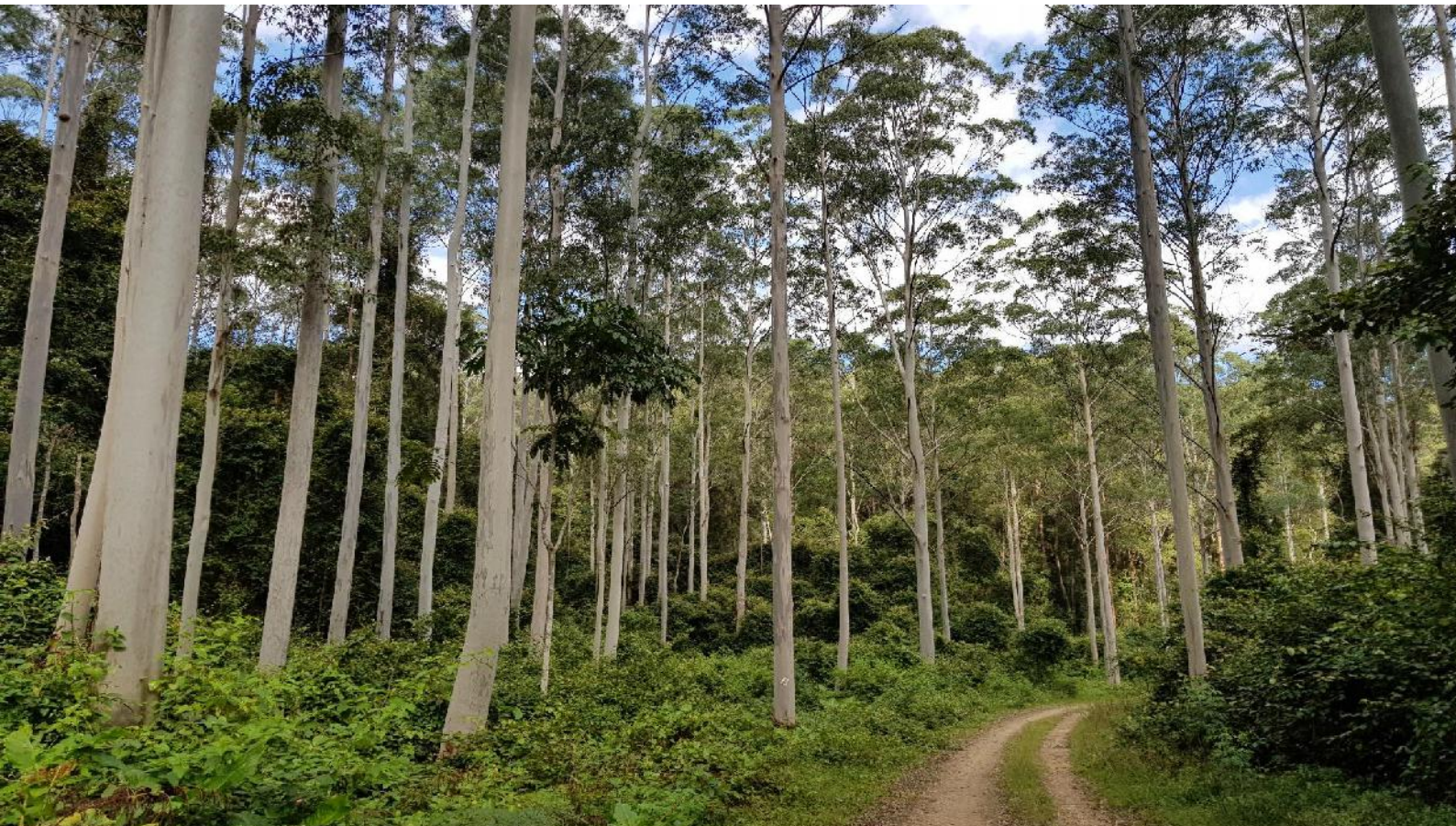
Biodiversity Development Assessment Report

Yanco Battery Energy Storage System - 120 Houghton Road, Yanco, NSW 2703,

04/11/2024

Version 3.0



Biodiversity Development Assessment Report

Yanco Battery Energy Storage System - 120 Houghton Road, Yanco, NSW 2703,

04/11/2024

Prepared for

ACEnergy Pty Ltd

Declaration:

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016*.

Signature: _____
Date: _10/05/2024_____
BAM Assessor Accreditation and Case File no: _00050848/BAAS18041/24/00050849

Document Control

Version	Description	Date
3.0	Final Report	04/11/2024

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1 Introduction

1.1 Background

Habitat Environmental Services Pty Ltd (Habitat) have been engaged by ACEnergy Pty Ltd to prepare a Biodiversity Development Assessment Report (BDAR) to support the development of a 250 Megawatt AC (MWAC) and 1,100 MW-hours Battery Energy Storage System (BESS) on lands located at 120 Houghton Road, Yanco NSW (Lots 516 and 521 DP 751745). Road upgrades will also be required at the Houghton-Hume Road intersection and the Houghton Road-Irrigation Way intersection.

The proposed development is for the purpose of electricity generating works and has an estimated development cost ('EDC') of more than $30 million. Pursuant to Section 20 of Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021*, the proposed development is characterised as State Significant Development (SSD).

This assessment has been undertaken in accordance with the NSW Biodiversity Assessment Method (BAM) (DPIE 2020a) under the NSW *Biodiversity Conservation Act 2016 2016* (BC Act) and the *Biodiversity Conservation Regulation 2017* (BC Regulation). The following terms are used throughout this report:

- **Study Area (Investigation Area)**- Areas (42.79 ha) that were assessed during fieldwork:
  - The site where BESS is proposed to be constructed (Lots 516 and Lot 521, DP 751745).
  - Areas adjacent to the Yanco Substation (Lot 10, DP 844961).
  - Road easements at the Houghton-Hume Road intersection and the Houghton Road-Irrigation Way intersection (Lot 1, DP 931848 and Lot 1, DP 1072592).
- **Subject Land (Development Footprint)** - Areas (10.42 ha) to be directly impacted/removed.
- **Locality** - Areas within a five-kilometer (km) radius of the Study Area
- **Assessment Area** - Areas within a 1,500-meter buffer of the Subject Land.

1.2 Scope

This BDAR aims to quantify impacts of the proposed development upon biodiversity values based upon the methods described within the BAM (DPIE 2020a), including threatened biota listed under the BC Act. The assessment includes:

- Stage 1 – Biodiversity Assessment: Mapping of Plant Community Types (PCTs) including Endangered Ecological Communities (EECs), an assessment of the potential occurrence of threatened species and their habitats, and the potential occurrence of candidate threatened species returned by the BAM Calculator (BAM-C)
- Stage 2 – Impact Assessment: Identification of potential impacts of the proposed development, avoidance and mitigation measures, and biodiversity offset requirements based upon residual impacts.

The Biodiversity Accredited Assessor System (BAAS) Case number for the Project is BAAS Case Number: 00050848/BAAS18041/24/00050849. The accredited assessor for the project is Dr. Gilbert Whyte (BAAS18041).

1.3 Information Sources

The following resources were used to inform the assessment:

- Biodiversity Assessment Method (DPIE 2020)
- The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) BioNet Atlas (NSW DCCEEW 2024a) for previous records of threatened species, populations, and ecological communities within five km radius of the Study Area.
- NSW State Vegetation Type Map (NSW DCCEEW 2024b) for Plant Community Types (PCTs) mapped within the locality.
- The NSW DPE, BioNet Vegetation Classification Database (NSW DCCEEW 2024c) for identification and allocation of Plant Community Types (PCTs) to Vegetation Zones on site.
- The NSW DCCEEW, BioNet Threatened Biodiversity Data Collection (NSW DCCEEW 2024d), Threatened Species Profiles (NSW DCCEEW 2024e) and Final Determinations (NSW DCCEEW 2024f) for information on threatened species, populations, and ecological communities.
- The Commonwealth DCCEEW Protected Matters Search Tool (PMST) (DCCEEW 2024a) for Matters of National Environmental Significance (MNES) including predicted threatened species, populations, and ecological communities.
- Relevant published literature.

Additional information sources applicable to a specific assessment methodology are listed in the corresponding section of this report. References are provided in **Section 10**.

1.4 Experience of Contributors

Details of the persons responsible for preparing the BDAR plus any surveys and/or investigations on which the BDAR relies are detailed in **Table 1**.

Table 1 Experience of contributors

Name and Position	Role and tasks performed	Qualifications	BAM accreditation No.
Dr Gilbert Whyte Principal Ecologist (Botanist)	BAM Accredited Assessor for the project All Fieldwork and Reporting	BSc (Hons) PhD	BAAS18041
Dr Daniel O'Brien Principal Ecologist (Zoologist)	Report review	BSc (Hons) PhD	BAAS21023

1.5 Site Description

The Project Site and the Intersection Investigation Area are located directly to the southwest of the township of Yanco, within the Leeton Local Government Area (LGA) (see **Figure 1**). The Project site is zoned RU1: Primary Production under the Leeton Local Environmental Plan (LEP) 2014. The majority of the Intersection Investigation Area is also zoned RU1: Primary Production and the road easement is zoned SP2 Road and Traffic Facilities (LEP 2014).

The surrounding land use is predominantly agricultural with sparse occurrences of native vegetation, mostly comprised of isolated trees and small patches of woodland (see **Figure 2**). The topography within the locality is relatively flat and no natural waterways occur within the Project Site or the Intersection Investigation Area. Constructed irrigation channels occur to the north of Houghton Road and to the east of the Project Site along Hume Road.

1.6 Proposed Development

The Yanco BESS project comprises a BESS with capacity of 250 Megawatt AC (MWAC) and 1,100 MW-hours and includes the following key infrastructure:

- Enclosed lithium-ion batteries.
- Power conversion systems including associated transformers.
- Underground power and fiber optic cabling interconnecting the equipment.
- Grid connection equipment including switchgear, protection and control equipment, metering, reactive power equipment, filtering equipment, auxiliary transformers and enclosures/buildings for housing equipment.
- An underground or overhead transmission line of up to approximately 450 metres long to connect the BESS to the Yanco substation.
- Earthing and lightning protection systems.
- Site office, control rooms, storage area/enclosure, internal access tracks, on-site parking, security fencing, CCTV, and temporary construction laydown area.
- Vegetation screening.
- Provision of a new site access from Hume Road to the east.
- Road upgrades at Houghton-Hume Road and Houghton Road-Irrigation Way intersections

The primary components associated with the installation of the BESS are as follows:

- Site investigations, vegetation clearing, road upgrades, levelling, access way construction, drainage system installation and installation of foundations/supports to install equipment.
- Transport to site and installation of equipment.
- Testing and commissioning of the equipment.
- Operation and maintenance.

The layout of the proposed BESS is presented on **Figure 3**. The layout of the proposed road upgrades at the intersection of Houghton Road and Irrigation Way is presented on **Figure 4.** Note that only areas to be directly impacted by the proposed development were included when defining the Subject Land (Development Footprint).

Figure 1 - Locality

Habitat ENVIRONMENTAL SERVICES

Study Area (Investigation Area)

0 2 4 Kilometers

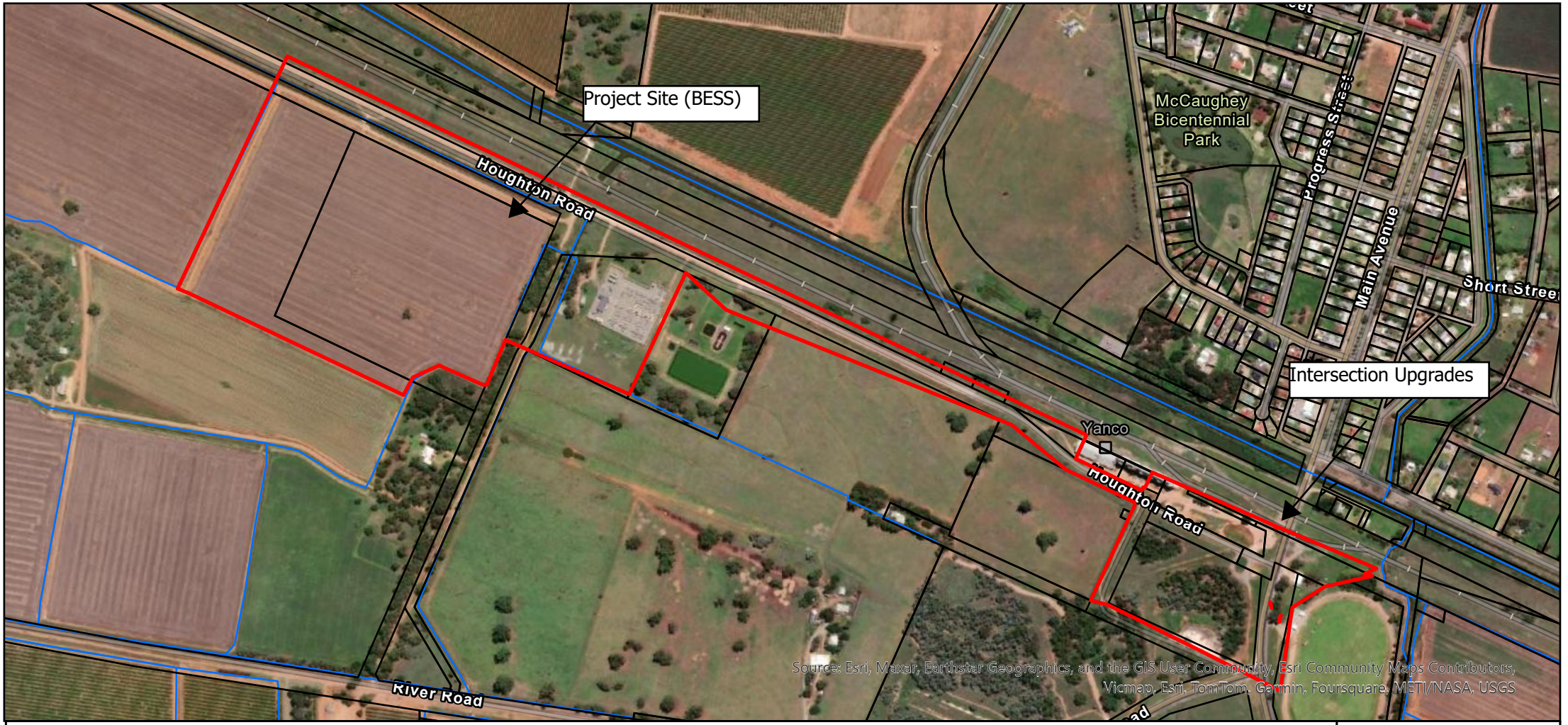


Figure 2 - Site Map

Habitat ENVIRONMENTAL SERVICES

- Study Area (Investigation Area)
- Cadastre
- Contours (10m)
- Mapped Waterway (SiXMaps 2023)

0 160 320 Meters

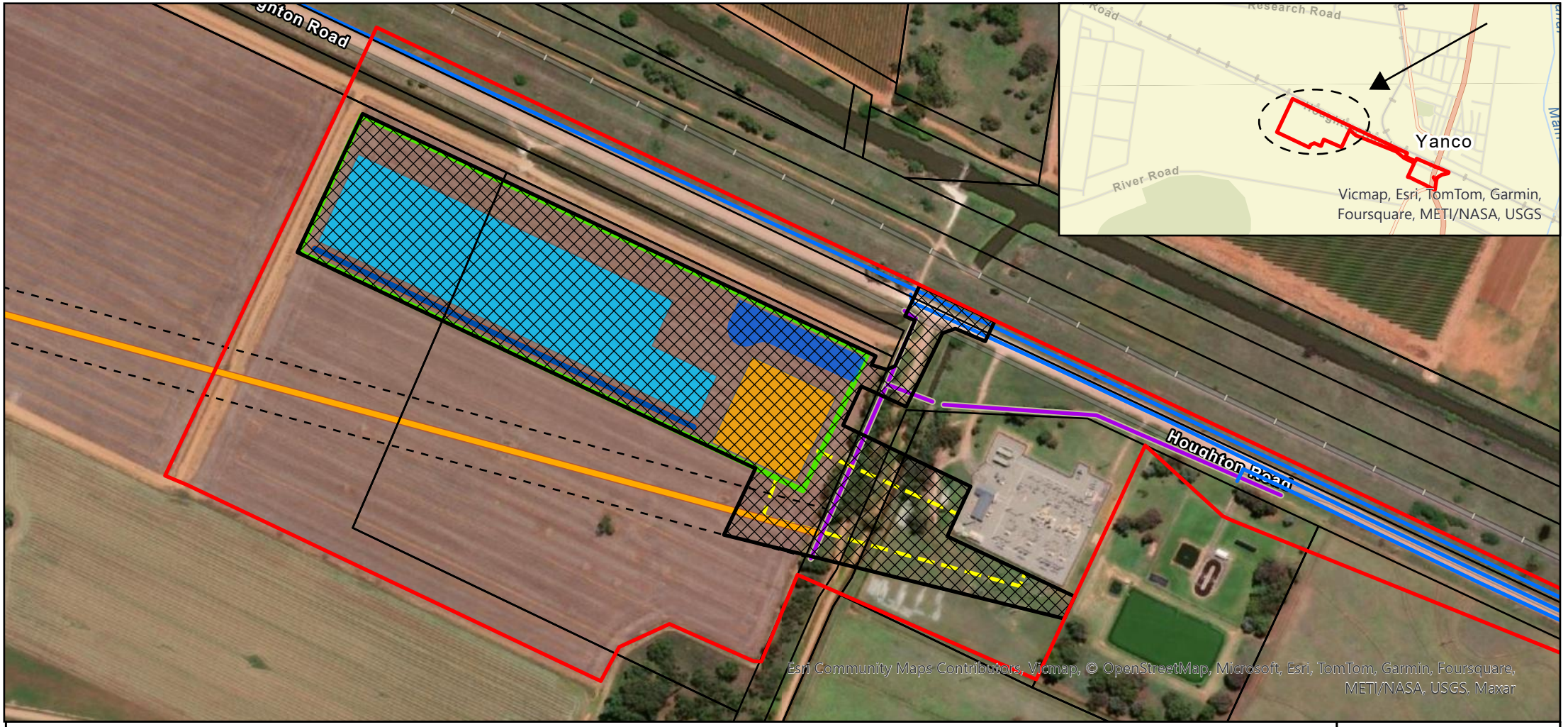


Figure 3 - Proposed Development (BESS)

Habitat ENVIRONMENTAL SERVICES

- Study Area (Investigation Area)
- Cadastre
- Subject Land (Development Footprint)
- Indicative Landscaping
- Indicative Hardstand Area
- Indicative Connection Asset
- Indicative BESS Area
- Electricity Transmission Line
- Easement
- Indicative Fencing
- Indicative ETL Connection
- Indicative Noise Wall
- Road Upgrades

0 125 250 Meters

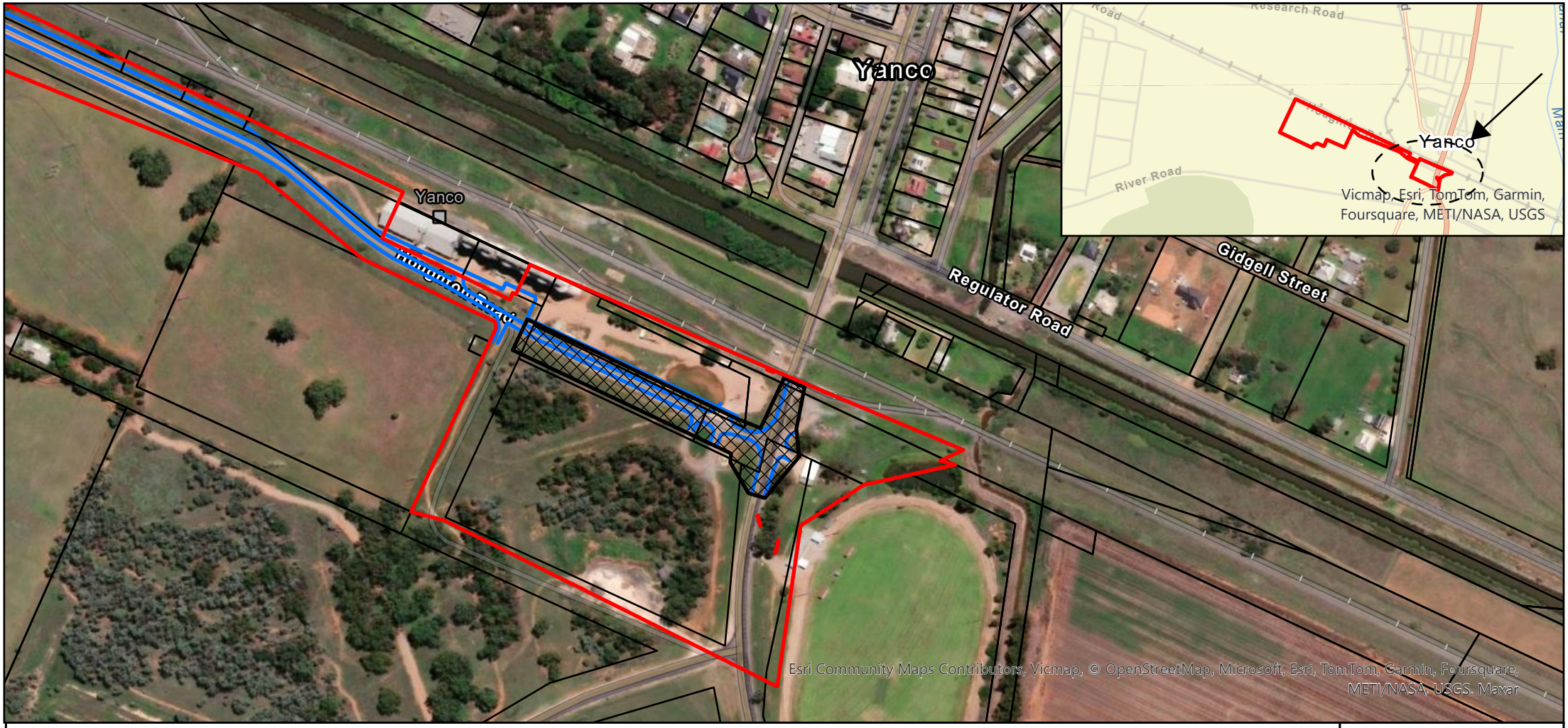


Figure 4 - Proposed Development (Intersection Upgrades)

Habitat ENVIRONMENTAL SERVICES

- Study Area (Investigation Area)
- Cadastre
- Subject Land (Development Footprint)
- Indicative Landscaping
- Indicative Hardstand Area
- Indicative Connection Asset
- Indicative BESS Area
- Electricity Transmission Line
- Easement
- Indicative Fencing
- Indicative ETL Connection
- Indicative Noise Wall
- Road Upgrades

0 125 250 Meters

2 Legislation and Policy

2.1 Summary

The assessment was undertaken in accordance with the following Acts and Policies.

Commonwealth:

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

State:

- Biodiversity Conservation Act 2016 (BC Act)
- Biodiversity Conservation Regulation 2017 (BC Regulation)
- Biosecurity Act 2015
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Water Management Act 2000 (WM Act)
- Fisheries Management Act 1994 (FM Act)
- State Environmental Planning Policy (Biodiversity and Conservation) 2021
- State Environmental Planning Policy (Resilience and Hazards) 2021

Local:

- Leeton Local Environmental Plan 2014 (LEP)
- Leeton Development Control Plan 2022 (DCP)

2.2 Key Acts and Policies

2.2.1 Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act, approval is required for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES). An action includes a project, development, undertaking, activity, or series of activities. When a person proposes to take an action, which they believe may need approval under the EPBC Act, they must refer the proposal to the Australian Government Minister for the Environment. The Act identifies the following nine MNES:

- World Heritage properties
- National heritage places
- Wetlands of international importance (Ramsar Convention)
- Listed threatened species and communities
- Migratory species listed under international agreements
- Great Barrier Reef Marine Park
- Commonwealth marine areas
- Nuclear actions
- Water resources in respect to CSG and large coal mines.

While this BDAR is not required to address MNES, the proponent is required to address the EPBC Act as part of their development application to Council. Items 4 and 5 are relevant to this proposal. A summary of the assessment is presented in **Section 9.1**.

2.2.2 Biodiversity Conservation Act 2016

The NSW BC Act and the NSW BC Regulation outline the framework for addressing impacts on biodiversity from development and clearing. The framework details a pathway to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offset Scheme (BOS).

Entry into the NSW Biodiversity Offset Scheme (BOS) is triggered by developments, projects and activities that meet criteria or certain thresholds for significant impacts on biodiversity in accordance with Section 6.3 of the BC Act.

Criteria to which the BOS applies include the following:

- Local Development (assessed under Part 4 of the EP& A Act) that triggers the BOS Threshold or is "likely to significantly affect threatened species" (based on a test of significance pursuant to Section 7.3 of the BC Act). The BOS Threshold has two parts, and is triggered by the following:
- Clearing of vegetation that exceeds an area threshold (based on the minimum lot size), or
- Impacts are predicted to occur within an area mapped on the NSW Biodiversity Values Map (BV Map) (DPIE 2022f).
- State Significant Development (SSD) and State Significant Infrastructure projects (SSI), unless the Environment Agency Head and Secretary of the Planning Agency determine that the project is not likely to have any significant impact on biodiversity values.
- Biodiversity certification proposals.
- Clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the BOS threshold and does not require development consent.
- Clearing of native vegetation that requires approval by the Native Vegetation Panel under the LLS Act
- Activities assessed and determined under Part 5 of the EP&A Act (generally, proposals by government entities) if proponents choose to 'opt in' to the Scheme.

Conclusion

The proposed development is for the purpose of electricity generating works and has an estimated development cost ('EDC') of more than $30 million. Pursuant to Section 20 of Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021*, the proposed development is characterised as State Significant Development ('SSD'). As such, a BDAR is required to support the project.

Assessment Requirements

The Planning Secretary's Environmental Assessment Requirements (SEARS) for the project (SSD-67478479) issued on 28/02/24 require an assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the *Biodiversity Conservation Act 2016* (NSW) (BC Act), the *Biodiversity Assessment Method* (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must:

- Be prepared using the approved BDAR template.
- Document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM.
- Assess the impacts associated with all ancillary infrastructure, including the transport route road upgrades.

- Include an assessment for serious and irreversible impacts (SAII) in accordance with Section 9.1 of the BAM.
- Include a strategy to offset any residual impacts of the development in accordance with the BC Act, unless BCS and DPHI determine the proposed development is not likely to have any significant impacts on biodiversity values.
- An assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*, and a description of the measures to minimise and rehabilitate impacts.
- A cumulative impact assessment of biodiversity values in the region from nearby developments.
- If an offset is required, details of the measures proposed to address the offset obligation.

2.2.3 Biosecurity Act 2015

Under the *Biosecurity Act 2015* all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated, or minimised, so far as is reasonably practicable. Under the Act, a biosecurity impact is an adverse effect on the economy, environment, or the community that arises, or has the potential to arise, from a biosecurity matter. This legislation is addressed in **Section 9.2**.

2.2.4 Water Management Act 2000

Controlled activities carried out in, on or under waterfront land are regulated by the WM Act. Waterfront land is defined as the bed of any river, lake or estuary, and the land within 40 meters (m) of the riverbank, lake shore or estuary mean-high-watermark.

A network of irrigation channels occurs within the locality. Although many of these channels are identified as mapped watercourses, most are constructed and used for the purpose of irrigation agriculture. All mapped waterways occurring near or adjacent to the project site are comprised of constructed irrigation channels that lack natural features such as riparian or emergent native vegetation. Given that all irrigation channels will be maintained following construction of the project, a controlled activity approval for the proposed development is unlikely to be required.

Further consideration of potential indirect impacts to aquatic and riparian habitat is provided in **Section 7.2**. Mitigation measures are detailed in **Section 7.6**.

2.2.5 Fisheries Management Act 1994

The objects of this FM Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. In particular, the objects of this Act include--

- To conserve fish stocks and key fish habitats, and
- To conserve threatened species, populations and ecological communities of fish and marine vegetation.
- To promote ecologically sustainable development, including the conservation of biological diversity.

No key fish habitat or aquatic habitat that is likely to be important to aquatic native species will be directly impacted by the proposed development. Consideration of potential indirect impacts to aquatic and riparian habitat is provided in Section 7.2.

2.2.6 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity and Conservation SEPP) consolidates, transfers and repeals the provisions of a number of SEPPs. Chapters 3 and 4 of this SEPP relate specifically to the former State Environmental Planning Policies, Koala Habitat Protection 2020 and Koala Habitat Protection 2021, respectively. Chapter 3 of the SEPP applies to RU1, RU2 and RU3 zoned land, in local government areas specified in Schedule 1 of State Environmental Planning Policy (Koala Habitat Protection) 2021, but not if the local government area is marked with an * in that Schedule.

Koala Habitat Protection (Koala SEPP) 2020 (Chapter 3)

Leeton LGA is listed under Schedule 1 of the SEPP, where Chapter 3 applies to rural-zoned land, i.e., land zoned RU1, RU2 and RU3. The Subject Land is zoned RU1 (Primary Production) under the Leeton LEP 2010, and therefore, Chapter 3 of the SEPP applies. Leeton Shire Council do not have an approved Koala Plan of Management for the Land. Therefore, under Section 3.5 the policy applies to land that has an area of at least one hectare. The occurrence and condition of Koala habitat is discussed in **Section 5** and **Section 9.3.**

2.2.7 State Environmental Planning Policy (Resilience and Hazards) 2021

The State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) consolidates, transfers and repeals the provisions of three (3) SEPPs into a single environmental planning instrument, including: the SEPP (Coastal Management) 2018 (Coastal Management SEPP), SEPP 33 – Hazardous and Offensive Development (SEPP 33), and SEPP 55 – Remediation of Land (SEPP 55). The Resilience and Hazards SEPP aims to promote the protection and improvement of key environmental assets for their intrinsic value and the social and economic benefits they provide. Relevant chapters of the Resilience and Hazards SEPP are considered below:

Chapter 2 – Coastal Management

The aim of this Chapter is to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area, by:

- Managing development in the coastal zone and protecting the environmental assets of the coast.
- Establishing a framework for land use planning to guide decision-making in the coastal zone.
- Mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the Coastal Management Act 2016.

The Coastal Management Chapter incorporates the provisions of the now repealed Coastal Management SEPP which commenced on 3 April 2018 and consolidated the provisions of: SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection).

The Coastal Management Chapter defines the four coastal management areas in accordance with the Coastal Management Act and details mapping and specifies assessment criteria that are tailored for each coastal management area. Councils and other consent authorities must apply these criteria when assessing proposals for development that fall within one or more of the mapped areas. The four coastal management areas are:

- Coastal wetlands and littoral rainforests area – areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26.
- Coastal vulnerability area – areas subject to coastal hazards such as coastal erosion and tidal inundation.
- Coastal environment area – areas that are characterized by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included.
- Coastal use area – land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The Study Area and Subject Land are not mapped as any of the above coastal management areas. The Study Area does not occur on land identified as a Coastal Wetland or Littoral Rainforest, or on land mapped as within proximity to these areas.

2.2.8 Leeton Local Environmental Plan 2014

The Study Area is located within the Leeton LGA. The Leeton Environmental Plan 2013 (LEP) controls development within the Study Area through zoning and development controls. These controls are described in greater detail by the supporting Leeton Development Control Plan 2022 (DCP).

2.2.9 Leeton Development Control Plan 2022

The Leeton Development Control Plan 2022 supports the LEP by providing additional detail and guidance on addressing biodiversity issues associated with development. In regard to biodiversity, the DCP contains provisions that relate to environmental effects, soil and erosion control and vegetation. These provisions have been considered during the preparation of this assessment.

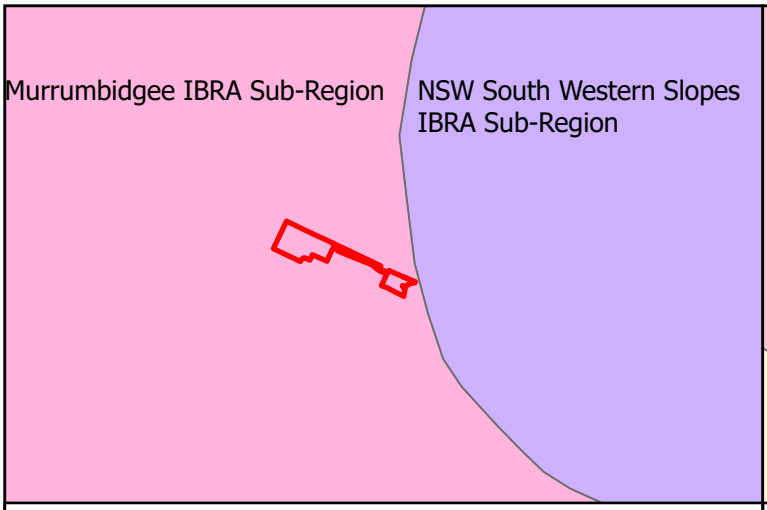
3 Landscape Features

The landscape features detailed in Section 3 of the BAM (DPIE 2020a), which are applicable to the Study Area are described in Table 2 and are shown on **Figure 5**.

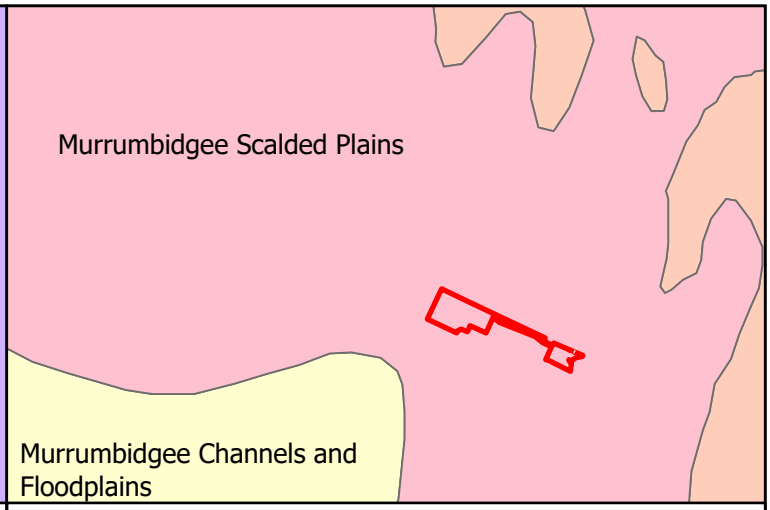
Table 2 Landscape Features

Landscape Features	Information
IBRA Region	The Study Area occurs within the Riverina IBRA Region.
IBRA Sub Region	The Study Area occurs within the Murrumbidgee IBRA Sub Region.
Local Government Area	The Study Area occurs within the Leeton LGA
Mitchell Landscape	The extent of Mitchells Landscapes within the locality of the Study Area is mapped as Murrumbidgee Scalded Plains. A description of this landscape is provided below, and the mapping is shown on **Figure 5**. "Quaternary alluvial plains with extensive scalding interpreted as relic floodplains or terraces. Grey, brown and red cracking clays, red brown texture-contrast soils with scalds. Levees traces evident, relief generally <1m, up to 5m on associated pans, swamps and lunettes. Low shrublands and grasslands of bladder saltbush (Atriplex vesicaria), other annual Saltbushes (*Atriplex* sp.), numerous Burrs (*Sclerolaena* sp.), Cotton-bush (*Maireana aphylla*), Bush Minuria (*Minuria cunninghamii*), White-top Grass (*Austrodanthonia caespitosa*), Windmill Grass (*Chloris truncata*), and Hill Wallaby Grass (*Austrodanthonia eriantha*)."
Rivers, Streams, or Wetlands	No areas within the Study Area or the Subject Land contain natural aquatic habitat features such as rivers, streams or wetlands. All mapped watercourses within or adjacent to the Study Area are comprised of irrigation channels that have been constructed for agricultural purposes. These areas do not contain important habitat for native aquatic species. No areas within the coastal environment area as defined under Chapter 2 of the Resilience and Hazards SEPP. Mitigation measures to reduce the potential for indirect impacts to aquatic and riparian habitats during construction and operation activities are provided in Section 7.
Connectivity of different areas of habitat	The Study Area is situated within an agricultural landscape where only small existing remnants of native vegetation occur. The native vegetation within the Study Area is comprised of small areas of roadside vegetation (mature trees and shrubs) that have minimal habitat connectivity due to their isolated location within a predominantly agricultural landscape.
Areas of geological significance and soil hazard features	The Study Area lies within a large alluvial plain where soils are mainly comprised of Quaternary deposits. No areas of geological significance or soil hazard features, such as steep slopes occur within the Study Area.
Areas of outstanding biodiversity value	No areas of outstanding biodiversity value mapped within the Study Area.
Geology and Soils	Typically, Leeton soils have brown, moderately calcareous loam A1 horizons; pinkish gray, moderately calcareous loam, B2 horizons, and pinkish white, strongly calcareous light loam Cca horizons.

Landscape Features	Information
Native Vegetation Cover	Native vegetation was assessed as per Section 3.2 of the BAM 2020 (DPIE 2020a). Native vegetation constitutes 7.23% (96.82 ha) of the 1,500 m landscape buffer (1338.90 ha). Native Vegetation Cover is classed as >10%. The extent of native vegetation within 1,500 m buffer from the Study Area boundary is presented on **Figure 5.**



IBRA Sub Region Map



Mitchells Landscape Map

Figure 5 - Landscape Assessment

Habitat ENVIRONMENTAL SERVICES

- Study Area (Investigation Area)
- Subject Land (Development Footprint)
- 1500m Buffer (1338.90 ha)
- Native Vegetation Extent (96.82 ha - 7.23%)
- Contours (10m)
- Mapped Waterway (SiXMaps 2023)

0 0.75 1.5 Kilometers

4 Native Vegetation

4.1 Methodology

4.1.1 Data Review

A database search and literature review were completed as part of the desktop assessment of the Study Area prior to the commencement of field surveys. The review focused on database searches, relevant ecological reports pertaining and Geographic Information System (GIS) layers. The review was used to prepare a list of PCTs and potential Threatened Ecological Communities (TECs), to inform survey effort required for both native vegetation and threatened species assessment. The following databases and information sources were used to inform the assessment:

- The NSW BioNet Atlas
- NSW BioNet Vegetation Classification database
- Mitchell Landscapes Version V3.1
- NSW State Vegetation Type Map
- Review of historic aerial imagery.

4.1.2 Vegetation Mapping Surveys

Detailed vegetation surveys, in accordance with Section 4 of the BAM (DPIE 2020a), were conducted across the Study Area on 09/11/23, 10/11/23, 07/01/24, and 08/01/24. Given that the Subject Land (Development Footprint) for the project was not defined at the time of the surveys, areas outside the Subject Land were assessed. As a result, the vegetation mapping and sampling of BAM plot/transects exceeds the requirements of the BAM (DPIE 2020a). This information was included in the assessment to allow for a more comprehensive discussion of biodiversity values in areas adjacent to the Subject Land.

The vegetation within the Study Area was mapped using a combination of rapid data points (RDP), walking transects and aerial photo interpretation (API). The RDPs involved collecting waypoints over the Study Area using a handheld GPS unit and recording dominant species, structure, and condition. Walking transects involved verifying polygons which were homogenous in floristic composition and condition to help define vegetation community boundaries. The RDPs and survey tracks were then overlaid on an aerial photograph and used to further clarify vegetation boundaries. The RDPs and plots were classified and tagged with a PCT by field surveyors. Polygons produced from the API work adopted the PCT of the sample point that they intersected.

4.1.3 Plant Community Type Identification

Each vegetation community identified within the Study Area was assigned to the closest equivalent PCT from those listed in the BioNet Vegetation Classification database (NSW DCCEEW 2024c). The closest equivalent PCT for each vegetation community was determined through a comparison of the floristic descriptions of PCTs in the database with the plot / transect data collected from the Study Area.

In addition to floristic and structural similarity, the landscape position, soil type and other diagnostic features of the vegetation communities on the site were compared to the descriptions in the database to determine the most suitable PCT. Threatened ecological communities (TECs) as defined under State and Commonwealth legislation were also identified if present.

Areas of planted native vegetation were assessed in accordance with guidance published in Appendix D of the BAM. Based on the criteria provided in the decision- making key, the module was not applied given that "the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal". As such, the planted vegetation was assigned to an appropriate Plant Community Type (PCT) and delineated as a vegetation zone.

4.1.4 Vegetation Zones and Vegetation Integrity

Vegetation Zones were identified and delineated in the Study Area in accordance with Section 4.3 of the BAM (DPIE 2020a). A Vegetation Zone is defined in the BAM as a relatively homogenous area that is the same vegetation type and broad condition.

Following stratification of the Study Area into Vegetation Zones, BAM plots/transects were sampled in accordance with Section 4.3 of the BAM (DPIE 2020a) (refer to **Figure 6**). The composition, structure and function attributes that were assessed during the sampling of each plot/transect are listed in **Table 3**.

Table 3 Components of Vegetation Integrity

Growth form groups	Function attributes
• Tree (TG) • Shrub (SG) • Grass and grass-like (GG) • Forb (FG) • Fern (EG) • Other (OG)	• Number of large trees • Tree regeneration (presence/absence) • Tree stem size class (presence/absence) • Total length of fallen logs • Litter cover • High threat exotic vegetation cover (HTE) • Hollow-bearing trees (HBT)

The number of plots/transects sampled in each Vegetation Zone exceeds the minimum number of transects stipulated in the BAM (DPIE 2020a). In addition to sampling all Vegetation Zones (native vegetation), two BAM Plot/transect were also sampled in areas containing non-native vegetation (Exotic Grassland). A summary of the floristic composition and structural attributes is provided in addition to cover and abundance data (see **Appendix E)**.

4.1.5 Floristic Identification and Nomenclature

Floristic identification and nomenclature were based on Harden (1992, 1993, 2000 and 2002) with subsequent revisions as published on NSW PlantNet (http://plantnet.rbgsyd.nsw.gov.au).

4.2 Results

4.2.1 Regional Vegetation Mapping

The NSW State Vegetation Type Map (NSW DCCEEW 2024b) currently displays no Plant Community Types (PCTs) mapped within the Study Area. However, the following PCTs are mapped nearby, to the south of the intersection of Houghton Road and Irrigation Way.

- PCT 74 - Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
- PCT 26 - Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion.

The field surveys confirmed that low condition forms of both PCTs occur within the Subject Land (further discussed in **Section 4**).

4.2.2 Floristic Diversity

A relatively low diversity of native plant species were recorded during the assessment. This was expected given that the Study Area lies within an agricultural landscape where large-scale vegetation clearing has occurred historically. A total of 74 plant species were recorded during the sampling of BAM plots and during random meander surveys. These were comprised of 34 native species and 40 exotic species.

Most native plant species were detected within roadside woodland remnants (mostly trees and shrub species). A range of introduced grasses and forbs were detected in cleared areas such as along managed roadsides.

Of the exotic plant species detected, Chilean Needle Grass (*Nassella neesiana*) was the only weed species detected that is recognised as a priority weed species for the Leeton LGA. Under the NSW *Biosecurity Act 2015*, landowners have a duty of care to manage the spread of this weed. Chilean Needle Grass is also listed as a Weed of National Significance (WoNS) under the EPBC Act (discussed further in **Section 9.2).**

No threatened flora species were identified during field surveys. A complete list of the flora species identified during the assessment is provided in **Appendix B**.

4.2.3 Plant Community Type Mapping

The Subject Land lies within a predominantly cleared landscape that has a long history of agricultural development. Most of the vegetation within the Study Area “not defined’ by the NSW Vegetation Types Map (NSW DCCEEW 2024b) contain either low condition native vegetation or non-native vegetation. Non-native vegetation is mainly comprised of Agricultural Cropland (see Plate 10) and Exotic Grassland (see **Plate 7**). Native vegetation within the Study Area was found to be limited to small areas of native roadside plantings, and isolated patches of woodland (mainly regrowth vegetation).

Floristic analysis revealed that the native vegetation within the Study Area is commensurate with two PCTs that have previously been mapped within the locality:

- PCT 74 - Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
- PCT 26 - Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion.

Note that although the PCTs listed above are not currently mapped within the Study Area according to the according to the NSW State Vegetation Type Map (NSW DCCEEW 2024b), however, both PCTs are mapped within woodland patches that lie directly to the south of the intersection of Houghton Road and Irrigation Way.

4.2.4 Vegetation Zones

Vegetation Zones were delineated delineated in the Study Area in accordance with Section 4.3 of the BAM (DPIE 2020a). The extent of each Vegetation Zone is shown on **Figure 6** (Bess Project Site) and **Figure 7** (Intersection Upgrade). The characteristics of each Vegetation Zone are summarised as follows:

- **Vegetation Zone 01 (VZ 01 - PCT 74 - Woodland Regrowth)** – This Vegetation Zone was mapped as a single woodland patch containing a moderate diversity of native species. Most of the vegetation appeared to be recently established with evidence of some planting (see **Plate 1** and **Plate 2**. The Vegetation Zone occurs in the eastern portion of the Study Area to the south of the intersection of Houghton Road and Irrigation Way. Note that no areas of vegetation within Vegetation Zone 01 occur within the Subject Land. No direct impacts (clearing/slashing/pruning) to the Vegetation Zone is proposed.
- **Vegetation Zone 02 (VZ 02 - PCT 74 - Planted Roadside Vegetation)** – This Vegetation Zone is comprised of planted rows of native tree species (mainly River Redgum) with a managed understory and predominantly non-native groundcover. The Vegetation Zone mainly occurs along roadsides and also bordering the eastern edge of the woodland patch previously defined as Vegetation Zone 01. The native trees within Vegetation Zone 02 are evidently planted given that most trees are of similar age, comprised of the same species, and have been established in even rows (see **Plate 3** and **Plate 4**). Approximately 0.50 ha of the Vegetation Zone will be impacted by the proposed development.
- **Vegetation Zone 03 (VZ 03 - PCT 26 - Woodland Regrowth)** – This Vegetation Zone was mapped as small patches in the western portion of the Study Area (see Plate 5 and Plate 6. The Vegetation Zone was delineated from Vegetation Zone 01 due to differences in the floristic composition further discussed below). A negligible area (0.01 ha) of the Vegetation Zone will be impacted by the proposed development.

Detailed information pertaining to each vegetation zone is further discussed in **Section 4.2.7.** The floristic composition of non-native vegetation types is further discussed in **Section 4.2.8**.

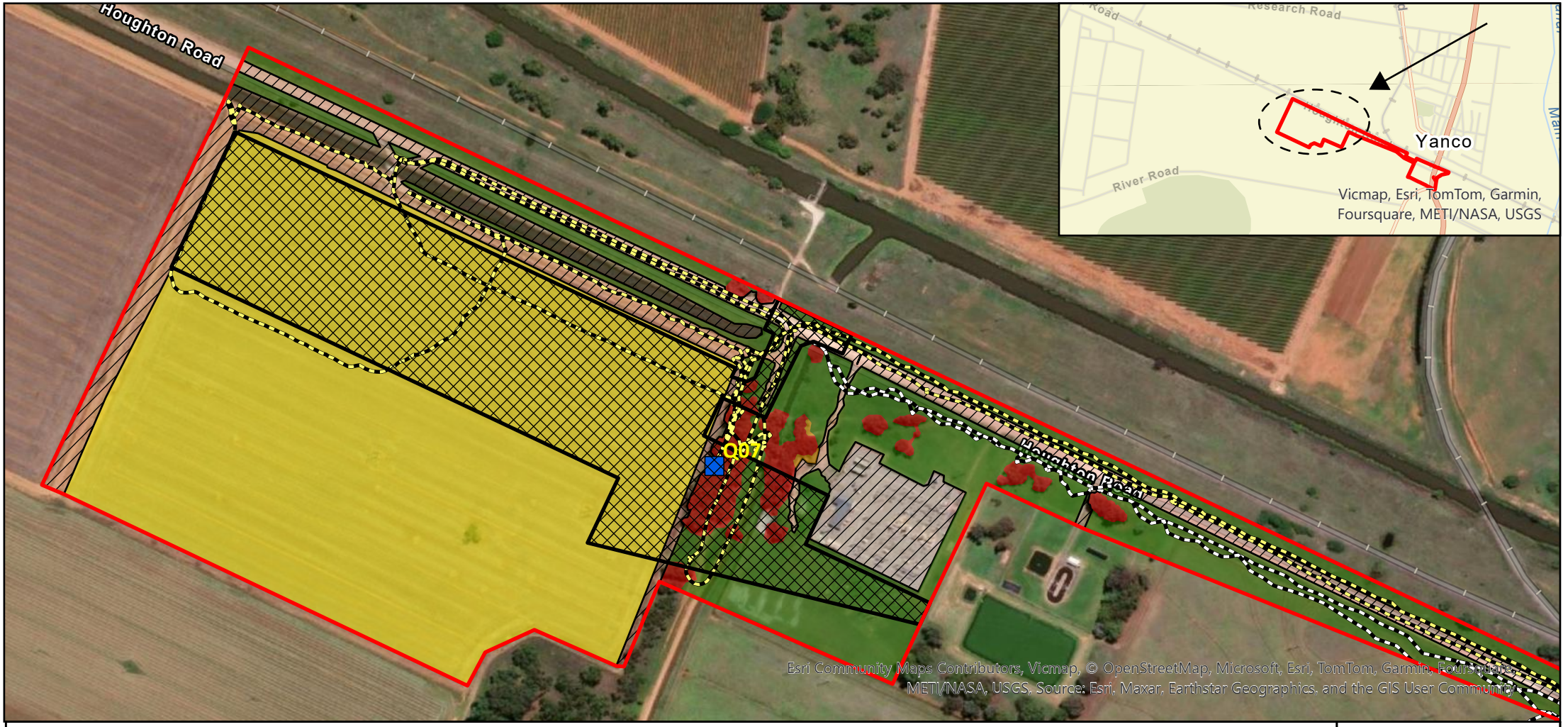


Figure 6 - Plant Community Types (BESS)

Habitat ENVIRONMENTAL SERVICES

- Study Area (Investigation Area)
- Subject Land (Development Footprint)
- BAM Plot
- Survey Track (09-10/11/23)
- Survey Track (07-08/01/24)

Vegetation Zone (VZ) - Plant Community Type (PCT) - Condition Class

- VZ 01 - PCT 74 - Woodland Regrowth
- VZ 02 - PCT 74 - Planted Roadside Vegetation
- VZ 03 - PCT 26 - Woodland Regrowth
- Non-native Vegetation (Agricultural Crops)
- Non-native Vegetation (Exotic Grassland)
- Cleared/ Developed

0 130 260 Meters

Figure 7 - Plant Community Types (Intersection Upgrades)

Habitat ENVIRONMENTAL SERVICES

- Study Area (Investigation Area)
- Subject Land (Development Footprint)
- BAM Plot
- Survey Track (09-10/11/23)
- Survey Track (07-08/01/24)

Vegetation Zone (VZ) - Plant Community Type (PCT) - Condition Class

- VZ 01 - PCT 74 - Woodland Regrowth
- VZ 02 - PCT 74 - Planted Roadside Vegetation
- VZ 03 - PCT 26 - Woodland Regrowth
- Non-native Vegetation (Agricultural Crops)
- Non-native Vegetation (Exotic Grassland)
- Cleared/ Developed

0 100 200 Meters

4.2.5 Vegetation Integrity

Information pertaining to the vegetation integrity scores (VI score) for each Vegetation Zone are detailed in **Table 4**. Note that VI scores for Vegetation Zone 01 are provided, however, this data has not been included in the BAM-C given that no impacts to this Vegetation Zone are proposed. Areas of non-native vegetation (Exotic Grassland and Agricultural Cropland) were also excluded from analysis in the BAM-C. Detailed information pertaining to each Vegetation Zone is presented below.

Table 4 Vegetation Integrity

Zone	PCT	Condition class	Subject Land (ha)	HBT presence	Condition Attributes			VI Score
					Composition	Structure	Function	
01	74	Woodland Regrowth	0.00	No	23.3	25.9	44.3	29.9
02	74	Planted Roadside	0.50	No	25.6	19.6	35.0	26.0
03	26	Woodland Regrowth	0.01	No	25.4	27.0	46.2	31.6
N/A	74	Exotic Grassland	1.69	No	10.7	0.6	0.0	0.3

4.2.6 Assessment of Patch Size

A patch is defined in the BAM as an area of intact native vegetation that occurs on the Subject Land. The patch may extend onto adjoining land beyond the proposed footprint, and for woody ecosystems, includes native vegetation separated by less than or equal to 100 meters from the next area of intact native vegetation. Based on aerial imagery and regional vegetation mapping, the largest patch of woodland vegetation within the Study Area that forms part of all Vegetation Zones is approximately 17 ha. This patch is isolated and greater than 100m from any other areas of woodland patches.

4.2.7 Plant Community Type Information

A summary of detailed information is provided below for each PCT and Non-native Vegetation Type that was mapped within the Study Area.

Table 5 Plant Community Type Information - PCT 74 (Vegetation Zone 01 and 02)

Criteria	Information
PCT	PCT 74- Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
Vegetation Formation and Class	Grassy Woodland
Vegetation Class	Floodplain Transition Woodland
Area within the Subject Land	Vegetation Zone 01: 0.00 ha Vegetation Zone 02: 0.50 ha
Survey Effort	Vegetation Zone 01: 0 plot/transects required, 2 plot/transects sampled (Q03, Q04) Vegetation Zone 02: 1 plot/transect required, 2 plot/transects sampled (Q01, Q07)
Floristic description	**Vegetation Zone 01**: The canopy contains a mix of locally occurring native tree species, including *Brachychiton populneus* (Kurrajong), *Eucalyptus camaldulensis* (River Red Gum), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus melliodora* (Yellow Box), and *Eucalyptus populnea* (Bimble Box). The shrub layer is sparse to dense and dominated by common shrub species, including *Acacia dawsonii* (Poverty Wattle), *Acacia deanei* (Deane's Wattle), and *Senna artemisioides* (Silver Cassia). The groundcover is sparse and contains a mix of native and exotic grasses and herbs. The dominant native grass species include *Aristida ramose, Austrostipa aristiglumis, Austrostipa scabra, Chloris truncata, Chloris ventricose, Panicum effusum,* and *Rytidosperma erianthum.* The dominant native forbs include *Boerhavia domini, Crassula sieberiana, Einadia nutans, Einadia trigonos subsp. stellulata, Sida corrugate, Solanum esuriale, and Vittadinia cuneata*. Although no priority weeds were detected, introduced grasses and forbs were recorded throughout the Vegetation Zone. The most common of these species were *Avena barbata, Lolium perenne, Vulpia myuros, Bromus hordeaceus, Bromus catharticus, and Plantago lanceolata.* **Vegetation Zone 02:** The vegetation is characterized by even aged rows of native tree species. Most of the trees were identified as *Eucalyptus camaldulensis* (River Red Gum) and *Eucalyptus melliodora* (Yellow Box). Other tree species that were less frequently recorded, included *Eucalyptus crebra* (Narrow-leaved Ironbark), and *Eucalyptus populnea* (Bimble Box). The shrub layer is managed throughout. The groundcover is managed and dominated by introduced grasses and forbs, including *Avena barbata, Lolium perenne, Vulpia myuros, Bromus hordeaceus, Bromus catharticus, and Plantago lanceolata.*
Condition within the Subject Land	Vegetation Zone 01 is in a low condition state evidenced by the lack of mature trees, low diversity of plant species and lack of habitat features such as fallen logs and hollow-bearing trees. Consequently, this zone has low structural and functional attributes which is reflected through a low vegetation integrity (VI) score of 29.9.

Criteria	Information
	Vegetation Zone 02 is in a low condition state evidenced by the lack of native shrubs and groundcover species, and the lack of habitat features such as fallen logs and hollow-bearing trees. Consequently, this zone has low structural and functional attributes which is reflected through a low vegetation integrity (VI) score of 26.0.
Presence of hollow bearing trees	No hollow bearing trees occur within Vegetation Zone 01 or Vegetation Zone 02
Justification for PCT selection	PCT 74 was assigned based on the presence of dominant upper stratum species and the landscape position. PCTs mapped within the locality and on the Subject Land (NSW DCCEEW 2024b) were also reviewed to determine the most appropriate PCT. The vegetation has the typical woodland structure of PCT 74 and is located on a floodplain where the PCT is mainly mapped within the locality. Key diagnostic species of PCT 74 that were recorded during the sampling of the vegetation are listed below: • **Canopy Species:** *Brachychiton populneus* (Kurrajong), *Eucalyptus camaldulensis* (River Red Gum), *Eucalyptus melliodora* (Yellow Box), and *Eucalyptus populnea* (Bimble Box). • **Shrub Species***: Acacia deanei* (Deane's Wattle) • **Groundcover Species** Aristida ramosa, Austrostipa scabra, Chloris truncata, Chloris ventricosa, Panicum effusum, and Einadia nutans,
Status	**BC Act:** The vegetation within Vegetation Zone 01 and Vegetation 02 is commensurate with the following Critically Endangered Ecological Community (EEC): • White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions Note that the planted vegetation that forms part of Vegetation 02 also forms part of the CEEC given that key diagnostic species, such as Yellow Box are given that these areas would, under appropriate management, would respond to assisted natural regeneration, (further discussed in Section **4.2.9.**
	EPBC Act: PCT 74 is linked to the following TEC: • White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Review of the final determination for the TEC determined that Vegetation Zone 01 and 02 do not meet the criteria for the TEC. Justifications are provided in **Section 4.2.9**
PCT % Cleared	73%

Plate 1 Vegetation Zone 01 (VZ 01 - PCT 74 – Woodland Regrowth) – Regrowth sampled at Q03 in the eastern portion of the Study Area (south of the intersection of Houghton Road and Irrigation Way).

Plate 2 Vegetation Zone 01 (VZ 01 - PCT 74 – Woodland Regrowth) – Native woodland regrowth sampled at Q04 in the eastern portion of the Study Area (southwest of the intersection of Houghton Road and Irrigation Way).

Plate 3 Vegetation Zone 02 (VZ 02 - PCT 74 - Planted Roadside Vegetation) – Roadside vegetation sampled at Q01 (east of the Intersection of Houghton Road and Irrigation Way).

Plate 4 Vegetation Zone 02 (VZ 02 - PCT 74 - Planted Roadside Vegetation) – Planted vegetation sampled at Q07 (adjacent to the BESS Project Area).

Table 6 Plant Community Type Information - PCT 26 (Vegetation Zone 03)

Criteria	Information
PCT	PCT 26 - Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion.
Vegetation Formation	Semi-arid Woodland (Grassy sub-formation)
Vegetation Class	Riverina Plain Woodlands
Area within the Subject Land	Vegetation Zone 03: 0.01 ha
Survey Effort	Vegetation Zone 03: 1 plot/transect required, 1 plot/transect sampled (Q02)
Floristic description	This canopy is dominated by *Acacia pendula* (Weeping Myall). Other tree species that occur to a lesser extent include *Brachychiton populneus* (Kurrajong), *Eucalyptus crebra* (Narrow-leaved Ironbark), and *Eucalyptus melliodora* (Yellow Box). The shrub layer is sparse to dense and dominated by common shrub species, including *Acacia dawsonii* (Poverty Wattle) and *Senna artemisioides* (Silver Cassia). The groundcover is sparse and contains a mix of native and exotic grasses and herbs. The dominant native grass species include *Aristida ramose, Austrostipa aristiglumis, Austrostipa scabra, Chloris truncata, Chloris ventricose, Panicum effusum,* and *Rytidosperma erianthum.* The dominant native forbs include *Einadia nutans, Solanum esuriale, and Vittadinia cuneata*. Although no priority weeds were detected, introduced grasses and forbs were recorded throughout the Vegetation Zone. The most common of these species were *Avena barbata, Lolium perenne, Vulpia myuros, Bromus hordeaceus, Bromus catharticus, and Plantago lanceolata.*
Condition within the Subject Land	Vegetation Zone 03 is in a low to moderate condition state evidenced by the lack of mature trees, low diversity of plant species and lack of habitat features such as fallen logs and hollow-bearing trees. Consequently, this zone has low structural and functional attributes which is reflected through a low vegetation integrity (VI) score of 31.6..
Presence of hollow bearing trees	No hollow bearing trees occur within Vegetation Zone 03.
Justification for PCT selection	The 'closest fit' PCT was assigned based on the presence of dominant upper stratum species and the landscape position. PCTs mapped within the locality and on the Subject Land (NSW DCCEEW 2024b) were also reviewed to determine the most appropriate PCT. The vegetation has a typical woodland structure and is located on a brown clay soil where the PCT mainly occurs. Key diagnostic species of PCT 26 that were recorded during the sampling of the vegetation or observed during random meanders are listed below: • **Canopy Species:** *Acacia pendula* (Weeping Myall), *Brachychiton populneus* (Kurrajong) and *Eucalyptus melliodora* (Yellow Box)). • **Groundcover Species** Austrostipa scabra, Austrostipa aristiglumis, and Einadia nutans,
Status	**BC Act**: The vegetation within the Study Area mapped as PCT 26 is also commensurate with the following TEC:

Criteria	Information
	• Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions Review of the final determination for the TEC determined that Vegetation Zone 03 meets the criteria for the TEC. Justifications are provided in **Section 4.2.9.**
	EPBC Act: PCT 26 linked to the following TEC: • Weeping Myall Woodlands Review of the final determination for the TEC determined that Vegetation Zone 03 does not meet the criteria for the TEC. Justifications are provided in **Section 4.2.9**
PCT % Cleared	90%

Plate 5 Vegetation Zone 03 (VZ 03 - PCT 26 – Woodland Regrowth) – Roadside vegetation sampled at Q02 (south of the Intersection of Houghton Road and Irrigation Way).

Plate 6 Vegetation Zone 03 (VZ 03 - PCT 26 – Woodland Regrowth) – Roadside vegetation sampled at Q02 (south of the Intersection of Houghton Road and Irrigation Way).

4.2.8 Non-native Vegetation

Exotic Grassland

All cleared/ managed areas along the roadsides within the Study Area and the surrounding fields were found to be vegetated with Exotic Grasslands (see **Plate 7, Plate 8** and **Plate 9**). The dominant species in these areas include the following: *Avena barbata, Lolium perenne, Vulpia myuros, Bromus hordeaceus, Bromus catharticus, and Plantago lanceolata*. Floristic analysis following sampling of the vegetation (see BAM Plots Q05 and Q06) revealed that the total coverage of exotic plant species in these areas is approximately 99%. Vegetation Integrity (VI) analysis using the BAM-C is determined that the grasslands have a VI Score of 0.3.

Plate 7 Exotic Grassland along the roadside of Houghton Road (to the east of the access to the proposed BESS)

Plate 8 **Exotic Grassland adjacent to the Intersection of Houghton Road and Irrigation Way**

Plate 9 **Exotic Grassland adjacent to the Intersection of Houghton Road and Irrigation Way**

Agricultural Cropland

This vegetation is comprised of Agricultural Cropland that was recently harvested at the time of the assessment. Given that the croplands were relatively bare throughout at the time of the assessment, no BAM Plot/transects were sampled (see **Plate 10**).

The proposed development predominantly lies within an area that has been used historically for agricultural development. Approximately 7.19 ha of Agricultural Cropland will be impacted/ removed for the proposed development.

Plate 10 **Agricultural Cropland within the proposed location for the BESS**

4.2.9 Threatened Ecological Communities (BC Act)

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland

The native vegetation within the Study Area mapped as PCT 74 (Vegetation Zone 01 and 02) were determined to meet the listing criteria for the following BC Act listed Critically Endangered Ecological Community (CEEC):

- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions

The Final Determination for the CEEC (NSW Scientific Committee 2020) explicitly recognises that some remnants of the CEEC are degraded. Highly disturbed sites that have few if any native species in the understorey are specifically included in the community provided the "vegetation, either understorey or overstorey or both, would, under appropriate management, respond to assisted natural regeneration, such as where the natural soil and associated seed bank are still at least partially intact. As such, the vegetation within Vegetation Zones 01 and 02 are determined to be commensurate with the CEEC. Further justifications are provided below:

- The vegetation occurs within the Riverina Bioregion where the CEEC is known to occur
- Vegetation Zones 01 and 02 both have a grassy woodland structure and occur on fertile soils that typically support the CEEC.
- The canopy vegetation in both vegetation zones contains key diagnostic tree species that occur within the CEEC, such as *Eucalyptus melliodora* (Yellow Box).
- The shrub layer in both vegetation zones is generally sparse throughout (characteristic of the CEEC).
- The groundcover in both vegetation zones is dominated by mostly exotic plant species, however, a sparse coverage of native groundcover species is also present. These species are likely to respond to assisted natural regeneration.

Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions

Areas of native woodland within the Study Area mapped at PCT 26 (Vegetation Zone 03) are commensurate with the following BC Act listed Endangered Ecological Community (EEC): *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions*

Although the vegetation within Vegetation 03 is in a low condition state, these areas are considered to form part of the CEEC based on the Final Determination. The relevant listing criteria for the CEEC are summarised below:

- The EEC occurs across the eastern parts of alluvial plains of the Murray-Darling River system and is known to occur within the Leeton LGA.
- Typically, the EEC occurs on red-brown earths and heavy textured grey and brown alluvial soils.
- The EEC tends to occur within the climatic belt receiving between 375 and 500 mm mean annual rainfall.

- The canopy vegetation is dominated by the key diagnostic species, *Acacia pendula* (Weeping Myall)
- The shrub layer is generally sparse, which is a characteristic of the CEEC
- The groundcover is dominated by mostly exotic plant species; however, a sparse coverage of key diagnostic native groundcover species is also present (see **Table 6**).

4.2.10 Threatened Ecological Communities (EPBC Act)

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

The patches of woodland vegetation mapped as PCT 74 (Vegetation Zone 01 and 02) are linked with the EPBC Act listed EEC known as *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland.*

In accordance with the Commonwealth Conservation Advice for the EEC (Commonwealth Scientific Committee 2021), the woodland vegetation mapped as PCT 74 (Vegetation Zone 01 and 02) does not meet the EEC criteria given that the understory of the woodland patches is note predominantly comprised of non-native species and no areas contain more than 12 native non-grass species.

Weeping Myall Woodlands

Areas of native woodland within the Study Area mapped at PCT 26 (Vegetation Zone 03) are also linked to the EPBC Act listed EEC known as *Weeping Myall Woodlands*. Review of the Commonwealth listing Advice (Commonwealth Scientific Committee revealed that the vegetation within Vegetation Zone 03 does not meet the criteria for the ECC due to the absence of the following structural characteristics:

- The overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha.
- The area is at least 0.5 ha in size.
- The patch has either: More than two layers of regeneration of Weeping Myall present.
- The tallest layer of living, dead or defoliated Weeping Myall trees is at least 4m tall and of the vegetative cover present, 50% is comprised of native species.

5 Threatened Species

5.1 Database Searches

A search of the NSW BioNet Atlas (NSW DCCEEW 2024a) was conducted for threatened species records within five km radius of the Study Area. Th BAM-C was also used to generate a "candidate list of threatened species requiring further assessment. The availability of suitable habitat within the Study Area for each of these species was assessed to inform the Likelihood of Occurrence (LoO) Assessment presented in **Appendix C**.

5.1.1 Habitat Assessment – Threatened Flora

Several threatened plant species were returned by the BAM-C as candidate threatened species for further assessment. A habitat assessment for these species was undertaken via random meander on 09/11/23, 10/11/23, 07/01/24, and 08/01/24. Given that the Study Area is predominantly cleared and has been subjected to long-term intensive land management practices (vegetation clearing, mowing, slashing pruning), the extent of native vegetation is low. The remaining woodland patches are highly fragmented and contain a low diversity of native plant species (see **Section 4.2.2**). Due to the degraded state of the habitat, the Study Area is unlikely to support populations of any threatened plant species that are known or predicted to occur within the locality.

In summary, the likelihood of occurrence assessment determined that all threatened flora species returned by NSW BioNet Atlas (DPE 2024a) and the BAM-C have a low to nil likelihood of occurrence within the Subject Land either due to habitat degradation or vagrancy (lack of previous records) (refer to **Appendix C**).

5.1.2 Habitat Assessment – Threatened Fauna

A habitat assessment for relevant threatened fauna species was undertaken via random meander on 09/11/23, 10/11/23, 07/01/24, and 08/01/24. This assessment revealed that the habitats present within the Study Area (woodland patches and grasslands) are highly degraded throughout and lack key habitat features required to support all of the threatened fauna species previously recorded or predicted to occur within the locality. Key habitat features that were found to be absent within the Subject Land and surrounding areas include breeding habitat features, such as, hollow-bearing trees, habitat logs, refugia and shelter (canopy cover, dense groundcover etc), riparian vegetation, and aquatic emergent vegetation.

In summary, the habitats within the Study Area are highly degraded and unlikely to be important to the long-term survival of any threatened fauna species. Highly mobile threatened fauna species such as woodland birds and microbats may use the site occasionally to forage as part of a broader network of habitat within the locality.

5.1.3 Aquatic Habitat

A network of constructed irrigation channels occurs within the locality (see Plate **10**). Although the irrigation channels have been constructed for the purposes of irrigation farming most are identified as mapped waterways. The assessment revealed that all irrigation channels within the Study Area lack natural features such as riparian vegetation or emergent aquatic vegetation. Given that herbicides are commonly used by farmers to prevent the establishment of vegetation that can cause blockages, these areas are unlikely to support populations of aquatic or amphibian species.

Note that no areas within the Subject Land are identified as Key Fish Habitat under the FM Act and no mapped waterways will be impacted.

Plate 10 An Irrigation Channel adjacent to the proposed location for the BESS

5.1.4 Ecosystem Credit Species

Step 1: Identify threatened species for assessment.

The BAM-C was used to generate a list of the predicted ecosystem credit species (**Appendix D)**. According to the BAM, ecosystem credit species are species that can be reliably predicted to occur within a habitat based on the vegetation types (PCTs) present.

Step 2: Assessment of the habitat constraints and vagrant species on the subject land.

An assessment of the habitat constraints on the Subject Land for ecosystem credit species is presented in **Table 7**. Despite the degraded condition of the vegetation within the Subject Land, these areas constitute marginal foraging habitat for all ecosystem credit species

Table 7 Ecosystem credit species

Scientific name	Common name	Confirmed Predicted Species	Sensitivity to gain class	Justification
Anthochaera phrygia	Regent Honeyeater	Yes	High	Suitable foraging habitat present
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Yes	Moderate	Suitable foraging habitat present
Chthonicola sagittata	Speckled Warbler	Yes	High	Suitable foraging habitat present.
Falco hypoleucos	Grey Falcon	Yes	Moderate	Suitable foraging habitat present
Falco subniger	Black Falcon	Yes	Moderate	Suitable foraging habitat present.
Grus rubicunda	Brolga	Yes	Moderate	Suitable foraging habitat present
Haliaeetus leucogaster	White-bellied Sea-Eagle (Foraging)	Yes	High	Suitable foraging habitat present.
Hirundapus caudacutus	White-throated Needletail	Yes	High	Suitable foraging habitat present
Lathamus discolor	Swift Parrot (Foraging)	Yes	Moderate	Suitable foraging habitat present.
Lophochroa leadbeteri	Pink Cockatoo (Foraging)	Yes	Moderate	Suitable foraging habitat present
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Yes	Moderate	Suitable foraging habitat present.

Scientific name	Common name	Confirmed Predicted Species	Sensitivity to gain class	Justification
Petroica boodang	Scarlet Robin	Yes	Moderate	Suitable foraging habitat present
Petroica phoenicea	Flame Robin	Yes	Moderate	Suitable foraging habitat present.
Polytelis swainsonii	Superb Parrot (Foraging)	Yes	Moderate	Suitable foraging habitat present
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Yes	Moderate	Suitable foraging habitat present.
Stagonopleura guttata	Diamond Firetail	Yes	Moderate	Suitable foraging habitat present

5.1.5 Species Credit Species

Step 1: Identify threatened species for assessment.

A list of candidate species credit species for the Subject Land was generated using the BAM. The candidate species report is presented within **Appendix D**.

Step 2: Assessment of the habitat constraints and vagrant species on the Subject Land.

The potential for candidate species credit species to occur on the Subject Land was assessed according to species-specific habitat requirements as listed in the TBDC and/or published literature (refer to **Table 8**).

Step 3: Identify candidate species credit species for further assessment.

All species credit species were excluded as candidate species due the lack of habitat constraints within the Subject Land or due to the degraded nature of available habitat. The habitat requirements for each species is presented in **Table 8.** Justifications for exclusion of each species is provided with reference to relevant habitat constraints provided in the BAM-C and known occurrence within the locality.

Table 8 Candidate Species for Further Assessment

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
Anthochaera phrygia	Regent Honeyeater (breeding)	In NSW the species is confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks are seen occasionally in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests. Habitat for the species includes dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	No	Habitat Constraints – The Subject Land is not located within an area mapped as "important habitat" for this species (NSW DCCEEW 2024i). Habitat Degraded – Lack of high canopy cover and abundance of mistletoes. Only two previous records within 5km of the Study Area, and only two records within the IBRA Sub Region
Ardeotis australis	Australian Bustard	The Australian Bustard mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. Breeding now only occurs in the north-west region of NSW. The species mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams.	No	Habitat Degraded: Subject Land lacks suitable habitat.(grasslands, shrublands and woodlands containing dense native tussock grasses). No previous records within 5km of the Study Area, and only five records within the IBRA Sub Region
Austrostipa wakoolica	A Spear Grass	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve). The species grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity indicates that the habitat is unlikely to support a population of this species, for which the

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise.		preferred habitat is edges of a lignum swamp with box and mallee No previous records within 5km of the Study Area, and only one record within the IBRA Sub Region.
Convolvulus tedmoorei	Bindweed	This species has been recorded from northern inland areas of South Australia, south-wstern Queensland and western NSW. There are few known records from NSW: two areas on the Murrumbidgee and Darling River floodplains in central-western NSW (from Toganmain Station, Darlington Point, and from a locality 8km north-west of Louth); and two other records from east of Broken Hill on the road to Wilcannia, and from the Menindee Road, Scarsdale. The species grows in self-mulching grey clay soils on the floodplains of the Darling and Murrumbidgee Rivers.	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity indicates that the habitat is unlikely to support a population of this species, for which the preferred habitat is native vegetation associated with self-mulching clay soils.. No previous records within 5km of the Study Area, and only one record within the IBRA Sub Region.
Crinia sloanei	Sloanei Froglet	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. At a number of sites where records are verified by museum specimens, the species has not been subsequently detected during more recent frog surveys in the vicinity (e.g. Holbrook, Nyngan, Wagga Wagga and Tocumwal). The low number of sites, low number of recorded individuals per site, and the low proportion of records of this species in regional surveys all indicate that a moderately low	No	Habitat Constraints – The Subject Land does not contain semi-permanent/ephemeral wet areas, relatively shallow sections with submergent and emergent vegetation, or is within 500 m of wet area, Swamps or Waterbodies.

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		number of mature individuals exist. The apparent loss from previous recorded sites and decline in recording rates indicates that this is not just a rare or uncommonly encountered species, but that there has been a reduction in population size and range. The species is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.		
Cullen parvum	Small Scurf-pea	The Small Scurf-pea is known in NSW from only two herbarium collections; one from Wagga Wagga in 1884 and the other from Jindera (near Albury) in 1967. A small population was recently reported from near Jerilderie (although it has not been relocated). In recent years, two populations have been recorded in travelling stock reserves south-west of Wagga Wagga, and a population reputedly exists on a roadside near Galong. Another population has recently been discovered on private land near Young. Large populations have been recorded in grassy gaps in the Red Gum Woodlands of Barmah State Park, just across the border in Victoria. Extensive suitable habitat probably occurs across the border in NSW. In known populations in Victoria and NSW, plants are found in grassland, River Red Gum (Eucalyptus camaldulensis) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm.	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity indicates that the habitat is unlikely to support a population of this species, for which the preferred habitat is riparian vegetation associated with drainage channels. No previous records within 5km of the Study Area, and only two records within the IBRA Sub Region.
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles,	No	Habitat Constraints – The Subject Land does not contain living or dead mature trees or is within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines.

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		mammals and carrion. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.		
Lathamus discolor	Swift Parrot	A migratory species that travels to the mainland from March to October, the species breeds in Tasmania from September to January. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. *Eucalyptus robusta, Corymbia maculata* and *C. gummifera* dominated coastal forests are also important habitat.	No	Habitat Constraints – The Subject Land is not within an area mapped as "important habitat" for this species (NSW DCCEEW 2024i).
Lepidium monoplocoides	Winged Peppercress	Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie. The species occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by Allocasuarina luehmannii (Bulloak) and/or eucalypts, particularly Eucalyptus largiflorens (Black Box) or Eucalyptus populnea (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses. The species has been recorded in a wetland-grassland community comprising Eragrostis australasicus, *Agrostis*	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity indicates that the habitat is unlikely to support a population of this species, for which the preferred habitat is grassland dominated by native tussock species. No previous records within 5km of the Study Area, and only one record within the IBRA Sub Region.

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma and Pycnosorus globosus, on waterlogged grey-brown clay. Also recorded from a *Maireana pyramidata* shrubland.		
Leptorhynchos orientalis	Lanky Buttons	Recorded from several Hay Plain and southern Riverina localities, including Willanthry east of Hillston, Zara-Wanganella via Hay, McKinley Road SW of Hillston, and "Morundah" navy land west of Buckingbong SF. A large population has most recently been recorded from Cowl Cowl Station SSW of Hillston along a TSR. The species grows in woodland or grassland, sometimes on the margins of swamps. Communities include a Bimble Box plain in red-brown soil, dense Acacia pendula woodland with herbaceous understorey on red clay to clay-loam, open grassland areas on red soils, and red clay plains at the edge of a Canegrass swamp. The specuies is mainly with plant communities containing *Eucalyptus populnea subsp. bimbil, Acacia pendula, Eragrostis australasica, Lepidium monoplocoides, Enchylaena tomentosa, Minuria leptophylla, Rhodanthe floribunda, R. pygmaea* and *Ptilotus spathulatus*.	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity indicates that the habitat is unlikely to support a population of this species, for which the preferred habitat is woodland with a native herbaceous understorey. No previous records within 5km of the Study Area. Most records of the species within the IBRA Sub Region occur within the localities of Willanthry, east of Hillston, Zara-Wanganella via Hay, McKinley Road SW of Hillston, and "Morundah" navy land west of Buckingbong State Forest.
Lophochroa leadbeteri	Pink Cockatoo	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. It feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of	No	Habitat Constraints – The Subject Land does not contain hollow bearing trees or living or dead tree with hollows greater than 10cm diameter.

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.		
Maireana cheelii	Chariot Wheels	NSW collections have mainly been from the Moulamein, Deniliquin and Hay districts, including Tchelery and Zara Stations. There is an outlying record from "Wangareena east of Wanaaring on heavier, grey clay soils with Atriplex vesicaria (Bladder Saltbush). Recorded on the Hay Plain in *Atriplex vesicaria, Maireana aphylla* and *Acacia homalophylla* shrublands. Soils include heavy brown to red-brown clay-loams, hard cracking red clay, other heavy texture-contrast soils. Tends to grow in shallow depressions, often on eroded or scalded surfaces, and does not extend to the higher soils in the habitat. It has been found on the edges of bare, windswept claypans, in shallow depressions of eroded surfaces where rainwater collects and on a "shelf" in the crabhole complex of heavy grey soils. Associated species include Atriplex vesicaria, *Maireana pentagona, M. excavata, M. ciliata, Cressa cretica, Avena fatua* and *Acacia homalophylla*.	No	Habitat Degraded: Subject Land lacks suitable saltbush habitat. No previous records within 5km of the Study Area. Most records of the species within the IBRA Sub Region occur in the the southern Riverina region of NSW, mainly in the area between Deniliquin and Hay.
Myotis macropus	Southern Myotis	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and	No	Habitat constraints. Suitable foraging habitat (Irrigation channels adjacent to the site contain waterbodies >3m wide), but no suitable roosting or breeding habitat (hollow-bearing trees). No previous records within 5km of the Study Area, and only 11 records within the IBRA Sub Region.

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		pools catching insects and small fish by raking their feet across the water surface.		
Phascolarctos cinereus	Koala	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	No	Habitat Degraded: Subject Land contains Koala feed trees, however, due to the low coverage of native bushland, it is unlikely the area could support a resident population of Koalas. Only four records within 5km of the Study Area, and only 61 records within the IBRA Sub Region.
Pilularia novae-hollandiae	Austral Pillwort	In NSW, the Austral Pillwort has been recorded from suburban Sydney, Khancoban, the Riverina between Albury and Urana (including Henty, Walbundrie, Balldale and Howlong), Oolambeyan National Park near Carrathool and at Lake Cowal near West Wyalong. The populations at Lake Cowal and Oolambeyan NP are the only known extant populations in NSW, although the species is obscure and has possibly been overlooked elsewhere. The species has also been recorded in the Australian Capital Territory, Victoria, Tasmania, South Australia and Western Australia. Austral Pillwort grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. Most of the records in the Albury-Urana area were from table drains on the sides of roads.	No	Habitat Degraded: Subject Land lacks suitable habitat (shallow swamps and waterways, often among grasses and sedges). No records within 5km of the Study Area, and only 41 records within the IBRA Sub Region.
Polytellis swainsonii	Superb Parrot (Breeding)	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter,	No	Habitat Degraded: Subject Land contains marginally suitable foraging habitat but no breeding habitat.

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. In the Riverina superb parrots nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum forest or woodland. On the South West Slopes and Southern Tablelands nest trees can be in open Box-Gum woodland or isolated living or dead paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Superb Parrots nest in tree hollows with an entrance diameter of 6 cm or wider, and that are at least 3.5 m above the ground. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.		Habitat Constraints: The Subject land does not contain hollow bearing trees or living or dead E. blakelyi, *E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta, E. bridgesiana* with hollows greater than 5cm diameter that are greater than 4m above ground or trees with a DBH of greater than 30cm
Sclerolaena napiformis	Turnip Copperburr	Known from only a few small populations in remnant grassland in the southern Riverina of NSW and north-central Victoria. NSW populations are confined to the area between Jerilderie and Moama on travelling stock routes and road reserves. Confined to remnant grassland habitats on clay-loam soils. Grows on level plains in tussock grassland of Austrostipa nodosa and Chloris truncata, in grey cracking clay to red-brown loamy clay. Sites are often roadside travelling stock routes and reserves subject to sheep grazing.	No	Habitat Degraded: Subject Land lacks suitable habitat. No previous records within 5km of the Study Area. The majority of records within the IBRA Sub Region lie between the localities of Jerilderie and Moama.
Swainsona murrayana	Slender Darling Pea	Previously recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. The species has been collected from clay-based soils, ranging from grey, red and	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
		brown cracking clays to red-brown earths and loams. The species grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.		indicated that the habitat is unlikely to support a population of this species. No previous records within 5km of the Study Area. The majority of records within the IBRA Sub Region lie between the localities of Jerilderie and Moama.
Swainsona plagiotropis	Red Darling Pea	Grows on flat grassland and in heavy red soil, often on roadsides and especially in table drains. Soils are derived from quaternary sediments and are usually red-brown clay-loams. The species is absent from black low-lying soils. Recorded from roadsides, rail reserves, stock routes and areas of lightly grazed unimproved pasture comprising Austrodanthonia, Enteropogon acicularis and Austrostipa grassland communities.	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity indicated that the habitat is unlikely to support a population of this species. No previous records within 5km of the Study Area. The majority of records within the IBRA Sub Region occur near the locality of Jerilderie, with possible collections from the Louth-Bourke area and a disjunct record in the north-western plains from Buttabone Stud Park 35 km NW of Warren.
Swainsona sericea	Silky Swainson-pea	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum (*Eucalyptus pauciflora*) Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines *Callitris* spp.	No	Habitat Degraded: The Subject Land has been subjected to long-term management practices such as vegetation clearing, slashing and mowing. The lack of overall native plant diversity indicates that the habitat is unlikely to support a population of this species, for which the preferred habitat is natural temperate grasslands.

Species Credit Species		Preferred Habitat	Candidate Species Assessment	
Scientific name	Common name		Conclusion	Justifications
				No previous records within 5km of the Study Area. The majority of records within the IBRA Sub Region occur in the Monaro locality.

5.2 Targeted Threatened Species Surveys

Step 4: Determine presence or absence of candidate species credit species.

Due to the lack of suitable habitat within the Subject Land for threatened species, no targeted surveys were conducted. Opportunistic surveys for threatened fauna species were conducted during the sampling of vegetation and when conducting the habitat assessment via random meander on 09/11/23, 10/11/23, 07/01/24, and 08/01/24.

5.3 Identified Threatened Species

Step 5: Determine the area or count, and location of suitable habitat for Species Credit species and Step 6: Determine the habitat condition within the species polygon for species assessed by area

One threatened fauna species was identified during the site assessment. A group Superb Parrots (Polytellis swainsonii) was observed foraging within a woodland patch to the south of the intersection of Houghton Road and Irrigation Way.

The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina, the species nests in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Nest in small colonies, often with more than one nest in a single tree. Breed between September and January.

As shown on **Figure 8**, the Superb Parrot was detected foraging within Vegetation Zone 01, which represents the better-quality available habitat within the Study Area. No areas of this vegetation zone will be impacted by the proposed upgrades for the project. Additionally, the habitat assessment revealed that the areas of native vegetation that will be impacted by the project (Vegetation Zones 01 and 02) do not contain the following habitat constraints for the species (as published in the TBDC):

"Hollow bearing trees or living or dead E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta, E. bridgesiana with hollows greater than 5cm diameter that are greater than 4m above ground or trees with a DBH of greater than 30cm"

Given that the proposed development will result in the removal of foraging habitat only (no breeding habitat will be impacted), a species polygon for the Superb Parrot is not required.

Figure 8 - Threatened Species Detected (Superb Parrot)

Habitat Environmental Services

- Study Area (Investigation Area)
- Subject Land (Development Footprint)
- Superb Parrot Detection

Vegetation Zone (VZ) - Plant Community Type (PCT) - Condition Class

- VZ 01 - PCT 74 - Woodland Regrowth
- VZ 02 - PCT 74 - Planted Roadside Vegetation
- VZ 03 - PCT 26 - Woodland Regrowth
- Non-native Vegetation (Agricultural Crops)
- Non-native Vegetation (Exotic Grassland)
- Cleared/ Developed

0 100 200 Meters

6 Avoiding and Minimising Impacts

Avoidance can be achieved both through initial site selection to identify suitable sites with low levels of impact, together with project refinements identified through investigation and understanding of site constraints.

The initial effort to avoid impacts to native vegetation was a key consideration in site selection. Key aspects of site selection included identifying a site that has been historically disturbed through vegetation clearance and agricultural activities. The host land holding has been the subject of ongoing agricultural activities for many years and was considered to represent a viable proposal site due to the absence of extant native vegetation. Areas of native vegetation adjacent to the site were considered to be capable of avoidance or impact minimisation. To assist with the determining the nature of project refinement and associated avoidance of impact. Steps to avoid, minimise and mitigate impacts to native vegetation, threatened species and their habitat in the planning stage were informed by initial ecological investigations within the Study Area were completed on 09/11/23 and 10/11/23. The findings of these investigations were summarised in a Biodiversity Assessment Summary Report that was issued by Habitat Environmental Services on 06/12/23 and submitted in support of the project scoping report to request SEARs.

To reduce the potential for direct or indirect impacts to better quality areas of habitat, including EECs and foraging habitat for threatened species (such as the Superb Parrot), the layout of the proposed development was designed to utilise areas within the Study Area with low biodiversity value, including Exotic Grassland, Agricultural Cropland and Cleared Developed Land). Areas of native and non-native vegetation to be impacted/retained within the Study Area are summarised in **Table 9**. Based on the extent of the proposed development footprint (Subject Land), impacts will be limited to the removal of 0.51 ha of native vegetation/habitat and will allow for the retention of 2.66 ha of native vegetation/ habitat. In summary, approximately 84% of native vegetation/habitat will be avoided.

Table 9 Areas of vegetation to be impacted/retained within the Study Area

Vegetation Zone	PCT	Condition Class	Study Area (ha)	Subject Land (ha)	Retained (ha)
Native Vegetation					
01	74	Woodland Regrowth	1.28	0.00	1.28
02	74	Planted Roadside	1.46	0.50	0.96
03	26	Woodland Regrowth	0.43	0.01	0.42
Sub-total			**3.18**	**0.51**	**2.66**
Non-native Vegetation					
-	-	Exotic Grassland	12.80	1.69	11.10
-	-	Agricultural Cropland	18.33	7.27	11.05
-	-	Cleared/Developed	8.49	0.93	7.56
Sub-total			**39.61**	**9.90**	**29.71**
Total			**42.79**	**10.42**	**32.38**

Mitigation measures are presented in **Section 7.6** to further minimize direct and indirect impacts to Biodiversity values within the Study Area and the surrounding environment.

7 Assessment of Impacts

7.1 Vegetation Clearing Impacts

The proposed development will impact 0.51 ha of native vegetation (Vegetation Zones 02 and 03), and 8.21 ha of non-native vegetation. Impacts to native vegetation and non-native vegetation types, are summarised in **Table 10**. The current Vegetation Integrity Score (VI Score) and future VI Score of each vegetation zone is also presented.

Table 10 Impacts on Native Vegetation (Vegetation Zones) and Non-native Vegetation Types

Vegetation Zone	PCT	Condition Class	Impact Area (ha)	Current VI Score	Future VI Score
Native Vegetation					
02	74	Planted Roadside	0.50	26.0	0
03	26	Woodland Regrowth	0.01	31.6	0
Sub-total			**0.51**		
Non-native Vegetation					
-	-	Exotic Grassland	1.69	-	-
-	-	Agricultural Cropland	7.27	-	-
-	-	Cleared/Developed	0.93	-	-
Sub-total			**9.90**		
Total			**10.42**		

7.2 Habitat Removal

The proposed development will require the removal of 0.51 ha of low condition woodland habitat that constitutes marginally suitable foraging habitat for threatened species such as Superb Parrot, which was detected adjacent to the Subject Land. The habitat to be removed has been subjected to long-term land management practices resulting in the removal of key habitat features such as hollow-bearing trees, therefore, the habitat to be removed is unlikely to be important to the long-term survival of any threatened species that may forage within the Study Area intermittently as part of a larger network of habitats within the locality.

7.3 Indirect Impacts

Potential indirect impacts to biodiversity that may arise during the construction or operation phase of the proposed development include the following:

- Increased edge effects following vegetation clearing may change abiotic conditions and facilitate the spread of weeds.
- Increased noise and vibration during the construction phase may disturb and adversely affect the natural behaviors of resident fauna species.
- Light spill from artificial lighting during the operational phase of the project may adversely affect the natural behaviors of nocturnal fauna species, such as microbats, arboreal mammals, and large forest owls.
- Changes in topography caused by the construction of roads and other infrastructure may cause changes in hydrology that may indirectly impact downstream aquatic environments.

7.4 Cumulative Impacts

Cumulative impacts arise from the interaction of individual elements associated with the proposed development and the additive effects of other external projects. In early 2024, Habitat Environmental Services Pty Ltd (Habitat) was prepare an ecological assessment for the construction of a BESS at 649 Ronfeldt Road, Yanco, NSW 2703. Field investigations revealed that this project site is vegetated throughout Agricultural Cropland. A low diversity of native plant species was recorded and no areas of native vegetation or threatened species habitat was identified.

In summary, the potential for cumulative impacts to biodiversity as a result of the proposed development and the nearby BESS project are likely to be negligible given that potential impacts to biodiversity at both sites are minimal due to the lack of biodiversity values present. No other relevant projects have been identified within the locality with the potential to contribute to cumulative impacts.

7.5 Prescribed Biodiversity Impacts

The following are prescribed impacts which need to be considered as per Section 8.3 of the BAM (DPIE 2020a).

Impacts of the development on the habitat of threatened species or ecological communities associated with significant geological features, human made structure or non-native vegetation.

The proposed development will not result in impacts to significant geological features or human-made structures. Areas of non-native vegetation to be removed within the Subject Land, such as Agricultural Cropland and Exotic Grasslands may provide a foraging resource to threatened species such as the Superb Parrot intermittently; however, these resources do not constitute important habitat for this species.

Impacts of the development on the connectivity of different habitat which facilitates movement of threatened species.

The Subject Land is situated within a locality where the pre-European extent of native vegetation has been extensively reduced for the purposes of agricultural development. The remaining areas of

remnant native woodland within the Subject Land is comprised of small woodland patches within a matrix of non-native vegetation types such as Exotic Grassland and Agricultural Cropland. In summary, the removal of native vegetation for the proposed development is likely to have a negligible impact on fauna movement given the current lack of habitat connectivity.

Impact of the development on movement of threatened species that maintains their life cycle.

As discussed above, impacts of the proposed development on the movement of fauna species within the locality are likely to be negligible. No breeding habitat or important movement corridors are proposed to be impacted

Impacts of the development on water quality, bodies and hydrological processes that sustain threatened species or ecological communities.

No natural aquatic landscape features (billabongs, rivers or streams) will be directly impacted by the proposed development. Consideration of indirect impacts to water quality and surrounding aquatic/riparian habitats are further detailed in **Section 7.6.**

Impact of wind turbine strikes on protected animals.

Not applicable to the current application.

Impacts of vehicle strikes on threatened species or on animals that are part of a TEC

An increase in vehicle movement within the Subject Land during the construction and operational phases of the project is anticipated. Mitigation measures such as reduced speed limits when entering and leaving the BESS site during the construction and operational phases of the project are proposed to reduce the potential for vehicle strike (see **Section 7.6**).

7.6 Mitigation Measures

Mitigation measures to reduce the potential for direct and indirect impacts to biodiversity values are presented in **Table 11**.

Table 11 Mitigation Measures

Impact	Action and Outcome	Responsibility	Timing
Direct impacts			
Clearing of native vegetation	• Avoid and minimise clearing impacts to native vegetation where possible. • Clearly delineate the boundaries of the project footprint to prevent any unnecessary clearing beyond its extent. This includes the installation of appropriate fencing along the eastern extent of the Subject Land. Fencing should prohibit entry into the retained vegetation area and minimise indirect impacts during construction such as the movement of dust and rubbish into the forest and wetland. • Ensure vehicle and equipment parking areas and stockpile areas are identified and positioned to avoid areas containing ecological value. Stockpiling must not occur within, or in proximity (5m) to, areas of native vegetation retained under the proposed development. • Appropriate signage such as 'no go zone' or 'environmental protection area' should be installed surrounding the area of retained native vegetation and wetlands. • Clearly identify and communicate the location of any 'no go zones' in site inductions. • Tree protection measures will be implemented to protect retained trees surrounding the Subject Land. Tree protection measures should consider allowances for Tree Protection Zones in accordance with AS4970 (Standards Australia, 2009).	Construction site manager	Prior to and during vegetation clearing
Removal of Fauna Habitat	• Limit removal of trees to that required within the project footprint where possible. • Pre-clearance surveys will be undertaken to determine if any inhabiting fauna, or habitat features (i.e. nests or hollows) are present 24 hours prior to clearing. • A staged approach is required to the removal of vegetation (trees and shrubs) to minimise the potential for impacts to fauna by providing them with an opportunity to vacate hollows and relocate naturally. • Avoid clearing vegetation during the breeding season of threatened fauna species, such as the Superb Parrot (spring/ early summer). • Ensure a licensed wildlife carer and/or ecologist is present during vegetation clearing/habitat removal.	Construction site manager / Ecologist	Prior to and during vegetation clearing
Impacts to surface and groundwater quality and quantity due to sediment run-	• Source controls such as sediment fences, mulching and jute matting will be utilized where appropriate, especially along the eastern boundary of the proposed development area that runs adjacent to a first-order stream. • Site-based vehicles will carry spill kits.	Construction site manager	During vegetation clearing, construction and operation

Impact	Action and Outcome	Responsibility	Timing
off and/or contaminant runoff into adjacent watercourses	• Erosion and sediment control will be required for the development in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) prior to commencement of construction. • Limit the use of pesticides in the project footprint where possible to avoid contamination of nearby watercourses/wetland areas.		
Vehicle collision with fauna	• Speed limits within the Subject Land should be limited to 40 km/hr. • This limit should be clearly signed at all entry points to site. • The Subject Land should be separated from vegetated areas throughout the construction and operational phases of the development. This separation should be achieved through physical barriers including fencing and appropriate signage.	Construction site manager	During construction and operation
Indirect Impacts			
Transfer of weeds and pathogens to and from site	• The fungal pathogens *Phytophora cinnamomi* and Myrtle Rust (Puccinia psidii) are likely to occur within the LGA, however, it is unknown if they occur within the Subject Land. These pathogens can have devastating impacts on native plant communities and inhabiting fauna if not properly managed. • Appropriate washdown facilities will be available to clean vehicles and equipment prior to arrival on-site and prior to departure. • Ensure soil and seed material is not transferred	Construction site manager	During vegetation clearing, construction, and operation
Noise, vibration, lighting, waste and air pollution impacts to adjacent sensitive habitat areas	• Increased human activity (from workers and traffic levels) directly adjacent to sensitive habitat areas may cause disturbance to flora and fauna species in adjoining habitat. • Impacts from construction and operational activities, such as disturbance to an animal's normal behavior patterns due to noise, vibration, lighting or dust may cause areas of previously suitable habitat to become sub-optimal and may cause fauna species to vacate areas of previously suitable habitat. • Measures to mitigate impacts on flora and fauna from noise, vibration, waste, light and air pollution such as: • Restriction of public access and associated impacts from domestic pets, waste dumping and damage to adjoining vegetation must be enforced pre, during and post construction. • Fence sensitive areas to delineate 'no go' zones. • Levels of lighting associated with the proposed development (during construction and operation) will be reduced to a minimal level and directed away from retained vegetation	Construction site manager	During construction and operation

Impact	Action and Outcome	Responsibility	Timing
	areas to reduce any adverse effects upon the essential behavioral patterns of light-sensitive fauna. Lighting design and utilization during construction and operational phases of the development should be based on principles detailed in Appendix A of the National Light Pollution Guidelines for Wildlife (DEE 2020). This includes consideration of adaptive controls, and measures to reduce light intensity and inappropriate light spill into retained vegetation and fauna habitat. • Lighting should also comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting. • Noise minimization practices in accordance with standard practises. • Dust control measures such as covering loads where required; amending operations under excessive wind conditions including ceasing operations if required; use of water tankers as required, to control dust; rehabilitation through vegetation of surfaces to be left unsealed; and truck wheel washes or other dust removal measures.		

8 Impact Summary

8.1 Serious and Irreversible Impacts

One entity at risk of Serious and Irreversible Impacts (SAIIs) will be impacted by the proposed development:

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions

Direct impacts to the CEEC will be limited to the removal of 0.5 ha of low condition vegetation (Vegetation Zones 01 and 02). Given that the vegetation to be removed forms part of a narrow-fragmented patch that is mainly comprised of planted vegetation (see **Section 4.2.9**), this removal is unlikely to reduce the extent of the CEEC such that its long-term survival or recovery will be severely affected within the locality. An SAII Assessment for the CEEC is presented in **Table 12.**

Table 12 SAII Assessment - White Box - Yellow Box - Blakely's Red Gum Grassy Woodland

Criteria	Discussion
1. Impact avoidance	
What action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII?	Avoidance measures have been undertaken to reduce the potential for direct impacts to White Box - Yellow Box - Blakely's Red Gum Grassy Woodland CEEC. The development has been strategically located to reduce the requirement for vegetation clearing. The development footprint for the project lies predominantly within cleared areas that lack biodiversity value (Agricultural Cropland and Exotic Grassland) and do not constitute the CEEC. Mitigation measures will be implemented to ensure reduce the potential for indirect impacts to areas of the CEEC that will be retained in adjacent (See **Table 11**).
2. Current population	
Principle 1 - evidence of rapid decline	Yes. The CEEC is listed as an SAII under Principle 1 in the TBDC. The community has observed a rapid decline of ≥80% in 10 years Much of the clearing has been undertaken to allow for agricultural development (TSSC 2020). Clearing of the CEEC is likely to continue into the short-term under the current regulatory framework (TSSC 2020).
Principle 2 - evidence of small population size	Yes. The community is listed as an SAII under Principle 2. For a TEC, this principle refers to the degree of environmental degradation. Most of the remaining remnant patches of this community are fragmented and have been degraded via land management practices such as vegetation clearing, slashing and pruning. Grazing of stock and clearing over trees (thinning) have been reported as the most widespread activity (TSSC 2020). It is estimated that less than 10% of this threatened community is

Criteria	Discussion
	likely to have avoided long-term impacts and degradation (Prober and Thiele 2004).
Principle 3 - evidence of limited geographic range (SAII Principle 3)	No. This community is not listed as an SAII under this principle. Regionally, CEEC extends in a north-south distribution along the NSW western slopes and tablelands.
Principle 4 - evidence that the species is unlikely to respond to management	No. This community is not listed as an SAII under this principle. This principle does not currently apply to TECs. The management of the CEEC under various conservation programs is well documented (National Recovery Plan (DECCW 2010, Saving our Species program NSW (DPE)).
3. Unknown or data deficient	
	The TBDC does not indicate data is 'unknown' or 'data deficient' for this species
4. Impacts of the project on the species at risk of SAII	
	Direct impacts to the CEEC will be limited to the removal of 0.5 ha of low condition vegetation (Vegetation Zones 01 and 02). Given that the vegetation to be removed forms part of a narrow fragmented patch that is mainly comprised of planted vegetation (see Section 4.2.9), this removal is unlikely to reduce the extent of the CEEC such that its long-term survival or recovery will be severely affected within the locality.

- Department of Planning and Environment (DPE) (2023). Threatened Biodiversity Profile Search. Available at: https://www.environment.nsw.gov.au/threatenedspeciesapp/
- Department of Planning and Environment (DPE) (2023). NSW Threatened Species Scientific Committee – Final Determinations. Available at: https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations
- New South Wales Threatened Species Scientific Committee (TSSC) (2020). Final Determinations - White Box Yellow Box Blakelys Red Gum Grassy Woodland and Derived Native Grassland. Available at https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Scientific-Committee/Determinations/2020/white-box-yellow-box-final-determination-ceec.pdf?la=en&hash=DD6076E55435D715E7E90B1A901EEB83D488563B
- Prober S. M. and Thiele K. R. (2004) Floristic patterns along an east-west gradient in grassy box woodlands of Central New South Wales. Cunninghamia 8, 306–325.

8.2 Impacts Requiring Offset

In accordance with Section 9.2.1 of the BAM assessors must determine an offset for all impacts of proposals on PCTs that are associated with a Vegetation Zone that have a VI Score of:

- ≥15, where the PCT is representative of an EEC or a CEEC.
- ≥17, where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community.
- ≥20, where the PCT does not represent a TEC and is not associated with threatened species habitat.

Vegetation Zone 02 is commensurate with a CEEC (Box Gum Grassy Woodland) and Vegetation Zone 03 is commensurate with an EEC (Weeping Myall Woodland). Given that the VI Scores of both vegetation zones is >15, an ecosystem credit obligation will be incurred for residual impacts. The native vegetation impacts requiring offset, and the ecosystem credit requirement is provided in **Table 13**.

Table 13 Ecosystem credit requirements

Zone	PCT	Condition class	Impact Area (ha)	Current VI Score	Future VI Score	Credits Required
02	74	Planted Roadside	0.50	26.0	0	8
03	26	Woodland Regrowth	0.01	31.6	0	1

8.3 Impacts Not Requiring Offsets

The proposed development will impact 0.93 ha of cleared /developed land and 8.21 ha of non- native vegetation (comprised of 1.69 ha of Exotic Grassland and 7.27 ha of Agricultural Cropland. In accordance with the BAM, impacts to non-native vegetation do not require biodiversity offsets.

Biodiversity Offsets have been calculated for direct impacts of the proposed development based on the extent of native vegetation proposed to be removed No offsets have been generated for indirect impacts to retained areas of native vegetation within the site.

9 Legislative Review

9.1 Environment Protection and Biodiversity Conservation Act 1999

One EPBC Act listed vulnerable species, Superb Parrot (*Polytelis swainsonii*) was identified foraging within the Study Area in an area of low condition native vegetation that will not be impacted by the proposed development. No breeding habitat (hollow-bearing trees) occurs within the Study Area; therefore, the species is likely to utilise Subject Land as part of a broader network of foraging habitats.

The Study Area is unlikely to be important habitat for any resident populations or communities listed under the EPBC Act listed species. An EPBC Referral to the Commonwealth Minister for the Environment is not recommended.

9.2 Biosecurity Act

Two Priority Weeds were recorded in grassland habitat within the Study Area (see **Table 14**). Weed control measures and weed hygiene procedures have been recommended to reduce the potential for spread of these species during the construction and operational phases of the project.

Table 14 Weed species requiring control

Family	Scientific Name	Common Name	Weed of National Significace	Priority Weed (Leeton LGA)
Poaceae	*Eragrostis curvula*	African Lovegrass	No	Yes
Poaceae	*Nassella neesiana*	Chilean Needle Grass	Yes	Yes

9.3 Biodiversity and Conservation SEPP (2021) - Chapter 3 - Koala Habitat Protection

The canopy vegetation within the Study Area is comprised of Koala feed tree species listed under Schedule 1 of the SEPP (mainly *Eucalyptus camaldulensis* and *Eucalyptus* populnea) that constitute greater than 15% of the canopy, therefore, all vegetation zones meet the definition of 'Potential Koala Habitat'. No koalas were detected during opportunistic diurnal surveys (high visibility given the sparsity of trees). This was expected given that the woodland patches are isolated, fragmented, and have low external habitat connectivity due to the extent of agricultural development in surrounding areas. Given the lack of Koala records within the locality, no areas within the Study Area or Subject Land are likely to support a resident population of Koalas. The existing vegetation occurs in a low condition state and does not meet the definition of 'Core Koala Habitat'.

10 References

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Appendix A – Assessment Summary

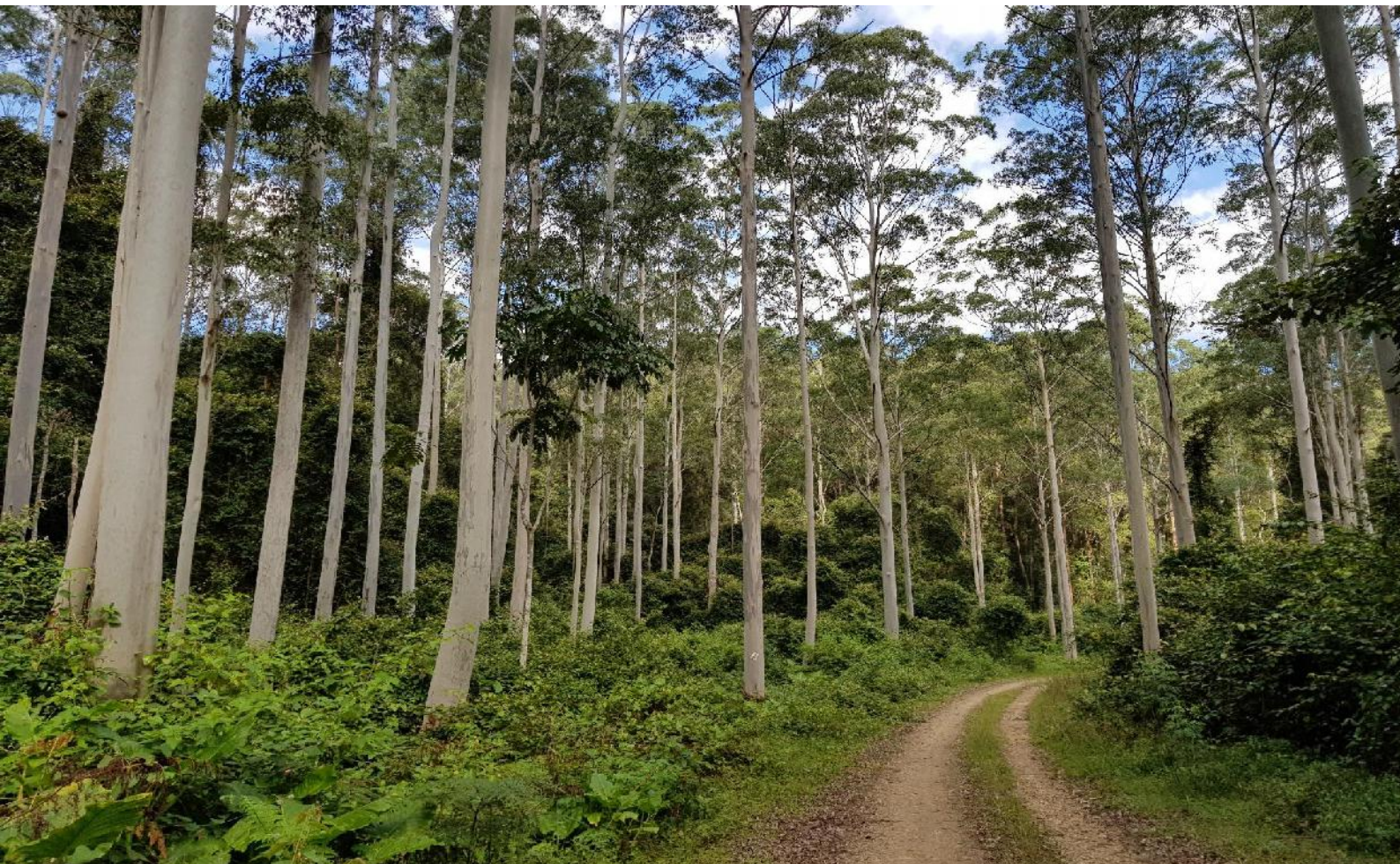
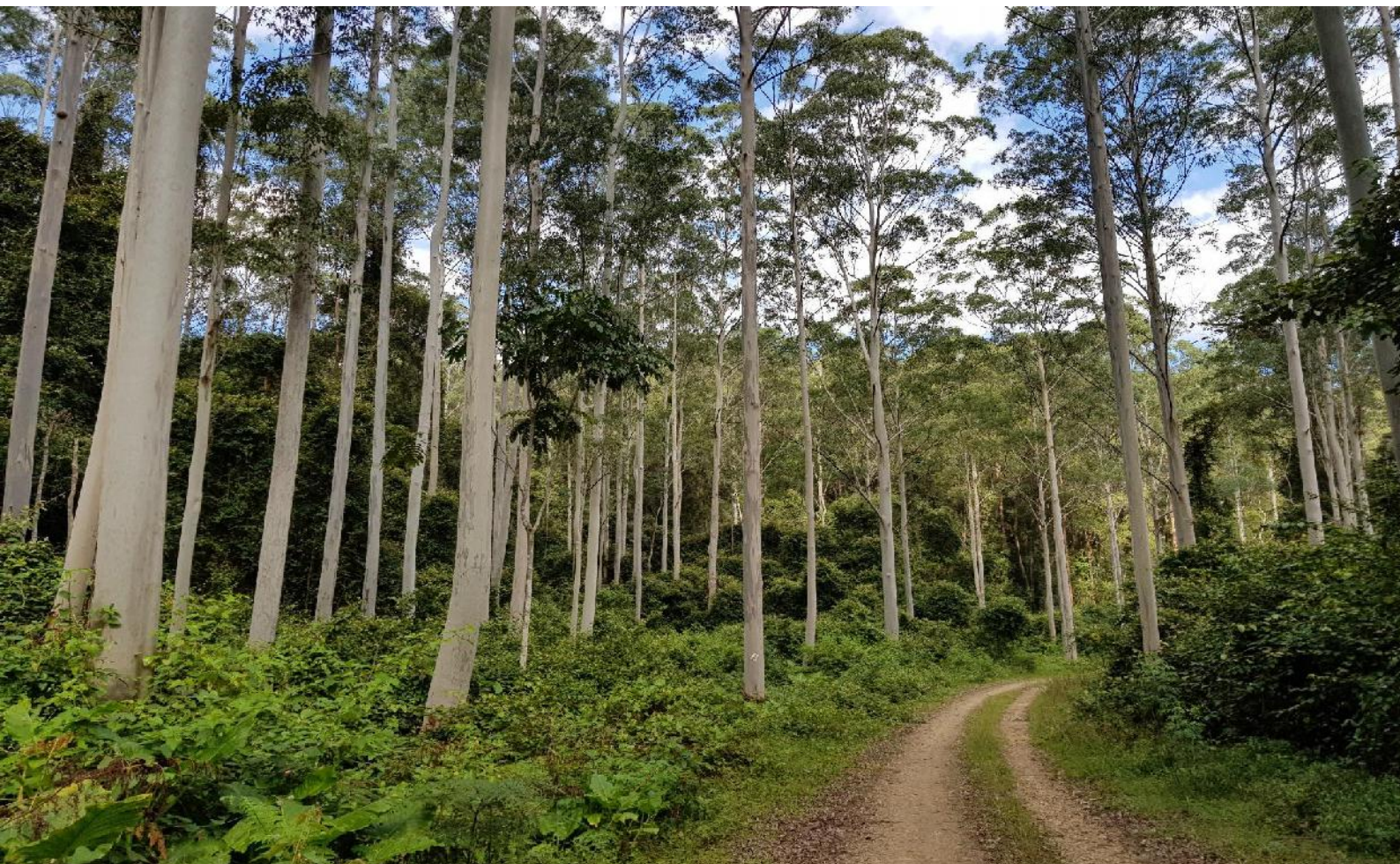


Table A-1 Study Area and Subject Land assessment summary

Details	
Date of report issue	04/11/2024
Report Version	3.0
Document number	HBT0204_BDAR_V2.0.
Client	ACEnergy Pty Ltd
Report type	Biodiversity Development Assessment Report
Site address	Yanco Battery Energy Storage System - 120 Houghton Road, Yanco, NSW 2703,
BAAS	00050848/BAAS18041/24/00050849

Appendix B – Flora List/ BAM Plot Data



BAM Plot Data - Cover Abundance Scores (Q01-Q07)

Form	Plant Species	Q01	Q02	Q03	Q04	Q05	Q06	Q07	RM
Shrub	Acacia dawsonii		0.5		2				
Shrub	Acacia deanei			2					
Tree	Acacia decurrens			1	5				
Tree	Acacia pendula		20	0.5					
Tree	Acacia salicina			5	10				
Exotic	Arctotheca capensis								1
Tussock Grass	Aristida ramosa								1
Chenopod	Atriplex semibaccata						0.1	0.1	
Tussock Grass	Austrostipa aristiglumis								1
Tussock Grass	Austrostipa scabra		1			1	2		
Exotic	Avena barbata	1	10			90	80	70	
Forb	Boerhavia dominii							0.2	
Tree	Brachychiton populneus		0.2		1				
Exotic	Bromus catharticus		20						
Exotic	Bromus hordeaceus		20	2			2		
Exotic	Bromus sterilis							2	
Tussock Grass	Chloris truncata	0.1		0.1			1	1	
Tussock Grass	Chloris ventricosa								1
Exotic	Chloris virgata								1
Exotic	Cichorium intybus						1		
Exotic	Cirsium vulgare								1
Forb	Crassula sieberiana								1
Exotic	Cupressus sp.	5							
Other Grass	Cynodon dactylon	5							
Epiphyte	Dendrophthoe vitellina		0.1						
Exotic	Echium plantagineum		0.2						
Forb	Einadia nutans	0.1	20					0.5	
Forb	Einadia trigonos subsp. stellulata								1
Chenopod	Enchylaena tomentosa	0.1	2	0.2			0.1		
Tree	Eucalyptus camaldulensis							10	
Tree	Eucalyptus crebra	10							
Tree	Eucalyptus melliodora			20	20				
Tree	Eucalyptus populnea		5	1					
Exotic	Foeniculum vulgare								1
Exotic	Hirshfieldia incana							0.1	
Exotic	Hordeum leporinum							0.2	
Exotic	Hypochaeris radicata								1
Rush	Juncus continuus								1
Exotic	Lactuca serriola	0.1					0.1		
Exotic	Lepidium africanum		0.1						
Exotic	Lolium perenne	60				0.5	5	2	
Exotic	Lycium ferocissimum		0.1						
Exotic	Marrubium vulgare								1
Exotic	Medicago sativa	5							
Exotic	Nassella neesiana		5			0.5			
Exotic	Oxalis latifolia			2					
Exotic	Oxalis pes-caprae								1

Form	Plant Species	Q01	Q02	Q03	Q04	Q05	Q06	Q07	RM
Exotic	Panicum capillare						2		
Tussock Grass	Panicum effusum								1
HTW	Phoenix canariensis			0.1					
Exotic	Plantago lanceolata	5					1	10	
Exotic	Rapistrum rugosum								1
Exotic	Rumex conglomeratus						0.1		
Tussock Grass	Rytidosperma erianthum								1
Chenopod	Salsola australis								1
Exotic	Salvia verbenaca				0.1	0.2			
Chenopod	Sclerolaena muricata	0.1		0.1					
Chenopod	Sclerolaena muricata								1
Shrub	Senna artemisioides				2				
Forb	Sida corrugata	0.1	0.2	0.2				0.2	
Exotic	Solanum elaeagnifolium								1
Forb	Solanum esuriale		2	0.2	0.1	1	0.2	0.1	
Exotic	Sonchus aspera	0.1							
Exotic	Sonchus oleraceus		0.2						
Exotic	Sorghum halepense								1
Exotic	Tribulus terrestris							0.1	
Exotic	Trifolium arvense						0.2		
Exotic	Trifolium campestre								1
Exotic	Trifolium cernuum								1
Exotic	Trifolium dubium								1
Exotic	Verbascum thapsus								1
Forb	Vittadinia cuneata		0.2			0.1	0.1		
Exotic	Vulpia bromoides					0.5			
Exotic	Vulpia myuros	5	20	20	0.1		0.5		

BAM Plot Data Summary (Q01-Q07)

Plot	Q01	Q02	Q03	Q04	Q05	Q06	Q07
pct	74	26	74	74	74	74	74
area	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Patch size	15	15	15	15	101	101	15
Condition class	VZ01_Planted	VZ02_Regrowth	VZ01_Planted	VZ01_Planted	VZ03_Grass	VZ03_Grass	VZ01_Planted
zone	55	55	55	55	55	55	55
easting	445776	445592	445686	445540	445503	445621	444516
northing	6170382	6170390	6170372	6170454	6170395	6170456	6170966
bearing	201	114	266	63	357	106	214
Comp Tree	1	3	5	4	0	0	1
Comp Shrub	0	1	1	2	0	0	0
Comp Grass	2	1	1	0	1	2	1
Comp Forbs	2	4	2	1	2	2	4
Comp Ferns	0	0	0	0	0	0	0
Comp Other	2	2	2	0	0	2	1
Struc Tree	10	25.2	27.5	36	0	0	10
strucS hrub	0	0.5	2	4	0	0	0
Struc Grass	5.1	1	0.1	0	1	3	1
Struc Forbs	0.2	22.4	0.4	0.1	1.1	0.3	1
Struc Ferns	0	0	0	0	0	0	0
Struc Other	0.2	2.1	0.3	0	0	0.2	0.1
Fun Large Trees	3	0	0	0	0	0	5
Fun Hollow trees	0	0	0	0	0	0	0
Fun Litter Cover	1	9	40	64	1	1	2
Fun Fallen Logs	0	6	0	0	0	0	0
Fun Tree Stem 5to9	0	1	0	1	0	0	0
Fun Tree Stem 10to19	0	1	1	1	0	0	0
Fun Tree Stem 20to29	0	1	1	1	0	0	0
Fun Tree Stem 30to49	0	0	1	1	0	0	0
Fun Tree Stem 50to79	1	0	0	0	0	0	1
Fun Tree Regen	0	1	1	1	0	0	0
Fun High Threatt Exotic	0	0	0.1	0	0	0	0

Attribute	Q01	Q02	Q03	Q04	Q05	Q06	Q07
Total Groundcover	86.5	78.7	24.4	0.2	92.7	95.1	85.5
Total Exotic Groundcover	81.2	75.6	24	0.2	91.7	91.9	84.4
Total Native Groundcover	5.3	3.1	0.4	0	1	3.2	1.1

Appendix C – Likelihood of Occurrence

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the DPIE BioNet Atlas: (http://www.bionet.nsw.gov.au/).

The table below summarises the likelihood of threatened species occurring within the Subject Site based on the habitat requirements of each species.

Definition of the likelihood of occurrence criteria are provided below:

- Known – species identified within the site during surveys
- High – species known from the area (DPIE BioNet Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site
- Moderate – species may be known from the area, potential habitat is present within the site
- Low – species not known from the area and/or marginal habitat is present within the site
- Nil – habitat requirements not met for this species within the site.

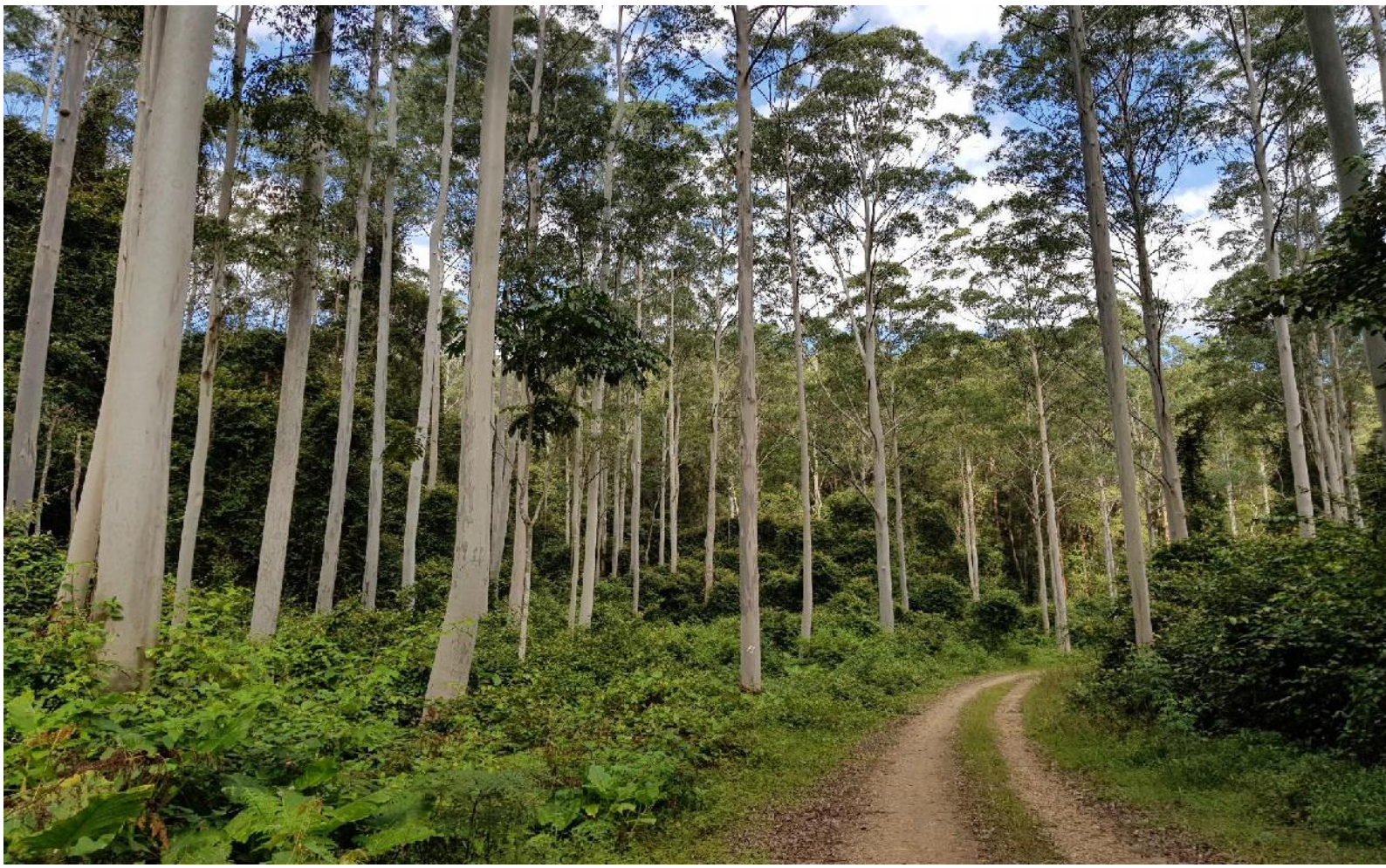


Table A1 Likelihood of Occurrence

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Austrostipa wakoolica **A Spear-grass**	E	E	0	1	Species Credit Species	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve). The species grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (swamp edges). No records within the locality. Not recorded during site assessment.
Convolvulus tedmoorei **Bindweed**	E	N/A	0	1	Species Credit Species	This species has been recorded from northern inland areas of South Australia, south-wstern Queensland and western NSW. There are few known records from NSW: two areas on the Murrumbidgee and Darling River floodplains in central-western NSW (from Toganmain Station, Darlington Point, and from a locality 8km north-west of Louth); and two other records from east of Broken Hill on the road to Wilcannia, and from the Menindee Road, Scarsdale. The species grows in self-mulching grey clay soils on the floodplains of the Darling and Murrumbidgee Rivers.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (self-mulching clay soils). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Cullen parvum **Small Scurf-pea**	E	CE	0	2	Species Credit Species	The Small Scurf-pea is known in NSW from only two herbarium collections; one from Wagga Wagga in 1884 and the other from Jindera (near Albury) in 1967. A small population was recently reported from near Jerilderie (although it has not been relocated). In recent years, two populations have been recorded in travelling stock reserves south-west of Wagga Wagga, and a population reputedly exists on a roadside near Galong. Another population has recently been discovered on private land near Young. Large populations have been recorded in grassy gaps in the Red Gum Woodlands of Barmah State Park, just across the border in Victoria. Extensive suitable habitat probably occurs across the border in NSW. In known populations in Victoria and NSW, plants are found in grassland, River Red Gum (Eucalyptus camaldulensis) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (drainage channels). Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Lepidium monoplocoides **Winged Peppercress**	E	E	0	176	Species Credit Species	Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie. The species occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by Allocasuarina luehmannii (Bulloak) and/or eucalypts, particularly Eucalyptus largiflorens (Black Box) or Eucalyptus populnea (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses. The species has been recorded in a wetland-grassland community comprising Eragrostis australasicus, Agrostis avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma and Pycnosorus globosus, on waterlogged grey-brown clay. Also recorded from a Maireana pyramidata shrubland.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (wetland/ grassland habitat). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Leptorhynchos orientalis **Lanky Buttons**	E	N/A	0	39	Species Credit Species	Recorded from several Hay Plain and southern Riverina localities, including Willanthry east of Hillston, Zara-Wanganella via Hay, McKinley Road SW of Hillston, and "Morundah" navy land west of Buckingbong SF. A large population has most recently been recorded from Cowl Cowl Station SSW of Hillston along a TSR. The species grows in woodland or grassland, sometimes on the margins of swamps. Communities include a Bimble Box plain in red-brown soil, dense Acacia pendula woodland with herbaceous understorey on red clay to clay-loam, open grassland areas on red soils, and red clay plains at the edge of a Canegrass swamp. The specuies is mainly with plant communities containing Eucalyptus populnea subsp. bimbil, Acacia pendula, Eragrostis australasica, Lepidium monoplocoides, Enchylaena tomentosa, Minuria leptophylla, Rhodanthe floribunda, R. pygmaea and Ptilotus spathulatus.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (woodlands with a herbaceous groundcover). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Maireana cheelii **Chariot Wheels**	V	V	0	1095	Species Credit Species	Restricted to the southern Riverina region of NSW, mainly in the area between Deniliquin and Hay. Also has a limited distribution in Victoria where very rare. NSW collections have mainly been from the Moulamein, Deniliquin and Hay districts, including Tchelery and Zara Stations. There is an outlying record from "Wangareena east of Wanaaring".Usually found on heavier, grey clay soils with Atriplex vesicaria (Bladder Saltbush). Recorded on the Hay Plain in *Atriplex vesicaria, Maireana aphylla* and *Acacia homalophylla* shrublands. Soils include heavy brown to red-brown clay-loams, hard cracking red clay, other heavy texture-contrast soils. Tends to grow in shallow depressions, often on eroded or scalded surfaces, and does not extend to the higher soils in the habitat. It has been found on the edges of bare, windswept claypans, in shallow depressions of eroded surfaces where rainwater collects and on a "shelf" in the crabhole complex of heavy grey soils. Associated species include Atriplex vesicaria, Maireana pentagona, M. excavata, M. ciliata, Cressa cretica, Avena fatua and Acacia homalophylla.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (grey clay soils). No records within the locality. Not recorded during site assessment. Not recorded during site assessment

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Pilularia novae-holandiae **Austral Pillwort**	E	E	0	41	Species Credit Species	In NSW, the Austral Pillwort has been recorded from suburban Sydney, Khancoban, the Riverina between Albury and Urana (including Henty, Walbundrie, Balldale and Howlong), Oolambeyan National Park near Carrathool and at Lake Cowal near West Wyalong. The populations at Lake Cowal and Oolambeyan NP are the only known extant populations in NSW, although the species is obscure and has possibly been overlooked elsewhere. The species has also been recorded in the Australian Capital Territory, Victoria, Tasmania, South Australia and Western Australia. Austral Pillwort grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. Most of the records in the Albury-Urana area were from table drains on the sides of roads.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (shallow swamps and waterways, often among grasses and sedges). Not previously recorded within the locality. Not recorded during site assessment.
Sclerolaena napiformis **Turnip Copperburr**	E	E	0	186	Species Credit Species	Known from only a few small populations in remnant grassland in the southern Riverina of NSW and north-central Victoria. NSW populations are confined to the area between Jerilderie and Moama on travelling stock routes and road reserves. Confined to remnant grassland habitats on clay-loam soils. Grows on level plains in tussock grassland of Austrostipa nodosa and Chloris truncata, in grey cracking clay to red-brown loamy clay. Sites are often roadside	Low	Degraded habitat within the Subject land. Absence of suitable habitat (native tussock grasslands). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						travelling stock routes and reserves subject to sheep grazing.		
Swainsona murrayana **Slender Darling Pea**	V V		0	495	Species Credit Species	Previously recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. The species grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.	Low	Degraded habitat within the Subject land. No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Swainsona plagiotropis **Red Darling Pea**	V	V	0	1354	Species Credit Species	Occurs in the upper Murray River valley in the south-western plains of NSW and into Victoria. Most NSW records are from the Jerilderie area, with possible collections from the Louth-Bourke area and a disjunct record in the north-western plains from Buttabone Stud Park 35 km NW of Warren. Also rare in Victoria, restricted to a few sites in the central north, mostly between Bendigo and the Murray River south of Echuca. Grows on flat grassland and in heavy red soil, often on roadsides and especially in table drains. Soils are derived from quaternary sediments and are usually red-brown clay-loams. The species is absent from black low-lying soils. Recorded from roadsides, rail reserves, stock routes and areas of lightly grazed unimproved pasture comprising Austrodanthonia, Enteropogon acicularis and Austrostipa grassland communities.	Low	Degraded habitat within the Subject land. Absence of suitable habitat (heavy red soils). No records within the locality. Not recorded during site assessment.
Swainsona sericea **Silky Swainsona-pea**	V, P	N/A	0	161	Species Credit Species	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum (*Eucalyptus pauciflora*) Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands	Low	Degraded habitat within the Subject land. Absence of suitable habitat (natural temperate grasslands). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						and South West Slopes. Sometimes found in association with cypress-pines *Callitris* spp.		
Aves								
Anthochaera phrygia **Regent Honeyeater**	E	CE	2	2	Ecosystem Credit Species Species Credit Species	In NSW the species is confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks are seen occasionally in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests. Habitat for the species includes dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	Low	Degraded habitat within the Subject land Foraging habitat only. Not mapped as important habitat. Only two records within the locality. Not recorded during site assessment.
Ardeotis australis **Australian Bustard**	E	N/A	0	5	Species Credit Species	The Australian Bustard mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. Breeding now only occurs in the north-west region of NSW. The species mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands;	Low	Degraded habitat within the Subject land (foraging habitat only. Not mapped as important habitat. Few records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						occasionally seen in pastoral and cropping country, golf courses and near dams.		
Artamus cyanopterus cyanopterus **Dusky Woodswallow**	V	N/A	2	40	Ecosystem Credit Species	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Low	Degraded habitat within the Subject land (foraging habitat only. Only two records within the locality Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Chthonicola sagittata **Speckled Warbler**	V	N/A	0	11	Ecosystem Credit Species	Within NSW most frequently reported from the hills and tablelands of the Great Dividing Range, rarely from the coast. The species inhabits a wide range of Eucalypt-dominated communities with a grassy understorey, a sparse shrub layer, often on rocky ridges or in gullies. Sedentary and requires large, relatively undisturbed remnants to persist in an area. Forages on the ground for seeds and insects, and nests in a slight hollow in the ground or at the base of low dense plants.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat within the Subject land. No records within the locality. Not recorded during site assessment.
Climacteris picumnus victoriae **Brown Treecreeper (eastern subspecies)**	V	N/A	8	221	Ecosystem Credit Species	Small grey-brown bird with black streaking on the lower breast/belly and black bars on the undertail. Inhabits Box-Gum woodlands and dry open forest of inland slopes and plains. Preferred woodlands dominant by stringybarks or other rough-barked eucalypts. Forages in trees and on the ground. Endemic to eastern Australia, occurring from the coast to inland plains and western slopes of the great dividing range. Nests in tree or stump hollows greater than 6cm.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat within the Subject land. Only eight records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Daphoenositta chrysoptera **Varied Sittella**	V	N/A	1	32	Ecosystem Credit Species	Sedentary, occurs across NSW from the coast to the far west. Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Sensitive to habitat isolation and loss of structural complexity, and adversely affected by dominance of Noisy Miners. Cleared agricultural land is potentially a barrier to movement. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat within the Subject land. Only one record within the locality. Not recorded during site assessment.
Falco hypoleucos **Grey Falcon**	E	N/A	0	7	Ecosystem Credit Species	Medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. The species is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat within the Subject land. No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Falco subniger **Black Falcon**	V	N/A	4	128	Ecosystem Credit Species	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat within the Subject land. Only four records within the locality. Not recorded during site assessment.
Grantiella picta **Painted Honeyeater**	V	V	7	68	Ecosystem Credit Species	The species is nomadic, occurring in low densities across most of NSW. Highest concentrations and almost all breeding occur on inland slopes of the Great Dividing Range. Habitat for the species includes Boree, Brigalow and Box Gum woodlands and Box-Ironbark forests.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat within the Subject land. Only seven records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Grus rubicunda **Brolga**	V	N/A	1	157	Ecosystem Credit Species	The Brolga occurs throughout Australia, except for in the south-east corner, Tasmania and the south-western third of the country. It is abundant in the northern tropics, but very sparse across the southern part of its range. Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged. They feed using their heavy straight bill as a 'crowbar' to probe the ground or turn it over, primarily on sedge roots and tubers. They will also take large insects, crustaceans, molluscs and frogs.	Low	No suitable habitat within the Subject land. Only one record within the locality. Not recorded during site assessment.
Haliaeetus leucogaster **White-bellied Sea-Eagle**	V	N/A	1	335	Ecosystem Credit Species Species Credit Species	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat within the Subject land. No suitable nesting habitat. Only one record within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						structures built from sticks and lined with leaves or grass.		
Hieraaetus morphnoides **Little Eagle**	V	N/A	1	121	Ecosystem Credit Species	The Little Eagle occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Low	Foraging habitat only. No suitable nesting habitat within the Subject land. Only one record within the locality Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Hirundapus caudacutus **White-throated Needletail**	P	V	4	9	Ecosystem Credit Species	Widespread in eastern and south-eastern Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground.	Low	Suitable aerial foraging habitat within the Subject land. Only four records within the locality. Not recorded during site assessment.
Lathamus discolor **Swift Parrot**	E	CE	0	0	Ecosystem Credit Species Species Credit Species	A migratory species that travels to the mainland from March to October, the species breeds in Tasmania from September to January. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. *Eucalyptus robusta, Corymbia maculata* and *C. gummifera* dominated coastal forests are also important habitat.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Lophochroa leadbeateri **Pink Cockatoo**	V	N/A	0	55	Ecosystem Credit Species	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. It feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Melanodryas cucullata cucullata **Hooded Robin**	V	N/A	0	6	Ecosystem Credit Species	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies cucullata) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies picata. Two other subspecies occur outside NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat). No records within the locality. Not recorded during site assessment.
Oxyura australis **Blue-billed Duck**	V	N/A	1	125	N/A	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species	Low	No suitable habitat within the Subject Land. Only one record within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached.		
Petroica boodang **Scarlet Robin**	V	N/A	1	8	Ecosystem Credit Species	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the	Low	No suitable habitat within the Subject land. Only one record within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude.		
Petroica phoenicea **Flame Robin**	V, P	N/A	0	28	Ecosystem Credit Species	The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. This species prefers clearings or areas with open understoreys. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense.	Low	No suitable habitat within the Subject land. No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Polytelis anthopeplus monarchoides **Regent Parrot**	V	N/A	1	9	N/A	The species is restricted to areas around the Murray River in SA, Victoria and NSW. In NSW it occurs along the Murray River downstream of Tooleybuc, the Wakool River downstream of Kyalite, and the Murrumbidgee River immediately upstream from the junction with the Murray River and adjoining areas of mallee. There are scattered records along the Darling River as far north as Menindee. The species nests within River Red Gum forests along the Murray, Wakool and lower Murrumbidgee Rivers, and possibly the Darling River downstream of Pooncarie. Typical nest trees are large, mature healthy trees with many spouts (though dead trees are used) and are usually located close to a watercourse. Principal foraging habitat is mallee woodlands, though foraging also occurs in riverine forests and woodlands. Mallee woodland within 20 kilometres of nesting sites is critical foraging habitat for breeding birds.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat). No suitable nesting habitat within the Subject land. Only one record within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Polytelis swainsonii **Superb Parrot**	V	V	37	1104	Ecosystem Credit Species Species Credit Species	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. In the Riverina superb parrots nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum forest or woodland. On the South West Slopes and Southern Tablelands nest trees can be in open Box-Gum woodland or isolated living or dead paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Superb Parrots nest in tree hollows with an entrance diameter of 6 cm or wider, and that are at least 3.5 m above the ground. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	Present	The Subject land contains marginally suitable foraging habitat, but no suitable breeding habitat) A group of Superb Parrots were detected during the site assessment.

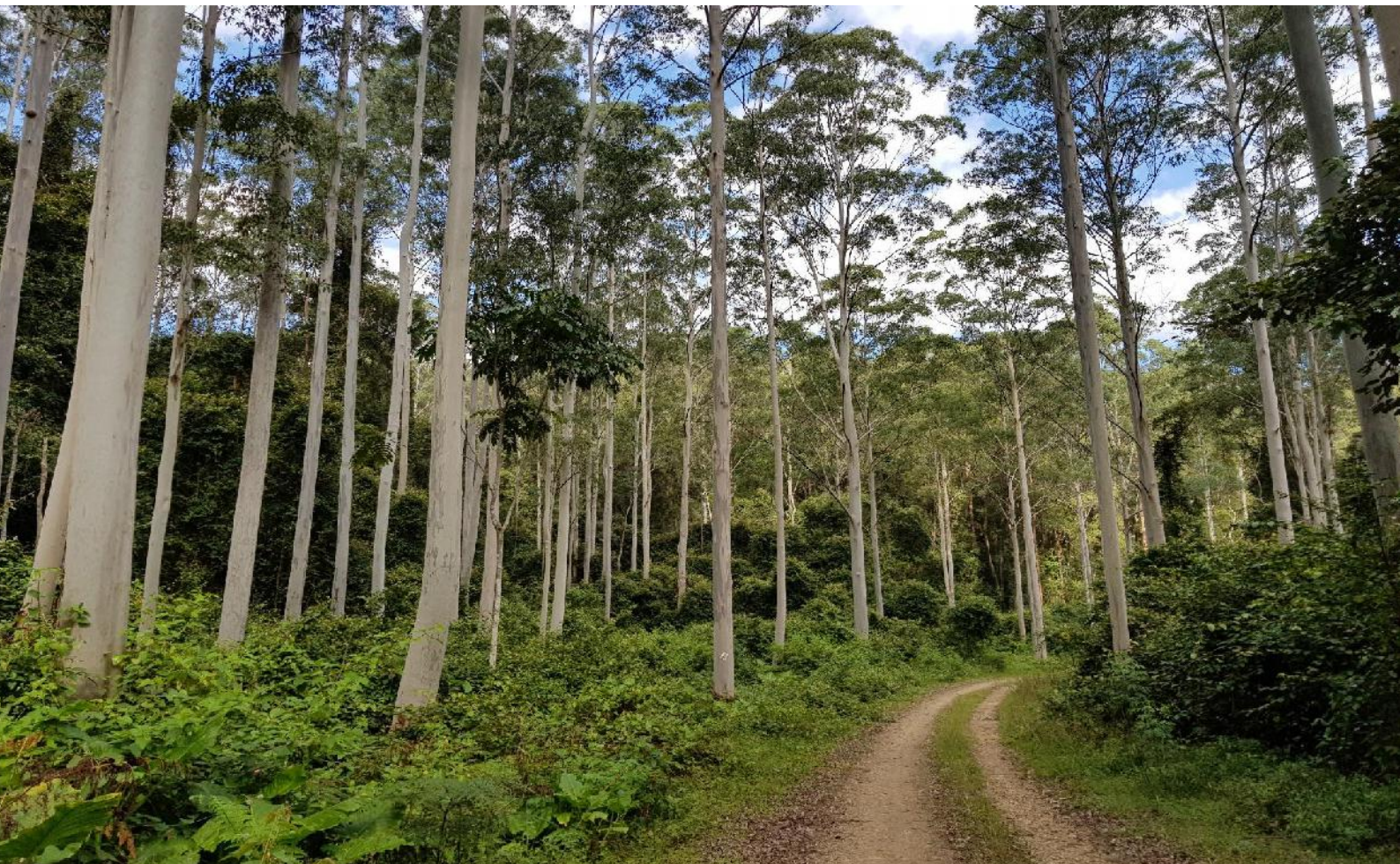
Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Pomatostomus temporalis temporalis **Grey-crowned Babbler (eastern subspecies)**	V	N/A	1	684	Ecosystem Credit Species	The Grey-crowned Babbler has two distinctive subspecies that intergrade to the south of the Gulf of Carpentaria. West of here the subspecies rubeculus, formerly considered a separate species (Red-breasted Babbler) is still widespread and common. The eastern subspecies (temporalis occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	Nil	Degraded habitat within the Subject land (marginally suitable foraging habitat). Only one record within the locality. Not recorded during site assessment.
Stagonopleura guttata **Diamond Firetail**	V	N/A	0	39	Ecosystem Credit Species	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Cental and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum (*Eucalyptus pauciflora*) Woodlands. Also	Nil	Degraded habitat within the Subject land (marginally suitable foraging habitat). No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.		
Mammals								
Myotis macropus **Southern Myotis**	V	N/A	0	11	Species Credit Species	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Low	Foraging habitat only. No breeding habitat. No records within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
Phascolarctos cinereus **Koala**	E	E	4	61	Species Credit Species	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat). Only four records within the locality. Not recorded during site assessment.
Crinia sloanei **Sloan's Froglet**	E	E	0	2	Species Credit Species	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. At a number of sites where records are verified by museum specimens, the species has not been subsequently detected during more recent frog surveys in the vicinity (e.g. Holbrook, Nyngan, Wagga Wagga and Tocumwal). The low number of sites, low number of recorded individuals per site, and the low proportion of records of this species in regional surveys all indicate that a moderately low number of mature individuals exist. The apparent loss	Low	Degraded habitat within the Subject land (marginally suitable foraging habitat). One record within the locality. Not recorded during site assessment.

Species	Status		Bionet Records		Candidate Species (BAM)	Preferred Habitat	LoO	Summary
	BC	EPBC	5km Radius	IBRA Sub Region				
						from previous recorded sites and decline in recording rates indicates that this is not just a rare or uncommonly encountered species, but that there has been a reduction in population size and range. The species is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.		

Appendix D – Biodiversity Credit Reports



BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00050848/BAAS18041/24/00050849	Yanco Solar BESS Houghton Road Yanco NsW	14/03/2024
Assessor Name	**Report Created**	**BAM Data version ***
Gilbert Whyte	04/09/2024	67
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18041	Part 4 Developments (General)	Open
Assessment Revision	**Date Finalised**	**BOS entry trigger**
1	To be finalised	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	74_VZ01_Regrowth	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	VZ01_Regrowth	0.01	1	
2	74_VZ02_Planted	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	VZ02_Planted	0.5	1	
3	74_VZ03_Grass	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	VZ03_Grass	1	1	
4	26_VZ03_Regrowth	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	VZ03_Regrowth	0.01	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00050848/BAAS18041/24/00050849	Yanco Solar BESS Houghton Road Yanco NsW	14/03/2024
Assessor Name	**Report Created**	**BAM Data version ***
Gilbert Whyte	04/09/2024	67
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18041	Part 4 Developments (General)	Open
Assessment Revision	**BOS entry trigger**	**Date Finalised**
1	BOS Threshold: Area clearing threshold	To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Brolga	Grus rubicunda	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Diamond Firetail	Stagonopleura guttata	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion

Flame Robin	Petroica phoenicea	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
Grey Falcon	Falco hypoleucos	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Pink Cockatoo	Lophochroa leadbeateri	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Regent Honeyeater	Anthochaera phrygia	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
Scarlet Robin	Petroica boodang	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
South-eastern Hooded Robin	Melanodryas cucullata cucullata	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Speckled Warbler	Chthonicola sagittata	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
Superb Parrot	Polytelis swainsonii	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Swift Parrot	Lathamus discolor	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion

White-bellied Sea-Eagle	Haliaeetus leucogaster	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
White-throated Needletail	Hirundapus caudacutus	74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
		26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Candidate Species Report

Proposal Details

Assessment Id 00050848/BAAS18041/24/00050849	Proposal Name Yanco Solar BESS Houghton Road Yanco NsW	BAM data last updated * 14/03/2024
Assessor Name Gilbert Whyte	Report Created 04/09/2024	BAM Data version * 67
Assessor Number BAAS18041	Assessment Type Part 4 Developments (General)	BAM Case Status Open
Assessment Revision 1	Date Finalised To be finalised	BOS entry trigger BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
A spear-grass	Austrostipa wakoolica	Habitat degraded Habitat constraints
Austral Pillwort	Pilularia novae-hollandiae	Habitat degraded Geographic limitations
Australian Bustard	Ardeotis australis	Habitat degraded
Bindweed	Convolvulus tedmoorei	Habitat degraded
Chariot Wheels	Maireana cheelii	Habitat degraded Habitat constraints Geographic limitations
Koala	Phascolarctos cinereus	Habitat degraded
Lanky Buttons	Leptorhynchos orientalis	Habitat degraded

Pink Cockatoo	Lophochroa leadbeateri	Habitat degraded Habitat constraints
Red Darling Pea	Swainsona plagiotropis	Habitat degraded Geographic limitations
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Silky Swainson-pea	Swainsona sericea	Habitat degraded
Slender Darling Pea	Swainsona murrayana	Habitat degraded
Sloane's Froglet	Crinia sloanei	Habitat degraded Habitat constraints
Small Scurf-pea	Cullen parvum	Habitat degraded Geographic limitations
Southern Myotis	Myotis macropus	Habitat degraded
Superb Parrot	Polytelis swainsonii	Habitat degraded Habitat constraints
Swift Parrot	Lathamus discolor	Habitat degraded Habitat constraints
Turnip Copperburr	Sclerolaena napiformis	Habitat degraded Geographic limitations
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat degraded Habitat constraints
Winged Peppercress	Lepidium monoplocoides	Habitat degraded

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00050848/BAAS18041/24/00050849

Proposal Name
Yanco Solar BESS Houghton Road Yanco NsW

BAM data last updated *
14/03/2024

Assessor Name
Gilbert Whyte

Assessor Number
BAAS18041

BAM Data version *
67

Proponent Names

Report Created
04/09/2024

BAM Case Status
Open

Assessment Revision
1

Assessment Type
Part 4 Developments (General)

Date Finalised
To be finalised

BOS entry trigger
BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	Not a TEC	1.5	0	8	8
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Not a TEC	0.0	0	1	1

BAM Biodiversity Credit Report (Like for like)

26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Plain Woodlands This includes PCT's: 26, 4104	Riverine Plain Woodlands >=90%	26_VZ03_Regrowth	No	1	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 101, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	74_VZ01_Regrowth	No	1	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 101, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	74_VZ02_Planted	No	7	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 101, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	74_VZ03_Grass	No	0	Murrumbidgee, Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id

00050848/BAAS18041/24/00050849

Proposal Name

Yanco Solar BESS Houghton Road Yanco NsW

BAM data last updated *

14/03/2024

Assessor Name

Gilbert Whyte

Assessor Number

BAAS18041

BAM Data version *

67

Proponent Name(s)

Report Created

04/09/2024

BAM Case Status

Open

Assessment Revision

1

Assessment Type

Part 4 Developments (General)

Date Finalised

To be finalised

BOS entry trigger

BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	Not a TEC	1.5	0	8	8.00
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Not a TEC	0.0	0	1	1.00

26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Plain Woodlands This includes PCT's: 26, 4104	Riverine Plain Woodlands >=90%	26_VZ03_Regrowth	No	1	Murrumbidgee,Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Semi-arid Woodlands (Grassy sub-formation)	Tier 1	26_VZ03_Regrowth	No	1	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
74-Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 101, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	74_VZ01_Regrowth	No	1	Murrumbidgee,Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 101, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	74_VZ02_Planted	No	7	Murrumbidgee,Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 101, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	74_VZ03_Grass	No	0	Murrumbidgee,Darling Depression, Lachlan, Lachlan Plains, Lower Slopes, Murray Fans, Robinvale Plains and South Olary Plain. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Grassy Woodlands	Tier 2 or higher threat status	74_VZ01_Regrowth	No	1	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Grassy Woodlands	Tier 2 or higher threat status	74_VZ02_Planted	No	7	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Grassy Woodlands	Tier 2 or higher threat status	74_VZ03_Grass	No	0	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

BAM Biodiversity Credit Report (Variations)

Credit Retirement Options

Like-for-like options

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00050848/BAAS18041/24/00050849	Yanco Solar BESS Houghton Road Yanco NsW	14/03/2024
Assessor Name	Report Created	BAM Data version *
Gilbert Whyte	04/09/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS18041	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
1	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

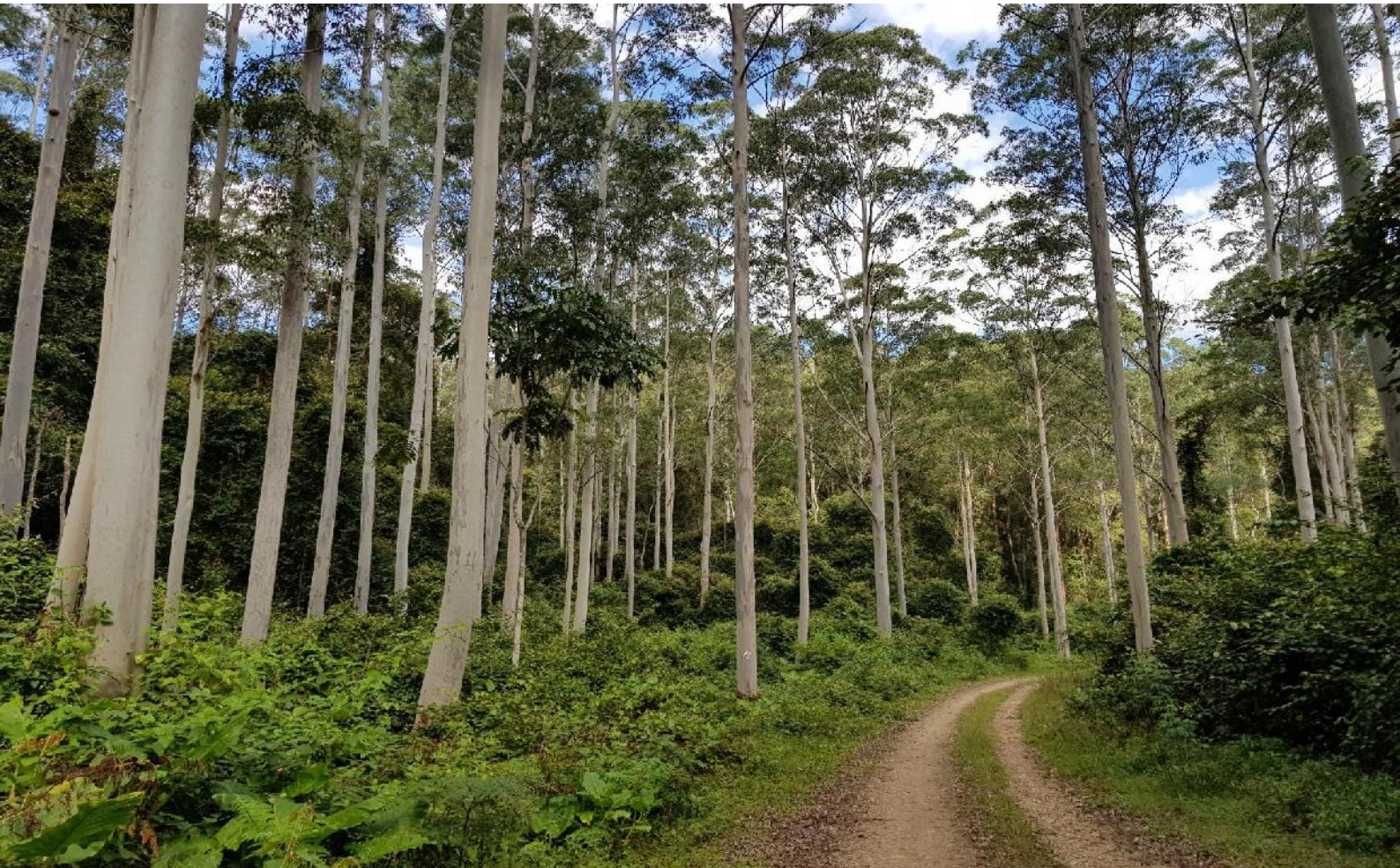
Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion												
4	26_VZ03_ Regrowth	Not a TEC	31.6	31.6	0.01	PCT Cleared - 90%	High Sensitivity to Gain			2.50		1
											Subtotal	**1**
Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion												
1	74_VZ01_ Regrowth	Not a TEC	29.9	29.9	0.01	PCT Cleared - 73%	High Sensitivity to Gain			2.00		1
2	74_VZ02_P lanted	Not a TEC	26	26.0	0.5	PCT Cleared - 73%	High Sensitivity to Gain			2.00		7
3	74_VZ03_ Grass	Not a TEC	0.3	0.3	1	PCT Cleared - 73%	High Sensitivity to Gain			2.00		0
											Subtotal	**8**
											Total	**9**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Appendix E – BAM Plot Data Sheets/ Transect Photos



Project No: HBT204	Project Title: YANCO SOLAR FARM	Ass Type: BDAR
Assessor: Dr. Gilbert Whyte (BAAS18041)		
Date: 09/11/23	Plot ID: Q01	Plot Photos and Coordinates
Bearing: 201	Datum: ~~WGS84~~ GDA94	T Start Photo ✓ T End Photo ✓
East: 445776	North: 6170382	T Start Coord ✓ T End Coord ✓

Landscape Position: ROADSIDE VEG	Weeds: EXOTIC PASTURE SPECIES
Soil/Geology: RED FERAL	Condition: LOW
Veg Structure: MANAGED ROADSIDE PATCH	

Veg Formation/ Class: N/A – FLOODPLAIN TRANSITIONAL W.	EEC: NO
PCT: 74 – YELLOW BOX – RIVER RED GUM	Veg Zone: 01

Litter Cover (5 x 1m² plots)	
P1 - 5m	1
P2 - 15m	1
P3 - 25m	1
P4 – 35m	1
P5 – 45m	1
Average:	1

Tree Stems	P	Large Tree Count	Hollow-bearing Tree Count
>80cm	X		
50-79cm	✓	3	0
30-49cm	X		
20-29cm	X		
10-19cm	X		
5-9cm	X		
<5cm	X		

Note: Only logs touching ground and greater than 10cm diam.

Length Logs (m):	
0	
	Total: 0

GF Codes: T (Tree), S (Shrub), Grasses (G), Forbs (F), Ferns (Fe), Other (O), Exotic (Ex), High Threat Weeds (HTW).

GF	Plant Species 1-23 (within 400m² Plot)	Cover	Abundance
T	1. EUCALYPTUS CREBRA	10	1
EX	2. CUPRESSUS SP. – (NON-NATIVE)	5	2
EX	3. PLANTAGO LANCEOLATA	5	1000
EX	4. LOLIUM PERENNE	60	100,000
EX	5. MEDICAGO SATIVA.	5	10,000
G	6. CHLORIS TRUNCATA	0.1	20
F	7. FELNADIA NUTANS	0.1	5
EX	8. SONCHUS ASPERA	0.1	20
HTW	9. LACTUCA SERRIOLA	0.1	20
F	10. SIDA CORRUGATA	0.1	5
EX	11. VULPIA MYUROS	5	10,000
S	12. SCLEROLAENA MURICATA	0.1	20
EX	13. AVENA BARBATA	1	1000
G	14. CYNODON DACTYLON	5	10,000
S	15. ENCHYLAENA TOMENTOSA	0.1	5
	16.		
	17.		
	18.		
	19.		
	20.		
	21.		
	22.		
	23.		

Date & Time: Thu, 09 Nov 2023 at 10:16:44 AEDT
Position: 55 S 445776 6170382 (±15.7ft)
Altitude: 468ft (±10.8ft)
Datum: WGS-84
Azimuth/Bearing: 201° S21W 3573mils True (±12°)
Elevation Angle: +02.0°
Horizon Angle: -00.3°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q01s

Date & Time: Thu, 09 Nov 2023 at 10:15:01 AEDT
Position: 55 S 445766 6170337 (±15.9ft)
Altitude: 467ft (±10.6ft)
Datum: WGS-84
Azimuth/Bearing: 006° N06E 0107mils True (±12°)
Elevation Angle: +00.7°
Horizon Angle: -00.8°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q01e

Project No: HBT204	Project Title: YANCO SOLAR FARM	Ass Type: BOAR
Assessor: Dr. Gilbert Whyte (BAAS18041)		
Date: 09/11/23	Plot ID: Q02	Plot Photos and Coordinates
Bearing: 114	Datum: WGS84	T Start Photo ✓ T End Photo ✓
East: 445592	North: 6170390	T Start Coord ✓ T End Coord ✓

Landscape Position: FLAT	Weeds: HIGH
Soil/Geology: RED EARTH	Condition: LOW
Veg Structure: REGENERATING WOODLAND	

Veg Formation/ Class: RIVERINE PLAIN WOODLANDS	EEC: YES
PCT: 26 - WEEPING MYALL OPEN WOODLAND	Veg Zone: QZ

Litter Cover (5 x 1m² plots)	
P1 - 5m	5
P2 - 15m	10
P3 - 25m	20
P4 – 35m	5
P5 – 45m	5
Average:	9

Tree Stems	P	Large Tree Count	Hollow-bearing Tree Count
>80cm	X	0	6
50-79cm	X	0	0
30-49cm	X		
20-29cm	✓		
10-19cm	✓		
5-9cm	✓		
<5cm	✓		

Note: Only logs touching ground and greater than 10cm diam.

Length Logs (m): 2, 4.

Total: 6

GF Codes: T (Tree), S (Shrub), Grasses (G), Forbs (F), Ferns (Fe), Other (O), Exotic (Ex), High Threat Weeds (HTW).

GF	Plant Species 1-23 (within 400m² Plot)	Cover	Abundance
T	1. EUCALYPTUS POPULNEA	5	1
T	2. ACACIA PENDULA	20	10
S	3. ACACIA DANIONII	0.5	1
F	4. SOLANUM IESURIALE	2	500
EX	5. AVENA BARBATA	10	100,000
F	6. VITTADINIA CUNEATA	0.2	50
F	7. EINADIA NUTANS	20	100,000
HTW	8. NASSELLA NEESII	5	10,000
G	9. AUSTROSTIPA SCABRA	1	1000
HTW	10. ECHIUM PLANTAGINEUM	0.2	50
T	11. BRACHYCHITON POPULNEA	0.2	1 (SUV)
EX	12. SONCHUS OLERACEUS	0.2	20
HTW	13. LYCIUM FEROCISSIMUM	0.1	1
S	14. ERICHYLAENA TOMENTOSA	2	500
O	15. DENDROPHTHOE VITTELINA	0.1	1
EX	16. BROMUS HORDEUS	20	100,000
EX	17. VULPIA MYOSUROS	20	100,000
EX	18. BROMUS CATHARTICUS	20	100,000
F	19. SIDA CORRUGATA	0.2	20
EX	20. LEPIDIUM AFRICANUM	0.1	20
	21.		
	22.		
	23.		

Date & Time: Thu. 09 Nov 2023 at 11:41:42 AEDT
Position: 55 S 445592 6170390 (±15.9ft)
Altitude: 467ft (±10.6ft)
Datum: WGS-84
Azimuth/Bearing: 114° S66E 2027mils True (±12°)
Elevation Angle: -04.1°
Horizon Angle: +00.1°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q02s

Date & Time: Thu. 09 Nov 2023 at 11:31:23 AEDT
Position: 55 S 445632 6170364 (±16.2ft)
Altitude: 469ft (±10.1ft)
Datum: WGS-84
Azimuth/Bearing: 303° N57W 5387mils True (±12°)
Elevation Angle: -01.7°
Horizon Angle: -00.5°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q02e

Project No: HBT 204	Project Title: YANCO SOLAR FARM	Ass Type: BOAR
Assessor: Dr. Gilbert Whyte (BAAS18041)		
Date: 09/011/23	Plot ID: Q03	Plot Photos and Coordinates
Bearing: 266	Datum: WGS84	T Start Photo ✓ T End Photo ✓
East: 445686	North: 6170372	T Start Coord ✓ T End Coord ✓

Landscape Position: FLAT	Weeds: GRASS SPECIES.
Soil/Geology: RED EARTH	Condition: LOW
Veg Structure: PLANTED TREES AND SHRUBS	

Veg Formation/ Class:	EEC: NO
PCT: 74 – YELLOW BOX – RIVER RED GUM	Veg Zone: 01

Litter Cover (5 x 1m² plots)	
P1 - 5m	20
P2 - 15m	60
P3 - 25m	40
P4 – 35m	40
P5 – 45m	40
Average:	40

Tree Stems	P	Large Tree Count	Hollow-bearing Tree Count
>80cm	X	0	0
50-79cm	X ✓	0	0
30-49cm	✓		
20-29cm	✓		
10-19cm	✓		
5-9cm	X		
<5cm	✓		

Note: Only logs touching ground and greater than 10cm diam.

Length Logs (m): 0	
	Total: 0

GF Codes: T (Tree), S (Shrub), Grasses (G), Forbs (F), Ferns (Fe), Other (O), Exotic (Ex), High Threat Weeds (HTW).

GF	Plant Species 1-23 (within 400m² Plot)	Cover	Abundance
T	1. EUCALYPTUS MELLIODORA	20	5
T	2. ACACIA SALICINA	5	2
S	3. ACACIA DEANEI (BIPINNATE)	2	1
T	4. ACACIA PENDULA	0.5	1
S	5. ACACIA ~~DIFFORA~~ DECURRENS	1	2
F	6. SOLANUM IZURIALE	0.2	50
Ex	7. VULPIA MYUROS	20	10,000
F	8. SIDA CORRUGATA	0.2	50
S	9. ENCHYLAENA TOMENTOSA	0.2	50
S	10. SCLEROLAENA MUNICATA	0.1	10
Ex	11. OXALIS LATIFOLIA	0.1	5
Ex	12. BROMUS HORDEUS	2	500
T	13. EUCALYPTUS POPULNEUS	1	1
Ex	14. PHOENIX CANARIENSIS	0.1	1
G	15. CHLORIS TRUNCATA	0.1	2
	16.		
	17.		
	18.		
	19.		
	20.		
	21.		
	22.		
	23.		

Date & Time: Thu, 09 Nov 2023 at 12:16:09 AEDT
Position: 55 S 445686 6170372 (±16.2ft)
Altitude: 467ft (±10.1ft)
Datum: WGS-84
Azimuth/Bearing: 266° S86W 4729mils True (±1°)
Elevation Angle: -04.3°
Horizon Angle: -00.6°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q03s

Date & Time: Thu, 09 Nov 2023 at 12:09:10 AEDT
Position: 55 S 445652 6170383 (±16.3ft)
Altitude: 468ft (±9.8ft)
Datum: WGS-84
Azimuth/Bearing: 109° S71E 1938mils True (±12°)
Elevation Angle: -02.0°
Horizon Angle: -00.5°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q03e

Project No: HBT204	Project Title: YANCO SOLAR FARM	Ass Type: BOAR
Assessor: Dr. Gilbert Whyte (BAAS18041)		
Date: 09/11/23	Plot ID: Q04	Plot Photos and Coordinates
Bearing: 063	Datum: WGS84	T Start Photo ✓ T End Photo ✓
East: 445540	North: 6170454	T Start Coord ✓ T End Coord ✓

Landscape Position: FLAT	Weeds: LOW
Soil/Geology: RED EARTH	Condition: LOW
Veg Structure: PLANTED TREES AND SHRUBS	

Veg Formation/ Class: FLOOD PLAIN TRANSITIONAL FORESTS	EEC: NO
PCT: 74 – YELLOW BOX – RIVER RED GUM	Veg Zone: 01

Litter Cover (5 x 1m² plots)	
P1 - 5m	40
P2 - 15m	66
P3 - 25m	100
P4 – 35m	40
P5 – 45m	40
Average:	64

Tree Stems	P	Large Tree Count	Hollow-bearing Tree Count
>80cm	X	0	0
50-79cm	X	0	0
30-49cm	✓		
20-29cm	✓		
10-19cm	✓		
5-9cm			
<5cm	✓		

Note: Only logs touching ground and greater than 10cm diam.

Length Logs (m): 0	
	Total: 0

GF Codes: T (Tree), S (Shrub), Grasses (G), Forbs (F), Ferns (Fe), Other (O), Exotic (Ex), High Threat Weeds (HTW).

GF	Plant Species 1-23 (within 400m² Plot)	Cover	Abundance
T	1. EUCALYPTUS MELLIODORA	20	10
T	2. BRACHYCHITON POPULNEUS	1	2
S	3. ACACIA DECURRENS	5	5
T	4. ACACIA SALICINA	10	15
S	5. SIENNA ARTEMISIOIDES	2	5
F	6. SOLANUM ESURIANE	0.1	20
S	7. ACACIA OANSONII	2	5
EX	8. SALVIA VERBANICA	0.1	20
EX	9. VULPIA MYUROS	0.1	50
	10.		
	11.		
	12.		
	13.		
	14.		
	15.		
	16.		
	17.		
	18.		
	19.		
	20.		
	21.		
	22.		
	23.		

Date & Time: Thu. 09 Nov 2023 at 14:03:26 AEDT
Position: 55 S 445540 6170454 (±16.4ft)
Altitude: 465ft (±9.7ft)
Datum: WGS-84
Azimuth/Bearing: 063° N63E 1120mils True (±12°)
Elevation Angle: -01.9°
Horizon Angle: -00.4°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q04s

Date & Time: Thu. 09 Nov 2023 at 14:00:57 AEDT
Position: 55 S 445571 6170468 (±16.8ft)
Altitude: 466ft (±9.1ft)
Datum: WGS-84
Azimuth/Bearing: 256° S76W 4551mils True (±12°)
Elevation Angle: +01.4°
Horizon Angle: -00.0°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q04e

Project No: HBT204	Project Title: YANCO SF	Ass Type: BDAR
Assessor: Dr. Gilbert Whyte (BAAS18041)		
Date: 09/11/23	Plot ID: Q05	Plot Photos and Coordinates
Bearing: 357	Datum: WGS84	T Start Photo ✓ T End Photo ✓
East: 445503	North: 6170395	T Start Coord ✓ T End Coord ✓

Landscape Position: FLAT	Weeds: PASTURE SP.
Soil/Geology: RED EARTH	Condition: LOW
Veg Structure: GRASSLANDS	

Veg Formation/ Class: N/A – EXOTIC GRASSLAND	EEC: N
PCT: N/A.	Veg Zone: 07

Litter Cover (5 x 1m² plots)	
P1 - 5m	1
P2 - 15m	1
P3 - 25m	1
P4 – 35m	1
P5 – 45m	1
Average:	1

Tree Stems	P	Large Tree Count	Hollow-bearing Tree Count
>80cm	0	0	0
50-79cm	0	0	0
30-49cm	0		
20-29cm	0		
10-19cm	0		
5-9cm	0		
<5cm	0		

Note: Only logs touching ground and greater than 10cm diam.

Length Logs (m): 0	
	Total: 0

GF Codes: T (Tree), S (Shrub), Grasses (G), Forbs (F), Ferns (Fe), Other (O), Exotic (Ex), High Threat Weeds (HTW).

GF	Plant Species 1-23 (within 400m² Plot)	Cover	Abundance
EX	1. AVENA BARBATA	90	100,000
G	2. ANTHOSTIPA SCABRA	1	500
EX	3. SALVIA VERBANICA	0.2	20
F	4. SOLANUM LEUCRIMUE	1	100
EX	5. LOLIUM PERRENE	0.5	50
EX	6. VULPIA BROMOIDES	0.5	50
F	7. VITADINIA CUNEATA	0.1	10
EX	8. NASSELLA NEESIANA	0.5	50
	9.		
	10.		
	11.		
	12.		
	13.		
	14.		
	15.		
	16.		
	17.		
	18.		
	19.		
	20.		
	21.		
	22.		
	23.		

Date & Time: Thu. 09 Nov 2023 at 14:23:57 AEDT
Position: 55 S 445503 6170395 (±15.7ft)
Altitude: 469ft (±10.9ft)
Datum: WGS-84
Azimuth/Bearing: 357° N03W 6347mils True (±12°)
Elevation Angle: -04.6°
Horizon Angle: +00.3°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q05s

Date & Time: Thu. 09 Nov 2023 at 14:21:10 AEDT
Position: 55 S 445512 6170443 (±16.1ft)
Altitude: 464ft (±10.3ft)
Datum: WGS-84
Azimuth/Bearing: 199° S19W 3538mils True (±12°)
Elevation Angle: -05.1°
Horizon Angle: -00.5°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q05

Project No: H350204	Project Title: VANCO SOLAR FARM	Ass Type: BOAR
Assessor: Dr. Gilbert Whyte (BAAS18041)		
Date: 10/11/23	Plot ID: Q 06	Plot Photos and Coordinates
Bearing: 106	Datum: WGS84	T Start Photo ✓ T End Photo ✓
East: 445621	North: 6170456	T Start Coord ✓ T End Coord ✓

Landscape Position: FLAT	Weeds: HIGH - EXOTIC GRASSES
Soil/Geology: RED EARTH	Condition: LOW
Veg Structure: GRASSLAND	

Veg Formation/ Class: N/A - EXOTIC GRASSLAND	EEC: NO
PCT: N/A.	Veg Zone: 03

Litter Cover (5 x 1m² plots)	
P1 - 5m	1
P2 - 15m	1
P3 - 25m	1
P4 – 35m	1
P5 – 45m	1
Average:	1

Tree Stems	P	Large Tree Count	Hollow-bearing Tree Count
>80cm	0	0	0
50-79cm	0	0	0
30-49cm	0		
20-29cm	0		
10-19cm	0		
5-9cm	0		
<5cm	0		

Note: Only logs touching ground and greater than 10cm diam.

Length Logs (m): 0	
	Total: 0

GF Codes: T (Tree), S (Shrub), Grasses (G), Forbs (F), Ferns (Fe), Other (O), Exotic (Ex), High Threat Weeds (HTW).

GF	Plant Species 1-23 (within 400m² Plot)	Cover	Abundance
G	1. ANTHOSTIDA SCABRA	2	1000
EX	2. AVENA BARBATA	80	100,000
EX	3. CICHORIUM INTYBUS	1	10
F	4. VITTADINIA CUNEATA	0.1	5
EX	5. BROMUS HORDEUS	2	1000
EX	6. LOLIUM PERENNE	5	20,000
G	7. CHLORIS TRUNCATA	1	100
F	8. SOLANUM ESURIALE	0.2	50
EX	9. PANICUM CAPILLARE	2	10,000
EX	10. LACTUCA SERRIOLA	0.1	20
EX	11. PLANTAGO LANCEOLATA	1	1000
F	12. ATRIPLEX SEMIBACCATA	0.1	5
F	13. ENCHYLAENA TOMENTOSIA	0.1	5
EX	14. VULPIA MYOSUROS	0.5	100
EX	15. TRIFOLIUM ARVENSIS	0.2	100
EX	16. RUMEX CONGLOMERATUS	0.1	2
	17.		
	18.		
	19.		
	20.		
	21.		
	22.		
	23.		

Date & Time: Thu. 09 Nov 2023 at 14:41:05 AEDT
Position: 55 S 445558 6170336 (±15.9ft)
Altitude: 464ft (±10.6ft)
Datum: WGS-84
Azimuth/Bearing: 171° S09E 3040mils True (±12°)
Elevation Angle: -04.3°
Horizon Angle: +00.1°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q06s

Date & Time: Thu. 09 Nov 2023 at 14:40:00 AEDT
Position: 55 S 445567 6170297 (±15.7ft)
Altitude: 464ft (±10.8ft)
Datum: WGS-84
Azimuth/Bearing: 347° N13W 6169mils True (±12°)
Elevation Angle: -05.2°
Horizon Angle: +00.6°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q06e

Project No: H210208	Project Title: - VANCO SSD.	Ass Type: BDAR
Assessor: Dr. Gilbert Whyte (BAAS18041)		
Date: 07/01/24	Plot ID: Q 07	Plot Photos and Coordinates
Bearing: 214	Datum: GDA94	T Start Photo ✓ T End Photo ✓
East: 444516	North: 6170966	T Start Coord T End Coord

Landscape Position: FLOOD PLAIN	Weeds: COMMON PASTURE SPP.
Soil/Geology: ALLUVIUM CRED	Condition: LOW
Veg Structure: - GRASSLAND ADJACENT PLANTED VEG.	

PCT No (V1): N/A		Veg Formation: N/A - (NON-NATIVE)	EEC (Y/N): N
(V2) /	(V3) /	Veg Class: " "	VZ No: N/A

Litter Cover (5 x 1m² plots)	
P1 - 5m	2
P2 - 15m	2
P3 - 25m	2
P4 – 35m	2
P5 – 45m	2
Average:	0

Tree Stem Diam Class		Large Tree Size Class:	Habitat Trees
>80cm	✓	No: 5	No:
50-79cm	X	No	No
30-49cm	X		
20-29cm	X		
10-19cm	X		
5-9cm	X		
<5cm	X		

Note: Only logs touching ground and greater than 10cm diam.

Length Logs (m) Tally: 0	
Length Logs (m) Tally:	
	Total: 0

GF Codes: T (Tree), S (Shrub), Grasses (G), Forbs (F), Ferns (Fe), Other (O), Exotic (Ex), High Threat Weeds (HTW).

GF	Plant Species 1-23 (within 400m² Plot)	Cover	Abundance
T	1. EUCALYPTUS CAMALDULENSIS PLANTED	10	3
GX	2. AVENA BARBATA	70	100,000
GX	3. PLANTAGO LANCEOLATA	10	5000
GX	4. BROMUS STERILIS	2	1000
F	5. SIDA CORRUGATA	0.2	500
F	6. BOERHAVIA DOMINII	0.2	200
GX	7. MALVA PARVIFLORA	1	1000
FX	8. TRIBULUS TERRESTRIS	0.1	50
GX	9. HIRSCHFIELDIA INCANA	0.1	100
F	10. ERODIA NUTANS	0.5	500
F	11. SOLANUM ESURIALE	0.1	50
G	12. CHLORIS TRUNCATA	1	1000
GX	13. LOLIUM PERENNE	2	2000
F	14. ATRIPLEX SEMIBACCATA	0.1	10.
GX	15. HORDEUM LEPORINUM	0.2	50
	16.		
	17.		
	18.		
	19.		
	20.		
	21.		
	22.		
	23.		

Date & Time: Fri. 10 Nov 2023 at 09:24:21 AEDT
Position: 55 S 445621 6170456 (±15.9ft)
Altitude: 468ft (±10.6ft)
Datum: WGS-84
Azimuth/Bearing: 106° S74E 1884mils True (±12°)
Elevation Angle: -04.0°
Horizon Angle: +00.0°
Zoom: 0.5X
HBT0204 - Yanco Solar Farm - Q07s

Date & Time: Sun. 07 Jan 2024 at 12:53:54 AEDT
Position: 55 S 444497 6170920 (±15.9ft)
Altitude: 464ft (±10.6ft)
Datum: AUSTRALIAN GEOCENTRIC 1994 (GDA94)
Azimuth/Bearing: 024° N24E 0427mils True (±11°)
Elevation Angle: -05.2°
Horizon Angle: -01.1°
Zoom: 0.5X
HBT0208 - Yanco Project Site - Q08e

Habitat

Habitat
ENVIRONMENTAL SERVICES