within the canopy and avoid removal thereby avoiding an increase in fragmentation. In some cases, fragmentation of patches outside of the Proposed Easement resulting from the creation of breaks of up	Likely: Most patches of the unconfirmed and confirmed patches of the TEC occur along roadsides that extend outside of the Proposed Easement (for example the patch around the intersection of Boort-Quambatook and Griffith Roads) providing some connectivity through the local landscape. Where the Proposed Easement and access tracks cross these roadsides, breaks are expected to be created. These breaks of up to 70 m wide for the Proposed Easement are likely to result in localised fragmentation of these patches, as well as contributing to further fragmentation of the community as a whole. Breaks of up to 10 m wide for access tracks in derived grassland areas of this TEC are unlikely to substantially affect connectivity due to being temporary and not comprised of hard surfaces. Many of the roadsides where the TEC occurs	Likely: Most patches of this TEC occur along roadsides that extend outside of the Proposed Easement providing some connectivity through the local landscape. Where the Proposed Easement crosses these roadsides, gaps will cause localised fragmentation and contribute to further fragmentation of the community as a whole. Although there will be localised fragmentation, it is unlikely to significantly change the species and	Unlikely: Roadsides, while contiguous in the area around the Proposed Easement crossing point, do not have strong connections to the west in the direction of the primary range of the community. Gaps of up to 70 m would be created in some of the roadside corridors and may disrupt local connectivity to some degree. However, most of the occurrences of potential community are on narrow roadsides (<10 m wide) that already have gaps and mallee bird species are capable of crossing open distances.

Natural Grasslands of the Murray Valley Plains	Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Plains Mallee Box Woodland of the Murray-Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Mallee Bird Community of the Murray Darling Depression Bioregion
the TEC. As the proposed access tracks are expected to be of similar dimension to existing tracks, would use existing tracks where present, and are only temporary, the Project is not likely to substantially increase fragmentation in the long term.	to 70 m wide may result in these patches no longer meeting minimum size thresholds to represent the TEC.	already have gaps (e.g. for farm gates) and micro-siting would ensure tracks utilise these areas and avoid removals (and therefore fragmentation) of adjacent, undisturbed patches. Although there will be localised fragmentation, it is unlikely to significantly change the species and structural assemblage of retained areas outside the Proposed Easement and these patches will likely continue to represent the TEC if they already qualify.	structural assemblage of retained areas outside the Proposed Easement and these patches will likely continue to represent the TEC if they already qualify.	Meering West and Crump Road roadsides represent the most extensive area of habitat associated with the Proposed Easement. Species present, or likely to be present, are capable of moving over cleared areas. Consequently, the Project is unlikely to represent a significant impact on the TEC through fragmentation.
Significant impact criteria (Endangered TEC): Adversely affect habitat critical to the survival of an ecological community				
Uncertain: Neither the Conservation nor Listing Advice for the TEC define habitat critical to its survival. However, as per the general definition of critical habitat for listed ecological communities, some patches within the Proposed Easement may meet this definition (although the majority of confirmed patched are degraded). It is uncertain if the habitat expected to be impacted, and the level of impact (largely associated with tracks) would be considered critical to the survival of the TEC as a whole.	Likely: Neither the Conservation nor Listing Advice for the TEC define habitat critical to its survival. However, as per the general definition of critical habitat for listed ecological communities, it is likely that some patches within the Proposed Easement would meet this definition (e.g. that patches currently providing connectivity are necessary for maintaining genetic diversity). Many of these patches are expected to be adversely affected (i.e. subject to removal as above) and therefore this criterion for significant impact would likely be met.	Likely: As per the Conservation Advice for the TEC, habitat critical to the survival are those patches that contain mature Buloke with >50% native understorey vegetation cover, and/or areas with <50% native understorey vegetation cover. Throughout many of the higher quality roadside patches, native vegetation cover was assessed during fieldwork as being >50%, though this was rarely the case on private properties. While many of the patches confirmed or assumed present are isolated and of relatively low landscape importance, a number are connected to large areas of roadside habitat and/or reserves containing important habitat including one location which is connected to habitat where the FFG Act-listed Hooded Scaly-foot <i>Pygopus schraderi</i> was recorded. Based on the above, and the 70 m impact area currently unconfirmed, it is likely that at least some habitat classified as critical to the TEC's survival would be impacted.	Likely: Many patches meet the definition of 'critical to the survival' as per the Conservation Advice. Many of these patches are expected to be adversely affected (i.e. subject to removal as above). It is therefore likely that at least some habitat classified as critical to the TEC's survival would be impacted.	Unlikely: Neither the Conservation nor Listing Advice for the TEC define habitat critical to its survival. As per the general definition of critical habitat for listed ecological communities however, it is unlikely the habitat expected to be impacted would be considered critical to the survival of the TEC as a whole, given the area to be impacted is outside the geographic range and the occurrence is limited to linear degraded habitat and not larger patches.

Natural Grasslands of the Murray Valley Plains	Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Plains Mallee Box Woodland of the Murray-Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Mallee Bird Community of the Murray Darling Depression Bioregion
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Significant impact criteria (Endangered TEC): Modify or destroy abiotic factors necessary for an ecological community's survival

Unlikely: Abiotic factors in the study area are not expected to be impacted above the level occurring with current agricultural uses.

Significant impact criteria (Endangered TEC): Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting

Unlikely: At present, it assumed that treed vegetation would require complete removal and therefore the impact has largely been encompassed within the first criterion.

There may be minor changes on edges of retained areas of the community where removal occurs, but this would be unlikely to cause a change in the species composition of the retained area of ecological community to the extent that the community would decline. Occurrences of the community are already subject to edge effects due to their linear nature or small size and location in an already fragmented landscape.

Maintenance of the Proposed Easement may create a disturbance at the edge of remaining patches and therefore careful management should include standard hygiene controls, regular monitoring, and weed control as required.

Unlikely: At present, it is assumed that treed vegetation would require complete removal and therefore the impact has largely been encompassed within the first criterion.

There may be minor changes on edges (i.e. edge effects) where removal has been conducted, but this is unlikely to cause a significant change in the functionally important species. All birds present or likely to be present are capable of crossing short expanses of open habitat if necessary.

Significant impact criteria (Endangered TEC): Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community

Unlikely: Invasive species that may reduce the quality of the habitat within the Proposed Easement and surrounds (e.g. weeds) are already present and can be managed through the implementation of standard hygiene controls, regular monitoring, and weed control as required.

Weed control would be defined in a Biosecurity Management Plan (BMP) (EPR-EC04) and use of herbicides versus non-chemical control methods would depend on the location and species. Biosecurity Management Plans (BMPs) (EPR-AG02) would be developed in consultation with landholders and would outline alternative weed control measures if required at individual properties.

Unlikely: Yellow-throated Miner may adversely affect woodland bird communities and tree health.

Natural Grasslands of the Murray Valley Plains	Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Plains Mallee Box Woodland of the Murray-Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Mallee Bird Community of the Murray Darling Depression Bioregion
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Additionally, the Noisy Miner was already present and would be a direct competitor (and aggressor) to the Yellow-throated Miner. The mallee woodland habitats crossed by the Proposed Easement are linear occurrences with extensive edges. Creation of gaps for the transmission line would not represent a major increase in opportunity for Yellow-throated Miners to become established. Noisy Miners are already abundant and common across the landscape.

Mallee birds may be at risk of predation by foxes and feral cats. The Project would not assist these species to become established as they are already established in the environment.

Significant impact criteria (Endangered TEC): Interfere with the recovery of an ecological community

Natural Grasslands of the Murray Valley Plains	Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Plains Mallee Box Woodland of the Murray-Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Mallee Bird Community of the Murray Darling Depression Bioregion
Unlikely: Impacts largely associated with degraded patches of the community. It is not expected that the Project would substantially affect the recovery of the TEC as a whole.	Unlikely: The Project is unlikely to interfere with the recovery of the TEC because core blocks such as those found in conservation reserves are avoided. The removals proposed of higher quality occurrences of the TEC are associated with small, dispersed areas that may be important in the local area but are not expected to make a substantial contribution to the TEC as a whole.	Unlikely: Impacts largely associated with linear vegetation along roadsides which does not represent core blocks of the overall TEC's habitat. It is not expected that the Project would substantially affect the recovery of the TEC as a whole.	Unlikely: Impacts largely associated with linear vegetation along roadsides which does not represent core blocks of the overall TEC's habitat. It is not expected that the Project would substantially affect the recovery of the TEC as a whole.	Unlikely: Impacts largely associated with degraded patches of the community. It is not expected that the Project would substantially affect the recovery of the TEC as a whole.

27.7.3 Threatened flora

Of the five EPBC Act-listed threatened flora species assessed as having a greater than low likelihood of occurrence, Turnip Copperburr *Sclerolaena napiformis* (Plate 27-2) was the only species recorded during targeted surveys. No individuals of the other species were detected in accessible areas. Suitable habitat was assessed via aerial imagery and desktop analysis, and inaccessible habitat is presumed to be suitable for these species but of lower quality as they exist on private, agricultural land, that have active threatening processes (e.g. cropping) that are absent in public surveyed areas.

Plate 272 Turnip Copperburr

Environmental performance requirements

As with native vegetation and TECs, the principal mitigation for impacts on threatened flora has been avoidance and minimisation through route refinement, easement refinement and tower siting. Further reduction in impact is expected through ground-truthing in inaccessible areas, detailed design refinement, micro-siting of infrastructure, and refinement of access tracks and access points where practicable (EPR-EC01 and EPR-EC11).

A Threatened Species Management Plan (TSMP) (EPR-EC06) will be developed that will include the requirement for pre-clearance surveys and the establishment of no-go zones (EPR-EC03) around occurrences that can be retained. The TSMP will also outline requirements for seed or propagule collection, salvage or translocation of individuals where feasible, and re-establishment or revegetation measures where appropriate.

An Understorey Retention and Partial Clearance Plan (URPCP) (EPR-EC010) will be developed to specify where partial clearance or understorey retention is proposed. An Operational Vegetation and Habitat Management Plan (OVHMP) (EPR-EC09) will be developed which will include methods for ongoing vegetation management that minimise impacts on retained biodiversity values and will include requirements for management of identified areas of partial clearance or retained understorey. The OVHMP will detail on-going monitoring requirements.

An Environmental Line List (ELL) (EPR-EC13) will identify habitat values, potential species occurrence and location-specific measures. The ELL will synthesise all the requirements from various ecological management plans in one place.

Residual impact

Alignment refinement and design development have prioritised avoidance of threatened flora habitat where practicable. In areas where avoidance was not feasible due to engineering, safety or land use constraints, impacts have been minimised through tower spotting and reduction of construction footprint. Notwithstanding these measures, clearance associated with construction would result in residual loss of habitat and individual plants in some locations.

Impacts on threatened flora are based on removal estimates of preferred EVCs within each species' geographic range representing habitat extent and the maximum extent of the four Proposed Easement option combinations. The impacts shown in Table 27-7 therefore represent a worst-case.

The significant impact assessments for EPBC Act-listed threatened flora species concluded that significant impacts are unlikely on all flora species apart from the Turnip Copperburr, where a significant impact is considered to be likely due to their occurrence in treed areas of the Proposed Easement. As the trees would require removal it is assumed that the Turnip Copperburr would also require removal. The loss of 53 plants over one hectare of habitat in the Proposed Easement footprint is likely to constitute a long-term decrease in the species' population.

Table 27-7 Significant impact on EPBC Act-listed threatened flora species (greater than low likelihood of occurrence)

Common name	EPBC Act Status	Impact (potential habitat in ha)	Likelihood of significant impact
River Swamp Wallaby-grass	VU	21.2	Unlikely
Erect Peppergrass	VU	21.5	Unlikely
Chariot Wheels	VU	29.2	Unlikely
Ridged Water-milfoil	VU	21.6	Unlikely
Turnip Copperburr	EN	14 (including 1 confirmed)	Likely

Table notes:

Impact areas are subject to change once field surveys are conducted at final design stage. As more areas are accessed for survey and the design is finalised, it is anticipated that impacts would be reduced.

EPBC Act status: CR Critically endangered; EN Endangered; VU Vulnerable; Mi Migratory

27.7.4 Threatened fauna

Of the 17 EPBC Act-listed threatened fauna species assessed as having a greater than low likelihood of occurrence in Table 27-3, two species were recorded during targeted surveys. Striped Legless Lizard *Delma impar* was recorded on roadsides at two locations around Glenloch (Plate 27-3) and Brown Tree creeper *Climacteris picumnus* was recorded in several riparian and roadside woodland remnants (Plate 27-4).



Plate 27-3 Plains Woodland habitat for Striped Legless Lizard, roadside at Glenloth, 30 April 2025



Plate 27-4 Murray River, one of the locations where Brown Treecreeper was recorded on 2 November 2025

Since many species cannot be detected in extensive, multi-season surveys, habitat assessments were used to determine the impact on all threatened fauna with greater than low likelihood of occurrence. Potential habitat for those species was identified through desktop and aerial imagery analysis and field surveys.

Habitat removal

Species at greatest risk from habitat removal are those with (solely or combination of) low population numbers (e.g. Swift Parrot *Lathamus discolor*), are sedentary and reliant on micro-habitats (e.g. Striped Legless Lizard) and have particular habitat/food requirements that coincide with areas that are suitable arable land (e.g. Brown Treecreeper).

The significant impact assessment considers the EPRs that would be implemented by the Project to minimise and manage potential impacts of the Project on habitat. The significance of the potential impacts on threatened fauna species are listed in Table 27-9 and discussed in the residual impact section.

Collision risk

The ongoing presence of transmission towers and transmission lines would present a collision risk to birds and bats where individuals fail to detect overhead wires during flight. Collision risk is influenced by both transmission line design and bird behaviour. Risk may be greater where ground wires⁴ or shield wires are less visible than conductors, where lines cross flight paths or occur in areas supporting high bird abundance, and where infrastructure is located near wetlands or other key habitat areas.

Species considered most susceptible to collision are generally larger and less agile birds, species that fly in flocks and species that move frequently between wetlands or foraging areas. These include shorebirds, waterbirds, some raptors and, potentially, other species that fly between habitat areas. Species of concern identified for collision risk are listed in Table 27-8 due to their, for example, body size, flight manoeuvrability, low population numbers and flocking behaviour.

Table 27-8 Species of concern for collision risk

Common name	EPBC Act status
Shorebirds and Plains-wanderer	
Plains-wanderer	CR
Australian Painted-snipe	EN
Sharp-tailed Sandpiper	VU, Mi
Red-necked Stint	Mi
Double-banded Plover	Mi
Latham's Snipe	VU, Mi
Common Greenshank	Mi
Marsh Sandpiper	Mi

⁴ Groundwires are the thinner, uppermost wires required to protect conductors from lightning damage; also referred to as 'shield wires', 'earthwires' or 'neutral cables'.

Common name	EPBC Act status
Waterbirds	
Glossy Ibis	Mi
Australasian Bittern	EN

Table notes:

EPBC Act status: CR Critically endangered; EN Endangered; VU Vulnerable; Mi Migratory

Waterbirds and shorebirds are most at risk at take-off and landing because that is when they are at the lowest altitude and most likely to encounter wires. In the Project area, this is most relevant in landscapes associated with the Kerang Wetlands and other wetland complexes. Species most at risk include EPBC Act-listed migratory species such as Double-banded Plover *Charadrius bicinctus* and Latham's Snipe, which are more likely to occur in the northern part of the Project area. These species would be at greatest risk if the Project was situated close to the Kerang Wetlands and other wetland complexes, hence the Project was rerouted to avoid these and similar wetlands.

Plains-wanderer is of possible concern due to the potential for some birds to be flying between areas of northern grassland habitat in the north of the Project area and high consequence of loss of an individual. However, the number of birds moving through the landscape are likely to be small as they are relatively sedentary and may fly at lower heights than the transmission infrastructure.

Plains-wanderer are also known to avoid moving within 200–300 m of tall trees, potentially due to predation risk of perching raptors. Transmission towers are frequently used as perches by raptors. Many waterbirds/shorebirds (including the Plains-wanderer) have difficulty perceiving wires as they are flying and therefore opportunity exists for mitigation.

Collision risk in other flying species such as bats is not considered a likely impact due to the nature of the lines. Microbats and flying-foxes are more likely to be able to detect static structures in the landscape, unlike wind farm blades. Microbats such as Corben's Long-eared Bat have highly evolved echolocation senses that they use for navigation and prey detection and flying-foxes have excellent night vision. Flying-foxes often collide with distribution wires (i.e. power lines on suburban/rural roads) because these are often at canopy height and sit in amongst tree foliage. Larger transmission lines are within a corridor devoid of vegetation and wires are far apart.

Further details of collision risk are provided in *Technical Appendix S: Ecology* including a collision risk assessment in Appendix M of *Technical Appendix S: Ecology*.

The sections of the Proposed Easement considered to present the greatest risk of collision are shown in Figure 27-3⁵ and comprise:

- One continuous section between Meering West and the Murray River that passes through a landscape that supports a series of wetlands associated with the Northern Victorian Wetlands Key Biodiversity Area and Important Bird Area, and/or the Kerang Wetlands Ramsar site
- Four separate sections around Morri Morri where the alignment passes between Morri Morri Nature Conservation Reserve and Glynwylln State Forest both of which form part of the St Arnaud Box-Ironbark Region Key Biodiversity Area and Important Bird Area

Electrocution risk

⁵ The Wycheproof–Oakvale pale-blue areas represent floodplain hydrology rather than discrete wetland complexes with consistently high waterbird utilisation and were therefore not identified as priority collision-risk areas; these locations would remain subject to refinement through the CRMP based on field observations and stakeholder input.

Electrocution risk associated with the proposed 500 kV transmission line is considered low for birds and flying-foxes due to the large conductor spacing⁶ (9–11 m) and insulation clearances, which make it highly unlikely for individuals to bridge between energised components or between energised and earthed components. Flying-foxes often confuse distribution lines as a place to rest and their wings make contact with oppositely charged wires, causing electrocution. Flying fox wing spans are only 1 m wide.

Electrocution generally requires an animal to bridge between two energised components (phase–phase) or an energised component and earth (phase–ground). Electrocution is most commonly associated with lower-voltage distribution networks where conductor spacing is small enough for many species to bridge components. By contrast, electrocution is relatively uncommon on high-voltage transmission infrastructure because conductor spacing, insulation clearances and separation from tower steelwork are substantially greater (9–11 m).

⁶ For VNI West, the scale of the proposed 500 kV and 220 kV structures means the separation between conductors and potential perch points on the tower would be expected to exceed these recommended minimum clearances by a substantial margin. In the current design, vertical separation between cross-arms is typically 9–11 m for 500 kV and 4–5 m for 220 kV, and horizontal spacing between conductors is also substantial (~14–15 m for 500 kV and ~9–10 m for 220 kV).

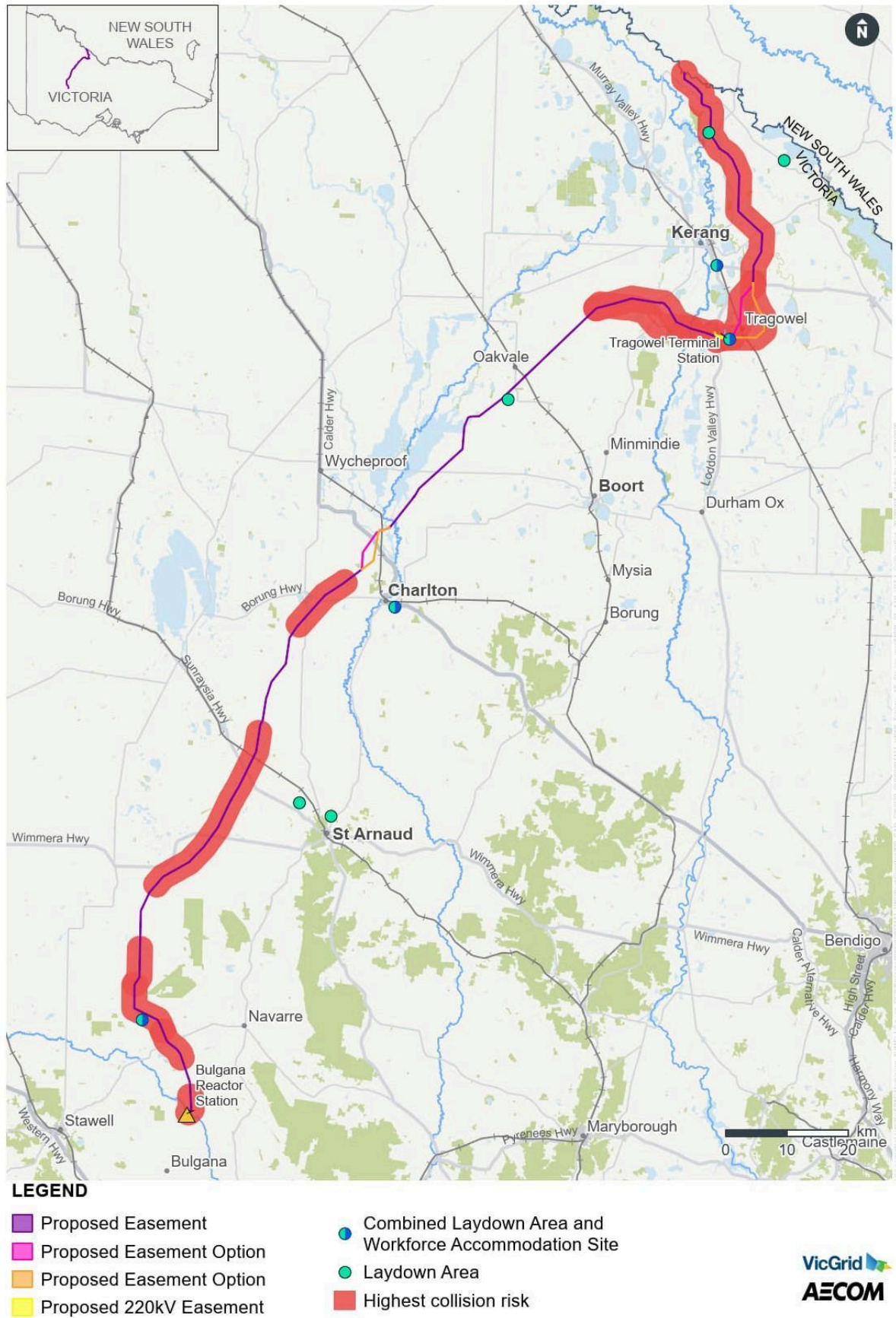


Figure 27-3 Locations of higher collision risk

Environmental performance requirements

EPRs are proposed to mitigate impacts to EPBC Act-listed threatened fauna. EPR-EC01 and EPR-EC11 focus on further avoidance of habitat through ongoing refinement of the construction footprint within the Proposed Easement, including minor adjustments to tower locations where practicable and refinement of access points and access tracks to avoid habitat.

Once avoidance to the extent practicable has been achieved, EPRs requiring the development and implementation of a CVHMP (EPR-EC02), Fauna Management Plan (FMP) (EPR-EC05), Threatened Species Management Plan (TSMP) (EPR-EC06), Understorey Retention and Partial Clearance Plan (EPR-EC10) and an Environmental Line List (EPR-EC13) will further mitigate impacts.

Depending on the species and location, these plans will include measures such as pre-construction surveys for resident fauna, nests, and hollow occupancy; salvage and relocation of fauna by appropriately qualified personnel where required; management of habitat removal timing; retention of felled habitat material such as logs where practicable; retention and protection of understorey vegetation in areas of partial clearance; reinstatement of disturbed habitat and connectivity where practicable; and traffic management measures, including reduced speed limits and contractor awareness measures, to reduce the risk of wildlife strike during construction (EPR-TT03).

A Collision Risk Management Plan (CRMP) (EPR-EC07) will be developed by the Principal Contractor with input from a suitably qualified ecologist, in consultation with DEECA, to identify priority collision-risk locations and specify appropriate measures, monitoring and adaptive management.

Increasing wire detectability may be a key collision risk mitigation for the Project. Wire detectability could be improved by increasing wire diameters and/or use of wire markers, also known as bird flight diverters. A range of methods would need to be implemented depending on the location and 'species of concern' and not all measures would be practicable for the Project.

Residual impact

The potential for significant impact was assessed in accordance with the relevant significant impact guidelines and also considered collision risk. Full details of how the significance of the impact on threatened fauna species listed in Table 27-3 was assessed, are provided in *Technical Appendix S: Ecology*, (specifically Appendix K of that appendix). That detail includes information about the species' profile, occurrence and the full assessment against the significance criteria. A summary of the outcomes of this assessment is provided in Table 27-9.

For some species, significant impact is unlikely because potential habitat is expected to be largely avoided through design refinement. Silver Perch *Bidyanus bidyanus* and Murray Cod *Maccullochella peelii* are likely to occur in the Murray River and Loddon River however impacts to habitat would be avoided by spanning over the waterways.

A significant impact is likely for two EPBC Act-listed woodland birds (Swift Parrot and Brown Treecreeper) under a worst-case scenario. Removal of habitat for the Swift Parrot would contribute to the cumulative loss of wintering habitat across their range and may lead to a long-term decrease in the population. Brown Treecreepers were recorded along roadsides and riparian corridors, and removal of habitat at those locations may result in a long-term decrease in an important population and therefore represent a significant impact on the species.

For many woodland birds (Southern Whiteface, Pink Cockatoo, Hooded Robin, Diamond Firetail and Blue-winged Parrot), the Project would remove some areas of habitat, but those discrete locations are unlikely to represent a significant impact in the context of the landscape, particularly given the mobility of those species. The Project may also be able to reduce impacts as design progresses.

Plains-wanderer are unlikely to be significantly impacted. Known populations are avoided and collision risk should be possible to mitigate.

Striped Legless Lizard were recorded during tile surveys at two locations around Glenloch and may occur in other areas of potential habitat. As a sedentary species, individuals would not readily move away from the Project area.

Plate 274 Striped Legless Lizard
(Credit AECOM)

Therefore, the only means of reducing potential impacts would be through adjusting the location of access tracks and towers. Furthermore, salvaging individuals from the works area and releasing them into immediately adjacent habitat may be required, in accordance with the Threatened Species Management Plan (EPR-EC06). Salvage may rescue some individuals but others may be lost.

Golden Sun Moth *Synemon plana* may occur in the south near Bulgana, however removal of habitat at individual tower locations and for temporary access tracks during construction is unlikely to constitute a significant impact. Suitable habitat would be retained outside of the discrete areas cleared for tower construction, allowing the population to persist and to recolonise the cleared areas at the end of the Project lifespan, reducing the significance of the impact.

Implementation of visibility enhancement measures in higher-risk locations would be expected to substantially reduce collision risk, although it is unlikely that all collision events could be eliminated over the life of the Project.

Monitoring would commence from energisation of the first circuits and would continue through the construction period and into early operation, with the initial monitoring period typically spanning at least two migration/breeding seasons (e.g. a minimum of two years) in priority risk areas, before transitioning to a risk-based ongoing program informed by monitoring results and consultation with DEECA.

With EPRs in place, the residual risk of collision for the species listed in Table 27-8 is expected to be low. A significant impact on threatened or migratory fauna is therefore unlikely as a result of collision.

Table 27-9 Significant impact assessment for EPBC Act-listed threatened fauna species with greater than low likelihood of occurrence

Common name	Impact	Likelihood of significant impact
Corben's Long-eared Bat	15.3 ha potential habitat Low risk of collision with transmission line because microbats have highly evolved echolocation senses for detecting structures in their environment.	Unlikely
Southern Whiteface	27.4 ha potential habitat	Unlikely
Hooded Robin	24.3 ha potential habitat	
Diamond Firetail	28.7 ha potential habitat	
Blue-winged Parrot	48.4 ha potential habitat	

Common name	Impact	Likelihood of significant impact
Pink Cockatoo	25.3 ha potential habitat	
Fork-tailed Swift	15.2 ha potential habitat	
Swift Parrot	17.5 ha potential habitat	Likely
Brown Treecreeper	28.8 ha potential habitat	Likely
Plains-wanderer	Habitat avoided Collision risk possible concern due to high consequence of loss of an individual and potential for some birds to be flying between areas of northern grassland habitat on the northern plains – Patho Plains to the east and Lower Avoca and Bunguluke Plains to the west. However, collision risk should be possible to mitigate, especially wire detectability.	Unlikely
Double-banded Plover	Habitat avoided	Unlikely
Latham's Snipe	Collision risk is a concern because may move through the landscape between the complex of wetlands of the Kerang Wetlands Ramsar site and have a medium likelihood of collision, with a high consequence due to the species being listed as endangered under the EPBC Act. Most of these birds fly regularly in low light (e.g. dawn, dusk) increasing the risk of collision with transmission lines. The potential for collision risk would be low with mitigation, especially wire detectability.	
Australian Painted-snipe		
Australasian Bittern		
White-throated Needletail	11.9 ha potential habitat	Unlikely
Striped Legless Lizard	17.7 ha potential habitat	Likely Impacts may also be avoidable.
Growling Grass Frog	Critical habitat avoided	Unlikely
Golden Sun Moth	12.0 ha potential habitat	Unlikely

27.7.5 Migratory species

Four migratory species, Double-banded Plover, Latham's Snipe, White-throated Needletail *Hirundapus caudacutus* and the Fork-tailed Swift *Apus pacificus*, were identified as having a greater than low likelihood of occurrence within the Project area.

The potential for significant impact to these species from habitat removal, disturbance and collision risk is considered unlikely. Key wetland habitats used by the Double-banded Plover and Latham's Snipe are avoided by the Project and, as neither species breeds in Australia, any habitat loss would relate primarily to temporary or occasional foraging habitat that may be used seasonally or opportunistically.

The Fork-tailed Swift and White-throated Needletail do not breed in Australia therefore any impacts relate to potential foraging resources and collision risk. The airspace over the Project would remain available for foraging and habitat that support the life cycle of prey species would remain available in the surrounding landscape. White-throated Needletail generally flies at heights well above transmission infrastructure and as Fork-tailed Swift are phylogenetically, morphologically and behaviourally similar, it is expected that they would generally avoid infrastructure.

Potential of collision risk for the Double-banded Plover and Latham's Snipe has been considered above. Fork-tailed Swift and White-throated Needletail are not considered as species of concern for collision risk due to their high manoeuvrability and flight behaviour.

A summary of the significant impact for migratory species is provided in Table 27-10.

Table 27-10 Significant impact assessments – Migratory birds

Criteria	Significant impact assessment	
	Double-banded Plover and Latham's Snipe	Fork-tailed Swift and White-throated Needletail
Substantially modify, destroy or isolate an area of important habitat for a migratory species	Unlikely No internationally or nationally important areas exist within the Proposed Easement The Double-banded Plover and Latham's Snipe are of concern for collision risk, because species likely to be moving between wetlands of the Kerang Wetland Ramsar site and moderate to high consequence of loss of individuals. Collision risk should be reduced with mitigation.	Unlikely Habitat occurs but is unlikely to be substantially modified. The airspace over the Project would remain available for foraging and habitat that support the life cycle of prey species would remain available in the surrounding landscape. Species are of mild concern for collision risk because species is widely dispersed, has high manoeuvrability and there are few records of birds in the swift family being electrocuted or colliding with static structures.
Result in an invasive species that is harmful to the migratory species becoming establish in an area of important habitat for the migratory species	Unlikely Invasive species are common and already present in the landscape. The Project would not change the occurrence of predators (e.g. cats and foxes)	Unlikely As a species that is exclusively aerial, the occurrence of on-ground predators is of little risk
Seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species	Unlikely No internationally or nationally important areas exist within the Proposed Easement, therefore no ecologically significant proportion of the population would be impacted	Unlikely The Project would not impact on breeding habitat for the species and is unlikely to affect the availability of foraging habitat or resources to the extent that the lifecycle of an ecologically significant proportion of the species would be seriously disrupted

27.7.6 Comparison of options

At Tragowel and Teddywaddy, two Proposed Easement options remain under consideration for the Proposed Easement. For the purposes of the ecology impact assessment, both Proposed Easement options were assessed and are reflected in the impact calculations. The combination of Proposed Easement options that could ultimately be chosen are:

- Combination 1 – Tragowel eastern easement option/Teddywaddy eastern easement option
- Combination 2 – Tragowel eastern easement option/Teddywaddy western easement option
- Combination 3 – Tragowel western easement option/Teddywaddy eastern easement option
- Combination 4 – Tragowel western easement option/Teddywaddy western easement option

A comparison of these options considered the total extent of TEC, threatened flora and fauna loss for each combination. The conclusion of the comparison was that the four combinations are similar in the MNES impacted and the extent of those impacts.

In terms of impact to EPBC Act-listed TECs, Combination 1 would have a slightly greater impact and Combination 4 would have the least impact, with Combination 2 and 3 being comparable.

27.8 Cumulative impact assessment

The cumulative impact assessment for MNES considers the combined effects of the Project when added to other planned and/or reasonably anticipated future Projects that may occur in the same area.

Cumulative impact assessment for the Project is complex due to the Proposed Easement length and the number of bioregions and vegetation types traversed by the Proposed Easement.

Information in relation to the extent and timing of other Projects is not always readily available which means that cumulative impacts are often likely to be understated. To make as conservative assessment as possible, potential projects within approximately 100 km of the Project were considered, based on a spatial overlap with the Project or the potential to overlap with the same receptors. Temporal overlap (where a project would impact on a receptor at the same time) was not relevant for MNES because any removals that occur at different times would result in a cumulative impact as the removals are permanent.

Projects taken through to the cumulative impact assessment are those that have potential to impact on the same receptors as the VNI West Project based on removal of native vegetation and habitat (i.e. known and assumed species/communities). Cumulative impacts may also include collision risk to birds and bats associated with wind turbines and transmission lines. These projects are listed in Table 27-11 and are shown on Figure 27-4.

Table 27-11 Projects included cumulative impact assessment

Project name	Project type	Spatial overlap	Receptor overlap	Collision risk
VNI West – NSW section	Transmission line	Interface with VNIW Victorian section at the Murray River, Murrabit	Yes	Yes
Western Renewables Link	Transmission line	Interface with VNIW at the proposed Bulgana Reactor Station.	Yes	Yes

Project name	Project type	Spatial overlap	Receptor overlap	Collision risk
Watta Wella Renewable Energy Project	Wind farm and battery storage	Not intersected by the Proposed Easement	Yes	Yes
Meering West Wind Farm	Wind farm	Intersected by VNIW	Yes	Yes
Navarre Green Power Hub	Wind farm and battery hub	Intersected by VNIW	Yes	Yes
Normanville Energy Park	Wind farm	Not intersected by VNIW	Yes	Yes
Cannie Wind Farm	Wind farm	Proposed transmission corridor connects to the Tragowel Terminal Station	Yes	Yes
Wimmera Plains Wind Facility	Wind farm	Not intersected by VNIW	Yes	Yes
Avonbank Mineral Sands Project	Mining	Not intersected by VNIW	Yes	No
Donald Mineral Sands Project	Mining	Not intersected by VNIW	Yes	No
Goschen Mineral Sands Project	Mining	Not intersected by VNIW	Yes	No
Victorian Murray Floodplain Restoration Project East Package (Gunbower National Park Project and Guttrum and Benwell Forests)	Floodplain restoration	Not intersected by VNIW	Yes	No
Western Highway duplication – Stage 3 – Ararat to Stawell	Road upgrade	Not intersected by VNIW; located 30 km to the south of Bulgana	Yes	No
Western Highway duplication – Stage 2 – Sunbury to Ararat	Road upgrade	Not intersected by VNI West; Ararat located 17 km to the south of Bulgana	Yes	No
Beaufort Bypass (Western Highway)	Road upgrade	Not intersected by VNI West; located approx. 40–50 km south-west of the nearest section of VNI West	Yes	No
East Grampians Rural Pipelines	Pipeline	Intersects VNI West at several locations, where the pipeline network follows road reserves crossed by the VNI West Proposed Easement	Yes	No

Project name	Project type	Spatial overlap	Receptor overlap	Collision risk
Wimmera Renewable Energy Solutions	Wind farm component	Not intersected by VNI West	Yes	Yes

The cumulative impact on EPBC Act-listed TECs, from the Project and the other projects, is dependent on the TEC. The greatest cumulative impact would be on Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia, Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions and Natural Grasslands of the Murray Valley Plains. There would be a lesser cumulative impact for Plains Mallee Box Woodland of the Murray Darling Depression and Riverina Bioregions.

Cumulative impacts on threatened species are anticipated but are difficult to quantify and assess from the information available and would vary between species. The greatest impact on EPBC Act-listed flora and fauna species would be on species with restricted distribution and microhabitats (e.g. Striped Legless Lizard, Turnip Copperburr) and those where the population number is incredibly low (e.g. Swift Parrot). An increased presence of wind farms and transmission lines in the landscape is likely to present a cumulative collision risk, with wind turbines presenting a greater risk than transmission lines due to the rotation of the blades. Combined, the ten windfarms included in the CIA represent potential for 1,300 wind turbines to be added to the landscape. Cumulatively, this could have an adverse effect on EPBC Act-listed birds and bats. The number of turbines is likely to change during the planning and approvals processes, meaning it is difficult to assess the risk.

Full details of the cumulative impact assessment are in *Technical Appendix S: Ecology*, (specifically Appendix L of that appendix).

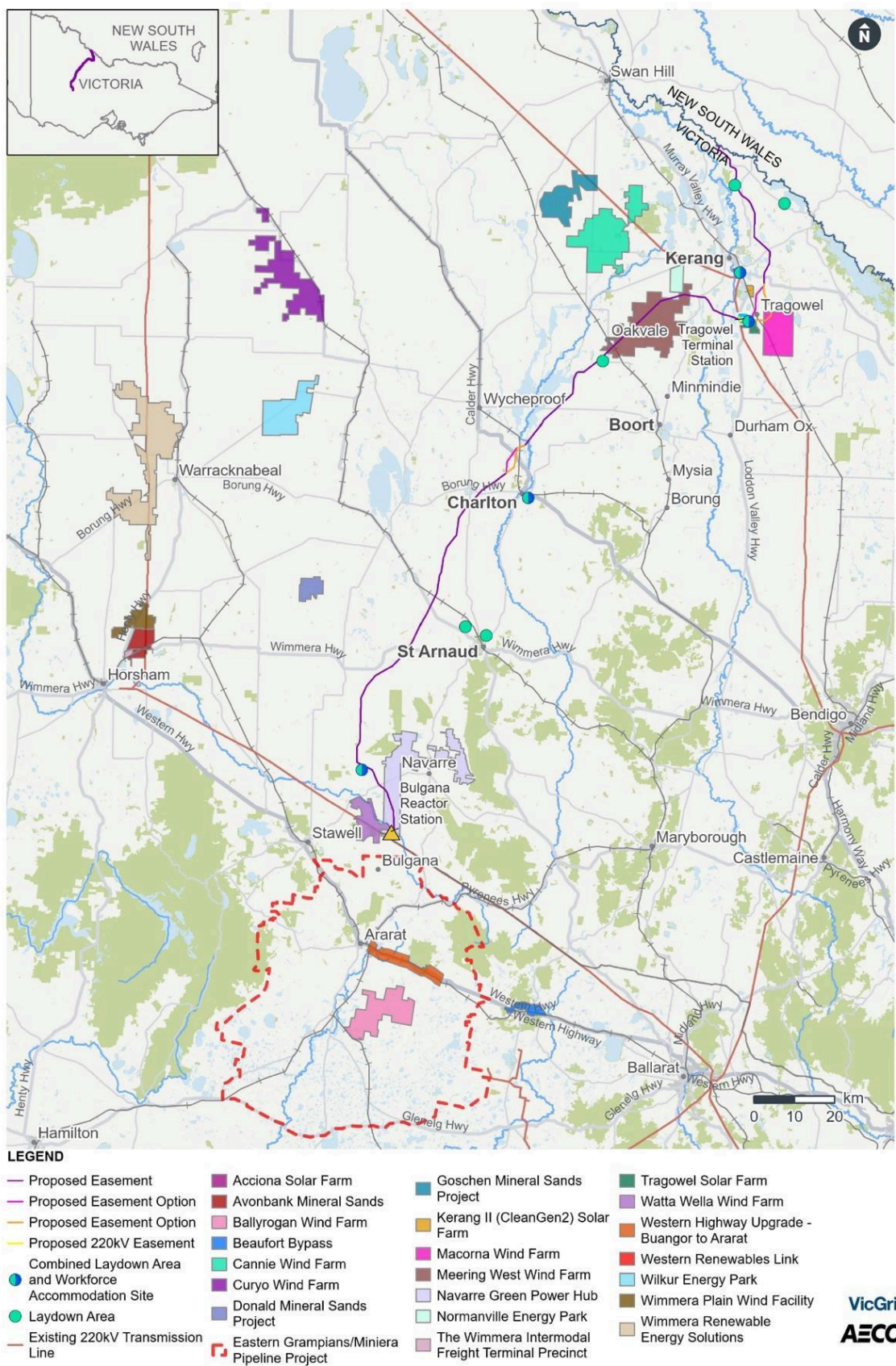


Figure 27-4 Cumulative impact map

27.9 Environmental performance requirements

EPRs define the environmental outcomes and performance standards that must be achieved by the Project.

EPRs have been developed to avoid and minimise impacts on native vegetation, TECs, flora, fauna and habitat to the extent practicable, and to manage residual impacts where avoidance is not possible. Where field verification in inaccessible areas, design refinement or management planning are needed, those requirements are identified in the relevant EPR.

As shown in Table 27-12, the ecology EPRs apply across different phases of the Project, including design, pre-construction, construction, operation and decommissioning, depending on the nature of the impact and the control required. Some measures apply broadly across multiple phases, while others will be implemented prior to works commencing or during detailed design to inform final siting, management planning or offset requirements.

The ecology EPRs summarised in Table 27-12 will form part of the Project's Environmental Management Framework (EMF) and once incorporated into the EMF endorsed by the Minister for Planning and relevant statutory approvals, will become enforceable commitments for the Project. In this way, the measures identified through the ecology assessment will be translated into approved environmental management requirements and implemented through the relevant management plans, monitoring programs and compliance processes for each Project phase. The detailed approval, verification, implementation and reporting pathways for these measures are set out in the EMF.

Table 27-12 EPRs

ID	Description	Phase
EPR-EC01	Complete ecological surveys, apply sag and sway analysis, and finalise design	Design Pre-construction
EPR-EC02	Construction Vegetation and Habitat Management Plan (CVHMP)	Construction
EPR-EC03	No-Go Zones and retained ecological values	Construction Operation Decommissioning
EPR-EC04	Ecological Biosecurity Management Plan (EBMP)	Construction Operation Decommissioning
EPR-EC05	Fauna Management Plan (FMP)	Construction Decommissioning
EPR-EC06	Threatened Species Management Plan (TSMP)	Construction Operation where relevant Decommissioning
EPR-EC07	Collision Risk Management Plan (CRMP)	Construction Operation
EPR-EC08	Riparian and aquatic habitat protection	Construction Decommissioning

ID	Description	Phase
EPR-EC09	Operational Vegetation and Habitat Management Plan (OVHMP)	Operation
EPR-EC10	Understorey Retention and Partial Clearance Plan (URPCP)	Design Construction
EPR-EC11	Further avoidance and minimisation framework for higher biodiversity value areas	Design
EPR-EC12	Pre-clearance surveys for threatened turtle nests	Pre-construction Construction
EPR-EC13	Environmental Line List (ELL)	Construction Operation Decommissioning where relevant
EPR-EC14	Ecological offsets	Pre-construction Construction Operation where relevant
EPR-EC15	Ecological monitoring and adaptive management	Construction Operation Decommissioning
EPR-EC16	Culturally significant species and materials salvage plan (CSSMSP)	Construction
EPR-EC17	Biodiversity induction	Construction Operation where relevant Decommissioning

In addition to the EPRs listed in Table 27-12, EPRs from other technical appendices are relevant to MNES impacts from the Project. These EPRs and linkages are summarised in Table 27-13 below.

Table 27-13 EPRs from related technical studies

EES Chapter	EPR ID	Relevance to MNES
<i>EES Chapter 20: Agriculture</i>	EPR-AG02	Biosecurity Management Plan
<i>EES Chapter 18: Traffic and transport</i>	EPR-TT03	Traffic Management Plans

A full list of Project EPRs is provided in *EES Chapter 28: Environmental Management Framework*.

27.10 Monitoring and adaptive management

The Project recognises that there may be instances where EPRs are not fully effective and there may also be unexpected finds during ecological surveys in inaccessible areas. As a contingency, an EPR has been developed (EPR-EC01) to ensure previously unrecorded ecological values that may be impacted by the Project would be addressed, any change in impacts would be identified and offsets recalculated for approval by DEECA/National EPA as relevant.

Monitoring is a key mechanism in the EMF for verifying compliance with statutory approvals, tracking implementation of the EPRs and assessing the effectiveness of EPRs and management plans and controls are effective. Where monitoring is required by an EPR, management plan or approval condition, the relevant implementation document would define the monitoring details including objectives, locations, monitoring methods, frequency, duration and timing of monitoring, performance criteria and management thresholds, roles and responsibilities, reporting requirements and contingency, corrective actions or adaptive management responses for the value of concern. Monitoring requirements and contingency measures will be defined in the relevant management plans to be prepared for the Project, which will be developed in accordance with the Commonwealth Environmental Management Plan Guidelines (DCCEEW, 2024).

Monitoring would be set on a risk-based basis in each relevant management plan and will specify the responsible party, locations, methods and reporting. As a guide, higher-risk matters (e.g. collision monitoring in priority areas and weed monitoring following ground disturbance) would typically be undertaken more frequently during early operation (e.g. quarterly or seasonally) and would reduce to annual monitoring where results demonstrate controls are effective. Monitoring reports would be provided to regulators where required by statutory approvals and/or EPRs. Where monitoring identifies non-compliance or unanticipated adverse impacts, corrective actions would be implemented in accordance with the relevant plan, including escalation/notification where required, review of controls, and implementation of additional mitigation through the adaptive management process.

The requirement to undertake ecological monitoring and adaptive management is set out in EPR-EC15. The EPR requires that monitoring be conducted to allow mitigation efficacy to be assessed and for adaptive management to occur throughout the life of each plan.

Adaptive management practices may require specialist input from on-ground contractors, industry experts, Traditional Owners and regulatory authorities. The monitoring required under EPR-EC15 and the associated management plans would generally comprise:

- Monitoring the success of revegetation, habitat reinstatement and remediation works at locations where these measures are implemented in accordance with the CVHMP (EPR-EC02), including vegetation establishment, survival and weed incursion

- Conducting bird and bat mortality counts in areas of higher risk to assess whether the mitigations implemented under the CRMP (EPR-EC07) to reduce collision risk are minimising impacts, and identifying whether other areas require measures to be adopted
- Monitoring weed establishment in accordance with the BMP (EPR-EC04) and the OVHMP (EPR-EC09) post-construction to identify whether ground disturbance during construction has resulted in weed encroachment
- Monitoring the condition of artificial hollow, nest boxes, salvaged hollows and other installed habitat features and monitoring the species which are using them (EPR-EC06)
- Monitoring the condition and extent of native vegetation and habitat (including TECs) and threatened flora in accordance with the CVHMP (EPR-EC02), the OVHMP (EPR-EC09) and the URPCP (EPR-EC10) to ascertain whether impacts during construction and operation are consistent with approvals and management plans
- Post construction monitoring as required by the TSMP (EPR-EC06)
- Monitoring the collection/salvage of culturally significant species or materials as required by the CSSMP (EPR-EC16)

Review and audit of the Project's performance against the EPRs and the efficacy of the measures would be conducted by the Principal Contractor, through the appointment of an Independent Environmental Auditor (EPR-EM02) to ensure continuing compliance with its environmental objectives and approval conditions. Where required under statutory approvals and/or EPRs, monitoring reports would be provided to regulators.



An **EPBC offset** is a measurable conservation action taken to compensate for significant residual impacts on matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), after all reasonable steps have been taken to avoid, mitigate and manage those impacts

27.11 Offsets

Critical to the approval of an action under the EPBC Act is an understanding of whether a suitable offset is available to compensate for any significant residual impacts to an MNES. The residual impacts of a project are those that remain (and are unavoidable) when all possible avoidance, minimisation measures and EPRs have been enacted. Offsets do not reduce the likely impacts of a proposed action but instead compensate for any residual significant impact.

Offsets can be delivered by a range of mechanisms, including market-based mechanisms and contracting third party providers. Suitable offsets must improve or maintain the viability of the protected matter (DSEWPac, 2012).

The Project would have significant residual impacts on TECs and habitat for threatened flora and fauna. Offsets will be obtained for the Project in accordance with *Attachment III: Draft Offset Strategy*, as required by EPR-EC14. Offset requirements for potentially significant residual impacts on MNES based on worst-case scenario are outlined in *Technical Appendix S: Ecology* and summarised in Table 26-15.

Table 26-15 Area to be offset for residual impacts on TECs and threatened species habitat

Offset type	Area to be offset (worst-case)
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	10 ha
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	121 ha
Natural Grasslands of the Murray Valley Plains	115 ha
Plains Mallee Box Woodlands of the Murray Darling Depression, Riverine and Naracoorte Plain Bioregion	27 ha
Turnip Copperburr	57 ha
Swift Parrot	121 ha
Brown Treecreeper	150 ha
Striped Legless Lizard	78 ha

Table notes:

As more areas are accessed for survey and the design is finalised, it is anticipated that impacts would be reduced. As such, the area to be offset for protected matters is subject to change.

Commonwealth offsets for the Project would be identified through a qualified offset broker and secured via a Trust for Nature conservation covenant or a DEECA Section 69 agreement. The estimated offset requirements were reviewed against known supply in consultation with a qualified offset broker to identify whether there would be risks to the availability of offsets for the Project. Supply risk was rated as low, moderate, high or extreme based on the ability to procure the offset.

Offsets for known occurrences of TECs are a moderate supply risk for Buloke Woodlands and extreme risk for Plains Mallee Box Woodland. Offsets for the worst-case (confirmed and unconfirmed) occurrence of the TECs represent an extreme supply risk for Plains Mallee Box Woodland.

Offsets for Turnip Copperburr and Striped Legless Lizard are a high supply risk. Offsets for Swift Parrot and Brown Treecreeper are a low supply risk.

There is potential to co-locate some species and TEC offsets and the Offset Strategy would aim to maximise co-location of multiple MNES at individual sites. Sites for Turnip Copperburr and Striped Legless Lizard offsets would need to demonstrate presence.

If suitable offset sites for particular species or communities cannot be found, alternative offset arrangements would need to be made in consultation with National EPA.

27.12 Conclusion

The Project traverses a landscape that has been largely cleared of native vegetation due to historical and ongoing agricultural land use.

The Project undertook a comprehensive and extensive avoidance and minimisation process to select the least constrained Proposed Easement. The route refinement process sought to minimise impacts on ecological features as much as practicable while also working within the constraints associated with other factors including social, cultural and engineering as well as technical and cost-benefit considerations such as limiting the number of angles required along the transmission line. Sensitive areas prioritised for avoidance were identified through a combination of desktop and field assessments, where access was available, as well as consultation with landholders, communities, Traditional Owners and other stakeholders.

The ecology impact assessment identified that the Project could have the potential to impact on areas of ecological sensitivity through:

- Construction activities removing native vegetation and habitat to install transmission lines and towers and for associated aspects including laydown and/or workforce accommodation areas.
- Operational activities where the ongoing presence of transmission infrastructure poses a risk of bird collision with cables and associated disruption of connectivity between habitats in the landscape
- Ongoing management of vegetation underneath transmission lines would be a source of continued disturbance to habitat and carries an associated risk of introduction or spread of weeds or pathogens during maintenance activities

Key findings

EPBC Act-listed threatened species recorded during surveys were Turnip Copperburr, Brown Treecreeper and Striped Legless Lizard.

Construction of the Project would result in the direct removal of native vegetation and habitat to install transmission lines, towers, laydown areas, workforce accommodation areas, and access tracks to, and within, the Proposed Easement. This removal would directly impact TECs where vegetation to be cleared forms part of those communities. It would also result in the direct loss or modification of habitat for flora and fauna species associated with that vegetation and, in some instances, may directly affect protected or threatened plants occurring within areas to be cleared.

Land access restrictions meant that there was limited survey coverage along parts of the Proposed Easement. Approximately 54% of properties intersected by the Project were accessed for field assessment. In terms of physical area, this represented approximately 47% of the Project area. The proposed Tragowel Terminal Station, Bulgana Reactor Station and laydown and/or workforce accommodation areas were all able to be accessed. Approximately 32% of the Proposed Easement was able to be accessed and assessed for ecology. In areas where access was not available, a conservative approach was adopted so that potential impacts were not understated. This included using modelled ecological information, remotely sensed data and precautionary assumptions.

Assessments determined that 115.7 ha of native vegetation patches (including 475 large trees in patches) and 149 scattered trees (130 large and 19 small) would be removed for construction.

Operational impacts are associated with the ongoing presence of transmission infrastructure posing a risk of bird collision and continued disruption to connectivity.

Risk of electrocution is low because the design of the transmission infrastructure means that it would not be possible for wildlife to make contact between conductors of the same phase or between phases. Ongoing management of vegetation underneath transmission lines would disturb any habitat that may re-establish following initial clearing and increase the risk of introduction, or spread of, weeds or pathogens.

Key mitigation

EPRs are proposed to achieve further avoidance of the habitat through ongoing design refinements (EPR-EC01 and EPR-EC11) and an URPCP (EPR-EC10) will be developed to specify where partial clearance or understorey retention is proposed.

Beyond avoidance, other mitigations including fenced no-go zones (EPR-EC03) to protect retained native vegetation and habitat during construction, a BMP (EPR-EC04) to enforce strict hygiene protocols to reduce the risk of introduction and/or spread of disease and the implementation of URPCP (EPR-EC10) to guide the retaining and/or replanting of understorey.

EPRs require the development and implementation of management plans including a CVHMP (EPR-EC02), a TSMP (EPR-EC06), a CRMP (EPR-EC07) and OVHMP (EPR-EC09). Those plans will be prepared in conjunction with overarching Project construction, operation and decommissioning environmental management plans (CEMP, OEMP and DEMP). These plans will contain specific measures which will be identified to minimise and manage ecological impacts.

Following the implementation of EPRs, The Project would have a residual impact on EPBC Act-listed TECs, and habitat for threatened flora and fauna species.

Residual impact

The Project is likely to have a significant impact on four EPBC Act-listed TECs – Natural Grasslands of the Murray Valley Plains, Grey Box Grassy Woodland, Buloke Woodlands and Plains Mallee Box Woodland. A significant impact on the Mallee Bird Community TEC is unlikely.

The Project would be unlikely to have a significant impact on threatened flora species listed under the EPBC Act with the exception of Turnip Copperburr, which has a likely significant impact as 53 individuals would be lost in treed areas of the Proposed Easement.

For EPBC Act-listed woodland birds such as the Southern Whiteface, Hooded Robin, Diamond Firetail, Blue-winged Parrot, Pink Cockatoo, and Fork-tailed Swift the Project would remove some areas of habitat, but those discrete locations are unlikely to represent a significant impact in the context of the landscape, particularly given the mobility of those species.

A significant impact is likely for two EPBC Act-listed woodland birds (Swift Parrot and Brown Treecreeper) under a worst-case scenario. Removal of habitat for the Swift Parrot would contribute to the cumulative loss of wintering habitat across their range and may lead to a long-term decrease in the population. Brown Treecreepers were recorded along roadsides and riparian corridors, and removal of habitat at those locations may result in a long-term decrease in an important population and therefore represent a significant impact on the species.

Striped Legless Lizard were recorded during tile surveys at two locations around Glenloth and may occur in other areas of potential habitat. As a sedentary species, individuals would not readily move away from the Project area. Therefore, the only means of reducing potential impacts would be through adjusting the location of access tracks and towers. Furthermore, salvaging individuals from the works area and releasing them into immediately adjacent habitat may be required. Salvage may rescue some individuals, but others may be lost.

Golden Sun Moth may occur in the south near Bulgana, however removal of habitat at individual tower locations and for temporary access tracks during construction is unlikely to constitute a significant impact. Suitable habitat would be retained outside of the discrete areas cleared for tower construction, allowing the population to persist and to recolonise the cleared areas at the end of the Project lifespan, reducing the significance of the impact.

There would be no residual impact on Kerang Wetlands Ramsar as the Project avoids the Ramsar site.

Offsets

Offsets would be required in accordance with the EPBC Act Environmental Offsets Policy for the loss of TECs or habitat for species when likely significant impacts are verified by National EPA.

A Draft Offset Strategy has been prepared to detail the approach to offsetting residual impacts of the Project on matters of national and state significance (see *Attachment III: Draft Offset Strategy*). The strategy sets out the proposed means for identifying the availability of, and securing, offsets required for the Project.

As the extent of removal of EPBC Act-listed TECs and threatened species habitat has not been finalised (and would not be finalised until after approval and detailed design), the Draft Offset Strategy provides information on the likely offsets required based on the worst-case scenario.

As more areas are accessed for survey and the design is finalised, it is anticipated that impact extents would be reduced. Because calculations of impacts and the final requirement for EPBC Act offsets are pending the outcome of additional surveys, design refinements and the EPBC Act determination, offset requirements for the Project identified in this chapter may be subject to change.

Priority would be given to offset sites closest to the Project and on the same Country as where the impact took place, prioritising land held by Traditional Owners where possible. The feasibility of achieving offsets in proximity to the Project will be influenced by factors that include landholder willingness to provide offsets for the Project and availability of landholdings that are suitable to be an offset.

