Biodiversity Development Assessment Report

Coleambally Battery Energy Storage System

May 2023

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Accredited Assessor Declaration

I, Julie Gooding (BAAS18074) certify that this Biodiversity Development Assessment Report has been prepared on the basis of the requirements of, and information provided under the Biodiversity Assessment Methodology 2020. The associated case (00029035/BAAS18074/21/00025975 revision 9) within the BAM Calculator has been finalised on 25/07/2023 and submitted via BOAMs.

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Acronyms and abbreviations

AHD	Australian Height Datum
BAM	Biodiversity Assessment Method
BAM-C	BAM Calculator
BC Act	Biodiversity Conservation Act 2016
BCD	Biodiversity Conservation Division
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BOM	Australian Bureau of Meteorology
BOS	Biodiversity Offset Scheme
Cth	Commonwealth
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth) (Formerly Department of Agriculture, Water and the Environment))
DPE	(NSW) Department of Planning and Environment (formerly Department of Planning, Industry and Environment)
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
ESD	Ecologically Sustainable Development
FM Act	*Fisheries Management Act 1994* (NSW)
ha	hectares
HBT	Hollow bearing tree
IBRA	Interim Biogeographic Regionalisation of Australia
km	kilometres
kV	Kilovolt
LCA	Land Category Assessment
LEP	Local Environment Plan
LLS	Local Land Services Act 2013
m	Metres
MNES	Matters of National environmental significance under the *EPBC Act* (c.f.)
NSW	New South Wales

OEH	Formally Office of Environment and Heritage, now BCD
PCT	Plant Community Type
Risen	Risen Energy Development Pty Ltd
SAII	Serious and Irreversible Impact
SEPP	*State Environmental Planning Policy* (NSW)
sp/spp	Species/multiple species
SSD	State Significant Development
SEARs	Secretary's Environmental Assessment Requirements
TEC	Threatened Ecological Community
TL	Transmission Line

Executive summary

NGH Pty Ltd has been engaged by Risen Energy Development Pty Ltd (Risen) to assess the impacts of the developing of a Battery Energy Storage System (BESS) adjacent to the existing Coleambally Solar Farm, located approximately 9km north-east of Coleambally in NSW within the Murrumbidgee Local Government Area.

This BDAR V3.0 includes the addition of a control room and bench extension to the development footprint and updates in response to NSW Biodiversity Conservation Division (BCD) comments following submission of the BDAR V2.0.

The development site occurs within the following cadastral boundaries:

- Lot 100 DP1139115 - Freehold.
- Lot 3 DP1055725 – Freehold.

This development is being assessed under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It is a State Significant Development (SSD) under the State and Regional Development State Environmental Planning Policy (SEPP). This Biodiversity Development Assessment Report (BDAR) assesses the impacts of the proposed BESS according to the NSW Biodiversity Assessment Methodology (BAM) as required by the Secretary's Environmental Assessment Requirements (SEARs) for the proposal.

The development site is comprised of three separate areas. These are:

- BESS location
- Access location
- Transmission line

The areas of each of the development site and footprint areas are shown in the following table.

Coleambally BDAR	**Location**	**Area (ha)**
Development Site		14.25
Development footprint	BESS location	4.02
	Transmission line (two options combined)	1.63
	Access location	0.02
Development footprint total		**5.67**

A Land Category Assessment (LCA) for the proposed BESS was prepared in June 2021. Section 6.8 (3) of the *Biodiversity Conservation Act 2016* (BC Act) determines that the BAM *is to exclude the assessment of the impacts of clearing of native vegetation on Category 1-exempt land (within*

the meaning of Part 5A of the Local Land Services Act 2013) other than any impacts prescribed by the regulations under section 6.3. Category 1 Land covers approximately 5.87ha in the proposed development site.

A site assessment was undertaken by an ecologist on 11 December 2020 to determine the Plant Community Types (PCTs) and vegetation zones present. Vegetation Integrity Plot data, in accordance with the BAM, was collected on 20 October, 8 December 2021, November 2022 and 8 May 2023.

The native vegetation on the development site was determined to comprise the following two PCTs:

- PCT 16 Black Box grassy woodland wetland of rarely flooded depressions in Southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion) (moderate zone)
- PCT 26 Weeping Myall open woodland of the Riverina Bioregion and NSW Southwestern Slopes Bioregion (low, moderate and grassland zones).

Exotic dominated ground cover, largely consisting of Sowthistle (**Sonchus sp*), Mallow (**Malva sp*), Prickly Lettuce (**Lactuca serriola*) and White Horehound (**Marrubium vulgare*) covers approximately 0.19ha of the proposed development site.

There is 2.75ha of PCT 16 and 2.86ha of PCT 26 within the development site. PCT 16 and 26 have been separated into zones due to varying condition - PCT 16 has two zones and PCT 26 has three zones.

The following areas of each zone would be cleared for the proposed BESS:

- 0.07 hectares of PCT 26 derived grassland (zone 1) - 1 ecosystem credits generated.
- 0.45 hectares of PCT 16 moderate condition (zone 2) - 13 ecosystem credits generated.
- 0.02 hectares of PCT 26 moderate condition (zone 3) – 1 ecosystem credit generated.
- 0.04 hectares PCT 26 low condition (zone 4) - 1 ecosystem credit generated.
- 0.42 hectares of PCT 26 exotic dominated grassland,(zone 5) – 0 credits generated.
- 0.44 hectares of PCT 16 low condition (zone 6) – 0 credits generated.

PCT 26 is associated with the Threatened Ecological Community (TEC) *Myall Woodland in the Darling Riverine Plains, Brigalow* listed as endangered under the BC Act. This TEC is also listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) under the name *Weeping Myall Woodlands*. All zones of PCT 26 are considered to represent the BC Act TEC, however, only zone 4 (PCT 26 moderate) satisfies the condition criteria of the EPBC Act listing.

Targeted flora and fauna surveys for candidate threatened species requiring assessment were undertaken by two ecologists on 17–18 August 2021, 22 September 2021, 20-21 October 2021, 8 December 2021 and 7-8 November 2022. Four flora species were unable to be surveyed during the optimal survey time in a small section of PCT 16 due to a change to the proposed transmission line route in November 2022 and May 2023. These four species; Spear-grass (*Austrostipa wakoolica*), Bindweed (*Convolvulus tedmoorei*), Red Darling-pea (*Swainsona plagiotropis*), and Slender Daring-pea (*Swainsona murrayana*) have been assumed present in a small area of PCT 16 just south of the existing substation and a small area of PCT 26_exotic dominated grassland in the north of the substation. The remaining species were surveyed during the optimal survey periods, as recommended by the BAM Calculator (BAM-C).

Targeted flora and fauna surveys were carried out for the following species:

Flora

- A spear-grass *(Austrostipa wakoolica*)
- Yellow Gum (*Eucalyptus leucoxylon subsp. pruinose*)
- Austral Pillwort (*Pilularia novae-hollandiae*) Claypan Daisy (*Brachyscome muelleroides*)
- Bindweed (*Convolvulus tedmoorei*)
- Chariot Wheels (*Maireana cheelii*)
- Small Scurf-pea (*Cullen parvum*)
- Winged Peppercress (*Lepidium monoplocoides*)
- Red Darling Pea (*Swainsona plagiotropis*)
- Slender Darling Pea (*Swainsona murrayana*)
- Silky Swainson-pea (*Swainsona sericea*)
- Turnip copperburr (*Sclerolaena napiformis*)
- Lanky buttons (*Leptorhynchos orientalis*)
- Mossgiel Daisy (*Brachyscome papillosa*)

Fauna

- Mammals
    - Koala (*Phascolarctos cinereus*)
- Birds
    - Bush Stone-curlew (*Burhinus grallarius*)
    - Little Eagle (*Heiraaetus morphnoides)*
    - Square-tailed Kite (*Lophoictinia isura*)
    - Barking Owl (*Ninox connivens*)
    - Major Mitchell's cockatoo *(Lophochroa leadbeateri*)
    - Superb Parrot (*Polytelis swainsonii*)
    - Masked Owl (*Tyto novaehollandiae*)
    - Australian Bustard (*Ardeotis australis*)

The Superb Parrot (*Polytelis swainsonii*) was detected on site during the October, December 2021 and November 2022 surveys. No other threatened fauna were observed. The Southern Myotis (*Myotis macropus*) was not generated by the BAM-C as a candidate species, however due to the presence of nearby records and suitable habitat it was considered to potentially occur on site. As no targeted surveys were undertaken it was assumed to occur in the development site.

Impacts to 0.45ha of habitat surrounding potential breeding habitat for the Superb Parrot generated the requirement of 15 species credits for the Superb Parrot.

Impacts to 0.47ha of assumed Southern Myotis habitat surrounding waterbodies generated the requirement of 16 species credits for the Southern Myotis.

Impacts to 0.33ha of assumed Red Darling Pea and Slender Darling-pea habitat in the eastern section of the development footprint (a late development footprint realignment) which was unable to be surveyed in the optimal survey period generated the requirement of 7 species credits each.

Impacts to 0.33 ha of assumed Bindweed (*Convolvulus tedmoorei*) in the north-eastern section of the development footprint (a late development footprint realignment) which was unable to be surveyed in the optimal survey period generated the requirement of 10 species credits.

Impacts to 0.16 ha of assumed Spear-grass in the north-eastern section of the development footprint (a late development footprint realignment) which was unable to be surveyed in the optimal survey period generated the requirement of 1 species credit in total.

An Assessment of Significance was completed for the EPBC Act listed species and community below. In both instances, a significant impact is not considered likely, therefore, the proposal is not required to be referred to the Department of Agriculture, Water and Environment.

The Assessment of Significance was completed for the following threatened entities:

- Grey Falcon (*Falco hypoleucos*) – Vulnerable
- Superb Parrot (*Polytelis swainsonii*) - Vulnerable
- Koala (*Phascolarctos cinereus*) – Vulnerable
- PCT 26 Weeping Myall Woodland (Moderate Condition) - Endangered

To prevent any indirect impacts to surrounding native vegetation, mitigation measures have been outlined for the construction phase of the development. With the retirement of credits and effective implementation of the mitigation measures, the proposal would be consistent with the requirements of the BAM.

1. Introduction

The Trustee for Coleambally BESS Trust (ABN 61 371 314 839) (the Applicant) proposes to develop a Battery Energy Storage System (BESS) adjacent to the existing Coleambally Solar Farm, located approximately 9km north-east of Coleambally. The BESS would have a capacity of 100 megawatt (MW) / 400 megawatt hours (MWh). The area proposed for the BESS is currently used for agriculture.

This development is being assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is a state significant development (SSD). A Biodiversity Development Assessment Report (BDAR) has been prepared.

This BDAR assesses the impacts of the proposed development of a BESS according to the New South Wales (NSW) Biodiversity Assessment Methodology 2020 (BAM). This BDAR V3.0 includes the addition of a control room and bench extension to the north of the Coleambally substation increasing the development footprint by 0.49ha. It also includes updates in response to NSW Biodiversity Conservation Division (BCD) comments following submission of the BDAR V2.0.

1.1 The proposal

The proposed Coleambally BESS involves the construction, operation and decommissioning of a ground-mounted lithium-ion battery storage system with an anticipated capacity of 100MW / 400MWh (i.e., 100MW of electricity discharged over 4 hours). This energy would be stored and supplied directly to the national electricity grid.

Of the 5.67ha Development Footprint, approximately 4ha would be developed for the BESS and 0.02 ha for an access location off Ercildoune Road. The grid connection for the BESS would be via a new underground 132 kilovolt (kV) transmission line (TL) routing from the Development Site to the existing TransGrid 33/132/220kV Coleambally substation. There are two TL route options for connection to the substation, one running on the western side of the substation and one running on the eastern side. Only one TL route option would be selected however this BDAR assumes impact to both options as a worst-case scenario. The TL route would be between 850m and 950m. This length is indicative and dependent on final design and siting to be determined in consultation with TransGrid.

Pending project approval, the Proponent will lease the subdivided land from the landowner of the Development Site. The area required for the Development Footprint including the TL easement within the Development Site would need to be subdivided from Lot 100/DP1139115.

The key features of the Proposal are summarised in Table 1-1. The component specifications are subject to change during detailed design. Where required, upper limit quantities and power level estimates are provided to ensure the assessment and any subsequent approval maintains the flexibility required in the detailed design stage.

Table 1-1 Key aspects of the Coleambally BESS

Proposal element	Description
Proposal	Coleambally Battery Energy Storage System (BESS)

Proposal element	Description
Proponent	The Trustee for Coleambally BESS Trust
Capacity	Up to approximately 100MW / 400MWh (i.e., 100MW of electricity discharged over 4 hours)
Development Site	The Development Site is approximately 14.25ha and inclusive of the BESS hardstand, site access and transmission line easement. The Development Site is located in part of Lot 100 DP1139115, lot 3 DP1055725 and part of Ercildoune Road.
Development Footprint	Approximately 5.67ha (BESS is 4.02ha, transmission line to the west is approximately 0.7ha, to the east it is approximately 0.93ha (both transmission line areas have been combined and assessed as one area in this BDAR, total area for this is 1.63 ha), entrance location is approximately 0.02 ha).
Site description	Located within part of Lot 100/DP1139115, zoned as RU1 Primary Production under Murrumbidgee LEP 2013. Site access via Kidman Way (State Road) then either Ercildoune Road or Kook Road (local roads).
Local Government	Murrumbidgee Council
Subdivision	Required for Development Footprint and TL easement within Lot 100/DP1139115 and 3/DP1055725
Proposal	• 40 battery system blocks • Each block has 3 battery cabinet strings, each string has 12 battery cabinets. Each block has 1 Power Conversion System (PCS). • One substation will include: ○ 33kV switchgear ○ One 33/132kV transformer • One 132kV circuit breaker
Substation	33/132kV substation to step up medium voltage (MV) to transmission line voltage class for interface with TransGrid transmission substation.
Grid connection	A new 132kV underground cable transmission line connecting the BESS switching substation to the TransGrid Coleambally transmission
Access tracks	External access tracks: unsealed gravel suitable for all weather conditions. New site access point from Ercildoune Road. Internal access tracks: up to 1.1km gravel road including 400m long 6m wide sealed road from entry gate to site substation, and 700m long 4m

Proposal element	Description
	wide unsealed road surrounding battery cabinets.

Ancillary infrastructure	• Operations and maintenance building, which would accommodate:
	  ○ 33kV switchgear
	  ○ Control and protection equipment
	• Site office
	• Operation & Maintenance (O&M) Building 11m x 15m, and relay room with approximate dimensions of 25M*7M
	• Separate storage and warehouse building with approximate dimensions of 10m x 19m
	• Water tanks (quantity and capacity to be confirmed with RFS in detail engineering stage)
	• Drainage infrastructure subject to final design
	• On site car parking
	• 10m Asset Protection Zone (APZ)
	• Updates to the Essential Energy substation, including:
	  ○ Control room
	  ○ Underground cabling
	  ○ Extension of substation bench
	  ○ New connection bay.

Security fencing, lighting, and CCTV	Steel security fence 2.3m high with barbed wire topping. Security system with CCTV and local flood lighting.
Construction hours	Standard daytime construction hours would be 6.00am to 5.00pm Monday to Friday and 7.00am to 1.00pm on Saturdays. Any construction outside of these standard construction hours, if required, would be kept to a minimum and only be undertaken with prior approval from relevant authorities, or unless in emergency circumstances (e.g., to make work safe.)
Construction timing	Approximately 8 to 10 months commencing Q4 2022, peak construction period of 4 to 6 months.
Workforce	Construction – up to 80 jobs during construction with 40 people on site during peak construction period. Operation – One full time staff member expected for ongoing operation and maintenance.
Operation period	Approximately 35 to 40 years.
Decommissioning	The proposal would be returned to its pre-developed state following

Proposal element	Description
	decommissioning. All above ground and below ground infrastructure would be removed. The removal of internal roads and pavements would be in consultation with the landowner. The Development Site would be rehabilitated consistent with future land use requirements. The subdivided land would likely return to agricultural practices. Topsoil condition would be re-established.

Ground disturbance	Ground disturbance activities would be limited to:
	• The installation of a large building pad, on which all Proposal infrastructure including:
	  ○ Construction of internal gravel access tracks and access bridges
	  ○ Trenching and boring for the installation of underground cables
	  ○ Excavation of building and infrastructure footings
	  ○ Construction of parking area
	  ○ Construction of perimeter security fencing
	  ○ Construction laydown area
	  ○ Control room for existing substation.
	• Potential additional topsoil laydown areas.
	• Excavation and foundation work for substation
	• Civil works for drainage if required

Capital investment	Estimated $184 million.

The following terms are used in this document:

- **Development footprint**–includes a 2.5m buffer around the BESS hardstand and a 5m buffer around the TL trench to account for additional disturbance during construction.
- **Development site –** The development footprint and area surveyed for the purpose of this BDAR
- **Assessment area** – The wider area within 1500m of the development site.

1.2 The development site

1.2.1 Site location

The proposed location of the BESS is within the Murrumbidgee Local Government Area (LGA) around 9km north-east of Coleambally, NSW. The proposal is zoned as RU1 - Primary Production, under the Murrumbidgee Shire Council Local Environmental Plan 2013 (LEP 2013) (Figure 1-1).

There are several major energy projects proposed or present in the Murrumbidgee LGA region, including:

- Coleambally Solar Farm (Determination) – Approved, and currently under construction.

- Agriwaste Energy from Waste Facility (Prepare EIS) – SEARs have been issued, and an EIS is under preparation.
- Coleambally Ethanol Plant (Determination) – Approved
- Darlington Point Solar Farm (Determination) – Approved. A proposed modification to increase BESS capacity is currently under assessment by DPE.

The development site occurs within the following cadastral boundaries:

- Lot 100 DP1139115 - Freehold.
- Lot 3 DP1055725 – Freehold.

1.2.2 Site description

The development site is accessed via Ercildoune Road. Ercildoune Road connects with Kidman Way. The Australian Height Datum (AHD) elevation is approximately round 120m.

The development site is located within the New South Wales (NSW) Riverina Interim Biogeographic Regionalisation of Australia (IBRA) Bioregion and Murrumbidgee IBRA Sub-region in land zoned RU1 – Primary Production. The development site is encompassed by the Murrumbidgee Scalded Plains Mitchell Landscape.

The main vegetation type identified within the development site was Black Box grassy open woodland wetland of rarely flooded depressions in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion). Weeping Myall open woodland of the Riverina Bioregion and NSW Southwestern Slopes Bioregion was dominant along the roadsides.

The development site is situated within an agricultural dominated landscape, with the exception of a patch (approximately 18.5ha) of vegetated land to the immediate north-west of the site. There are two state forests approximately 1km west and east of the site.

Drainage lines, watercourses and water features including irrigation canals occur within the general landscape, however the only water feature within the development site is an irrigation canal. Tubbo Channel occurs immediately south-east of the site, Boona channel approximately 2.8km further south-east. The Murrumbidgee River occurs around 17.6km north-east.

Figure 1-1 Site map

1.3 Study aims

This BDAR has been prepared by NGH Pty Ltd on behalf of Risen.

The aim of this BDAR is to address the requirements of the BAM, as required in the SEARs and summarised below in Table 1-2.

Table 1-2 Secretary's Environmental Assessment Requirements relevant to this BDAR

Secretary's environmental assessment requirements

General requirements
The environmental impact statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation).
In particular, the EIS must include:
• a stand-alone executive summary;
• a full description of the development, including:
  ○ details of construction, operation and decommissioning;
  ○ a high-quality site plan at an adequate scale showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approvals process);
  ○ a high-quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development;
• a strategic justification of the development focusing on site selection and the suitability of the proposed site with respect to potential land use conflicts with existing and future surrounding land uses (including existing land use, rural/residential development, Crown lands adjacent to the site and neighbouring developments);
• an assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including:
  ○ a description of the existing environment likely to be affected by the development using sufficient baseline data;
  ○ an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing or proposed developments in the region, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the Cumulative Impact Assessment Guideline (DPIE, July 2021) (subject to transitional arrangements);
  ○ a description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development (including draft management plans for specific issues as identified below); and
  ○ a description of the measures that would be implemented to monitor and report on the environmental performance of the development.
• a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS; and
• a detailed evaluation of the merits of the project as a whole having regard to:
  ○ the requirements in Section 4.15 of the Environmental Planning and Assessment Act 1979, and how the principles of ecologically sustainable development have been incorporated in

Secretary's environmental assessment requirements

the design, construction and ongoing operations of the development;

- the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses; and
- feasible alternatives to the development (and its key components), including the consequences of not carrying out the development.

- a detailed consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter;
- a signed statement from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.

The EIS must also be accompanied by:

- a report from a suitably qualified person providing a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; and
- an estimate of jobs that will be created during the construction and operational phases of the proposed infrastructure; and
- certification that the information provided is accurate at the date of preparation.

Key issues

The development application must be accompanied by the consent in writing of the owner/s of the land (as required in clause 49(1)(b) of the Regulation).

The EIS must address the following specific issues:

- Biodiversity – including:
  - 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), the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR), unless BCD and DPIE determine that the proposed development is not likely to have any significant impacts on biodiversity values;
  - the BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM;
  - if an offset is required, details of the measures proposed to address the offset obligation.

1.4 Source of information used in the assessment

The following information sources were used in the development of this BDAR:

- Risen Energy Development Pty Ltd (2021). 520541-0000-DRG-EE-0010-BESS Site
- Risen Energy Development Pty Ltd (2021). 520541-0000-DRG-EE-009-Overall Site
- Biodiversity Assessment Method Calculator (BAM-C). Accessed at https://customer.lmbc.nsw.gov.au/assessment/s/
- Biodiversity Assessment Method 2020 and Biodiversity Assessment Method Operational Manual (Department of Planning, Industry and Environment)
- NSW BioNet threatened biodiversity database collection (TBDC) Accessed online via login at http://www.bionet.nsw.gov.au/

- NSW BioNet Vegetation Classification Database (Veg -C). Accessed online via login at: https://www.environment.nsw.gov.au/research/Visclassification.htm
- NSW Bionet Vegetation Map Collection. Accessed online at http://www.environment.nsw.gov.au/research/VISmap.htm
- NSW Biodiversity Values Map https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap
- NSW Government SEED Mapping https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en
- NSW Central Resource for Sharing and Enabling Environmental Data (SEED) (2015). State Vegetation Type Map: Riverina Version 1.2-VIS_ID 4469,

  Department of Planning, Industry and Environment (2021) Riverina bioregion. https://www.environment.nsw.gov.au/topics/animalsandplants/biodiversity/bioregions/bioregions-of-nsw/riverina
- Department of Environment and Climate Change NSW (DECC) (2002). *Descriptions for NSW (Mitchell) Landscapes, Version 3 NSW Threatened Species Profiles* http://www.environment.nsw.gov.au/threatenedspeciesapp/ and www.environment.nsw.gov.au/AtlasApp/UI_Modules/
- Department of Planning, Industry and Environment (2021). Planning Secretary's Environmental Assessment Requirements. Application number SSD-233682211.
- Plantnet NSW. Accessed at https://plantnet.rbgsyd.nsw.gov.au/
- Australian Government Protected Matters Search Tool. Accessed online at http://environment.gov.au/epbc/protected-matters-search-tool
- Australian Government's Species Profiles and Threats (SPRAT) database http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl
- Aerial imagery of historical land use (Sourced from Spatial Services Delivery)
- 2017 Land Use Dataset (Australian Land Use and Management (ALUM) Classification Version 7 (Office of Environment and Heritage (OEH), 2017)
- NSW Woody vegetation extent and Foliage Projective Cover (FPC) 2011 (OEH, 2015)
- Sensitive regulated and vulnerable regulated lands on the Native Vegetation Regulatory Map portal
- R Thackway and I D Cresswell (1995). *An interim biogeographic regionalisation for Australia. Reserve Systems Unit, Australian Nature Conservation Agency, Canberr*a.

2. Landscape features

2.1 General description of development site

The development site is located within the Murrumbidgee Scalded Plains Mitchell Landscape within the Murrumbidgee Catchment. The Murrumbidgee River occurs approximately 17.6km north-east of the development site.

The stage 2 assessment of the soil survey undertaken by NGH (2022) indicates the surface soils are brown clay and clay loam and the subsoils are clay. The AHD elevation is approximately 120m.

The proposal conforms to the definition of a site-based development under the BAM. Therefore, the site-based development assessment methodology has been used in this BDAR.

2.2 Percent of native vegetation cover

As determined by database sources, the site assessment and GIS software, approximately 278.36 ha of native vegetation occurs in the surrounding 1500m buffer area of the development site (Figure 2-1). This vegetation in the landscape surrounding the development site is predominantly Riverine Plains Grassland and Riverine Plains Woodland. Due to the proposal containing linear based components as well, a 500m buffer was applied to the linear components within the development site (Figure 2-1).

Native vegetation percent cover was estimated by using aerial imagery, existing state vegetation mapping (VIS_4469) and field inspection. The area of the 1500m buffer is 1095.45ha. Therefore, the percent native vegetation in the 1500m buffer is 25.41%.

The area of the 500m buffer is 161.99ha and approximately 39.56 ha of native vegetation occurs in this area. Therefore, the percent native vegetation in the 500m buffer is 24.42%

This puts the native vegetation cover class as between 10–30% in the category in the BAM Calculator (BAM-C).

2.3 IBRA bioregions and subregions

IBRA Bioregions are geographically distinct bioregions based on common climates, geology, landforms and native vegetation (Thackaway and Creswell, 1995). There are 89 IBRA bioregions within Australia. Each IBRA bioregion contains multiple sub-regions. The proposal falls within the NSW Riverina IBRA Bioregion and Murrumbidgee IBRA sub-region.

The NSW Riverina occurs from Narrandera in the east to Balranald in the west, and from Ivanhoe in the Murray Darling Depression Bioregion south to Bendigo. The Riverina climate is classified as dry and semi-arid with cool winters and hot summers. Rainfall is highest during May and September. The bioregion includes parts of the Murray, Murrumbidgee, Lachlan and Goulburn Rivers (NSW National Parks and Wildlife Service, 2003).

The Murrumbidgee sub-region geology is described as containing quaternary alluvial sediments. Clay and sand with source bordering dunes and lakes. The characteristic landforms area described as alluvial fan with distributary channels and floodplains, undulating plains with depressions. Source bordering dunes common. Typical soils of the sub-region include red brown earths, grey and brown clays and deep siliceous sands on dunes (NSW National Parks and Wildlife Service, 2003).

2.4 Rivers and streams

No watercourses or mapped drainage lines occur within the development site. Within the 1500m buffer a number of ephemeral drainage (unnamed) watercourses and an irrigation channel (Tubbo Channel) occur. No dams or waterbodies occur within the development site. Within the 1500m buffer three (3) dams are mapped as occurring. Rains would sometimes build up water levels within the development site in the paddock and along the side of the road providing temporary waterbodies.

2.5 Wetlands within, Adjacent to and downstream of the development site

No significant wetlands occur within the development site or within the 1500m buffer area under the EPBC Act or the Murrumbidgee Local Environmental Plan 2013.

2.6 Connectivity of different areas of habitat

The locality is fragmented from agricultural activities, but vegetation connectivity occurs along Ercildourne road and connects to Bretts State Forest in the West. Irrigation canals adjacent to the development site are a habitat connectivity feature within the assessment area. Some woody vegetation in the form of sparsely scattered trees, act as stepping-stones throughout the landscape.

2.7 Karst, caves, crevices, cliffs, rocks or other geological and soil hazard features of significance

The development site does not contain karst, caves, crevices, cliffs, rocks or other geological features of significance.

2.8 Areas of outstanding biodiversity

The development site does not contain any areas of outstanding biodiversity.

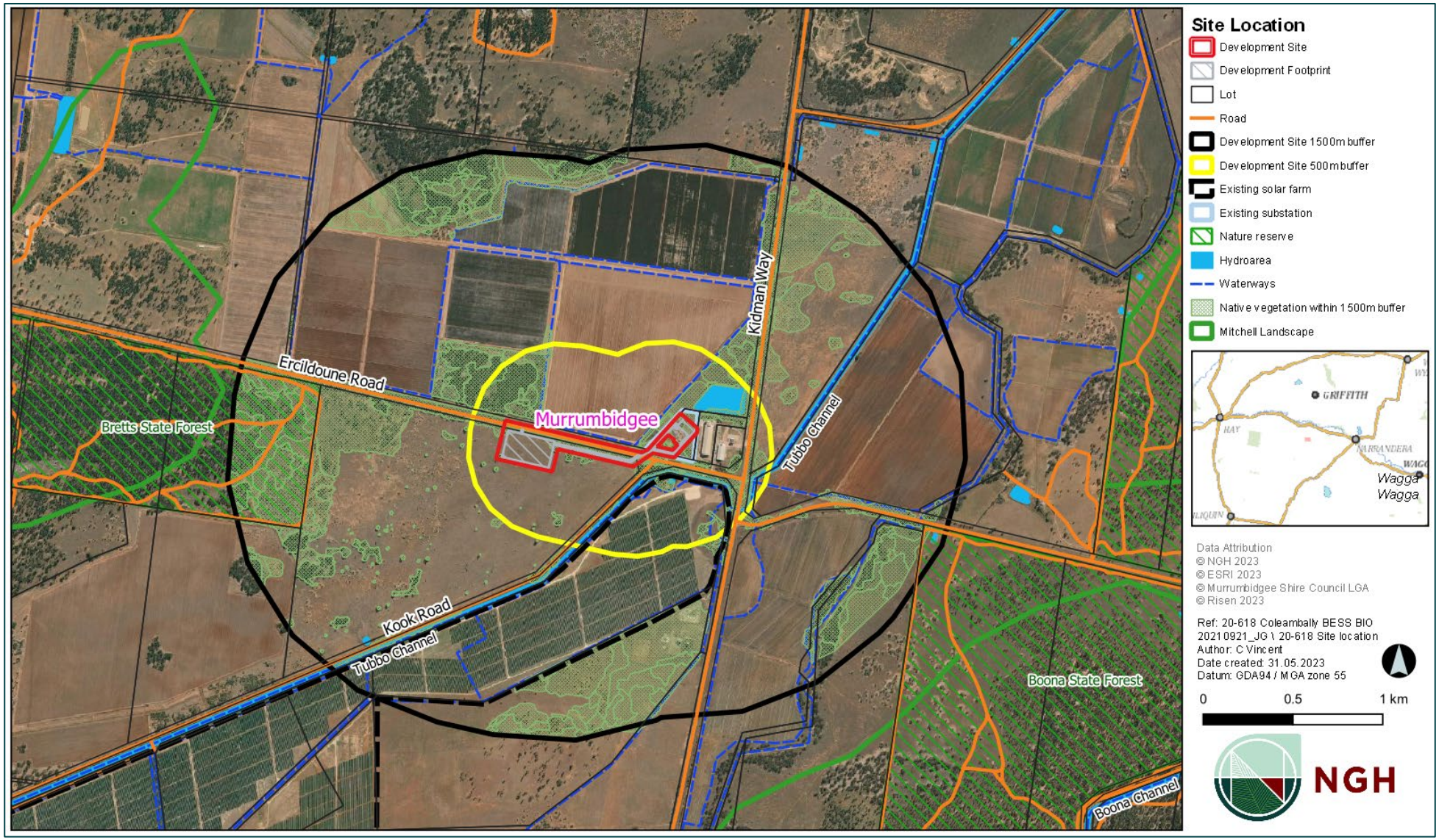


Figure 2-1 Location map

3. Native vegetation

3.1 Land category assessment

As stated within BC Act s6.8(3), the biodiversity assessment is to exclude the assessment of any clearing of native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the *Local Land Services Act 2013* (LLS Act). This excludes any impacts prescribed by the regulations under section 6.3. Additionally, in accordance with section 2.3.1.1 of the BAM, biodiversity values that do not need to be assessed include: *(d) biodiversity values associated with the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the LLS Act), other than the additional biodiversity impacts in accordance with clause 6.1 of the BC regulation*.

Boundaries delineating Category 1-exempt and Category 2-regulated land on the Native

Vegetation Regulatory (NVR) map are not yet publicly available. Therefore, during the transitional period (until the entire NVR map is released), accredited assessors may establish those boundaries and associated categorisation for the consent authority to consider by approximating the method used to make the NVR map under the provisions of the BC Act and the LLS Act. This is done by using the same methodology inclusive of, but not limited to:

- 2013 and 2017 Landuse mapping. A land use layer contributes to identifying land for inclusion in category 1 in the NVR map. Chapter 4 of the NVR map method statement describes the process for identifying and mapping existing and historical agricultural land use since 1 January 1990. Mapping existing and historical land use focuses on identifying patterns or evidence of agricultural land uses according to high-resolution aerial or satellite imagery and classifying land under a national land use classification system.
- Woody vegetation extent layer 2017. *Contributes to identifying areas for inclusion in category 2 in the NVR map (including individual trees).*
- *Aerial imagery post 1990.*
- *S*ensitive regulated land and vulnerable regulated land layer.

To meet the Category 1-exempt land requirement, land must be:

- Legally cleared at or since 1 January 1990 (Woody vegetation only).
- Significantly disturbed or modified since 1990 (Non-woody vegetation).

Most of the development site in the Land Category Assessment is mapped under the 2017 land use dataset as ‘cropped’. The site visit on 11 December 2020 showed there has been a lack of recent cropping due to the regrowth of Weeping Myall and native understory vegetation which was scattered throughout. As the Weeping Myall regrowth occurred post 1990, the land meets the definition of Category 1-exempt Land (see Appendix A).

These areas have been excluded from the BAM assessment, except where prescribed impacts are relevant and discussed in Section 7.3. Where in doubt, or where data sources were conflicting, a precautionary approach has been implemented for areas deemed inconclusive in terms of determining historical land use.

The Land Category Assessment was provided to BCD to review in June 2021. BCD reviewed and approved the assessment on 19th August 2021(see Appendix A.2).

3.2 Native vegetation extent

6.34ha of native vegetation occurs within the development site comprised predominantly of PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion). (See Figure 3-1). State vegetation mapping (SVM) was used to help map the native vegetation extent. More native vegetation was present than was mapped in the SVM, including PCT areas mapped from ground truthing, trees mapped as category 2 land, and other patches of vegetation. These additional areas were included in the area calculations.

The PCTs within the development site include PCT 16 and PCT 26 that forms part of a contiguous patch of vegetation, therefore no scattered trees occur within the development site.

3.2.1 Permissible clearing

Prior to the October targeted bird surveys, four mature trees along the northern fence line of Lot 100/DP 1139115 were cleared by the Landholder. One Black Box tree and one Weeping Myall Tree along Ercildoune Rd with overhanging limbs into the property were also trimmed back to the fence line. The clearing by the landholder was undertaken as a separate action and permissible under the LLS Act as an allowable activity to maintain rural infrastructure. Under Schedule 5A, part 3(31b) of the LLS Act, clearing up to 30m from a linear infrastructure is an allowable activity. These four trees were part of PCT 16 and 26 and were within 15m of the fence line. A statement from the landholder is shown in Appendix B. Although the canopy species were removed, native understory is still present and considered as native vegetation. This area is still considered as PCT 16 and 26 in the BDAR and the Vegetation Integrity Score (VIS) in the BAM-C is consistent with the woodland area adjacent to the permissible clearing.

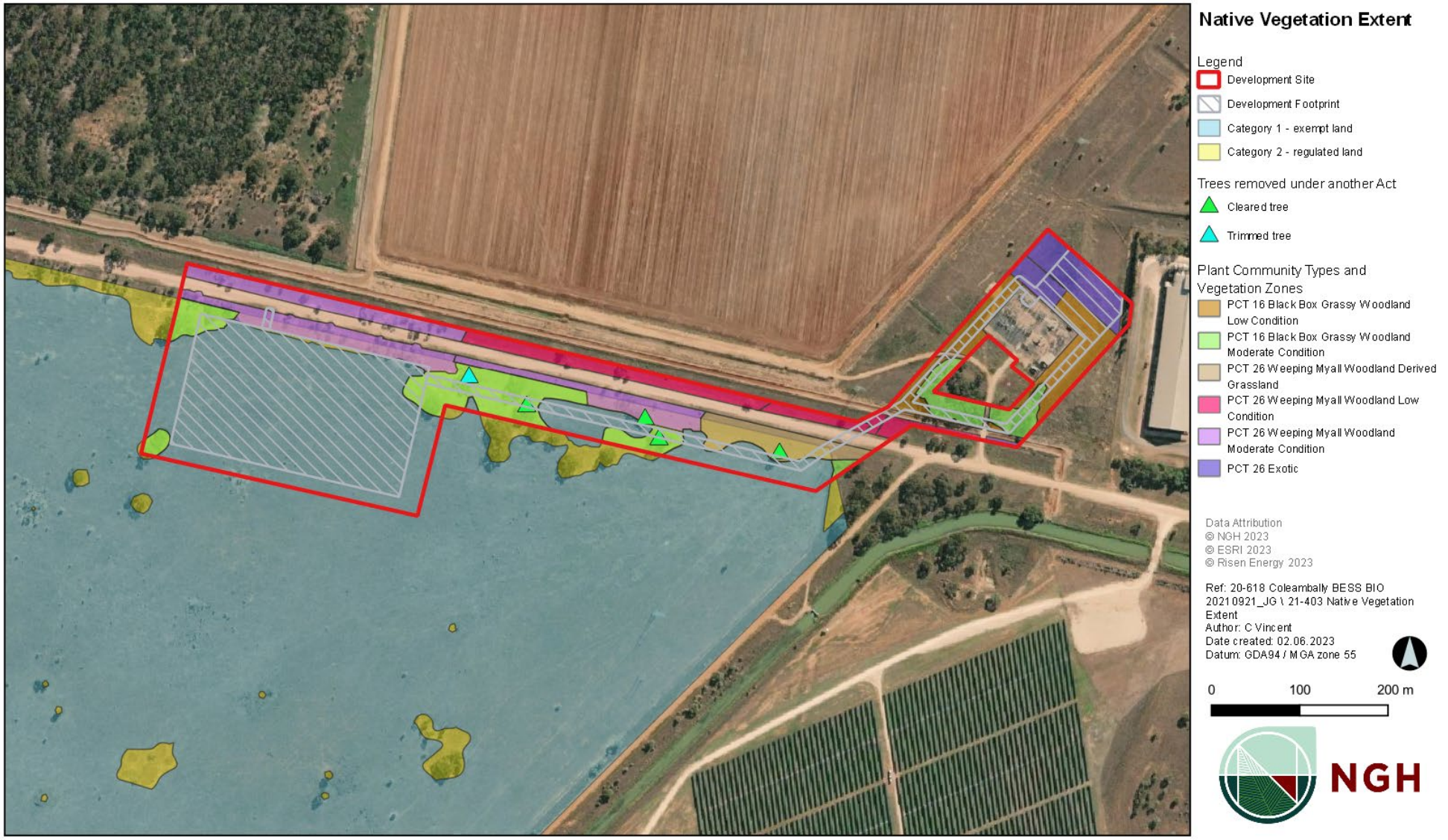


Figure 3-1 Native vegetation extent within the development site

3.3 Plant Community Types (PCTs)

3.3.1 Methods to assess PCTs

Review of existing information

A search was undertaken of the BioNet Vegetation Classification Tool (Veg-C) database and the NSW SEED Mapping Portal to assess existing vegetation mapping information within the development site. Relevant mapping of the development site included DPE VIS State Vegetation Mapping (Riverina Region V1.2 – VIS_ID 4469). This identified five PCTs that may occur within, and surrounding, the development site. These are summarised in Table 3-1.

Table 3-1 Mapped PCTs within the assessment area

Mapped PCTs	Present within the Assessment Area
16 - Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	*Present*
26 - Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	*Present*
28 - White Cypress Pine open woodland of sand plains: prior streams and dunes mainly of the semi-arid (warm) climate zone	*Absent*
44 - Forb-rich Spear grass - Windmill Grass - White Top grassland of the Riverina Bioregion	*Absent*
45 - Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	*Absent*

A site assessment was completed to determine PCTs present in the development site and is detailed below.

Field surveys undertaken to determine PCTs

An initial site survey was undertaken on 11 December 2020. The entire development site was surveyed by an ecologist via vehicle and foot to determine the PCTs and zones present. Vegetation Integrity Plots (VIPs) were undertaken on 20 October 2021 and8 December 2021 in accordance with the BAM. An additional plot was undertaken in November 2022 due to a change in the TL route. and another plot undertaken in May 2023 in the additional footprint in the North East of the substation.

The aim of these surveys was to confirm the PCTs present and determine the condition and extent of communities and threatened species habitat in the development site. Random meander searches were conducted to determine the flora species present. Rapid Assessment of PCTs and zones was completed during the initial December survey period. PCTs were identified from the native species present, landforms, physiography and location in the IBRA subregion using the

Veg-C. The development site was then stratified into areas of similar condition class to determine vegetation zones for each PCT.

VIPs were completed to verify the PCTs and condition classes (zones) present. VIPs of 20m by 50m were completed in each vegetation zone within Category 2 Land. The required number of plots were completed for each vegetation zone to be impacted and is detailed in Table 3-2. A total of nine VIPs were completed in accordance with the BAM. Plots 1 – 5, 7 and 8 were used in BAM-C. Plots 6 and 9 were excluded because they are outside the development footprint. Data was collected utilising the methodology presented in the BAM 2020 by persons trained in the BAM and under the direction of persons accredited under the BAM.

3.3.2 Limitations

A thorough search of the development site was undertaken where possible to do so in accordance with the BAM, and relevant threatened flora and fauna guidelines. However, there is potential for some flora species not to be recorded during the survey due to the timing of the survey (outside optimal survey periods). In particular, inconspicuous or geophytic species which typically flower outside of the completed survey period, may not have been recorded. Targeted threatened flora and fauna surveys were undertaken in August, September, October and December 2021, and November 2022, at the optimal survey times for the species as recommended by the BAM-C. PCT determination and assessment of their overall condition were considered to have a high confidence and considered adequate.

3.3.3 PCTs identified on the development site

Based on the site survey, two PCTs were identified within the development site:

- PCT 16 Black Box grassy woodland wetland of rarely flooded depressions in southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion).
- PCT 26 Weeping Myall open woodland of the Riverina Bioregion and NSW Southwestern Slopes Bioregion.

Descriptions of the PCTs identified are provided in Table 3-2 below.

Table 3-2 Description of PCT 16 within the development site

PCT 16: Black Box grassy woodland wetland of rarely flooded depressions in southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)		
Vegetation formation	Semi-arid Woodlands (Grassy sub-formation)	
Vegetation class	Inland Floodplain Woodlands	
Vegetation type	PCT ID	16
	Common Community Name	N/A
Approximate extent within the development site	2.75ha	

PCT 16: Black Box grassy woodland wetland of rarely flooded depressions in southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)		
Species relied upon for PCT identification	**Species name**	**Relative abundance (% with BAM plot)**
	Black Box *(Eucalyptus largiflorens)*	12-18%
	Enchylaena tomentosa (Ruby Saltbush)	0-2%
	Atriplex semibaccata (Creeping Saltbush)	<1%
	Sclerolaena muricata (Black Rolypoly)	0.8-3%
	Einadia nutans (Climbing Saltbush)	8- 16%
	Atriplex suberecta	25-35%
	Salsola australis (Prickly Saltwort)	<1%
	Chenopodium murale (Nettle-leaf Goosefoot)	<1%
	Solanum esuriale (Quena)	<1%
	Oxalis perennans	<1%
	Rytidosperma sp	<1%
Justification of evidence used to identify the PCT	The sole canopy tree within this community is Black Box (*E. largiflorens*). Three PCTs (PCT 13, 15, 16) occur in the Murrumbidgee subregion with Black Box as the dominant canopy tree. The site has been grazed and cropped in the past so elements of the understory are missing however the location in the landscape provided key characteristics of the PCT. PCT 13 was not considered a suitable match for the community due to the absence of any sign of Lignum (*Muehlenbeckia florulenta*) or larger chenopods such as Nitre Goosefoot (*Chenopodium nitrariaceum*), Dillon Bush (*Nitraria billardierei*) or Thorny Saltbush (*Rhagodia spinescens*) and the site not being located on inner floodplains by major rivers. PCT 15 was not considered a suitable match for the community due to the absence of larger Chenopods, Maireana and Sclerolaena species and the site is not located on inner floodplains by major rivers. PCT 16 was considered the best match PCT due to; • the presence of an open understory comprised of low growing chenopods, forbs and grasses. • The site is situated on a clay-loam alluvial plain, distant from major	

PCT 16: Black Box grassy woodland wetland of rarely flooded depressions in southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	
	rivers and floodplains which is consistent with this PCT. • Understory and overstory species are consistent with the community. • Lack of the key characteristic understory species that are present in PCT 13 and PCT 15 • Its location in the Riverina IBRA region and Murrumbidgee subregion Thus PCT 16 was selected to be the best match for this PCT
TEC Status	No associated TECs
Estimate of percent cleared within NSW	50
Examples	

PCT 16: Black Box grassy woodland wetland of rarely flooded depressions in southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	
	 Figure 3-2 PCT 16 within development site

Table 3-3 Description of PCT 26 within development site

PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW Southwestern Slopes Bioregion		
Vegetation formation	Semi-arid Woodlands (Grassy sub-formation)	
Vegetation class	Riverine Plain Woodlands	
Vegetation type	PCT ID	26
	Common Community Name	N/A
Approximate extent within the development site	2.87ha In three condition zones; • Moderate condition (1.58 ha) • Low condition (0.78 ha) • Derived Grassland (0.51 ha)	
Species relied upon for PCT identification	Species name	Relative abundance (% with BAM plot)
	Acacia pendula (Weeping Myall)	1.03%

PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW Southwestern Slopes Bioregion		
	Atriplex semibaccata (Creeping Saltbush)	<1%
	Enchylaena tomentosa (Ruby Saltbush)	<1%
	Einadia nutans	1%
	Vittadinia cuneata (Fuzzweed)	2.03%
	Austrostipa scabra (Speargrass)	<1%
	Austrostipa aristiglumis (Plains Grass)	30%
	Rhodanthe corymbiflora (Small white Sunray)	<1%
	Rytidosperma setaceum	<1%
Justification of evidence used to identify the PCT	The sole canopy tree within this community is *Acacia pendula.* There are two PCTs (PCT 26 and 55) in the Murrumbidgee IBRA subregion within the vegetation formation 'Semi-arid woodlands' with *Acacia pendula* as an overstorey species. One further PCT, (PCT 27) includes *Acacia pendula* as an overstory species but occurs outside the Riverina Bioregion. PCT 55 was not considered a suitable match for the community due to the lack of Belah (*Casuarina cristata*) and *Acacia pendula* is not a dominant species in this PCT. PCT 27 was not considered a suitable match as it does not occur within the Riverina Bioregion, PCT 26 was considered to be the best match for the vegetation community based on; • The overstory is dominated by *Acacia pendula* • The site occurs on clay loam soils on alluvial plains • The understory and overstory species are consistent with the community. • The site is located in the Riverina Bioregion and Murrumbidgee Subregion Thus, this PCT was considered to be the best match for the community. Areas of grassland lacking an overstory had juvenile *Acacia pendula* present, and understory species consistent with PCT 26 so were considered to be a derived form of the community, likely having previously been impacted by clearing and agricultural activities.	
TEC Status	This PCT is associated with the listed TEC under the BC Act: *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression Riverina and NSW Southwestern Slopes bioregions*, listed as Endangered. This PCT is also associated with the listed TEC under the EPBC Act; *Weeping Myall Woodlands.* PCT 26 within the development site conforms to the BC Act listed EEC due to the site occurring within the Riverina IBRA Bioregion and the presence of	

PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW Southwestern Slopes Bioregion	
	Weeping Myall as the dominant canopy species. Refer to Table 3-6 for further assessment and justification on the presence of this TEC. PCT 26 in the moderate condition zone also conforms to the EPBC Act listed TEC. Refer to Table 3-6 for further assessment and justification on the presence and absence of this TEC in each of the zones
Estimate of percent cleared within NSW	90
Examples	 Figure 3-3 PCT 26 within the development site

3.4 Vegetation integrity assessment

3.4.1 Vegetation zones and survey effort

Two PCTs were identified within the development site. These PCTs were considered in terms of whether they should be stratified into zones on the basis of current condition state, management or other environmental variables.

PCT 26 was identified to occur in three condition zones (low, moderate and derived grassland conditions) throughout the development site on the basis of tree cover, flora composition and exotic dominated understory.

All PCT 26 zones meet the criteria for BC Act listing of the associated TEC *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression,*

Riverina and NSW Southwestern Slopes bioregions as this TEC can include areas that have shrub and canopy cover as well as areas that have been cleared or grazed and no longer have the shrub or canopy cover (refer to section 3.5. Zone 3 (PCT 26 moderate) meets the criteria for the EPBC Act listed TEC *Weeping Myall Woodlands* (refer to section 3.5)

PCT 16 was in two zones, (low and moderate condition)and is not associated with any TECs.

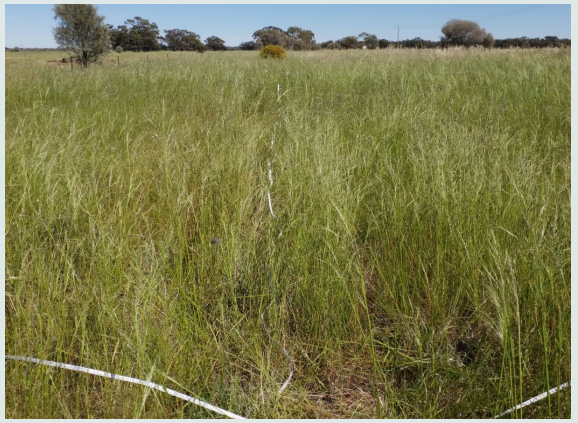
An area of exotic dominated vegetation also occurs in the development site. This was considered likely to have originally derived from PCT 26 based on the surrounding landscape and presence of juvenile Acacia pendula trees in the vicinity. For the purposes of the BAM assessment, this zone was named PCT 26_exotic.

PCT zones are detailed within Table 3-4 and shown in Figure 3-4..

Nine plots were undertaken. Plot 6 (non-native) and Plot 9 (PCT 16_low condition) were excluded from the BAM-C as they fell outside the final development site. Plot 8, was collected during the May 2023 site visit, Plot 8 contained fallen and discarded timber power poles which had a combined length of 43m. When Plot 8 was entered into BAM-C, the power poles were entered as fallen timber. This increased the function score, which in turn increased the VI score from 4.8 to 41. After discussion with BCD, it was confirmed acceptable to not include the power poles as fallen timber in BAM-C as the poles are not a representative of the function of fallen timber. Refer to Appendix C.3 for VI score comparison.

The boundary of PCT's in the area just north of the existing substation was delineated as a relatively straight line. This is due to this particular area being heavily disturbed over a number of consecutive years from the construction of the sub-station, sub-station maintenance and excavation works. The natural boundary of the PCT's is unable to be clearly defined, therefore drawing a straight line between both PCT's is the most suitable option in order to define the boundary of the PCT's.

Table 3-4 Plant Community Type and Zones

Zone ID	PCT ID	Stratification/condition	Area (ha) in development site	Area (ha) in development footprint	Survey effort (VIPs)	Patch size (ha)	Examples
1	26	**Weeping Myall Woodland Derived Grassland** Remnant native grassland with exotic groundcover present. Regeneration of *Acacia pendula* occurring. It occurs along Ercildoune Road This PCT forms part of the BC Act Listed Weeping Myall Woodland. This does not meet the EPBC Act criteria.	0.51	0.07	1 (Plot 1)	>100ha	
2	16	**Black Box grassy woodland moderate condition** Black box trees dominant overstorey. Mix of native and exotic ground cover species. This PCT is not associated with a TEC.	1.77	0.45	2 (Plot 2 and 3)	>100ha	

Zone ID	PCT ID	Stratification/condition	Area (ha) in development site	Area (ha) in development footprint	Survey effort (VIPs)	Patch size (ha)	Examples
3	26	**Weeping Myall woodland in moderate condition** Remnant native woodland comprising a mix of native and exotic groundcover. It occurs along Ercildoune Road. This PCT forms part of the BC Act Listed Weeping Myall Woodland. This zone also meets the EPBC Act criteria for Weeping Myall Woodland.	1.58	0.02	1 (Plot 4)	>100ha	
4	26	**Weeping Myall woodland in low condition** Remnant native woodland comprising a partially cleared canopy and exotic dominated groundcover. It occurs along Ercildoune road. This PCT forms part of the BC Act Listed Weeping Myall Woodland. This does not meet the EPBC Act criteria.	0.78	0.04	1 (Plot 5)	>100ha	

Zone ID	PCT ID	Stratification/condition	Area (ha) in development site	Area (ha) in development footprint	Survey effort (VIPs)	Patch size (ha)	Examples
5	26	**Exotic** Exotic dominated grassland (largely consisting of Sowthistle (*Sonchus sp), Mallow (*Malva sp), Prickly Lettuce (*Lactuca serriola) and White Horehound (*Marrubium vulgare). Some scattered native grasses (*Dichanthium sericeum* and *Austrostipa sp*.) and forbs (*Vittadinia sp*., *Oxalis sp* and *Epilobium billardierianum*) present (<1%) but nothing representative of a PCT (For the purposes of generating a VI score – this zone was added as PCT 26 in the BAM-C based on its proximity to PCT 26)	0.67	0.42	1(Plot 8)	n/a	

Zone ID	PCT ID	Stratification/condition	Area (ha) in development site	Area (ha) in development footprint	Survey effort (VIPs)	Patch size (ha)	Examples
6	16	**Black Box grassy woodland low condition** No Black box trees present. Mix of native and exotic ground cover species. This PCT is not associated with a TEC.	0.98	0.44	1 (Plot 7)	>100ha	

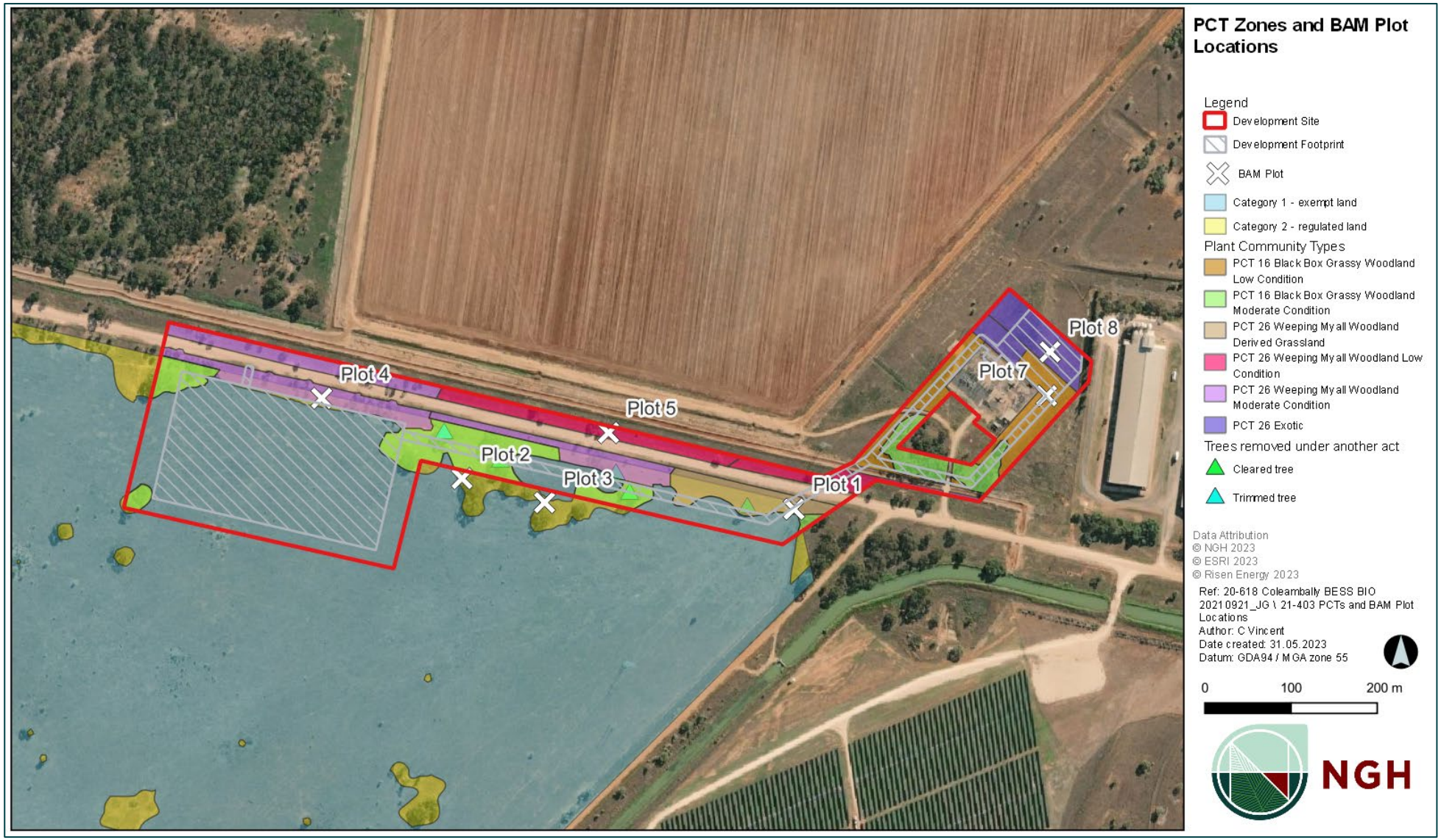


Figure 3-4 Vegetation zones and BAM Plot locations

3.4.2 Vegetation integrity assessment results

The plot data from the vegetation integrity survey plots were entered into the BAM Calculator by an accredited assessor (BAAS18074). Plot data can be found in Appendix C.1

The results of the vegetation integrity assessment are provided within Table 3-5 below.

Table 3-5 Current vegetation integrity scores for each vegetation zone within the development site

Zone ID	PCT/Zone	TEC listing	Composition score	Structure score	Function score	Hollow bearing trees (present/absent)	Vegetation Integrity Score
1	26 Derived Grassland	TEC under BC Act	72.9	50.3	87.7	absent	30.4
2	16 Moderate	Not a TEC	74.3	61.7	67.8	present	67.7
3	26 Moderate	TEC under EPBC and BC Act	65.4	53	44.5	absent	53.6
4	26 Low	TEC under BC Act	61.5	45.8	34.4	absent	45.9
5	Non Native (26 exotic)	Not a TEC	46.4	74.1	0	absent	4.8
6	16 Low	Not a TEC	64.8	3.1	5.3	absent	10.2

3.5 Threatened ecological communities

PCT 26 identified within the development site is associated with the BC Act listed TEC *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW Southwestern Slopes bioregions*, and EPBC Act *Weeping Myall Woodlands.* An assessment of the TEC equivalency for PCT 26 within the development site is provided in Table 3-6 below. The TEC extent within the development site is shown in Figure 3-5.

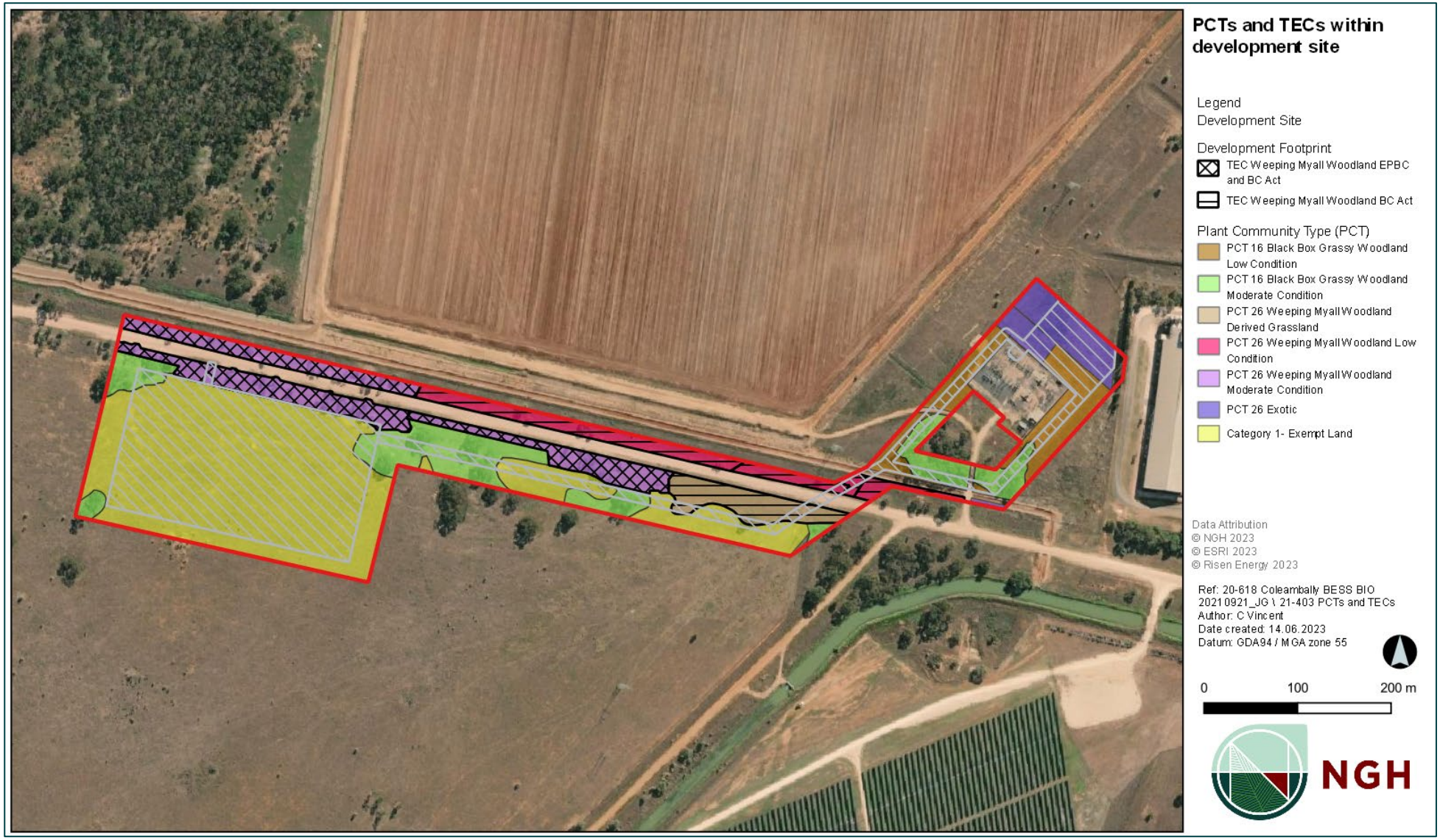


Figure 3-5 PCTs and TECs within the development site

Table 3-6 TEC's within the development site

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain Murray-Darling Depression, Riverina and NSW Southwestern Slopes bioregions	10973	Endangered	Not Listed	Zone 1, PCT 26_Grassland	• Development site occurs in the NSW Riverina IBRA Bioregion and Murrumbidgee IBRA sub-region where this TEC is known to occur. • This TEC typically occurs as a low woodland, low open woodland, low sparse woodland or open shrubland up to 10 metres tall dominated by *Acacia pendula*. Where canopy species are absent Chloris, *Austrodanthonia* (now *Rytidosperma sp.*) and *Austrostipa sp.* are usually dominant. ○ Regenerating canopy species were present in plot 1 for vegetation zone 1, however dominant species were characteristic of a grassland with 48.2% grass cover and 10.3%	Yes	0.51

[1] Sources used: NSW Department of Planning and Environment (2021). NSW Scientific Committee – Final Determination Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act.
Department of the Environment, Water, Heritage and the Arts (2009). Weeping Myall Woodlands Policy Statement.

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)
					forb cover. • Key characteristic species are listed in the final determination by the NSW Scientific Committee. Species present in plot 1 for vegetation zone 1 which correlate to the final determination are: ○ *Vittadinia cuneata* ○ *Austrostipa aristiglumis* ○ *Acacia pendula* ○ *Enteropogon acicularis* ○ *Sida spp.* ○ *Einadia nutans* ○ *Sclerolaena muricata* ○ *Chloris truncata* ○ *Enchylaena tomentosa* ○ *Solanum esuriale* ○ *Convolvulus spp.* ○ *Maireana spp.* ○ *Marsilea drummondii*		
Myall Woodland in the Darling	10973	Endangered	Not Listed	Zone 3, PCT 26_Moderate	• Development site occurs in the NSW Riverina IBRA Bioregion and	Yes	1.58

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)
Riverine Plains, Brigalow Belt South, Cobar Peneplain Murray-Darling Depression, Riverina and NSW Southwestern Slopes bioregions					Murrumbidgee IBRA sub-region where this TEC is known to occur. • This TEC typically occurs as a low woodland, low open woodland, low sparse woodland or open shrubland up to 10 metres tall dominated by *Acacia pendula*. Where canopy species are absent Chloris, *Austrodanthonia* (now *Rytidosperma* sp.) and *Austrostipa* sp. are usually dominant. ○ Regenerating canopy species were present in plot 4 for vegetation zone 3, dominant species were characteristic of a low sparse woodland with 1% tree cover, 0.4% shrub cover and 33% grass cover. • Key characteristic species are listed in the final determination by the NSW Scientific Committee. Species present in plot 4 for vegetation zone 3 which correlate to the final determination		

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)
					are: ○ *Vittadinia spp.* ○ *Austrostipa aristiglumis* ○ *Acacia pendula* ○ *Enteropogon acicularis* ○ *Sida spp.* ○ *Einadia nutans* ○ *Sclerolaena muricata* ○ *Chloris truncata* ○ *Enchylaena tomentosa* ○ *Solanum esuriale* ○ *Rhodanthe corymbiflora* ○ *Goodenia spp.*		
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain Murray-Darling Depression, Riverina and NSW Southwestern	10973	Endangered	Not Listed	Zone 4, PCT 26_Low	• Development site occurs in the NSW Riverina IBRA Bioregion and Murrumbidgee IBRA sub-region where this TEC is known to occur. • This TEC typically occurs as a low woodland, low open woodland, low sparse woodland or open shrubland up to 10 metres tall dominated by *Acacia pendula*. Where canopy species are absent Chloris,	Yes	0.77

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)
Slopes bioregions					*Austrodanthonia* (now *Rytidosperma* spp) and *Austrostipa* spp. are usually dominant. ○ Regenerating canopy species were present in plot 5 for vegetation zone 4, dominant species were characteristic of allow sparse woodland with 2% tree cover, 15.5% grass cover and 3.2% forb cover. • Key characteristic species are listed in the final determination by the NSW Scientific Committee. Species present in plot 5 for vegetation zone 4 which correlate to the final determination are: ○ *Vittadinia spp.* ○ *Austrostipa aristiglumis* ○ *Acacia pendula* ○ *Chloris truncata* ○ *Solanum esuriale* ○ Oxalis perennans		

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)

Weeping Myall Woodlands. (EPBC Act)	20415	Not Listed	Endangered	Zone 3, PCT 26_Moderate	• Development site occurs in the NSW Riverina IBRA Bioregion and Murrumbidgee IBRA sub-region where this TEC is known to occur.
					• This TEC typically occurs as an open woodland, generally 4-12 m high, in which Weeping Myall trees are the sole or dominant overstorey species. The understorey often includes an open layer of shrubs and an open ground layer of grasses and herbs.
					  ○ Regenerating canopy species were present in plot 4 for vegetation zone 3, dominant species were characteristic of a low open woodland with 1% tree cover, 0.4% shrub cover and 33% grass cover.
					• EPBC criteria which must be met in order to be the listed TEC:
					  ○ Tree canopy dominated (50%) by living, dead or defoliated Weeping Myall trees.
						Yes	N/A

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)
					▪ Yes. Weeping Myall is the only tree present in plot 4. ○ Overstory must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha. ▪ Yes. Tree canopy cover averages 5 – 10% cover across the patch. ○ The patch has either more than two layers of regeneration of Weeping Myall present; or the tallest layer of living, dead or defoliated Weeping Myall trees is at least 4 m tall and of the vegetative cover present, 50% is comprised of native species. ▪ Yes. The patch		

TEC Name	Profile ID (from TBDC)	BC Act Status	EPBC Act Status	Associated vegetation zone within the development site	Key Diagnostic Characteristics[1]	TEC Present?	Area within the development site (ha)
					does have at least two layers of regeneration of Weeping Myall present (4 stem classes present). ▪ Yes. Plot 4 did not capture data for the tallest layer of Weeping Myall trees. Therefore a conservative approach has been taken and trees present are assumed to be at least 4 m tall. The total native cover is greater than 50% in plot 4.		

4. Threatened species

4.1 Ecosystem Credit Species

The following ecosystem credit species were returned by the calculator as being assigned with the PCTs. These species were assumed to utilize the habitat for foraging. Three species were excluded from the BAM-C due to habitat constraints: Painted Honey-eater, White-bellied Sea-eagle and Regent Parrot and discussed in Table 4-2

Table 4-1 Ecosystem credit species predicted by the BAM-C

Common Name	Scientific name	Associated PCT	NSW Listing Status	National Listing Status	Sensitivity to gain
Barking Owl	*Ninox connivens*	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	High sensitivity to potential gain
Black Falcon	*Falco subniger*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Brolga	*Grus rubicunda*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Diamond Firetail	*Stagonopleura guttata*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain

Common Name	Scientific name	Associated PCT	NSW Listing Status	National Listing Status	Sensitivity to gain
Dusky Woodswallow	*Artamus cyanopterus*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Grey Falcon	*Falco hypoleucos*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Endangered	Not Listed	Moderate sensitivity to potential gain
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Hooded Robin (southeastern form)	*Melanodryas cucullata*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Inland Forest Bat	*Vespadelus baverstocki*	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	High sensitivity to potential gain

Common Name	Scientific name	Associated PCT	NSW Listing Status	National Listing Status	Sensitivity to gain
Little Eagle	*Hieraaetus morphnoides*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Little Pied Bat	*Chalinolobus picatus*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	High sensitivity to potential gain
Magpie Goose	*Anseranas semipalmata*	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Major Mitchell's Cockatoo	*Lophochroa leadbeateri*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Masked Owl	*Tyto novaehollandiae*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Vulnerable	Not Listed	High sensitivity to potential gain
Painted Honeyeater	*Grantiella picta*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland	Vulnerable	Vulnerable	Moderate sensitivity to potential gain

Common Name	Scientific name	Associated PCT	NSW Listing Status	National Listing Status	Sensitivity to gain
		wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)			
Pied Honeyeater	*Certhionyx variegatus*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Regent Parrot (eastern subspecies)	*Polytelis anthopeplus monarchoides*	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Endangered	Vulnerable	Moderate sensitivity to potential gain
Scarlet Robin	*Petroica boodang*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Spotted Harrier	*Circus assimilis*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain

Common Name	Scientific name	Associated PCT	NSW Listing Status	National Listing Status	Sensitivity to gain
Square-tailed Kite	*Lophoictinia isura*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
Superb Parrot	*Polytelis swainsonii*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Vulnerable	Vulnerable	Moderate sensitivity to potential gain
Swift Parrot	*Lathamus discolor*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Endangered	Critically Endangered	Moderate sensitivity to potential gain
Varied Sittella	*Daphoenositta chrysoptera*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	Moderate sensitivity to potential gain
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	High sensitivity to potential gain

Common Name	Scientific name	Associated PCT	NSW Listing Status	National Listing Status	Sensitivity to gain
White-throated Needletail	*Hirundapus caudacutus*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not Listed	Vulnerable	High sensitivity to potential gain
Yellowbellied Sheathtail bat	*Saccolaimus flaviventris*	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion 16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Vulnerable	Not Listed	High sensitivity to potential gain

4.1.1 Ecosystem species excluded

The following species (Table 4-2) from the species credit species BAM-C results were excluded from assessment.

Table 4-2 Species credit species excluded based on habitat quality

Species credit species	Habitats present	Reason for exclusion
White-bellied Sea-eagle *Haliaeetus leucogaster*	No	Not within 1km of a river, lake, large dam or creek, wetland or coastlines. No suitable water bodies nearby
Painted Honeyeater *Grantiella picta*	No	Mistletoes not present at a density of greater than 5 mistletoes/ha
Regent Parrot *Polytelis anthopeplus monarchoides*	No	Geographic limitation –not within 10km of the junction of the Murray River

4.2 Species credit species

4.2.1 Species credit species to be assessed

The BAM-C recommended that the following species credit species be assessed for their potential to occur at the development site. The following table, Table 4-3, assesses each species credit species to see if they should be included or excluded from further assessment via requiring survey. All included species were surveyed during required periods within August, September, October and December 2021, and November 2022 where the survey window was suitable.

Table 4-3 Candidate species credit species requiring assessment

Species Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	NSW Listing Status	National listing status	Habitat Components and abundance on site	Included or excluded	Reason for inclusion or exclusion
A spear-grass *Austrostipa wakoolica*	Clay loam soils, open woodland in Riverina. South of the Murrumbidgee River	Moderate sensitivity to potential gain	Endangered	Endangered	Clay loam soils, open woodland	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa*	Clay loam flats in Riverina	High sensitivity to potential gain	Vulnerable	Not listed	Clay loam flats	Included	Habitat components in PCT 16
Mennindee Nightshade *Solanum karsense*	West of Maude Semi-permanent/ephermal wet areas	High sensitivity to potential gain	Endangered	Endangered	N/A	Excluded	Development site East of Maude and outside geographic restrictions
Austral Pillwort *Pilularia novaehollandiae*	Waterways among grasses and sedges in Riverina	High sensitivity to potential gain	Endangered	Not listed	Drainage lines	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Claypan Daisy *Brachyscome muelleroides*	Damp areas on the margins of claypans in moist grassland		Vulnerable	Vulnerable	Damp clay loam areas	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6

Species Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	NSW Listing Status	National listing status	Habitat Components and abundance on site	Included or excluded	Reason for inclusion or exclusion
	in Riverina						
Bindweed *Convolvulus tedmoorei*	Clays soils in Riverina	High sensitivity to potential gain	Endangered	Not listed	Clays soils	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Chariot Wheels *Maireana cheelii*	Heavy grey clay soils and claypans or shallow depressions. West of Darlington Point, west of Jerilderie	High sensitivity to potential gain	Vulnerable	Vulnerable	Brown clay loam on eroded/scalded surfaces in shallow depressions	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Small Scurf-pea *Cullen parvum*	Grasslands, drainage lines in Riverina	High sensitivity to potential gain.	Endangered	Not listed	Grasslands, drainage lines	Included	Habitat components in PCT 16 zone 1,2, and 3, PCT 16 zone 4 and zone 6
Winged Peppercress *Lepidium monoplocoides*	Black box woodland, tussock grasses and seasonally moist sites in the Riverina	High sensitivity to potential gain	Endangered	Endangered	Black box woodland, tussock grasses and seasonally moist sites	Included	Habitat components in PCT 16 zone 1,3, and 4, PCT 16 zone 2 and zone 6

Species Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	NSW Listing Status	National listing status	Habitat Components and abundance on site	Included or excluded	Reason for inclusion or exclusion
Red Darling Pea *Swainsona plagiotropis*	Flat grassland, drains, clay loam soil in Riverina. Hay Plain	High sensitivity to potential gain	Vulnerable	Vulnerable	Flat grassland, drains, clay loam soil	Included	Habitat components in PCT 16 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Slender Darling Pea *Swainsona murrayana*	Brown clay soil, Black box and grassland communities in Riverina	High sensitivity to potential gain	Vulnerable	Vulnerable	Brown clay soil, Black box and grassland communities	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Silky Swainson pea *Swainsona sericea*	Found in Natural Temperate Grassland	High sensitivity to potential gain.	Vulnerable	Not Listed	Grassland	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Turnip copperburr *Sclerolaena napiformis*	Remnant grassland habitats on clay-loam soils in Riverina. Hay Plain	High sensitivity to potential gain	Endangered	Endangered	Remnant grassland habitats on clay-loam soils	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
Lanky buttons *Leptorhynchos orientalis*	Woodland or grassland, Acacia pendula woodland with herbaceous understorey in Riverina	Moderate sensitivity to potential gain	Endangered	Not listed	Woodland or grassland, Acacia pendula woodland with herbaceous understorey	Included	Habitat components in PCT 16 zone 1,3, and 4, PCT 16 zone 2 and zone 6

Species Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	NSW Listing Status	National listing status	Habitat Components and abundance on site	Included or excluded	Reason for inclusion or exclusion
Mossgiel Daisy *Brachyscome papillosa*	Clay soils in Riverina	High sensitivity to potential gain	Vulnerable	Vulnerable	Clay soils	Included	Habitat components in PCT 26 zone 1,3, and 4, PCT 16 zone 2 and zone 6
White-bellied Sea-eagle *Haliaeetus leucogaster*	Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	High sensitivity to potential gain	Vulnerable	Not Listed	N/A	Excluded	Outside geographic restrictions
Regent Parrot (eastern subspecies) *Polytelis anthopeplus monarchoides*	Hollow bearing trees Living or dead E. camaldulensis with hollows greater than 5 cm diameter, greater than 5 m above the ground OR trees with DBH of greater than 40cm, within 1 km of watercourses or	High Sensitivity to Gain	Endangered	Vulnerable	N/A	Excluded	Geographic limitation –not within 10km of the junction of the Murray River

Species Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	NSW Listing Status	National listing status	Habitat Components and abundance on site	Included or excluded	Reason for inclusion or exclusion
	billabongs. Trees can be isolated but within 20 km of mallee						
Koala *Phascolarctos cinereus* (Breeding)	Areas identified via survey as important habitat.	High sensitivity to potential grain	Vulnerable	Vulnerable	Black Box trees (feed trees) present.	Included	Habitat components in PCT 16 Zone 2.
Bush Stonecurlew *Burhinus grallarius*	Fallen/standing dead timber including logs.	High sensitivity to potential gain.	Endangered	Noted Listed	Fallen/standing dead timber was spread throughout most of the development site.	Included	Habitat components in PCT 26 zone 1,3, and 4, and PCT 16 zone 2
Little Eagle *Heiraaetus morphnoides* (Breeding)	Nest trees – live (occasionally dead) large old trees within vegetation	Moderate sensitivity to potential gain	Vulnerable	Noted Listed	5 stick nests approximately 30cm plus diameter	Included	Habitat components in PCT 16 Zone 2
Square-tailed Kite *Lophoictinia isura*	Nest trees	Moderate sensitivity to potential gain.	Vulnerable	Noted Listed	5 stick nests approximately 30cm plus diameter present.	Included.	Habitat components in PCT 16 Zone 2.

Species Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	NSW Listing Status	National listing status	Habitat Components and abundance on site	Included or excluded	Reason for inclusion or exclusion
Barking Owl *Ninox connivens* (Breeding)	Hollow bearing trees, living or dead trees with hollows greater than 20cm in diameter and greater than 4m above the ground.	High sensitivity to potential gain.	Vulnerable	Noted Listed	6 hollow bearing trees approximately 20cm in diameter and 4m plus above ground.	Included	Habitat components in PCT 16 zone 2
Major Mitchell's cockatoo *Lophochroa leadbeateri*	Hollow bearing trees. Living or dead tree with hollows greater than 10cm	High sensitivity to potential gain	Vulnerable	Noted Listed	20 hollow bearing trees approximately 10cm plus.	Included	Habitat components in PCT 16 Zone 2 and Zone 6, and PCT 26 grassland zone 1.
Superb Parrot *Polytelis swainsonii* (Breeding)	Hollow bearing trees, Living or dead *E. blakleyi, E melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. polyanthemos, E. mannifera, E. intertexta* with hollows greater than 5cm	High sensitivity to potential gain.	Vulnerable	Vulnerable	15 hollow bearing trees approximately 5cm plus diameter, greater than 4m from the ground present.	Included	Habitat components in PCT 16 Zone 2

Species Credit Species	Habitat components and geographic restrictions	Sensitivity to gain class	NSW Listing Status	National listing status	Habitat Components and abundance on site	Included or excluded	Reason for inclusion or exclusion
	diameter, greater than 4m above ground or trees with a DBH greater than 30cm.						
Masked Owl *Tyto novaehollandiae* (Breeding)	Hollow bearing trees, living or dead trees with hollows greater than 20cm diameter.	High sensitivity to potential gain.	Vulnerable	Not Listed	6 hollow bearing trees approximately 20cm in diameter	Included	Habitat components in PCT 16 zone 2
Australian Bustard *Ardeotis australis*	Tussock grasslands in Riverina	High sensitivity to potential gain.	Endangered	Noted Listed	Tussock grasslands	Included	Habitat components in PCT 16 zone 1,3, and 4, and PCT 16 zone 2 and zone 6
Swift Parrot *Lathamus discolor* (Breeding)	Important habitat map	Moderate sensitivity to gain.	Endangered	Critically Endangered	N/A	Excluded	No areas identified on the important habitat occur within or adjacent to the development site.

4.2.2 Inclusions and exclusions based on habitat features

The BAM-C predicted the species credit species listed to occur at the development site. As per the BAM Operational Manual - Stage 1, an assessor must consider species recorded on or near the development site even if they are not predicted by the BAM-C. A new Bionet search was undertaken on 24 November 2021. Within 10km of the development site, BioNet contains records of 14 threatened species (Table 4-4). An assessment of these species was undertaken to determine if they should be included in the BAM-C.

Table 4-4 BioNET species within 10km of development site

BioNET species within 10km	Species generated by BAM-C	Habitat in development site	Habitat present
Black Falcon *Falco subniger*	Yes	Records from 2016. Suitable stick nests on site. Site survey undertaken.	Yes
Bush Stone-curlew *Burhinus grallarius*	Yes	Records from 2009. Open woodland with sparse grassy groundlayer and fallen timber present within the development site. Site survey undertaken. Site survey undertaken.	Yes
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis*	Yes	Many recent records, latest 2015. Open Box woodlands on alluvial plains present within the development site.	Yes
Koala *Phascolarctos cinereus*	Yes	Record from 2004. Feed trees (*Eucalyptus largiflorens*) present within the development site. Site survey undertaken.	Yes
Little Eagle *Hieraaetus morphnoides*	Yes	Record from 1980. Suitable stick nests on site. Site survey undertaken.	Yes
Painted Honeyeater *Grantiella picta*	Yes	Recent records, latest 2009. Weeping Myall (Acacia pendula) woodland present within the development site. Specialist feeder on Mistletoes, none found within the development site.	No
Pine Donkey Orchid *Diuris tricolor*	No	Records from 1990. Sandy soil not within development site.	No

BioNET species within 10km	Species generated by BAM-C	Habitat in development site	Habitat present
Southern Bell Frog *Litoria raniformis*	No	Records from 2006. Swamps/billabongs not present within development site. Excluded	No
Spotted Harrier *Circus assimilis*	Yes	Records from 2002. Acacia remnants, grassland and stick nests present within development site.	Yes
Superb Parrot *Polytelis swainsonii*	Yes	Many recent records, 2019 latest. Suitable sized hollows and foraging habitat present. Site survey undertaken.	Yes
Varied Sittella *Daphoenositta chrysoptera*	Yes	Recent records, latest 2009. Acacia and Black Box woodland within development site.	Yes
Square-tailed Kite *Lophoictinia isura*	Yes	Records 2016. Dry woodland present with water nearby. Site survey undertaken.	Yes
Southern Myotis *macropus*	No	Records 2004. Hollow bearing trees and water close by.	Yes
Diamond firetail *Daphoenositta chrysoptera*	Yes	Recent records, latest 2009. Lack of preferred habitat. Excluded.	No

Three BioNet recorded species were not present in the ecosystem credit species list or candidate species list generated by the BAM-C, Southern Bell Frog, Pine Donkey Orchid and Southern Myotis. The habitat within the development site is not suitable for the Southern Bell Frog and Pine Donkey Orchid.

Suitable habitat was present for the Southern Myotis (*Myotis Macropus*) in the development site in the form of man-made irrigation canals. Southern Myotis requires waterbodies at least 3m wide for foraging and the irrigation canal alongside the site was considered to be suitable. This species was added to the BAM-C as a candidate species.

4.2.3 Candidate species requiring confirmation of presence or absence

The candidate species listed in Table 4-5 are those considered to have habitat present within the development site. Targeted surveys have been used to assess each species as summarised below where the survey window allowed. Details of the survey methodologies and results are provided for each surveyed species in section 3.4.1 with locations shown in Figure 4-1 and survey effort and results detailed in Table 4-5. Two species were considered to occur within the development site. Superb Parrot was observed in the site on two occasions. Southern Myotis was unable to be

surveyed for but was assumed to occur based on nearby Bionet records. Species polygons have been determined based on the guidelines in the Threatened Biodiversity Data Collection (TBDC).

Table 4-5 Summary of species credit species surveyed at the development site

Species Credit Species	Biodiversity risk weighting	Assumed to occur/survey/ expert report	Present on site?	Species polygon area or count
A spear-grass *Austrostipa wakoolica*	2.0	Surveyed 2021/10/2021 and 8/11/2022	Unknown	0.16 ha (assumed presence). Additional area of PCT 26_exotic which was unable to be surveyed for in 2023 due to project timeline constraints.
Yellow Gum *Eucalyptus leucoxylon subsp. pruinosa*	2.0	Surveyed 22/09/2021 and 8/11/2022	No	N/A
Austral Pillwort *Pilularia novaehollandiae*	3.0	Surveyed 2021/10/2021 and 8/11/2022	No	N/A
Claypan Daisy *Brachyscome muelleroides*	2.0	Surveyed 2021/10/2021 and 8/11/2022	No	N/A
Bindweed *Convolvulus tedmoorei*	3.0	Surveyed 22/09/2021	Unknown	0.33ha total (assumed presence) Comprised of Additional area of PCT 16_moderate could not survey for in November 2022 (0.17ha) Additional area of PCT 26_exotic which was unable to be surveyed for in 2023 due to project timeline constraints. (0.16ha)
Chariot Wheels *Maireana cheelii*	2.0	Surveyed 22/09/2021 and 8/11/2022	No	N/A
Small Scurf-pea *Cullen parvum*	2.0	Surveyed 08/12/2021 and 8/11/2022	No	N/A

Species Credit Species	Biodiversity risk weighting	Assumed to occur/survey/ expert report	Present on site?	Species polygon area or count
Winged Peppercress *Lepidium monoplocoides*	2.0	Surveyed 08/12/2021 and 8/11/2022	No	N/A
Red Darling Pea *Swainsona plagiotropis*	2.0	Surveyed 22/09/2021	Unknown	0.33ha total (assumed presence) Comprised of Additional area of PCT 16_moderate could not survey for in November 2022 (0.17ha) Additional area of PCT 26_exotic which was unable to be surveyed for in 2023 due to project timeline constraints. (0.16ha)
Slender Darling Pea *Swainsona murrayana*	2.0	Surveyed 22/09/2021	Unknown	0.33ha total (assumed presence) Comprised of Additional area of PCT 16_moderate could not survey for in November 2022. (0.17ha) Additional area of PCT 26_exotic which was unable to be surveyed for in 2023 due to project timeline constraints. (0.16ha)
Silky Swainson-pea *Swainsona sericea*	2.0	Surveyed 22/09/2021 and 8/11/2022	No	N/A
Turnip Copperburr *Sclerolaena napiformis*	2.0	Surveyed 22/09/2021 and 8/11/2022	No	N/A
Lanky buttons *Leptorhynchos orientalis*	2.0	Surveyed 2021/10/2021 and 8/11/2022	No	N/A
Mossgiel Daisy	2.0	Surveyed	No	N/A

Species Credit Species	Biodiversity risk weighting	Assumed to occur/survey/ expert report	Present on site?	Species polygon area or count
Brachyscome papillosa		20-21/10/2021 and 8/11/2022		
Southern Myotis *Myotis macropus*	2.0	Assumed to occur	Yes (Assumed)	0.47ha (native woodland vegetation within 200m from a waterbody)
Koala *Phascolarctos cinereus*	2.0	Surveyed 20-21/10/2021 and 8/11/2022	No	N/A
Bush Stone-curlew *Burhinus grallarius*	2.0	Surveyed 17/08/2021	No	N/A
Little Eagle *Heiraaetus morphnoides* (Breeding)	1.5	Surveyed 20-21/10/2021 and 8/11/2022	No	N/A
Square-tailed Kite *Lophoictinia isura*	1.5	Surveyed 20-21/10/2021 and 8/11/2022	No	N/A
Barking Owl *Ninox connivens*	2.0	Surveyed 17/08/2021	No	N/A
Major Mitchell's cockatoo *Lophochroa leadbeateri*	2.0	Surveyed 20-21/10/2021 and 8/11/2022	No	N/A
Superb Parrot *Polytelis swainsonii*	2.0	Surveyed 20-21/10/2021 and 8/11/2022	Yes	0.45ha (100m radius around PCT 16 Black Box woodland suitable for nesting)
Masked Owl *Tyto novaehollandiae*	2.0	Surveyed 17/08/2021	No	N/A
Australian Bustard *Ardeotis australis*	2.0	Surveyed 20-21/10/2021	No	N/A

4.2.4 Weather conditions during targeted survey

Rainfall recorded for these dates from the Australian Bureau of Meteorology (BOM) at the Coleambally Irrigation NSW Weather (ID: 074249) Station And other weather conditions area recorded from Griffith NSW Weather (ID: 075041) Station are presented in Table 4-6 below.

Table 4-6 Weather summary

Survey Date	Maximum temperature (°C)	Minimum temperature (°C)	Relative Humidity (RH)	Rainfall (mm) on survey date	Max wind gust (km/h)	Survey species
17/08/2021	16.5	1.2	59	0	33	Barking Owl, Masked Owl, Bush-stone Curlew
18/08/2021	18.3	0.0	46	0	20	Barking Owl, Masked Owl
22/09/2021	19.3	0	49	0	33	Yellow Gum, Silky Swainson pea, Red Darling Pea, Slender Darling Pea, Turnip Copperburr, Bindweed
20/10/2021	25.6	6.3	34	0		Little Eagle, Square-tailed Kite, Australian Bustard, Superb Parrot, Major Mitchells Cockatoo
21/10/2021	24.8	13.7	34	0	39	Spear Grass,
						Mossgiel Daisy, lanky Buttons, Austral Pillwort. Little Eagle, Square-tailed Kite, Australian Bustard, Superb Parrot, Major Mitchells Cockatoo
8/12/2021	15.9	22.1	29	0	44	Small Scurf-pea, Winged peppercress
7/11/2022	26.0	12.4	52	0	31	Spear Grass, Small Scurf-pea Winged Peppercress Mossgiel Daisy,

Survey Date	Maximum temperature (°C)	Minimum temperature (°C)	Relative Humidity (RH)	Rainfall (mm) on survey date	Max wind gust (km/h)	Survey species
						Lanky Buttons, Austral Pillwort. Turnip Copperburr Chariot Wheels Claypan Daisy Yellow Gum, Silky Swainson-pea, Red Darling Pea, Slender Darling Pea, Turnip Copperburr, Bindweed Little Eagle, Square-tailed Kite , Superb Parrot, Major Mitchells Cockatoo Koala
8/11/2022	27.6	10.0	68	0	44	Spear Grass, Small Scurf-pea Winged Peppercress Mossgiel Daisy, Lanky Buttons, Austral Pillwort. Turnip Copperburr Chariot Wheels Claypan Daisy Yellow Gum, Silky Swainson-pea, Red Darling Pea, Slender Darling Pea, Turnip Copperburr, Bindweed Superb Parrot, Major Mitchells Cockatoo Koala

4.2.5 Candidate species survey and results

Diurnal avifauna (Little Eagle, Square-tailed Kite, Superb Parrot, Major Mitchells Cockatoo, Australian Bustard)

Survey effort

The development site was surveyed for two hours searching for stick nests suitable for the Little Eagle and Square-tailed Kite by one Ecologist. Stick nests were found and were surveyed for a further 2 hours that day and two the following day. Total person hours for this surveying was 6 hours. This was undertaken on 20 and 21 October 2021. While undertaking these two bird surveys and the flora surveys the Ecologists looked out for the Australian Bustard, which if present, was expected to be flushed out due to disturbance of walking across the site.

Hollows suitable for the Superb Parrot and Major Mitchells Cockatoo were stag watched at dusk for one hour over two nights on 20 and 21 October 2021.

Further stick nest and HBT searching occurred on 7 November 2002 for the Major Mitchells Cockatoo, Superb Parrot, Little Eagle and Square-tailed Kite while in the area encompassed by the latest development site. One nest was seen, but was not large enough for a raptor, therefore no further surveys were required for the Little Eagle.

Two bird surveys were undertaken for the Superb Parrot and Major Mitchells Cockatoo at 5.45pm 7 November 2022, and 7.30am 8 November 2022 (one person hour per survey),

The avian surveys generally occurred within woodland areas with a clear view of the surrounding habitat. All fauna species observed by sight and avian songs/calls were recorded.

The October and November surveys were completed in calm weather conditions, with no adverse weather such as rain, extreme hot or cold temperatures or high wind. All avian and fauna species recorded during the surveys are provided in Appendix C.5.

Survey results

A total of 38 avian species were opportunistically recorded during the targeted surveys. One of these species was a targeted species, the Superb Parrot.

Two Superb Parrots were identified within the development footprint in two Black Box trees on 20 October 2021 and approximately 10 on 8 December 2021. In October they flew out of two Black Box trees. In December 2021 10 were seen flying near Weeping Myall trees. In November 2022 two Superb Parrots were seen flying over Black Box trees in the north-eastern patch in the development site. (Refer to Figure 4-1 for locations of these sightings)

Although Superb Parrots were not seen utilising a hollow during the surveys, suitable hollows were present within the development site and more than two birds were present within the site on numerous occasions. Therefore, a threatened species polygon has been created for the Superb Parrot. A 100m buffer was created around each potential nest habitat within the Black Box woodland. This was then clipped to the development footprint (Figure 4-2).

No evidence of the Little Eagle, Square-tailed Kite, Major Mitchell Cockatoo or Australian Bustard was present and they are not considered to be reliant on the development site for breeding. No species credits have been generated for these species.

Nocturnal avifauna (Barking Owl, Masked Owl, Bush stone Curlew)

Survey effort

Call play back was used at the development site, where hollows greater than 20cm diameter were identified for the Masked Owl and 4m above the ground for the Barking Owl (one location) and where large amounts of fallen timber were located for the Bush-stone Curlew (three locations). The call playback surveys were undertaken on 17 and 18 August 2021 at dusk.

Call play back was undertaken for 30 seconds, then a 5-minute listening time, 3 times for both the Barking Owl and Bush-stone Curlew for 2 nights. Call play back was undertaken for 30 seconds, then a 4.5-minute listening time, 3 times for the Masked Owl for 2 nights.

Total person hours for the call play back surveying was 3 hours.

Survey results

None of the target species were heard or observed during the surveys. An unidentified possum was heard during call playback and seen during the day in a Black Box tree.

Mammals (Koala)

Survey effort

The development site was surveyed on 20 October 2021 over a two hour period for evidence of Koala such as scats. The Black Box patch in the additional development site area was surveyed over a 1- person hour period on 7 November 2022 for scats and individuals.

Survey results

There was no evidence of Koalas observed.

Mammals (Southern Myotis)

Survey effort

No targeted surveys were able to be undertaken for this species. Based on nearby Bionet records and suitable man-made waterbodies, the Southern Myotis was assumed to occur within the development site

Survey results

As no targeted surveys were undertaken this species was assumed to occur, A threatened species polygon was mapped as per the TBDC guidelines for this species. All woodland habitat on the Development Site within 200m of a waterbody at least 3m wide has been mapped. This included the man-made irrigation canal and waterbody to the north. The threatened species polygon was clipped to the development footprint to determine the area of impact. Zones with woodland habitat (zone 2, 3 and 4) for the Southern Myotis were put in the species polygon.

Threatened Flora

(Yellow Gum, Red Darling-pea, Silky Swainson-pea, Slender Darling pea, *Convolvulus tedmoorei* (Bindweed), Turnip Copperburr, Chariot Wheels, Austral Pillwort, Lanky Buttons, Mossgiel Daisy, Claypan Daisy, Austrostipa wakoolica (Spear Grass), Small Scurf-pea, Winged Peppercress)

Survey effort

Floristic surveys were undertaken during the optimal time for each species. Survey dates include 22 September 2021, 21 October 2021, 8 December 2021 and 8 November 2022. Surveys were undertaken in the areas of the development site where each species may occur. Two ecologists walked the relevant areas utilising 5m wide parallel field traverses looking for presence of targeted species.

Surveys for the Yellow Gum, Red Darling-pea, Silky Swainson-pea, Slender Darling-pea, Bindweed, Turnip Copperburr and Chariot Wheels were undertaken on 22 September 2021. Total person hours for this survey was 12 hours.

Surveys for the Austral Pillwort, Lanky Buttons, Mossgiel Daisy, Claypan Daisy and Spear Grass were undertaken on 21 October 2021. Total person hours for this surveying was 18 hours.

Surveys for the Small Scurf-pea and Winged Peppercress were undertaken on 8 December 2021. Total person hours for this survey was 12.5 hours.

With the change in TL route in November 2022, additional surveys were undertaken for candidate species listed in the BAM as suitable for surveying at this time. These species included: Yellow

Gum, Silky Swainson-pea, Turnip Copperburr, Austral Pillwort, Lanky Buttons, Mossgiel Daisy, Claypan Daisy, Spear Grass, Small Scurf-pea and Winged Peppercress.

Total person hours for this surveying was 5.5 hours.

With the addition of the control room to the development footprint in May 2023, no additional flora surveys were able to be undertaken during the correct time period. The entire additional area (0.49 ha) was walked on foot by an NGH ecologist in May 2023 and any perennial threatened flora species were searched for. One BAM plot (Plot 8) was undertaken. Parts of this additional area had been surveyed during the flora transects in September 2021 and November 2022 (Figure 4-1)

Survey results

Yellow Gum, Silky Swainson-pea, Turnip Copperburr, Chariot Wheels, Austral Pillwort, Lanky Buttons, Mossgiel Daisy, Claypan Daisy, Spear Grass, Small Scurf-pea and Winged Peppercress were not observed during the targeted surveys, therefore, they are considered to be absent from the development site.

Red Darling-pea, Slender Darling-pea and *Convolvulus tedmoorei* (Bindweed) were not observed within the BESS site and Ercildoune Road during the September 2021 targeted surveys. However, these species were not able to be surveyed within the updated section of the TL route in November 2022 due to the timing not being within their survey period. These species have been assumed present in the small patch of PCT 16 (Zone 2 -PCT 16_moderate condition) just south of the Substation. This woodland was considered suitable habitat as another Swainsona species (*Swainsona swainsonioides*) had been detected. A threatened species polygon was mapped within this zone (Figure 4-1).

Zone 7 (PCT 16_ low condition) around the substation was considered sufficiently degraded to provide any potential habitat for these threatened flora, and was excluded from the threatened species polygon. This zone had a VI score of 10.9, is commonly disturbed from mowing and has very few native species present.

The additional area to the north of the substation added to the development footprint in May 2023 was also in low condition (Zone 5 – PCT 26 Exotic) and had a VI score of 4.8. This zone is considered to be sufficiently degraded to support threatened flora species. It has very few native species, high competition from exotic grass species and is commonly disturbed from mowing and past construction activities from the substation development. It lacked suitable habitat features for Yellow Gum, Mossgiel Daisy, Claypan daisy, Small-scurf pea, Winged Peppercress, Lanky Buttons, Chariot Wheels, Austral Pillwort, Silky Swainson-pea and Turnip Copperburr. No genus of these species were detected during the May 2023 survey or the previous September and November flora surveys.

However, as a precaution, as some scattered Austrostipa and Convolvulus species lacking their key diagnostic features were present in the area, *Austrostipa wakoolica* and *Convolvulus tedmoorei* were added to the BAM-C as being assumed present within Zone 5. Similarly, as a precaution, Red Darling Pea and Slender Darling Pea were added to the BAM-C as assumed presence as these species are cryptic and ephemeral in nature.

A threatened species polygon has been mapped for these species (Figure 4 2).

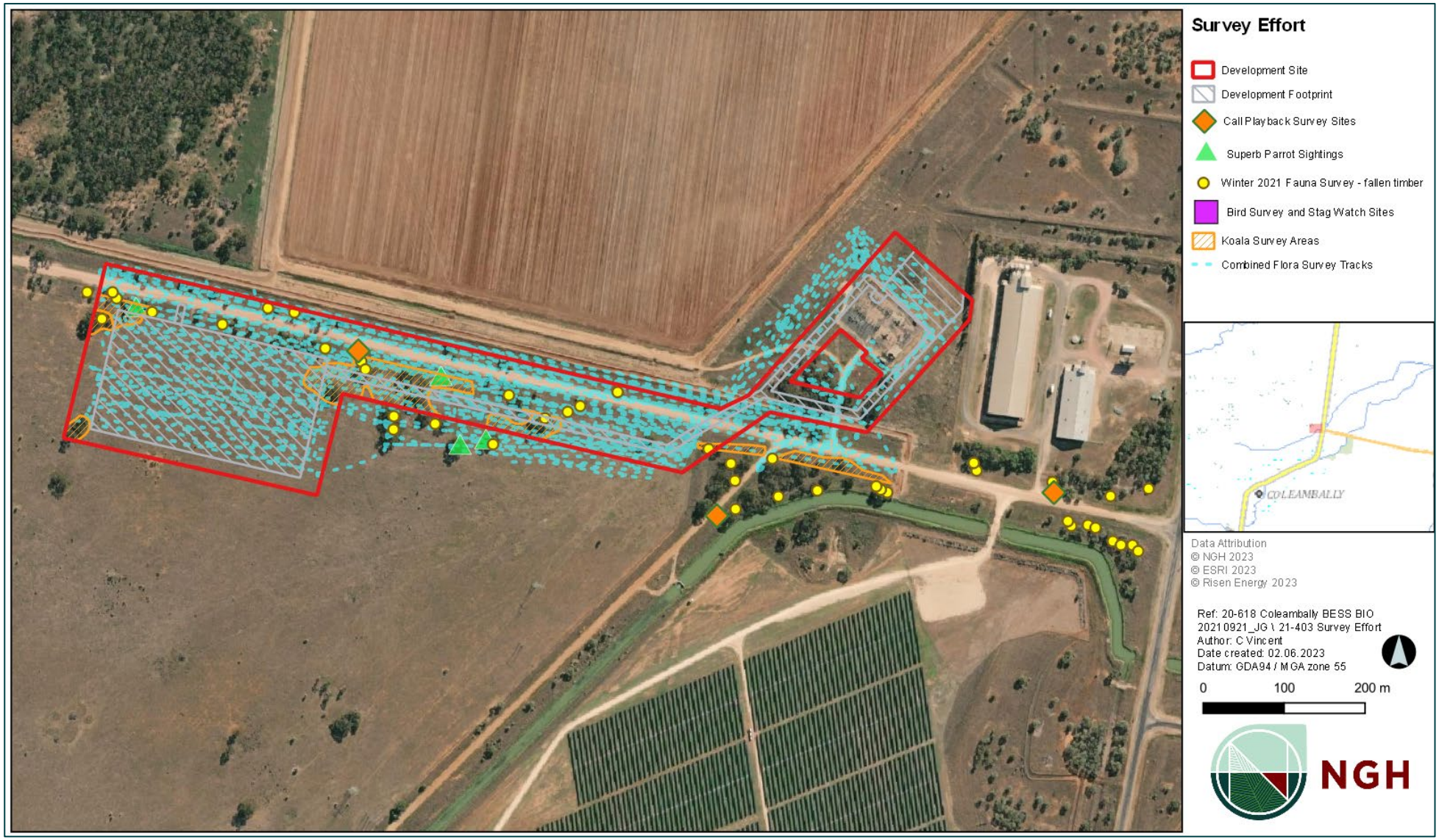


Figure 4-1 Survey effort and targeted survey locations

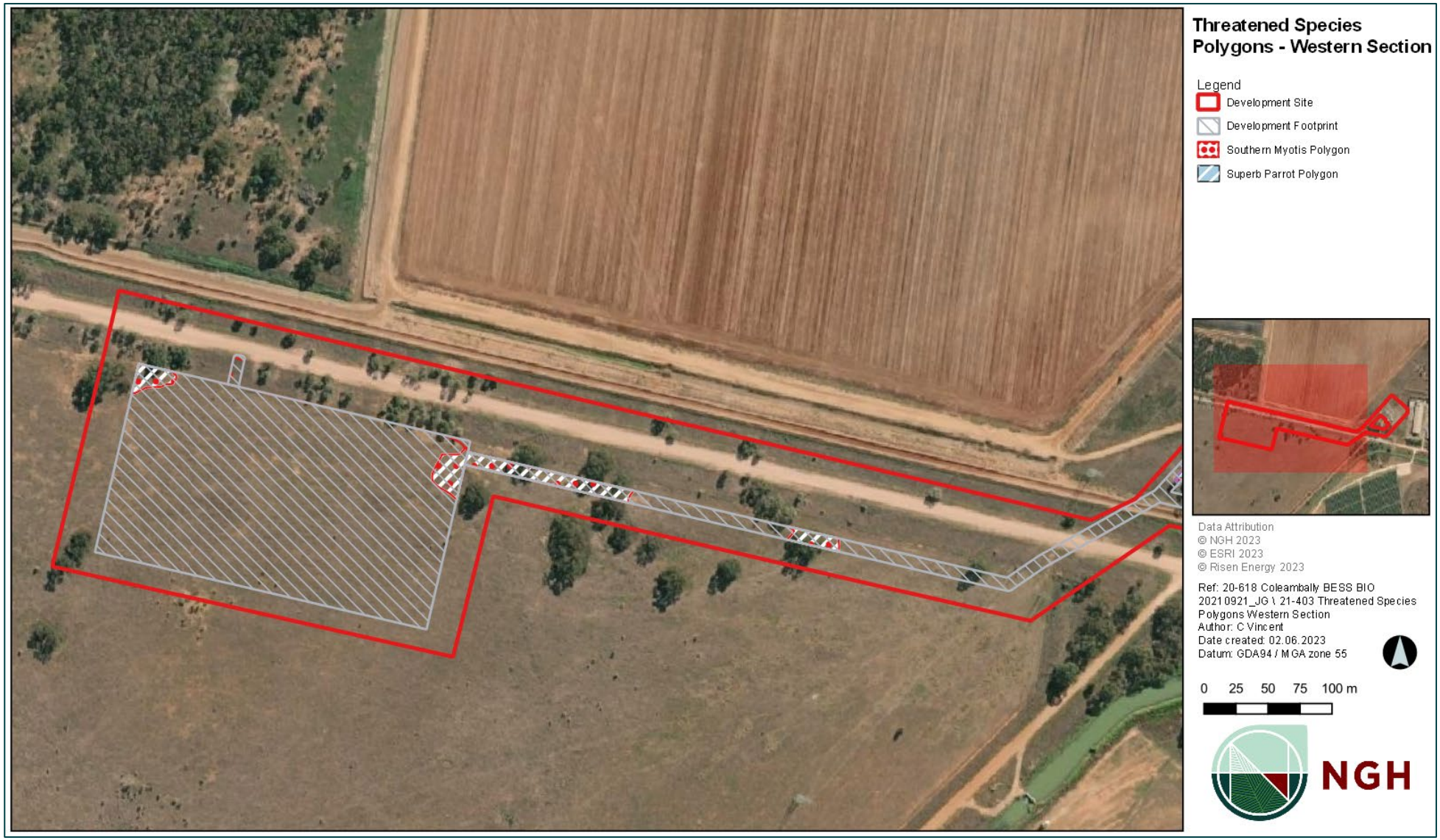


Figure 4-2 Threatened Species Polygons (Western End)

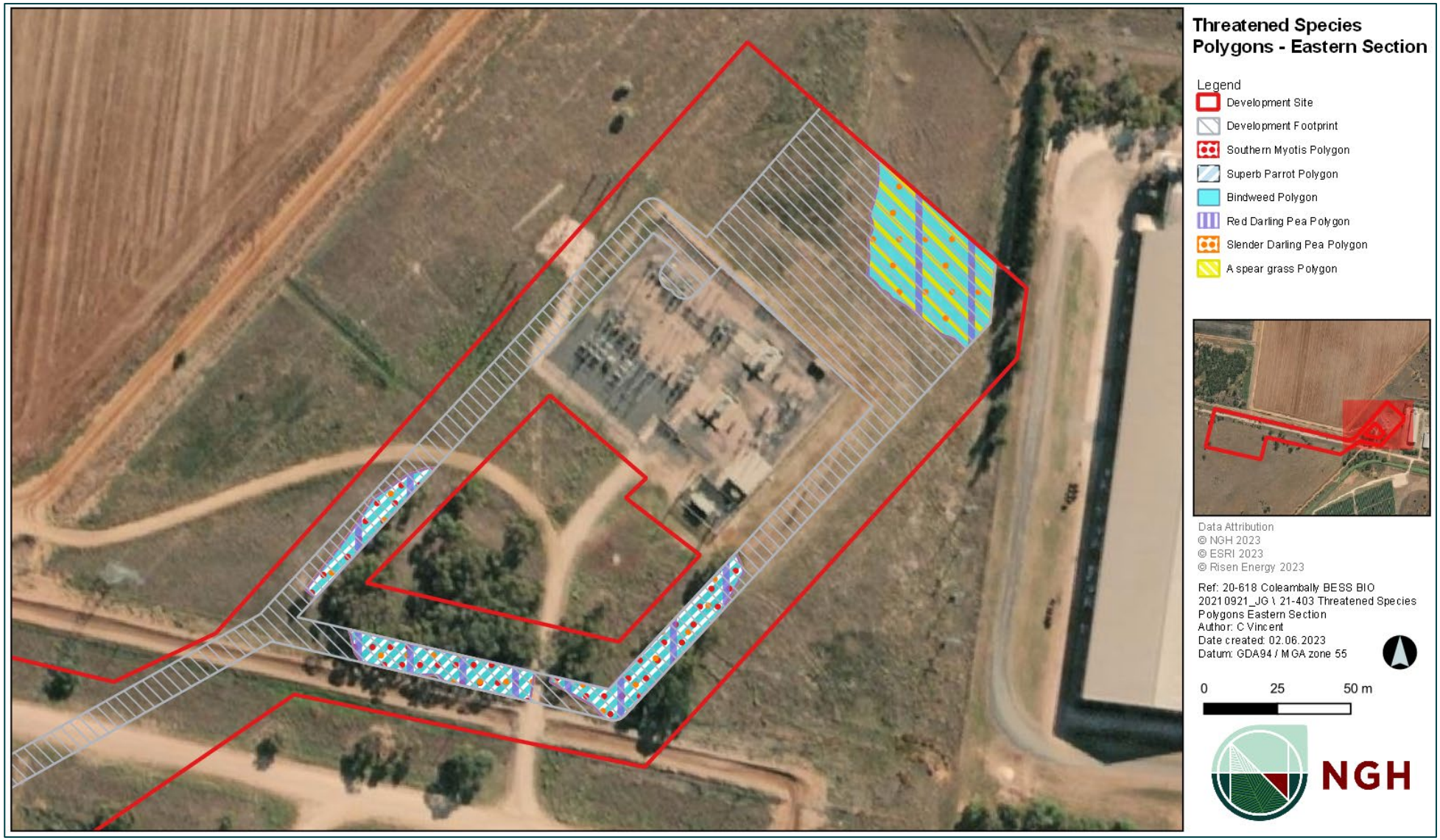


Figure 4-3 Threatened Species Polygon (Eastern End)

4.3 Additional habitat features relevant to prescribed biodiversity impacts

Prescribed additional biodiversity impacts (prescribed impacts) must be assessed as part of the BOS, as per clause 6.1 of the BC Regulation. A summary is provided in Table 4-7 below. Location of the prescribed impact habitat features are shown in Figure 7-2. Assessment of prescribed impacts is addressed in Section 7.3.

Table 4-7 Prescribed additional biodiversity impacts

Feature	Present	Description of feature characteristics	Threatened Species or community using or dependent on feature	Description of importance of habitat features present
Karst, Caves, Crevices, Cliffs or other geological features of significance	No	N/A	N/A	N/A
Human-made structures	No	Irrigation canal	Southern Myotis	Southern Myotis forages over streams and waterbodies (Churchill, 2008). Southern Myotis requires waterbodies at least 3m wide for foraging (Bionet, 2018) and the irrigation canal alongside the site was considered to be suitable. Impacts to the irrigation canal could reduce foraging habitat available for this species.
Non-native vegetation	Yes	Exotic grassland vegetation present and Category 1 Land (grassland)	Superb Parrot	Superb Parrot mostly forages on the ground on native and introduced seeds such as Barley Grass (Hordeum sp) and Oats (Avena sp) (DAWE, 2021). Exotic grass seeds are present in the exotic grassland and Category 1 land that may provide a foraging source for the Superb Parrot. Impacts to this vegetation could reduce foraging habitat available for this species.
Habitat Connectivity	Yes	Semi-arid woodland along Ercildoune Road	Fauna ecosystem species defined in section 4.1. Superb Parrot (foraging), Southern Myotis, Bindweed	The landscape surrounding the development site is highly fragmented from past clearing and agricultural activities. These mobile fauna species could use woodland vegetation alongside Ercildoune Road as refuge when moving across the landscape. Impacts to this corridor vegetation could reduce the availability of refuge for these fauna species. Vegetation along Ercildoune Road may provide seed dispersal opportunities for Bindweed through movement of fauna. Impacts to this

Feature	Present	Description of feature characteristics	Threatened Species or community using or dependent on feature	Description of importance of habitat features present
				corridor vegetation could reduce the dispersal for this species, as there may be reduced fauna species movement through the landscape.
Waterbodies and hydrological processes	Yes	Table drains and irrigation canals present, site drainage goes into the table drains	Southern Myotis Superb Parrot foraging area Ecosystem species as defined in section 4.1 Weeping Myall Woodland Red Darling Pea Slender Darling Pea Bindweed	The Irrigation canal is a man-made water body that provides a low quality water source for these fauna species listed. In particular, Southern Myotis forages over streams and waterbodies (Churchill, 2008), and Superb Parrot are typically found near watercourses (DAWE, 2021). Impacts to these waterbodies will reduce foraging habitat quality and availability for these species. Heavy rain results in periodic shallow inundation of low lying areas including table drains and woodland vegetation. Habitat for Red Darling Pea, Slender Darling Pea and Bindweed includes periodically inundated areas such as table drains, depressions and floodplains (OEH, 2022$_a$, OEH, 2022$_b$, DPE, 2022). Impacts to these hydrological process will reduce the quality and availability of habitat for these flora species. Blackbox woodland is dependent on periodic inundation and provides foraging and roosting habitat for these fauna species listed.
Wind farm development	No	No Wind farm development	N/A	N/A
Vehicle strikes	Yes	Ercildoune road may have increased traffic.	Superb Parrot Southern Myotis Mobile fauna ecosystem species defined in 4.1.	Superb Parrots often feed on the ground along roadsides and are at risk of vehicle strikes when taking off (DAWE, 2021). Irrigation canal runs alongside Ercildoune Road and Southern Myotis may be at risk of vehicle strike when foraging at dusk and night. Mobile Ecosystem species listed in section 4.1 may fly across Ercildoune Road, and therefore may be at risk of vehicle strike when traversing across the landscape or using roadside vegetation.

5. Matters of national environmental significance

An EPBC Act protected matters report was undertaken on 1 December 2020 (10km buffer of the development site) and updated again on 22 November 2021 and the 30 March 2022 to identify Matters of National Environmental Significance (MNES) that have the potential to occur within the development site (Appendix G). Relevant to biodiversity these include:

- Wetlands of International Importance - 4
- Threatened Ecological Communities - 4
- Threatened species - 19
- Migratory species - 9

The potential for these MNES to occur at the site are discussed below.

5.1 Wetlands of international importance

Four wetlands of international importance were returned from the Protected Matters Report, these were:

- Banrock station wetland complex – 500-600km downstream.
- Hattah-Kulkyne lakes – 300-400km downstream.
- Riverland 400-500km downstream.
- The Coorong, and Lakes Alexandrina and albert wetland 500-600km downstream

The Murrumbidgee River is around 16.4km north of the development site. There is no indication that the proposed works would impact wetlands of international importance.

5.2 Threatened Ecological Communities

Four (4) Threatened Ecological Communities (TECs) were returned from the Protected Matters Report. One of these TECs have characteristics present in the development site.

The presence of Weeping Myall Woodland (PCT 26) indicates the potential for the federally listed endangered community:

- Weeping Myall Woodlands - Endangered.

As assessment was undertaken of PCT 26 to determine if it meets the key diagnostic characteristics and minimum condition thresholds of the EPBC Act listed community (see section 3.4.1, Table 3-4, Table 5-1). A site assessment confirmed that Zone1 PCT 26 Derived Grassland and Zone 4 PCT 26 Low do not meet the criteria to be considered part of the EPBC Act listed TEC. PCT 26 moderate meets the criteria for EPBC Act listing. An Assessment of Significance (AoS) has been completed (Appendix I) and concluded no significant impact would occur.

Table 5-1 EPBC Condition class for Weeping Myall Woodland within the development site

Condition classes	Zone 1 PCT 26 Derived Grassland	Zone 3 PCT 26 Moderate	Zone 4 PCT 26 Low
The tree canopy is dominated (at least 50% of trees present) by living, dead or defoliated Weeping Myall trees;	Yes Weeping Myall dominate species in tree canopy.	Yes Weeping Myall dominate species in tree canopy.	Yes Weeping Myall dominate species in tree canopy.
The overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature Weeping Myall trees/ha;	No No tree canopy cover. Juvenile *Acacia pendula* only	Yes Tree canopy cover 10% to 20%. Patch size 1.58ha.	No
The area is at least 0.5ha in size;	n/a	Yes 1.58ha is within the development site	n/a
The patch has either: more than two layers of regeneration of Weeping Myall present; or 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.	n/a	Yes. Two layers of regeneration of Weeping Myall (4 stem classes) Tallest trees were assumed to be above 4m and vegetative cover is 50% native species	n/a
Conclusion	**Does not meet listing criteria**	**Meets EPBC Act criteria**	**Does not meet listing criteria**

5.3 Threatened species

The following threatened species were considered to potentially occur in the development site by the Protected Matters Search Tool. There were fifteen birds, two fish, one frog, two mammals, and plant species listed (Table 5-2).

A habitat evaluation has been completed in Appendix H. The Koala, Superb Parrot and Grey Falcon have suitable habitat within the development site. Assessments of Significance (AoS) have been undertaken (Appendix I).

Table 5-2 Threatened species listed in Protected Matters Search

Common Name	Scientific Name	EPBC Act Status	Habitat	Impact
Birds				
Australasian Bittern	*Botaurus poiciloptilus*	Endangered	No	N/A

Common Name	Scientific Name	EPBC Act Status	Habitat	Impact
Fork-tailed Swift	*Apus pacificus*	Migratory	No	N/A
Common Sandpiper	*Actitis hypoleucos*	Migratory	No	N/A
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered, Migratory	No	N/A
Sharp-tailed Sandpiper	*Calidris acuminata*	Migratory	No	N/A
Pectoral Sandpiper	*Calidris melanotos*	Migratory	No	N/A
Latham's Snipe	*Gallinago hardwickii*	Migratory	No	N/A
Satin Flycatcher	*Myiagra cyanoleuca*	Migratory	No	N/A
Yellow Wagtail	*Motacilla flava*	Migratory	No	N/A
Grey Falcon	*Falco hypoleucos*	Endangered	Shrublands and woodlands present within development site	Yes
Painted Honeyeater	*Grantiella picta*	Vulnerable	No	N/A
Malleefowl	*Leipoa ocellata*	Vulnerable	No	N/A
Plains-wanderer	*Pedionomus torquatus*	Critically Endangered	No	N/A
Eastern Curlew	*Numenius madagascariensis*	Critically Endangered, Migratory	No	N/A
Superb Parrot	*Polytelis swainsonii*	Vulnerable	Suitable hollow bearing Black Box trees present	Yes
Australian Painted Snipe	*Rostratula australis*	Endangered	No	N/A
Fish				
Macquarie Perch	*Macquaria australasica*	Endangered	No	N/A
Flathead Galaxias	*Galaxias rostratus*	Critically Endangered	No	N/A

Common Name	Scientific Name	EPBC Act Status	Habitat	Impact
Frogs				
Growling Grass Frog	*Litoria raniformis*	Vulnerable	No	N/A
Mammals				
Corben's Long-eared bat	*Nyctophilus corbeni*	Vulnerable	No	N/A
Koala	*Phascolarctos cinereus*	Vulnerable	Black Box is within development site.	Yes
Plants				
A Speargrass	*Austrostipa wakoolica*	Endangered	Clay soil is within the development site.	Yes
Mossgiel Daisy	*Brachyschome papillosa*	Vulnerable	No	N/A
Slender Darling-pea	*Swainsona murrayana*	Vulnerable	No	N/A
Winged Peppercress	*Lepidium monoplocoides*	Endangered	No	N/A
Chariot Wheels	*Maireana cheelii*	Vulnerable	No	N/A

5.4 Migratory species

The following migratory species were considered to potentially occur in the development site by the Protected Matters Search Tool (Table 5-3).

A habitat evaluation has been completed in Appendix H. No species are considered likely to use the development site.

Table 5-3 Migratory species listed in the Protected Matters Search

Common Name	Scientific Name	EPBC Act Status	Habitat	Impact
Fork-tailed Swift	*Apus pacificus*	Migratory	No	N/A
Common Sandpiper	*Actitis hypoleucos*	Migratory	No	N/A
Sharp-tailed Sandpiper	*Calidris acuminata*	Migratory	No	N/A

Common Name	Scientific Name	EPBC Act Status	Habitat	Impact
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered, Migratory	No	N/A
Pectoral Sandpiper	*Calidris melanotos*	Migratory	No	N/A
Latham's Snipe	*Gallinago hardwickii*	Migratory	No	N/A
Satin Flycatcher	*Myiagra cyanoleuca*	Migratory	No	N/A
Yellow Wagtail	*Motacilla flava*	Migratory	No	N/A
Eastern Curlew	*Numenius madagascariensis*	Critically Endangered, Migratory	No	N/A

6. Avoid and minimise impacts

6.1 Avoiding and minimising impacts on biodiversity values

6.1.1 Modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology

It is for a battery energy storage system which means less energy needed to be supplied from coal-fired power stations.

Battery technology was selected over mechanical or physical storage methods (flywheel, pumped hydro, liquid air, compressed air) or thermal storage (such as hot water or molten salt) because it enables modular installation without major infrastructure or specialised landform features. It is also well suited to land within the development site. Batteries generally have lower weight, lower physical volume and better scalability compared to other technologies.

The lithium-ion ('Li-ion') battery is currently the preferred technology for storing energy generated from wind and solar sources at this point in time (Nova Academy of Science, 2017). The shift to Liion batteries is because of their greater energy density (which means they are smaller and lighter), longer expected life spans and ability to undergo deeper discharges, reducing the capacity required (Helen Lewis Research, 2016).

Li-ion battery cells were selected for the Proposal because they provided the optimal combination of:

- Proven ability to complement to renewable energy generation developments
- Ability to support the network to increase renewable energy penetration
- Ability to provide energy during periods of peak demands
- Minimal environmental impact
- Safety and ease of integration
- Demonstration and maturity of technology
- Value for money.

Once the BESS reaches the end of its operational life (30-35 years), the development site can be re-established to its previous condition.

6.1.2 Alternative locations that would avoid or minimise impact on biodiversity values and justification for selecting the proposed location

Coleambally BESS Pty Ltd has selected an area that is permissible within the land zone. The site has been selected as it is largely cleared of native vegetation. There are minimal biodiversity values within the site and a large component of the site is routinely used for agricultural activities of cropping and grazing. There are no areas of mapped important habitat or core breeding areas of threatened species within the proposal area.

The proposed site has favourable site conditions including minimal erosion and flood risk, low relief and level slope. The existing transmission lines traversing the Development Site and nearby substation allow for reduced disturbance and to connect the BESS to electrical infrastructure.

6.1.3 Alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site

The site for the BESS has been situated in areas of disturbed native vegetation. The location of the BESS is proposed in areas of Category 1 land which have been routinely cropped and grazed. The site was selected to avoid areas of remnant vegetation. The transmission line easement was originally proposed through the centre of the patch of Black Box woodland (PCT 16) however the easement was moved to occur along the fence line to avoid any clearing of remnant trees. The location of the access track to Ercildoune Rd was selected to avoid any impacts to Weeping Myall trees.

The access development footprint encompasses a relatively small amount of PCTs 26 (0.02ha) with a limited number of tree removal to occur.

Alternative locations within the property were considered however landholder permission for use of the site was only allowed along the northern fence line of the property. An alternative location for the transmission line was also considered in more disturbed areas however crown land permission was not granted.

6.1.4 Efforts made to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design

The majority of the development footprint consists of agricultural grazing land containing modified pasture and a high proportion of non-native vegetation. The final development footprint can be seen in Figure 6-2. The BESS has been strategically located within an area predominantly comprised of non-native vegetation, avoiding impacts to Weeping Myall and Black Box trees. The connection of the BESS to the Coleambally Substation would be via a new 132kV underground transmission line, which avoids the need to remove trees This would also minimise impacts of collision risks with transmission lines for native fauna.

Although plain wire fencing around the BESS would be preferred to avoid impacts of entanglement and injury to native fauna, Barbed Wire fencing is required for security and safety purposes.

Landscaping would occur in the North-Eastern corner of the BESS. Landscaping would be comprised of native vegetation representative of PCT 26.

The development footprint has been adjusted based on site surveys and the area reduced/amended to lessen impact. The footprint on 7 October 2021 was 6.45ha, the final footprint is 5.67ha, this is a reduction of impact by approximately 1.27ha. (Figure 6-1, Figure 6-2). The final development footprint change in November 2022 involved moving the transmission line route through the edge of wooded areas due to permission to construct on crown land not being granted.

6.1.5 Other site constraints that the proponent has considered in determining the location and design of the proposal

The proposal would be located in close proximity to the Coleambally substation and the Solar Farm, becoming an extension of that land use.

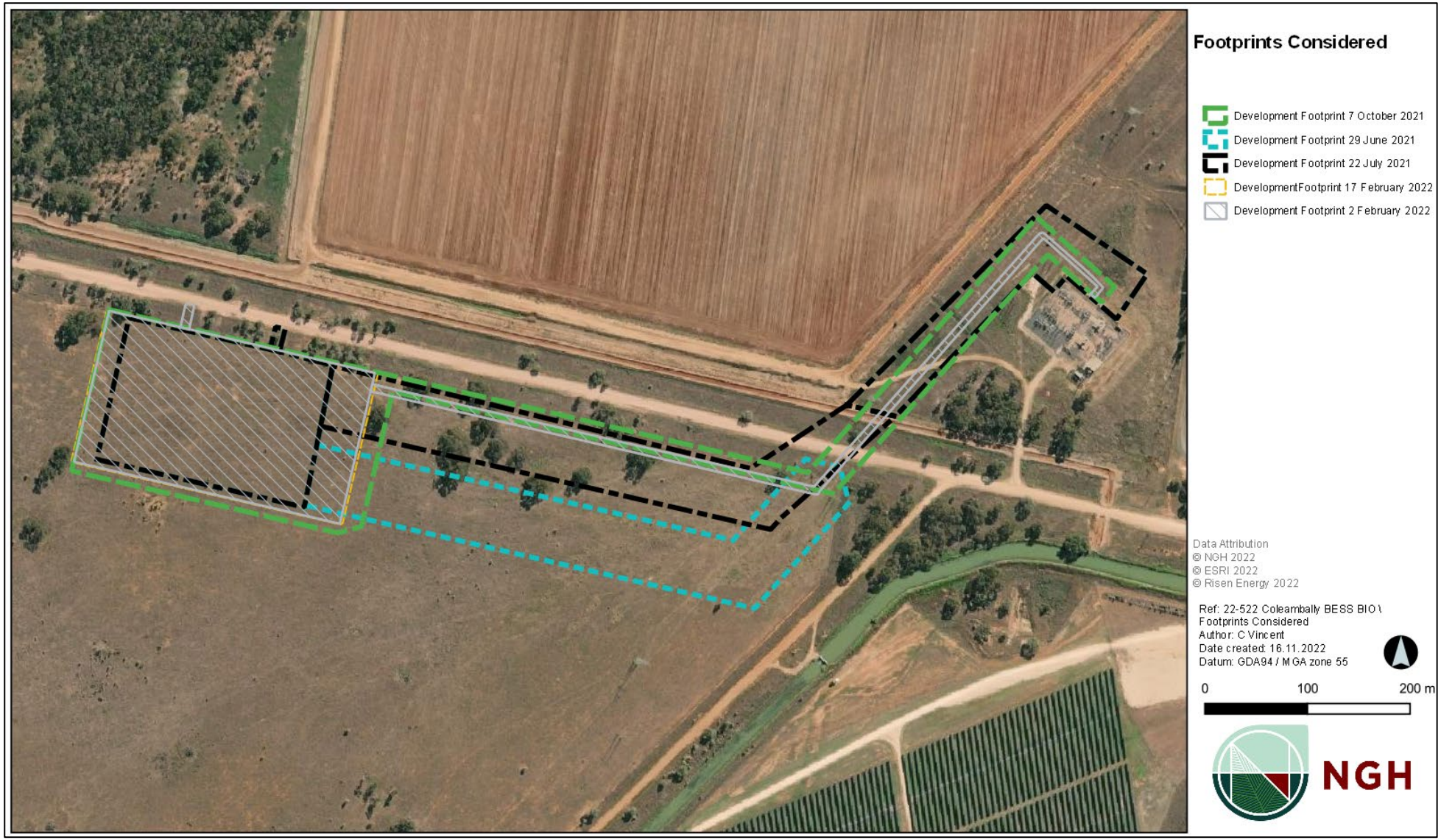


Figure 6-1 Footprints considered

Figure 6-2 Final development footprint

7. Impacts unable to be avoided

7.1 Direct impacts

The construction and operational phases of the proposal have the potential to impact biodiversity values at the site that cannot be avoided. This would occur through direct impacts, such as habitat clearance (and associated noise and disturbance) and ongoing existence of infrastructure (which may create barriers to movement and generate noise and disturbance). These are summarised in Table 7-1. The development footprint itself was unable to be avoided.

Table 7-1 Potential impacts to biodiversity during the construction and operational phases

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence
Direct impacts					
Clearing for development footprint	A total of 5.67ha	One off event	Construction (permanent impact)	Weeping Myall Woodland TEC PCT 26 (0.13, PCT 16 (0.89)	Clearing of 0.13ha of PCT 26 Clearing of 0.89ha PCT 16
Displacement of resident fauna from vegetation clearing		One off event	Construction (permanent impact)	PCT 16 and PCT 26. Total 1.02ha. Superb Parrot. Southern Myotis Ecosystem species as defined in section 4.1	Displacement to native fauna through vegetation clearing expected to only impact on small common ground dwelling mammals (e.g., native mice and rats), reptiles and possibly birds relying on tree canopies for nesting sites.
Injury or death of fauna		One off event	Construction	PCT 16 and PCT 26. Total 1.02 ha. Ecosystem species as defined in section 4.1	Possible loss of native fauna expected to only be on small common ground dwelling mammals (i.e., native mice and rats) and reptiles. These species are however mobile and are likely to vacate the Development Footprint into adjacent habitats.

7.1.1 Changes in vegetation integrity

Complete clearing of the vegetation is proposed, thus the vegetation removal would reduce the vegetation integrity scores to 0, as shown in Table 7-2 below.

Table 7-2 Current and future vegetation integrity scores for each vegetation zone within the development site

Zone ID	PCT/Zone	TEC and/or threatened species habitat?	Development Site Area (ha)	Area Impacted (ha)	Current vegetation Integrity Score	Future vegetation Integrity Score
1	26 Derived Grassland	BC act TEC: *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions*	0.51	0.07	30.4	0
2	16 Moderate	No	1.77	0.45	67.7	0
3	26 Moderate	BC act TEC: *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions*	1.58	0.02	53.6	0
4	26 Low	BC act TEC: *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions*	0.78	0.04	45.9	0
5	Non Native (26 Exotic)	Not a TEC	0.67	0.42	4.8	0
6	16 Low	No	0.98	0.44	10.2	0

7.1.2 Loss of species credit species habitat

The loss of species credit species habitat or individuals as a result of clearing is documented in Table 7-3 below.

Table 7-3 Summary of species credit habitat loss in the development site

Species Credit Species	Biodiversity risk weighting	Area of habitat (ha) lost
Superb Parrot (*Polytelis swainsonii*)	2	0.45
Southern Myotis (*Myotis macropus*)	2	0.47 (assumed presence)
Bindweed (*Convolvulus tedmoorei*)	3	0.33 (assumed presence)
Slender Darling Pea (*Swainsona murrayana*)	2	0.33 (assumed presence)
Red Darling Pea (*Swainsona plagiotropis*)	2	0.33 (assumed presence)
A Spear-grass (*Austrostipa wakoolica*)	2	0.16 (assumed presence)

The full Biodiversity Credit Report generated by the BAM Calculator is provided in Appendix E.

7.2 Indirect impacts

Indirect impacts can occur when the proposal or activities relating to the construction or operation of the proposal affect native vegetation, threatened ecological communities or threatened species habitat beyond that of the development site. Indirect impacts of the proposal can include soil and water contamination, increased edge effects, or the generation of excessive dust, light or noise. A 2.5m buffer for construction works has been included within the development footprint for the BESS and 5m for the transmission line. Indirect impacts listed in the BAM that must be considered are addressed in Table 7-4 and are shown in Figure 7-1. Table 7-4 details the type, frequency, intensity, duration, and consequence of the direct and indirect impacts of the proposal.

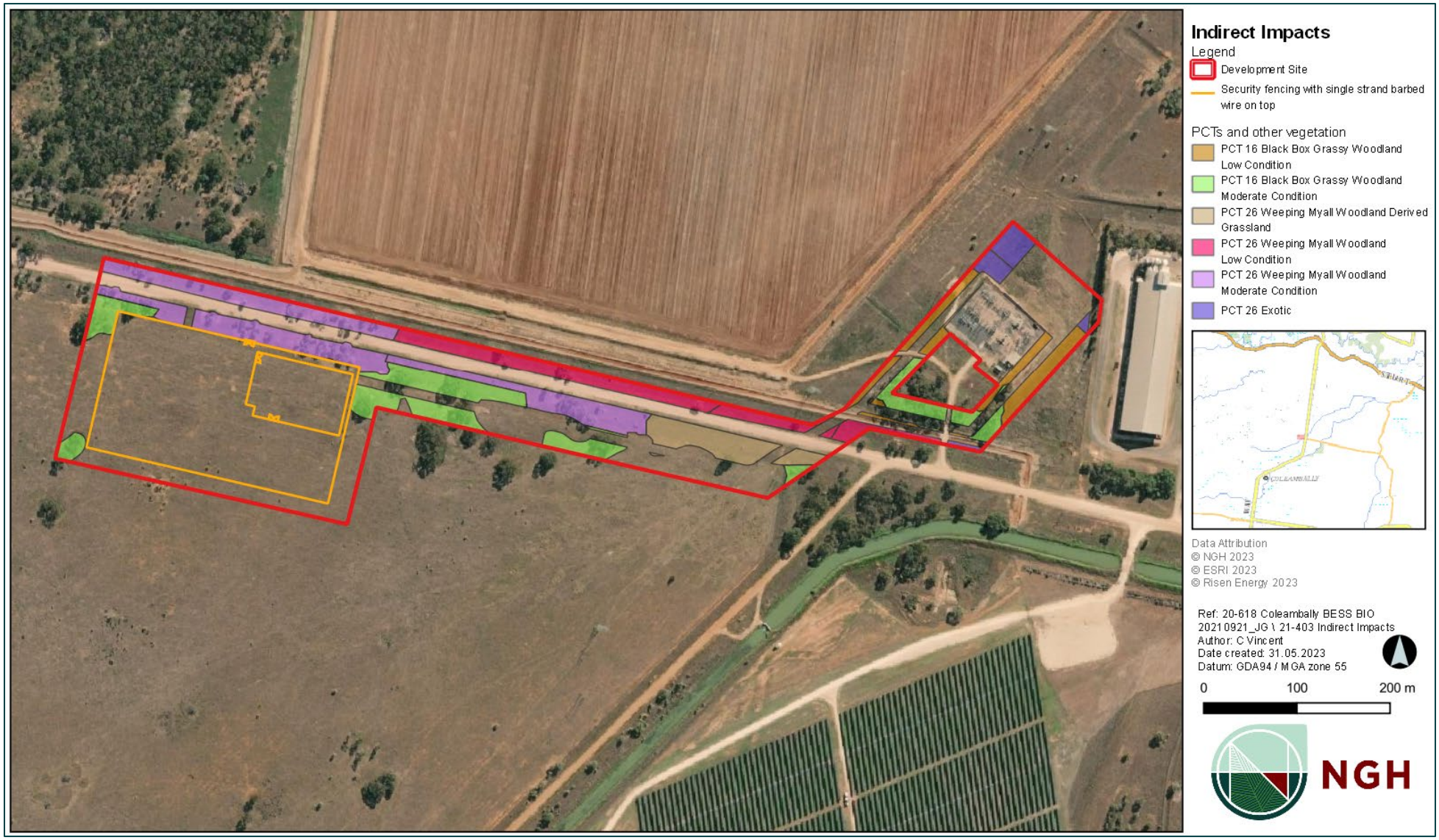


Figure 7-1 Indirect impacts

Table 7-4 Potential impacts to biodiversity during the construction and operational phases

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence for bioregional persistence
Indirect impacts (those listed below are included in the BAM)					
Inadvertent impacts on adjacent habitat or vegetation	2.86ha PCT 26, 2.75ha PCT 16, 0.67haha exotic dominated ground cover	Rare	Construction Phase: Short-term	Superb Parrot Weeping Myall Woodland Southern Myotis Red Darling Pea Slender Darling Pea Bindweed	Injury and mortality of fauna during clearing of fauna habitat and habitat trees; Disturbance to stags, fallen timber; and Increased edge effects. Removal of some trees.
Reduced viability of adjacent habitat due to edge effects	2.86ha PCT 26, 2.75ha PCT 16	Constant	Operational Phase: Long-term	Superb Parrot foraging area Weeping Myall Woodland Southern Myotis Red Darling Pea Slender Darling Pea Bindweed	Reduction of connectivity.
Reduced viability of adjacent habitat due to noise, dust, heat or light spill	2.86ha PCT 26, 2.75ha PCT 16, 0.67ha exotic dominated ground cover	Rare	Operational Phase: Short-term	Superb Parrot foraging area Southern Myotis	May alter fauna activities and/or movements; Loss of foraging habitat

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence for bioregional persistence
Transport of weeds and pathogens from the site to adjacent vegetation	2.86ha PCT 26, 2.75ha PCT 16, 0.67ha exotic dominated ground cover	Irregular	Construction & Operational Phase: Long-term	Superb Parrot foraging area Weeping Myall Woodland Red Darling Pea Slender Darling Pea Bindweed	Degradation of community biodiversity and integrity; Weed encroachment changing ground storey cover
Increased risk of starvation, exposure and loss of shade or shelter	Unknown	Rare	Construction & Operational Phase: Long-term	Superb Parrot foraging area	Loss of foraging habitat.
Loss of breeding habitats	Unknown	Once	Construction Phase	Superb Parrot foraging area	Noise disturbance may reduce viability of adjacent areas for breeding.
Trampling of threatened flora species	None	None	n/a		
Inhibition of nitrogen fixation and increased soil salinity	Unknown	Unknown	Construction & Operational Phase: Long- Term	Weeping Myall Woodland Red Darling Pea Slender Darling Pea Bindweed	Reduction in area of nitrogen fixation due to habitat removal. Potential increase of soil salinity due to reduction in vegetation cover.
Fertilizer drift	None	None	n/a		
Rubbish dumping	None	None	n/a		

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence for bioregional persistence
Increase in pest animal populations	None	None	n/a		
Removal and disturbance of rocks, including bush rock	Not present	Not present	n/a		
Entanglement in Barbed wire	Approximately 1177m of single stranded barbed wire on top of the security fence around BESS.	Constant Risk	Operation	Superb Parrot Southern Myotis Ecosystem species as defined in section 4.1	Injury and mortality of fauna

7.3 Prescribed impacts

The prescribed biodiversity impacts mentioned in the BAM section 8.3 are addressed in Table 7-5 below and shown in Appendix E.

Table 7-5 Prescribed biodiversity impacts

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence for bioregional persistence
Prescribed biodiversity impacts (those listed below are included in the BAM)					

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence for bioregional persistence
Impact on threatened entities associated with karst, caves, crevices, cliffs, rocks and other geological features of significance	N/A	N/A	N/A	N/A	N/A
Impacts on habitat of threatened entities associated with human made structures or non-native vegetation	0.42ha (this is the total extent of the exotic area within the development footprint . 1.77 ha of Category 1 Land.	Operation period of BESS (35-40 yrs)	Operation period of BESS (35-40 yrs)	Superb Parrot, Southern Myotis	The non-native vegetation includes exotic grassland which has limited foraging and/or breeding habitat for these threatened species. Given this the impact is unlikely to have an impact that could cause a decline in a threatened species, with a potential modification of their behaviour to avoid the development footprint area.

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence for bioregional persistence
Impacts on connectivity of habitat of threatened entities	5.67ha (development footprint area)	Operation period of BESS (35-40 yrs)	Operation period of BESS (35-40 yrs)	Superb Parrot foraging area Southern Myotis Fauna ecosystem species as defined in section 4.1	Connectivity would be minimally impacted due to presence of the BESS and access tracks, but given these species are able to fly the impact is unlikely to have an impact that could cause a decline in a threatened species, with a potential modification of their behaviour to avoid being near the BESS.
Impacts on water quality, water bodies and hydrological processes that sustain threatened entities.	Unknown	Construction and decommissioning	Construction and decommissioning	Superb Parrot foraging area Weeping Myall Woodland Southern Myotis Red Darling Pea Slender Darling Pea Bindweed Ecosystem species as defined in section 4.1	Construction and decommissioning of the BESS would disturb soils and potentially lead to sediment or other pollutants being present in runoff, mobilising and entering local waterways or waterbodies, adversely impacting on water quality. Mitigation measures to help maintain water quality are mentioned Section and 6.8 and 7.1 of the EIS including the implementation of a sedimentation control plan, a spill control plan and progressive rehabilitation where possible. With these mitigation measures in place the

Nature of impact	Extent	Frequency	Duration and timing	TEC, threatened species and habitats likely to be affected	Consequence for bioregional persistence
					works are unlikely to have an impact that could cause a decline in a threatened species.
Impacts of wind turbine strikes on protected animals identified in subsection 6.1.5 of the BAM.	N/A	N/A	N/A	N/A	N/A
Impacts of vehicle strike to threatened fauna or flora that are a part of a TEC	Ercildoune road within the development site (approximately 0.92ha).	Irregular	During construction and operation	Superb Parrot Southern Myotis Mobile ecosystem species as defined in section 4.1	The installation of access track to the BESS and other infrastructure may increase the likelihood of vehicle strike to a minor extent. The risk to fauna can be mitigated by regulating speed limits. Given the speed limit of the access road would likely be relatively low, the likelihood of vehicle strike is still considered low risk.

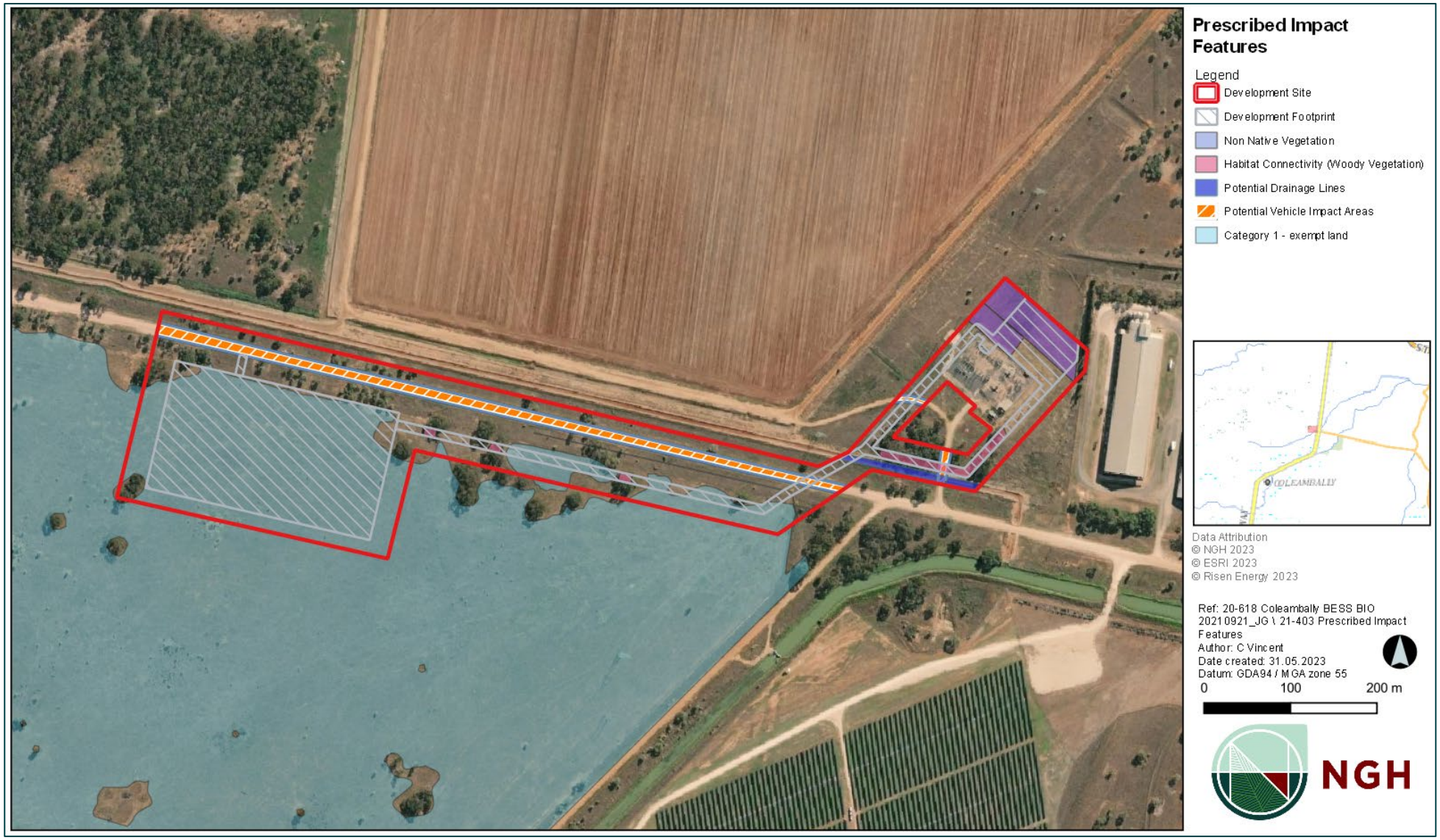


Figure 7-2 Prescribed impacts

8. Impacts to matters of national environmental significance

An EPBC Act habitat assessment (Appendix H) evaluation was undertaken for species predicted to occur within the broader study locality (10km radius). An EPBC Act Assessments of Significance (AoS) (Appendix I) was completed for each species and TEC that has a moderate to high likelihood to occur within the development site.

8.1.1 Threatened Ecological Communities

NGH surveys confirmed one TEC, identified by the protected matters search tool as having potential to occur, is present within the development footprint:

- Weeping Myall Woodlands.

Weeping Myall Woodlands is associated with PCT 26, however, only Zone 3 - moderate meets the requirement for EPBC Act listing. An AoS was completed and found referral to DCCEEW is not considered necessary for this TEC as a significant impact is considered unlikely.

8.1.2 Threatened species

The following species have suitable habitat on site and are considered likely to be impacted by the proposal:

- Koala (*Phascolarctos cinereus*)
- Grey Falcon (*Falco hypoleucos*)
- Superb Parrot (*Polytelis swainsonii*)

AoSs were completed (Appendix I) for these three species and determined a referral to DCCEEW is not considered necessary as a significant impact is considered unlikely.

8.1.3 Migratory species

A habitat assessment was conducted for migratory species returned from the protected matters report. None of these species are considered likely to occur onsite, as detailed in Appendix H.

8.2 Assumptions and predictions

Climatic conditions may influence the species present within the development site at any one time (see Section 4.2.4 for weather condition during surveys). Where survey has been undertaken for candidate species requiring confirmation of presence or absence, this has been done employing appropriate methods and timing, as require under the BAM. Nevertheless, it is an unavoidable limitation that not all species that utilise an area will be detected. This is generally due to their cryptic nature or mobility and unpredictable movement throughout their habitat and prevailing drought conditions. The results in this assessment are based on the proper application of the BAM and therefore are considered sufficient to inform the development of the project's mitigation strategies and offset obligation.

The calculation of hollow bearing trees (HBTs), in particular the size and number of hollows, was made from ground level. It is possible that some hollows are present that were not visible from

ground level, which may result in underestimates of the number of hollows (Gibbons and Lindenmayer 2000). Additional mitigation has been recommended to address this limitation.

The November 2022 survey occurred after high rainfall. Not all areas were accessible for determining HBT presence due to water levels on site. Four mature trees that couldn't be accessed were marked as HBTs due to their large diameter (>90cm dbh).

9. Mitigating and managing impacts

9.1 Mitigation measures

A general summary of the key measures required to mitigate the impacts of the proposal are provided below. Mitigation measures proposed to manage impacts, including proposed techniques, timing, frequency, responsibility for implementing each measure, risk of failure, and an analysis of the consequences of any residual impacts are provided in Table 9-1. The performance criteria and method for these mitigation measures are provided in Table 9-2.

9.1.1 Displacement of resident fauna

1. Time works to avoid critical life cycle events.
2. Relocate habitat features (fallen timber) into retained vegetation patches.
3. Delineation of 'no-go areas'
4. Induct all staff prior to construction to identify vegetation to be retained, awareness of location of the threatened Superb Parrot and the Weeping Myall Woodland TEC, prevent inadvertent damage and reduce soil disturbance.

9.1.2 Indirect impacts

1. Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance.
2. Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise.
3. Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill.
4. Adaptive dust monitoring programs to control air quality.
5. Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas.
6. Staff training and site briefing to communicate environmental features to be protected and measures to be implemented.
7. Injury and mortality of fauna entering the proposal site during construction and road strike risk.

9.1.3 Prescribed impacts

1. Time works to avoid critical life cycle events.
2. Clearing protocols: daily survey.
3. Replacing habitat provided by non-native vegetation with alternative habitat.
4. Sediment barriers and spill management procedures to control the quality of water runoff released from the site into the receiving environment.
5. Staff training and site briefing to communicate environmental features to be protected and the measures implemented to protect them.
6. Maintenance of retained native vegetation on the Development Site.
7. Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the Development Site

Table 9-1 Mitigation measures proposed to avoid and minimise impacts on native vegetation and habitat

ID*	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	Displacement of resident fauna through vegetation clearing and habitat removal						
B1	Time works to avoid critical life cycle events	• Works not to occur during the nesting period of the Superb Parrot which is between September and December	Construction	Once off	Construction Contractor	Moderate	Moderate risk of Superb Parrots foraging in the area
B2	Relocate habitat features (fallen timber, hollow logs) into retained vegetation patches within the development site.	• Tree clearing procedure which includes moving fallen timber within the development footprint into adjacent area to be used as habitat. • Fauna captured by fauna spotters and the like should be relocated during clearing.	Construction	Irregular	Construction Contractor	Low	None
B4	Delineation of 'no-go areas'	• Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing. • No stockpiling or storage within dripline of any mature trees. • No stockpiling or storage within riparian buffers.	Construction	Once off	Construction contractor	Moderate	Low risk of inadvertent clearing of native vegetation and fauna habitat intended for conservation onsite
B3	Induct all staff prior to construction to identify vegetation to be retained,	• Site inductions. • Toolbox talks.	Prior to and during	Regular	Construction Contractor	High	Low risk of inadvertent impacts

ID*	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	awareness of location of the threatened Superb Parrot and the Weeping Myall Woodland TEC, prevent inadvertent damage and reduce soil disturbance		construction				to vegetation or threatened species for staff training not being followed.
	Indirect impacts on native vegetation and habitat						
B4	Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance.	• Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing. • No stockpiling or storage within dripline of any mature trees to be retained; • Where trees are to be retained, an adequate protection zone (TPZ) will be provided around each tree for the duration of construction, where possible. Details for calculating TPZs are provided within Australian Standard 4970-2009 – Protection of trees on development site.	Construction	Regular	Contractor	Low	None
B5	Noise barriers or daily timing of construction and operational activities to reduce impacts of noise	• Night works will be avoided as far as practicable to reduce the impacts of noise on adjacent nocturnal habitats.	Construction	Regular	Contractor	Low	None

ID*	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
B6	Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	• Avoid night works; and • Direct lights away from nearby vegetation such as the Black Box woodland where the Superb Parrots were sighted.	Construction /Operation	Regular	Contractor	Low	None
B7	Adaptive dust monitoring programs to control air quality	• Daily monitoring of dust generated by construction activities; and • Construction would cease if dust observed being blown from site until control measures were implemented; and • All activities relating to the proposal would be undertaken with the objective of preventing visible dust emissions from the development site.	Construction	Regular	Contractor	Moderate	Sedimentation in nearby canal, ephemeral areas and dams.
B8	Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	• Machinery would be cleaned prior to entering the site to ensure that weed seeds and propagules are not imported to the site. • Weeds shall be managed according to the requirements of the Biosecurity Act; in that they are to be disposed of at a licenced waste management facility or similar.	Construction , Operation	Regular	Contractor	Moderate	Weed encroachment

ID*	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
		• Weeds are not to be mulched and repurposed for any landscaping use. • Any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated, and reported. • Pest and Weed Management Plan (PWMP) would be developed to prevent/minimise the spread of weeds.					
B9	Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	• Site induction. • Toolbox talks.	Construction	Regular	Contractor	Moderate	Impacts to native vegetation or threatened species for Staff training not being followed
B10	Injury and mortality of fauna entering the proposal site during construction and road strike risk	• If fauna are encountered during construction, allow fauna to leave an area without intervention as much as possible. • The project manager and/or environment manager should ensure the contact details of the animal rescue agency/wildlife care group or vet are provided to the site manager, displayed in the site office and included in the Construction Environmental	Construction	Regular	Contractor	Moderate	Local decrease in fauna populations.

ID*	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
		Management Plan (CEMP) or other relevant management plans for the project. • Fauna spotter to be employed onsite if HBTs are to be removed – pre-clear survey and on day of removal.					
	Prescribed biodiversity impacts						
B1	Time works to avoid critical life cycle events	• Works not to occur during nesting time of the Superb Parrot which is between September and December	Construction	Once off	Construction Contractor	Moderate	Moderate risk of Superb Parrots leaving the area

B4, B11	Clearing protocols	• A trained ecologist or licensed wildlife handler would be present during clearing events and complete:
		  • Pre-clearing checklist
		  • Tree clearing procedure.
		Undertake daily surveys of clearing (only required on days where clearing is being undertaken) to ensure over clearing does not occur.
			Construction	Regular	Contractor	Moderate	Impacts may occur without realising if surveys are not conducted.

B12	Replacing impacted habitat provided by non-native vegetation with	• The area where the pipeline would be installed would be	Construction	As needed	Contractor	Low	Further loss of foraging habitat if not restored and

ID*	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	alternative habitat	revegetated as soon as practicable with a mix of local indigenous species representative of the vegetation in the development site.					managed appropriately.
B13	Sediment barriers and spill management procedures to control the quality of water runoff released from the site into the receiving environment	• An erosion and sediment control plan would be prepared in conjunction with the final design and implemented; and • Spill management procedures would be implemented.	Construction	Regular	Contractor	Moderate	Impacts may occur to waterway if erosion and sedimentation control plan not implemented
B17	Staff training and site briefing to communicate impacts of traffic strikes on native fauna	• Awareness training during site inductions regarding enforcing site speed limits; and • Site speed limits to be enforced to minimise fauna strike.	Construction and Operation	Regular	Contractor	Moderate	Fauna strikes from vehicles resulting in decrease of local fauna populations.
B14	Maintenance of retained native vegetation on the Development Site	• Weed control	Construction	As needed	Contractor		
	General						
B16, T2 & S1	Implementation of management plans.	• Preparation and implementation of Construction Environment Management Plan (CEMP) • Preparation and implementation of Rehabilitation Plan (RP). • Preparation and implementation	Construction	Regular	Contractor	Moderate	Impacts to native vegetation or threatened species for staff training not being followed

ID*	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
		of a construction Erosion and Sediment control Plan (ESCP). • Preparation and implementation of a Traffic Management Plan (TMP). • Preparation and implementation of a Flora and Fauna Management Plan (FFMP) for incorporation of construction related environmental management safeguards. • Preparation and implementation of a Pest and Weed Management Plan (PWMP) for construction and operation.					
B15	Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the Development Site	• Landscaping around the BESS should be comprised of species representative of Weeping Myall Woodland (PCT 26). • An annual report within one year of construction is required to detail effectiveness, outcomes and follow up measures.	Construction	As needed	Contractor	Moderate	Impacts to native vegetation

*Corresponding number in Coleambally BESS Amendment Report (NGH, 2023)

Table 9-2 Summary of performance criteria and method for mitigation measures for impacts to biodiversity

Mitigation measure	Performance criteria	Method	Completion criteria
Time works to avoid critical life cycle events	• Construction work will not occur between September and December	• Construction contractor is to prepare a work schedule which plans for and avoids construction work during this period.	Construction of the project is complete.
Relocate habitat features (fallen timber, hollow logs) into retained vegetation patches within the development footprint.	• Fallen timber, rocks and hollow logs removed during construction are retained. • Retained resources are relocated appropriately under direction of an ecologist during pre-clearance surveys.	• Prepare a rehabilitation and material salvage procedure. • Stockpiled resources are to be relocated immediately under the guidance of an Ecologist to ensure minimal damage. • Conduct a meeting to refresh all personnel working on site about rehabilitation and material salvage • Ensure the rehabilitation and material salvage procedure is included in site inductions, toolbox talks etc and that staff responsible are implementing the procedure.	All vegetation clearing is complete.
Delineation of ‘no-go areas’	• No impact on exclusions zones. • No stockpiling or storage within dripline of any mature trees. • No stockpiling or storage within	• Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction	Construction of the project is complete.

Mitigation measure	Performance criteria	Method	Completion criteria
	riparian buffers. • Pre-clearance surveys conducted.	commencing. • Post-clearing survey report will be compiled by Project Ecologist or fauna spotter catcher and provided to the project Environmental Manager. • Monthly monitoring of high disturbance areas, exclusion zones and boundary fencing during construction. • Progressive monitoring of the cumulative amount of vegetation cleared. • Inspection of exclusion zone disturbance.	
Induct all staff prior to construction to identify vegetation to be retained, awareness of location of the threatened Superb Parrot and the Weeping Myall Woodland TEC, prevent inadvertent damage and reduce soil disturbance.	• No impact on exclusions zones. • No harm occurs to threatened species and TECs	• Site inductions are completed before staff commence work during construction and operations. • Toolbox talks.	Ongoing for the life of the project
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance.	• No more than 0.58 ha of native vegetation will be removed. • Pre-clearance surveys.	• Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction	Construction of the project is complete.

Mitigation measure	Performance criteria	Method	Completion criteria
	• No impact on exclusions zones.	commencing. • No stockpiling or storage within dripline of any mature trees to be retained. • Where trees are to be retained, an adequate protection zone (TPZ) will be provided around each tree for the duration of construction, where possible. Details for calculating TPZs are provided within Australian Standard 4970-2009 – Protection of trees on development site. • Post-clearing survey report will be compiled by Project Ecologist or fauna spotter catcher and provided to the project Environmental Manager. • Monthly monitoring of high disturbance areas, exclusion zones and boundary fencing during construction. • Progressive monitoring of the cumulative amount of vegetation cleared. • Inspection of exclusion zone disturbance.	

Mitigation measure	Performance criteria	Method	Completion criteria

		• A trained ecologist or licensed wildlife handler would be present during clearing events and complete:
		  • Pre-clearing checklist
		  • Tree clearing procedure	

Noise barriers or daily timing of construction and operational activities to reduce impacts of noise	• No harm is caused to fauna species as a result of excessive noise levels.	• Night works will be avoided as far as practicable to reduce the impacts of noise on nocturnal adjacent habitats. • Construction contractor is to prepare a work schedule which plans for and avoids construction work at night.	Construction of the project is complete.
Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	• No harm is caused to fauna species as a result of excessive light spill.	• Night works will be avoided as far as practicable to reduce the impacts of light on nocturnal adjacent habitats. • Construction contractor is to prepare a work schedule which plans for and avoids construction work at night. • If night work is unavoidable, direct lights away from nearby vegetation such as the Black Box woodland where the	Construction of the project is complete.

Mitigation measure	Performance criteria	Method	Completion criteria
		Superb Parrots were sighted.	
Adaptive dust monitoring programs to control air quality	• No dust is observed being blown from site. • No sedimentation of nearby waterways.	• Daily monitoring of dust generated by construction activities. • Water truck is present on site and keeps areas of bare ground regularly wet. • Construction would cease if dust observed being blown from site until the water truck is able to cover all areas of expose soil, or high wind conditions cease.	Construction of the project is complete.
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	• Vehicle hygiene procedures implemented. • Pest and Weed Management Plan implemented. • A general reduction in the abundance of weeds in exclusion zones during the operation period as evidenced by annual inspections. • New invasive weeds detected in Project area are controlled during operation.	• Machinery would be cleaned prior to entering the site to ensure that weed seeds and propagules are not imported to the site. • All vehicle inspections and washdowns are recorded in the Vehicle Hygiene Register • Weeds are not to be mulched and repurposed for any landscaping use. • Weeds shall be managed according to the requirements	Ongoing for the life of the project.

Mitigation measure	Performance criteria	Method	Completion criteria
	• Listed priority weeds eradicated from the Development Site within 3 years of detection.	of the Biosecurity Act; in that they are to be disposed of at a licenced waste management facility or similar. • Eliminate priority weed species as soon as practicable. • Increase targeted weed or pest animal control. • Seek additional advice from Local Land.	
Injury and mortality of fauna entering the proposal site during construction and road strike risk	• Fauna encountered on site is rescued by an experienced ecologist/fauna spotter catcher. • Fauna is relocated injury free. • Fauna interaction is recorded in the Project fauna register.	• If fauna are encountered during construction, allow fauna to leave an area without intervention as much as possible. • The project manager and/or environment manager should ensure the contact details of the animal rescue agency/wildlife care group or vet are provided to the site manager, displayed in the site office and included in the Construction Environmental Management Plan (CEMP) or other relevant management plans for the project. • Conduct pre-clearing surveys.	Ongoing for the life of the project.

Mitigation measure	Performance criteria	Method	Completion criteria
		• All fauna interactions, including observed and unobserved fatalities, will be recorded in the Project fauna register. • The Project fauna register will be reviewed monthly during construction.	
Replacing impacted habitat provided by non-native vegetation with alternative habitat	• Non-native habitat impacted is replaced with native vegetation.	• The area where the pipeline would be installed would be revegetated as soon as practicable with a mix of local indigenous species representative of the vegetation in the development site.	Construction of the project is complete.
Sediment barriers and spill management procedures to control the quality of water runoff released from the site into the receiving environment	• Erosion and Sediment control plan is implemented. • Soil and Water Management Plan is implemented. • Spill management procedures implemented.	• An erosion and sediment control plan, and Soil and Water Management would be prepared in conjunction with the final design and implemented. • Sediment barriers are installed and monitored monthly. • Sediment barriers are inspected following a rainfall event.	Ongoing for the life of the project

Mitigation measure	Performance criteria	Method	Completion criteria
		• Spill management procedures would be implemented.	
Staff training and site briefing to communicate impacts of traffic strikes on native fauna	• No harm occurs to native fauna.	• Site inductions are completed before staff commence work during construction and operations regarding enforcing site speed limits. • Toolbox talks. • Site speed limits to be enforced to minimise fauna strike.	Ongoing for the life of the project
Maintenance of retained native vegetation on the Development Site	• Pest and Weed Management Plan implemented. • A general reduction in the abundance of weeds in exclusion zones during the operation period as evidenced by annual inspections. • New invasive weeds detected in Project area are controlled during operation. • Listed priority weeds eradicated from the Development Site within 3 years of detection.	• Weeds are not to be mulched and repurposed for any landscaping use. • Weeds shall be managed according to the requirements of the Biosecurity Act; in that they are to be disposed of at a licenced waste management facility or similar. • Eliminate priority weed species as soon as practicable. • Increase targeted weed or pest animal control. • Seek additional advice from Local Land.	Ongoing for the life of the project

Mitigation measure	Performance criteria	Method	Completion criteria
Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the Development Site	• To make provision for the ecological restoration, rehabilitation, and ongoing maintenance of retained native vegetation on the Project site.	• Landscaping around the BESS should be comprised of species representative of Weeping Myall Woodland (PCT 26). • Complete annual report commencing within 1 year of construction to detail effectiveness, outcomes, follow up measures.	Ongoing for the life of the project

9.1.4 Adaptive Management Strategy

Adaptive management during construction and operation will be receptive to any new and relevant data that may arise through ongoing assessment and monitoring and is key to the successful implementation of the relevant management plans. This will allow ongoing flexibility to manage objectives, allow for relevant feedback and modifications. Construction management plans will contain management plans for flora and fauna, which will have an adaptive management component.

An adaptive management strategy has been developed to monitor the predicted impacts of vehicle strikes, weed incursion into adjacent retained native vegetation and dust. The performance criteria, thresholds and adaptive management responses for vehicle strikes and weed incursion is detailed in Table 9-3 below.

Table 9-3 Adaptive management strategy

Mitigation Measure	Performance Criteria	Adaptive Management Threshold	Adaptive Management Response	Reporting
Maintenance of retained native vegetation on the Development Site	• A general reduction in the abundance of weeds in exclusion zones during the operation period as evidenced by annual inspections. • New invasive weeds detected in Project area are controlled during operation. • Listed priority weeds eradicated from the Development Site within 3 years of detection.	• >5% non-native ground cover. • Presence of priority weeds detected during quarterly or annual monitoring. • New weed species (species not detected during baseline surveys) on site detected during quarterly or annual monitoring. • Moderate or High levels of observed pest animal activity.	• Eliminate priority weed species as soon as practicable in accordance with recommended control methods and timing identified in the Pest and Weed Management Plan. • Increase targeted weed or pest animal control measures in accordance with the Pest and Weed Management Plan. • Seek additional advice from Local Land Services and adhere to recommendations.	• Photo points will be established as reference points for monitoring and incorporated into weed maps. • Quarterly during construction. • Annually during operation: ○ October for weeds
Injury and mortality of fauna entering the proposal site during construction and road	• Enforcement of site speed limits • Fauna encountered on site is rescued by an experienced ecologist/fauna spotter catcher.	• More than 5 vehicle fauna strikes a month. • Fauna is not relocated by an experienced ecologist/fauna spotter catcher or licenced wildlife handler/carer. • Fauna is injured.	• Check site speed limit signs are visible and readable. • Review site speed limits and reduce if necessary. • Install speed humps in high risk areas or areas where fatalities are commonly	• All fauna interactions, including observed and unobserved fatalities, will be recorded in the Project fauna register. • The Project fauna register will be reviewed

Mitigation Measure	Performance Criteria	Adaptive Management Threshold	Adaptive Management Response	Reporting
strike risk	• Fauna is relocated injury free. • Fauna interaction is recorded in the Project fauna register.	• Fauna interaction is not recorded in the Project fauna register.	occurring. • Undertake further environmental awareness training to personnel working on site about the fauna rescue and release procedure and measures to be implemented. • If fauna are encountered during construction, allow fauna to leave an area without intervention as much as possible. • The project manager and/or environment manager should ensure the contact details of the animal rescue agency/wildlife care group or vet are provided to the site manager, displayed in the site office and included in the Construction Environmental Management Plan (CEMP) or other relevant management plans for the project.	monthly during construction.

Mitigation Measure	Performance Criteria	Adaptive Management Threshold	Adaptive Management Response	Reporting
Adaptive dust monitoring programs to control air quality	• No dust is observed being blown from site. • No sedimentation of nearby waterways.	• Dust is observed being blown from site. • Sedimentation of nearby waterways. • High wind warnings issued by the Bureau of Meteorology.	• Daily monitoring of dust generated by construction activities. • Daily monitoring of weather reports and high wind warnings issued by the Bureau of Meteorology. • Water truck is present on site and is used regularly on areas of bare ground to minimise dust generation. • Reduced speed limits on internal and site access roads during dry and/or windy conditions • Construction would cease if dust observed being blown from site until the water truck is able to cover all areas of expose soil, or high wind conditions cease.	• Project environmental manager monitors weather conditions and site activities daily. • Project environmental manager reports to water truck driver and advises on the expected weather conditions and key areas to focus on for dust minimisation.

10. Serious and Irreversible Impacts (SAII)

The principles used to determine if a development will have serious and irreversible impacts (SAII), include impacts that:

- Will cause a further decline of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to be in a rapid rate of decline, or
- Will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size, or
- Impact on the habitat of a species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very limited geographic distribution, or
- Impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

10.1 Potential Serious and Irreversible Impact entities

10.1.1 Threatened Ecological Communities

There are no SAII TECs that would be impacted by the development.

10.1.2 Threatened species

Targeted surveys were carried out for Austral Pillwort (*Pilularia novae-hollandiae*) and Claypan Daisy (*Brachyscome muelleroides*). They were not detected. These two species are considered to not occur within the development site, therefore not at risk of an SAII.

Surveys were unable to be completed for Bindweed (*Convolvulus tedmoorei*) in the survey month due to late change in development footprint.

Bindweed is potentially at risk of a serious and irreversible impact according to Principle 2:

> It will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size.

A SAII assessment has been completed in Section 10.2 below.

10.1.3 Additional potential entities

No further species were considered to be potential SAII entities.

10.2 Assessment of Serious and Irreversible Impacts

10.2.1 Data and information used in SAII assessment

The following information sources were used in the SAII Assessment:

Atlas of Living Australia, (2022). Convolvulus tedmoorei R.W.Johnson. https://biocache.ala.org.au/occurrences/search?q=lsid:https://id.biodiversity.org.au/node/apni/2897683#tab_recordsView

NSW Department of Planning and Environment, (2022). Bindweed – profile. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10173

NSW Department of Planning and Environment (2002-2003). Convolvulus tedmoorei (a perennial plant) – endangered species listing. NSW Scientific Committee – final determination. https://www.environment.nsw.gov.au/Topics/Animals-and-plants/Threatened-species/NSW-Threatened-Species-Scientific-Committee/Determinations/Final-determinations/2000-2003/Convolvulus-tedmoorei-a-perennial-plant-endangered-species-listing

NSW Department of Planning and Environment, (2022). NSW BioNet. https://www.environment.nsw.gov.au/AtlasApp/Default.aspx

10.2.2 Bindweed

An assessment of impacts to Bindweed is provided in Table 10-1 below. Figure 10-1 shows the predicted area of this species within the development site.

Table 10-1 Bindweed SAII Assessment

Criteria for assessment of Threatened Species at risk of serious and irreversible impacts
1.The assessor is required to provide further information in the BDAR or BCAR for any species at risk of an SAII, including the action and measures taken to avoid the direct and indirect impact on the species at risk of an SAII. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR or BCAR.
Bindweed was not detected within the development site but was unable to be adequately surveyed in a small part of the development footprint so in accordance with the BAM was assumed to be present on site. A species polygon was created using suitable habitat within the development footprint. The impacts to Bindweed within the development footprint is comprised of clearing a small area adjacent to and to the southwest of the substation within PCT 16 (Black Box Grassy Open Woodland). Areas covered by the species polygon are surrounded by land that has been disturbed. Impacts to this SAII population have been avoided where possible, with approximately 5.60ha of potential habitat within the Development Site, and 0.33 ha (8.2%) potentially impacted. The area where they are predicted to occur would involve underground transmission line placement which would allow for regeneration of vegetation post works.
b. evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented by: **i. an estimate of the species' current population size in NSW, and** **ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and** **iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations**
Threatened biodiversity Data Collection (BCD) (2022) database states < 50 individuals or < 250 individuals

Criteria for assessment of Threatened Species at risk of serious and irreversible impacts
where threats are known. An estimate of the decline in the species' population size in NSW is not available on the TBCD 2022 database or in the NSW Scientific Committee - final determination (2000-2003). The Final determination (NSW Scientific Committee, 2000-2003) states this species is endemic to NSW and there are only two known collections. These are from the Darling and Murrumbidgee River floodplains in central western NSW. A search of The Atlas of Living Australia (Atlas of Living Australia, 2022) (ALA) found 18 records for this species in NSW, Queensland (QLD) and South Australia (SA). Location and habitat (where available) for these records are in Appendix J. Five of the records are of live specimens, and were found between 1971 and 2020. A search on BioNet for this endangered species on 15 November 2022 found 5 valid and accepted records ranging from 1969 to 1971 (NSW Department of Planning and Environment, 2022). Three records had habitat notes: one was found on a roadside, one was found in deep red, consolidated sand soil in an eroded stream bed, the other was found in deep self-mulching grey clay on darling River Flood Plain. The last two records were also listed in the ALA records. There is limited information on this species. Not enough data available on estimate number or percentage of mature individuals. There is not enough data available to determine if the species is likely to undergo extreme fluctuation.
3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a species for a criterion listed in Subsection 9.1.2(2.), the assessor must record this in the BDAR or BCAR.
There is no data provided in the TBDC
4. In relation to the impacts from the proposal on the species at risk of an SAII, the assessor must include data and information on: **a. the impact on the species' population (Principles 1 and 2) presented by:** **i. an estimate of the number of individuals (mature and immature) present in the subpopulation on the subject land (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population, and** **ii. an estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or** **iii. if the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that will be impacted, along with the area of habitat to be impacted by the proposal**
This species has been assumed to be present based on the presence of potentially suitable habitat. Up to 0.33 ha (8.2%) would be potentially impacted. 5.14 ha of potential habitat would be retained in the development site. The majority of the impact area would be available for this species post works given the transmission line would be underground. A search on BioNet for this endangered species on 15 November 2022 found five valid and accepted records ranging from 1969 to 1971 (NSW Department of Planning and Environment, 2022). The closest record is approximately 31.9km NWW of the Development Site from 1969. Although there is potentially suitable habitat for this species within the development site, it is unlikely that there are individuals or a population of this species within the Development Footprint as there are no known

Criteria for assessment of Threatened Species at risk of serious and irreversible impacts
populations of this species within a 10km radius of the development site.
5. The assessor may also provide new information that can be used to demonstrate that the principle identifying the species as at risk of an SAII, is inaccurate.
n/a

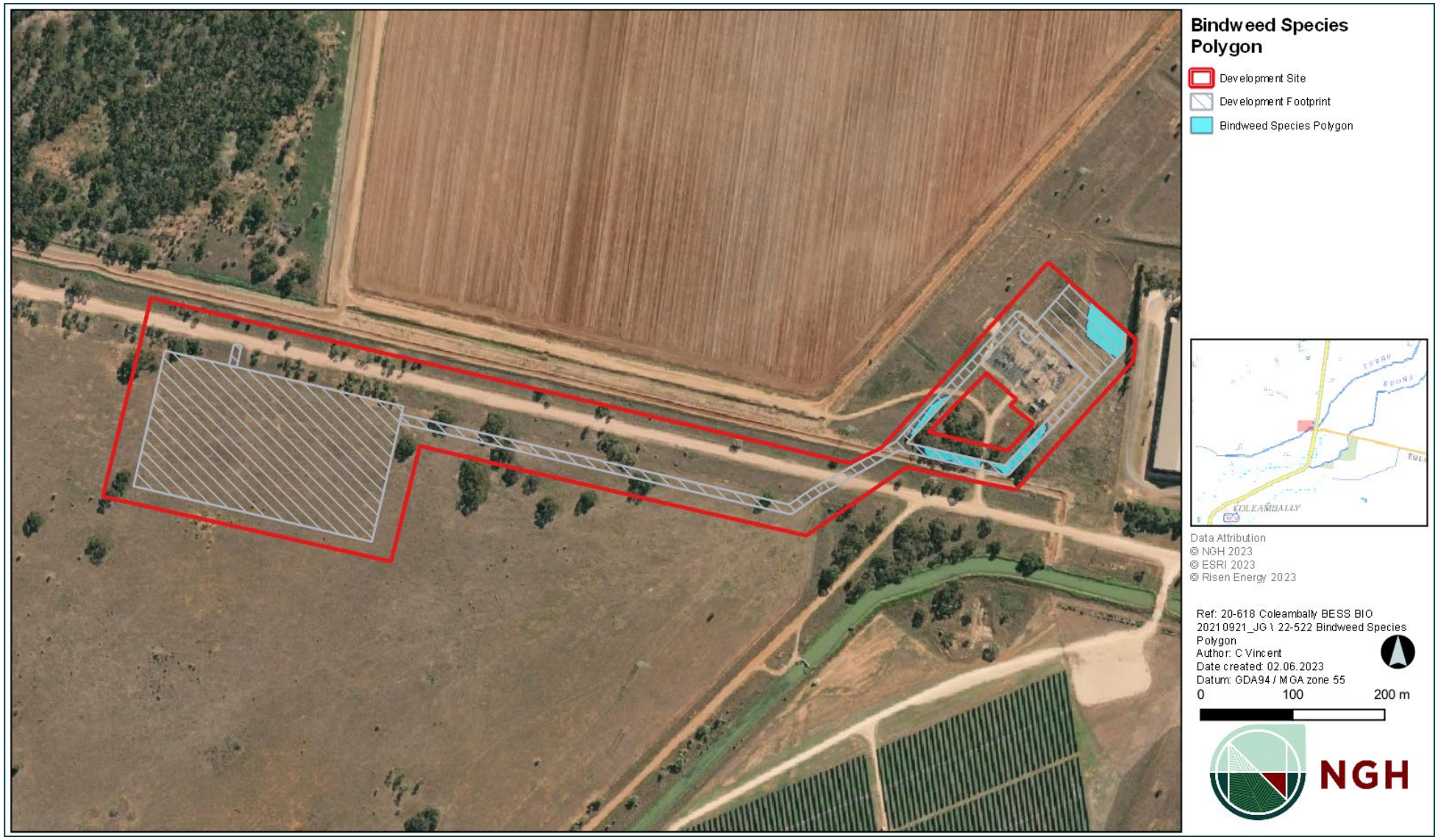


Figure 10-1 Bindweed Species Polygon

11. Requirement to offset

11.1 Impacts requiring an offset

11.1.1 Ecosystem credits

An offset is required for all impacts of development on PCTs that are associated with:

a) a vegetation zone that has a vegetation integrity score ≥15 where the PCT is representative of an endangered or critically endangered ecological community, or

b) a vegetation zone that has a vegetation integrity score of ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community, or

c) a vegetation zone that has a vegetation integrity score ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

The PCTs and vegetation zones requiring offset, and the ecosystem credits required, are documented in Table 11-1 and mapped on Figure 11-1.

Table 11-1 PCTs and vegetation zones that require offsets

Zone ID	PCT ID	PCT name	Credit Class	Zone area (ha)	Vegetation integrity score	Ecosystem credits required
1	26 Derived Grassland	Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	0.07	30.4	1
2	16 Moderate	Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Inland Floodplain Woodlands	0.45	67.7	13

Zone ID	PCT ID	PCT name	Credit Class	Zone area (ha)	Vegetation integrity score	Ecosystem credits required
3	26 Moderate	Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	0.02	53.6	1
4	26 Low	Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	0.04	45.9	1

The full Biodiversity Credit Report generated by the BAM Calculator is provided in Appendix E.

11.1.2 Species credits

An offset is required for the threatened species impacted by the development that require species credits. These species and the species credits required are documented in Table 11-2 below.

Table 11-2 Species credit species that require offsets

Species Credit Species	Biodiversity risk weighting	Area of habitat (ha)lost	Species credits required
A Spear-grass (*Austrostipa wakoolica*)	2	0.16	1
Superb Parrot (*Polytelis swainsonii*)	2	0.45	15
Southern Myotis (*Myotis macropus*)	2	0.47	16
Bindweed (*Convolvulus*	3	0.33	10

Species Credit Species	Biodiversity risk weighting	Area of habitat (ha)lost	Species credits required
tedmoorei)			
Slender Darling Pea (*Swainsona murrayana*)	2	0.33	7
Red Darling Pea (*Swainsona plagiotropis*)	2	0.33	7

The full Biodiversity Credit Report generated by the BAM Calculator is provided in Appendix E.

11.1.3 Offsets required under the EPBC Act

No species or TEC listed on the EPBC Act have been identified as having the potential to be significantly impacted by the development. As such, the proposal is not considered to require referral or offsets in accordance with the EPBC Offsets Policy.

11.2 Impacts not requiring an offset

Impacts to PCTs that do not meet the thresholds identified in Section 10.1.1 of the BAM do not require offsets. Two vegetation zones did not require offsets due to the VI score being too low. These PCTs and vegetation zones are identified in Table 11-3 and mapped on Figure 11-1.

Table 11-3 PCTs and vegetation zones that do not require offsets

Zone ID	PCT ID	PCT name	Zone area (ha)	Vegetation integrity score
5	26 Exotic	Non – native	0.42	4.8
6	16 Low	Black Box grassy open woodland wetland of rarely flooded depressions in south-western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	0.44	10.2

11.3 Areas not requiring assessment

The Land Category Assessment concludes that a large portion of the proposal site had been used for cropping pre and post 1990. Impacts to Category 1 – exempt land (5.9ha) are not regulated and do not require offset under the NSW BC Act

These areas are mapped on Figure 11-1.

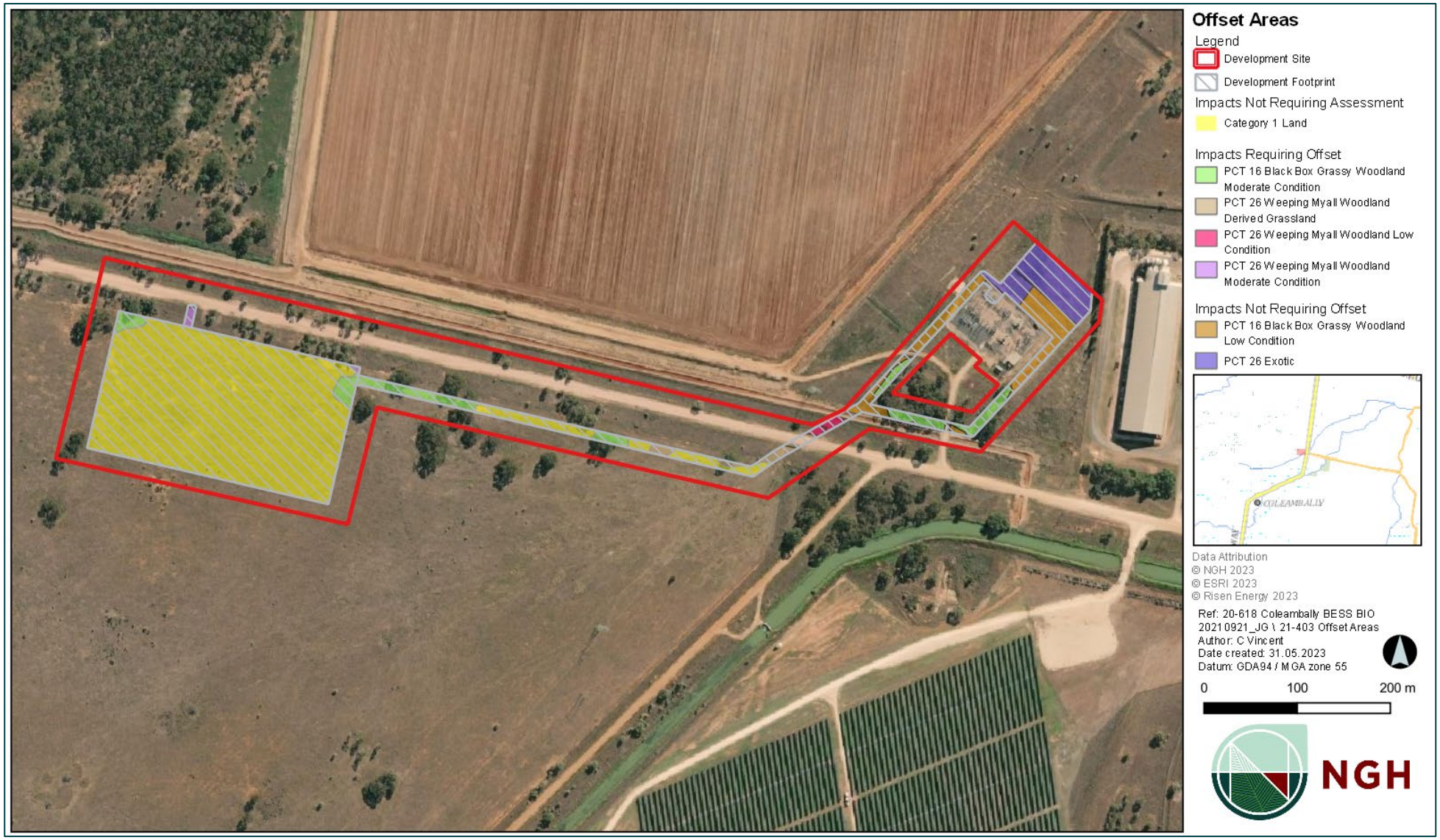


Figure 11-1 Impacts requiring offset, not requiring offset and not requiring assessment

12. Conclusion

The aim of this BDAR is to address the biodiversity matters raised in the SEARs and to address the requirements of the BC Act and the EPBC Act. This BDAR forms part of an EIS, prepared under Part 4 of the EP&A Act. This BDAR includes:

- Comprehensive mapping and assessment completed in accordance with the BAM.
- Identification of two PCTs (26 and 16), one threatened species (Superb Parrot) and the assumed presence of five species; Southern Myotis, Bindweed, Red Darling-pea, A Spear-grass and Slender Darling pea within the development site, the impacts to which have been adequately assessed.
- Mitigation measures which have been outlined to reduce the impacts to biodiversity.
- The generation of 16 ecosystem credits within the development site, and 56 species credits.

The PCTs present in the development site include:

- 2.86ha of PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW Southwestern Slopes Bioregion
- 2.75ha of PCT 16: Black Box grassy woodland wetland of rarely flooded depressions in southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

The development site is approximately 14.25ha. The proposed development footprint covers 5.67ha. The vegetation impacted from the proposal includes the following:

- 0.07ha of Vegetation Zone 1 (PCT 26 Derived Grassland)
- 0.45ha Vegetation Zone 2 (PCT 16 Black Box grassy woodland moderate condition)
- 0.02ha Vegetation Zone 3 (PCT 26 Weeping Myall Woodland in moderate condition)
- 0.04ha of Vegetation Zone 4 (PCT 26 Weeping Myall Woodland in low condition).
- 0.42ha of Vegetation Zone 5 (PCT 26 Exotic dominated grassland).
- 0.44ha of Vegetation Zone 6 (PCT 16 Black Box grassy woodland low condition)

The offsets requirements for the development site include:

- PCT 26 derived grassland (zone 1) – 1 ecosystem credits generated.
- PCT 16 moderate condition (zone 2) – 13 ecosystem credits generated.
- PCT 26 moderate condition (zone 3) – 1 ecosystem credit generated.
- PCT 26 low condition (zone 4) – 1 ecosystem credits generated.
- PCT 26 exotic dominated grassland (zone 5)– 0 ecosystem credits generated.
- PCT 26 low condition (zone 6) – 0 ecosystem credits generated.
- 15 species credits for impacts to Superb Parrot (*Polytelis swainsonii*)
- 16 species credits for assumed impacts to Southern Myotis (*Myotis Macropus*)
- 10 species credits for assumed impacts to Bindweed (*Convolvulus tedmoorei*)
- 7 species credits for assumed impacts to Slender Darling Pea (*Swainsona murrayana*)
- 7 species credits for assumed impacts to Red Darling Pea (*Swainsona plagiotropis*)
- 1 species credits for assumed impacts to A Spear-grass (*Austrostipa wakoolica*)

There are no offset requirements for vegetation zone 5 and Zone 6 or Category 1 Land.

Biodiversity Credits are proposed to be retired into the Biodiversity Conservation Fund. This will be achieved by contacting the BCT and requesting a Charge Quote form through the BCF Charge System.

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Appendix A Land Category Assessment

A.1 Land Category Assessment Report

LAND CATEGORY ASSESSMENT

Coleambally Battery Energy Storage System

May 2023

Project Number: 20-618

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Document verification

Project Title:	Coleambally Battery Energy Storage System
Project Number:	20-618
Project File Name:	20-618 Coleambally Land Cat Assessment Final 2.0

Revision	Date	Prepared by	Reviewed by	Approved by
Draft V1.0	21/05/2021	C. Vincent	J. Gooding	J. Gooding
Final V1.0	30/06/2021	C. Vincent	J. Gooding	J. Gooding
Final V2.0	29/05/2023	J. Russo	J. Gooding	J. Gooding
	[Enter the date]			

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Acronyms and abbreviations

ALUM	Australian Land Use and Management
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCD	Biodiversity and Conservation Division
BESS	*Battery Energy Storage System*
DPIE	Department of Planning, Industry and Environment (NSW)
FPC	Foliage Protective Cover
ha	hectares
km	kilometres
LCA	Land Category Assessment
LEP	Local Environment Plan
LLS	Local Land Services Act 2013
NSW	New South Wales
OEH	Office of Environment and Heritage (now DPIE)
PCT	Plant Community Type
PVP	Property Vegetation Plan
RISEN	RISEN ENERGY

1. Land Category Assessment

NGH were engaged by RISEN ENERGY (RISEN) to prepare a Land Category Assessment (LCA) for the proposed Battery Energy Storage System (BESS) located approximately 9km north east of Coleambally, NSW.

Section 6.8(3) of the Biodiversity Conservation Act 2016 (BC Act) determines that the Biodiversity Assessment Method (BAM*) is to exclude the assessment of the impacts of clearing of native vegetation on Category 1-exempt land (within the meaning of Part 5A of the Local Land Services Act 2013) other than any impacts prescribed by the regulations under section 6.3.* Boundaries mapping Category 1-exempt land on the Native Vegetation Regulatory Mapping are not yet publicly available. During the transitional period, accredited assessors may establish the categorisation of land for the agency head to consider, following the method utilised to develop the Native Vegetation Regulatory Map.

Category 1- Exempt land is defined under the Local Land Services Act 2013 (LLS) as;

- Land cleared of native vegetation as at 1 January 1990 or lawfully cleared after 1 January 1990.
- Low Conservation Grasslands (following commencement of the new framework on 25th August 2017
- Land (not being grasslands) containing only low conservation groundcover (following commencement of the new framework on 25th August 2017)
- Native vegetation identified as regrowth in a Property Vegetation Plan under the repealed Native Vegetation Act 2003
- Land biodiversity certified under the BC Act.

Category 2 – Regulated Land is defined as:

- Land **not** cleared as at 1st January 1990 or unlawfully cleared after 1st January 1990;
- Native vegetation grown with the assistance of public funds;
- Land that is (or was previously) subject to a Private Native Forestry Plan or Private Native Forestry Property Vegetation Plan (PVP);
- Grasslands that are neither low nor high conservation grasslands;
- Travelling stock reserves;

Additionally, two subcategories of Category 2 – Regulated Land are also relevant and include;

- *Category 2 Vulnerable Regulated Land*
    - Steep or highly erodible land;
    - Protected riparian areas;
    - Land susceptible to erosion, or land that is otherwise environmentally sensitive.

- *Category 2 Sensitive Regulated Land*
    - Land subject to a private land conservation agreement;
    - A set aside under the Land Management Code;
    - Land subject to a bio-certification conservation measure;
    - Land comprising an offset under a Property Vegetation Plan or set aside under a code under the *Native Vegetation Act 2003;*
    - Coastal wetlands and littoral rainforests *(Coastal Management Act 2016);*
    - High conservation grasslands;
    - Core Koala habitat identified in a plan of management (Koala Habitat Protection SEPP)
    - Critically endangered plants and critically endangered ecological communities

- Ramsar wetlands (EPBC Act)
- Land subject to remedial action or conservation measures under the BC Act
- Land subject to a property, trust or conservation agreement
- Land recommended for listing as an Area of Outstanding Biodiversity Value
- Conservation Areas under the Southern Mallee Land Use Agreement
- Native vegetation that must be retained under the Plantation and Reafforestation Act 1999
- Land subject to a condition of development consent requiring the land to be set aside for conservation purposes under the Environmental Planning and Assessment Act 1979

This letter report establishes the methodology, results and conclusions to evaluate the land categorisation for the development site. It is anticipated that the Department of Planning, Industry and Environment (DPIE) (Biodiversity and Conservation Division) would support this approach and provide endorsement for the land categorisation of the proposal site for the Coleambally BESS.

1.1 Methodology

A desktop assessment, literature review of previous studies and field observations were undertaken over the proposal site - to determine the ecological constraints, native vegetation communities and land class category. A precautionary approach was used when identifying Category 2- Regulated Land. Where data was conflicting, land was mapped as Category 2 - Regulated Land.

1.1.1 Desktop Assessment

A desktop assessment of the development site as Category 1 – exempt and Category 2 – regulated land was undertaken using as a minimum, the following data sources and assessed in the listed order:

- 2017 Land Use Dataset (Australian Land Use and Management (ALUM) Classification version 7 (Office of Environment and Heritage (OEH) 2017).
- NSW Woody Vegetation extent and Foliage Projective Cover (FPC) 2011 (OEH 2015).
- Sensitive regulated and vulnerable lands on the Native Vegetation Regulatory Map Portal (LLS 2020).
- Aerial imagery of historical land use (sourced from spatial data services; Department of Finance, Services and Innovation 2020).
- Relevant State Vegetation Mapping (OEH).

1.1.2 Site Assessment

According to NSW State vegetation mapping and a preliminary site inspection (undertaken by an NGH ecologist on 11 December 2020), three Plant Community Types (PCTs) are present on the site. Detailed surveys would need to be conducted to confirm the species present and structure/diversity/condition characteristics.

- PCT 16: Black Box grassy woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion).
- PCT 26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion.
- PCT 45: Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion.

1.2 Results

The analysis of the above sources, in conjunction with historical aerial imagery, demonstrates evidence of broad vegetation modification resulting from agricultural land use within the proposal site prior to and post 1990. The following table (Table 1) demonstrates how the above mentioned layers were used in determining land category.

Table 1 Summary of data sources and interpretation.

Data Sources	Category 1 – Exempt Land	Category 2– Regulated Land	Excluded Land

2017 Land Use Dataset (Appendix A.2)	• Mapped as the following:
	  ○ cropping
		• Mapped as the following:
		  ○ Grazing native vegetation.
			N/A

NSW Woody vegetation extent, 2011 (Appendix A.3)	• Areas with no woody vegetation	• Woody vegetation present as at 1990 inclusive of paddock trees.	N/A
Native Regulatory Map, 2017 • **Excluded land** • **Sensitive regulated land** • **Vulnerable regulated land (Appendix A.4)**	N/A –	N/A – No Sensitive or vulnerable regulated land mapped.	N/A – No excluded land mapped.
1977 aerial imagery (Appendix A.5)	• Areas with no woody vegetation	• Woody vegetation present at 1990 demonstrated within woody vegetation extent layer.	N/A
1993 aerial imagery (Appendix A.6)	• Areas with no woody vegetation	• Woody vegetation present at 1990 demonstrated within woody vegetation extent layer.	N/A
Current aerial imagery	• Areas with regenerating Weeping Myall not present in 1990	• Woody vegetation and native grasslands present with no evidence of historical ground disturbance	N/A

Data Sources	Category 1 – Exempt Land	Category 2– Regulated Land	Excluded Land
Plant Community Types (NGH), (Appendix A.7)	• Cropped areas.	• Woody vegetation present at 1990 demonstrated within woody vegetation extent layer. • PCT 16, PCT 26 & PCT 45 with no evidence of historic ground disturbance.	N/A

In summary, the analyses of the above sources identified the following:

- Most of the proposal site is mapped under the 2017 landuse dataset as 'cropped'. Historic aerial imagery shows regular agricultural use until 2015. A determining feature of agricultural use is a lack of woody vegetation regrowth as represented in the aerial imagery. Historical imagery from 1977 and 1993 shows the area was disturbed but with scattered trees present. Cropping was evident in 2003 and 2009. The site visit shows there has been a lack of recent cropping due to the regrowth of Weeping Myall and native understory vegetation which is scattered throughout. As the Weeping Myall regrowth occured post 1990, the land meets the definition of Category 1 Land. The area mapped as cropped, excluding the trees that were present pre 1990 have been mapped as Category 1- Exempt land.
- A small portion of the land north west of the proposal site is mapped under the 2017 landuse dataset as grazing native vegetation. Historical aerial imagery from 1977 and 1993 shows some evidence of woody regrowth here, continuing to increase over the next 25 years. There is no clear evidence of historic ground disturbance from aerial imagery. The site visit identified this area as PCT 26 Weeping Myall open woodland of the Riverina bioregion and NSW South Western Slopes Bioregion. This woodland was many years older than regrowth establishing in areas mapped as Category 1 - Exempt land.
- The 2011 Woody Vegetation extent identifies scattered paddock trees. From 1977 and 1993 historical imagery and current imagery there appears to be minimal if any clearing of these. These have been mapped as Category 2 - Regulated land.
- No areas are mapped as 'excluded land', 'sensitive regulated land' or 'vulnerable regulated land'.
- The entire proposal site is zoned as Primary Production - RU1 (Appendix A.3).
- Areas that are part of the following PCTS are mapped as Category 2 – Regulated land.
    - PCT 16 Black Box grassy woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion).
    - PCT 26 Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion.
    - PCT 45: Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion.
- Field surveys were conducted on 11th December 2020.

1.2.1 BCD Endorsement

The Draft revision of the Land Category Assessment was provided to BCD to review in June 2021. BCD reviewed and approved the assessment on 19th August 2021 (see Appendix A.9 for email correspondence).

1.3 Conclusion

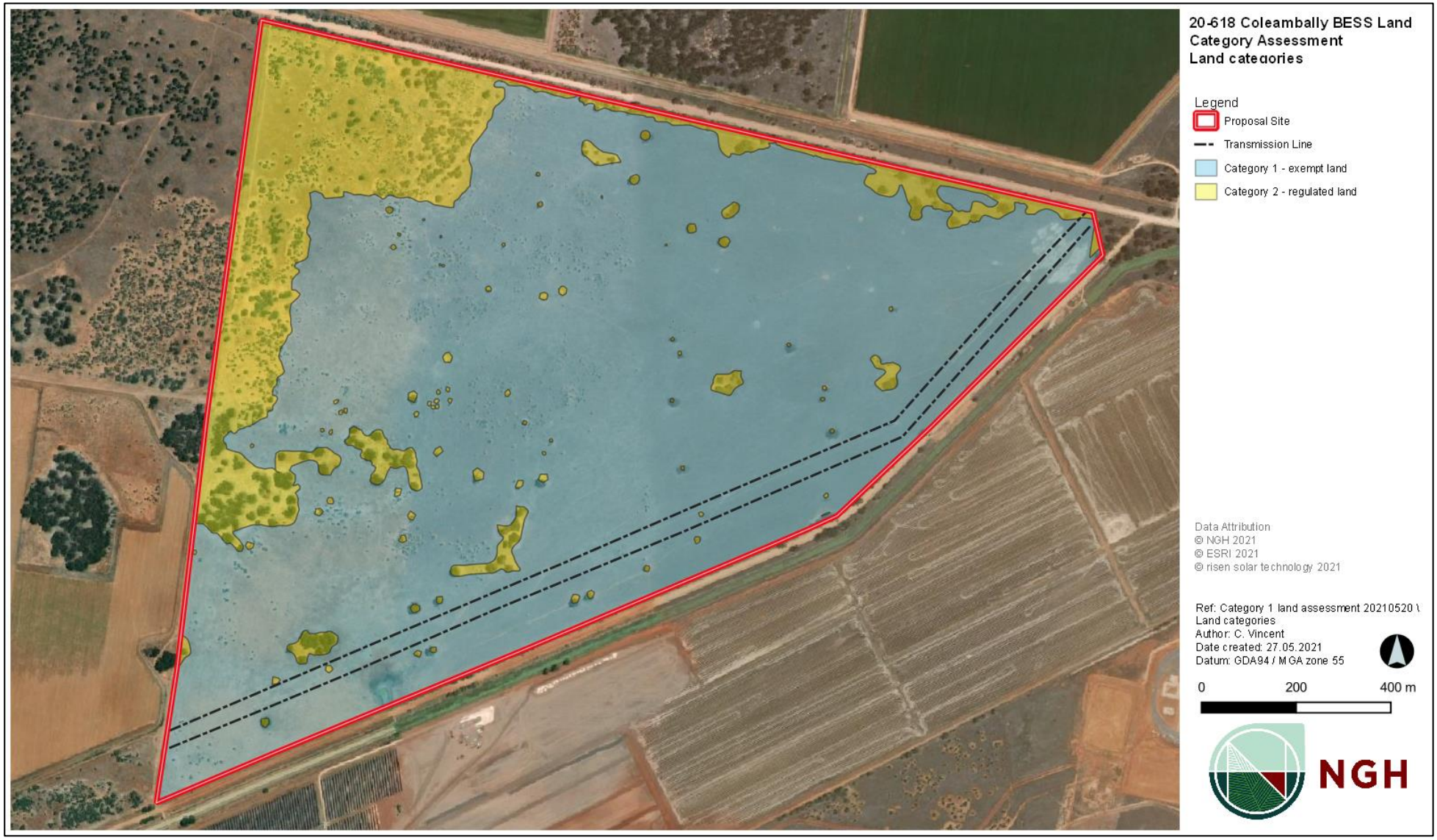
Based on the above data sources, there is evidence to suggest that a large portion of the proposal site had been used for cropping pre and post 1990. This is supported by the 2017 landuse datasets, historic aerial imagery and land zoning mapping data.

Areas of woody vegetation and scattered paddock trees have been mapped as Category 2 – Regulated land. Areas mapped as 'grazing native vegetation' in the 2017 land use dataset with no clear evidence of historic ground disturbance have been mapped as Category 2 – Regulated land.

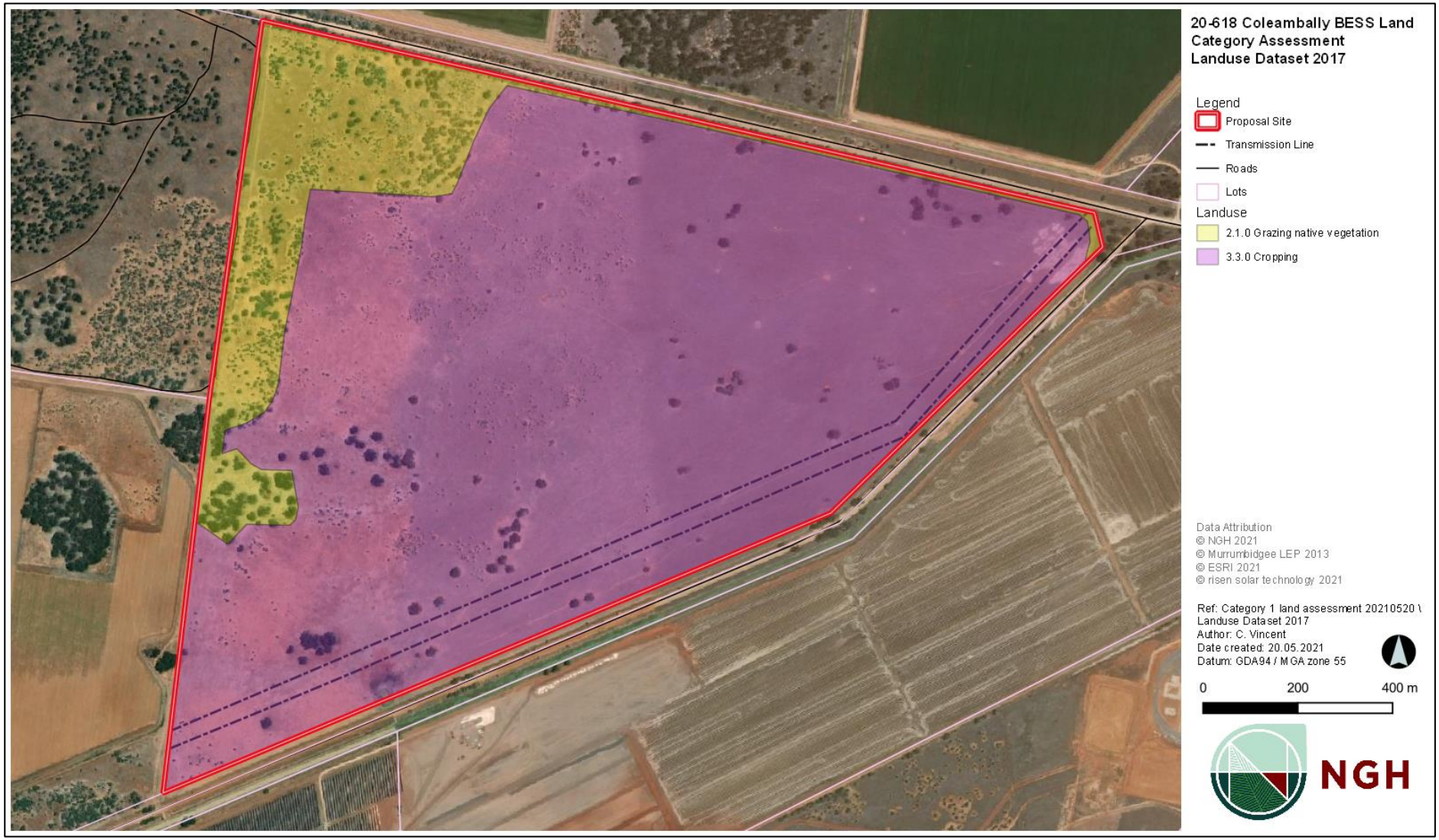
Based on our assessment, a draft map of areas considered to be Category 1 – Exempt Land and Category 2 – Regulated Land has been produced (Appendix A.1). The relevant datasets used in the assessment are in Appendix A.2 – Appendix A.8).

Appendix A Land Category Assessment Mapping

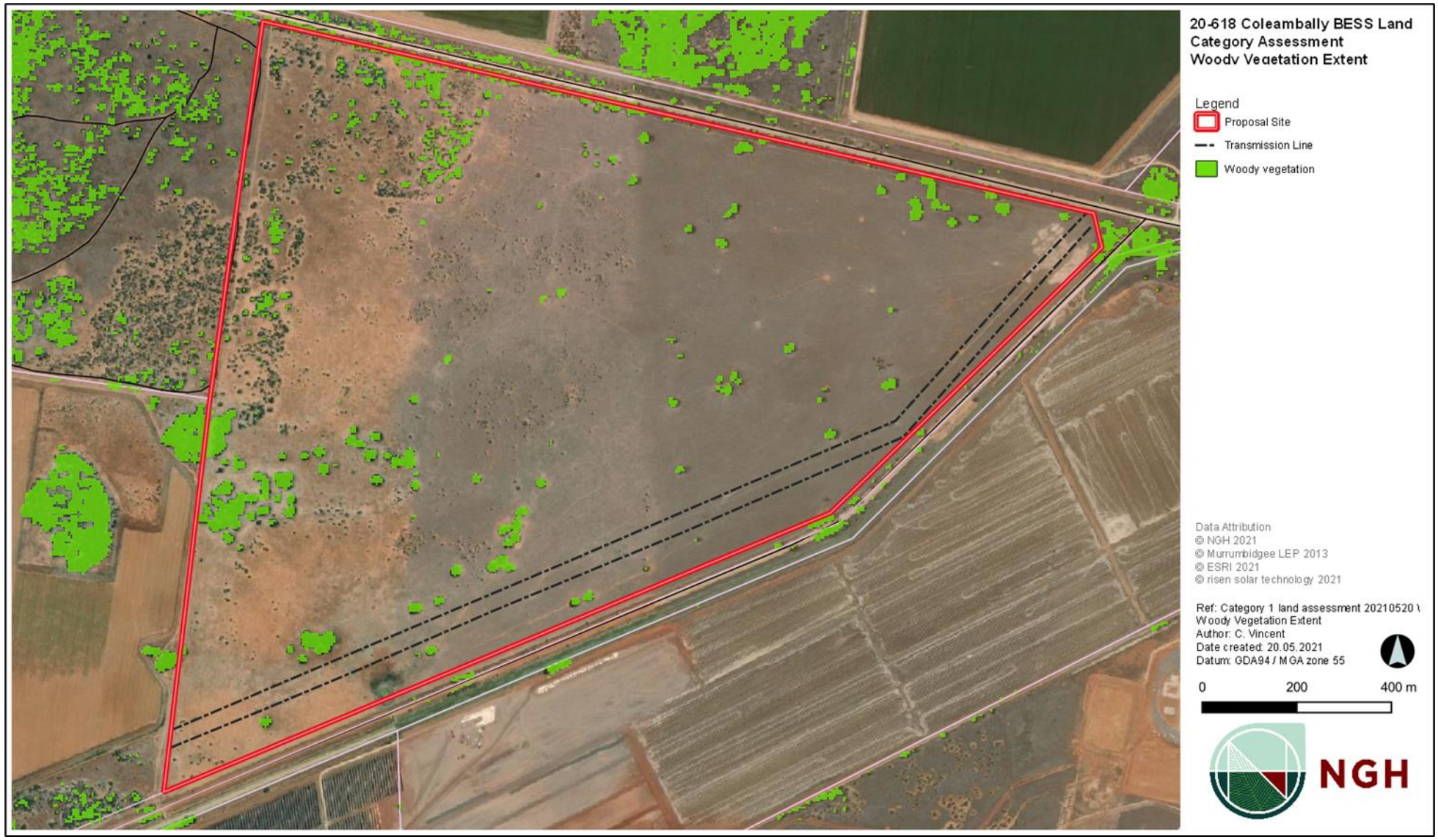
A.1 Development Site Overview and Land Categorisation



A.2 Landuse Dataset 2017

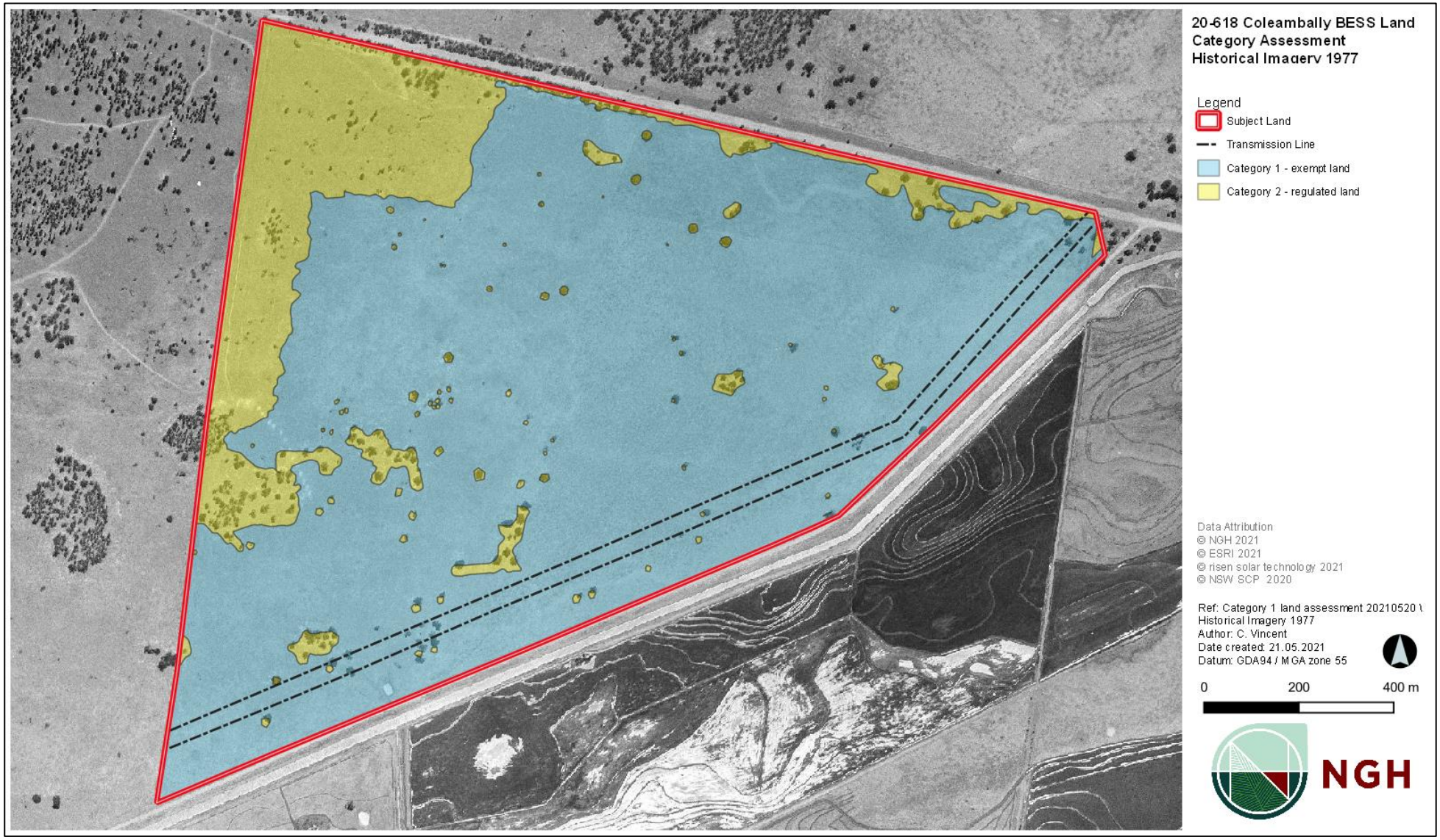


A.3 NSW Woody Vegetation Extent and FPC

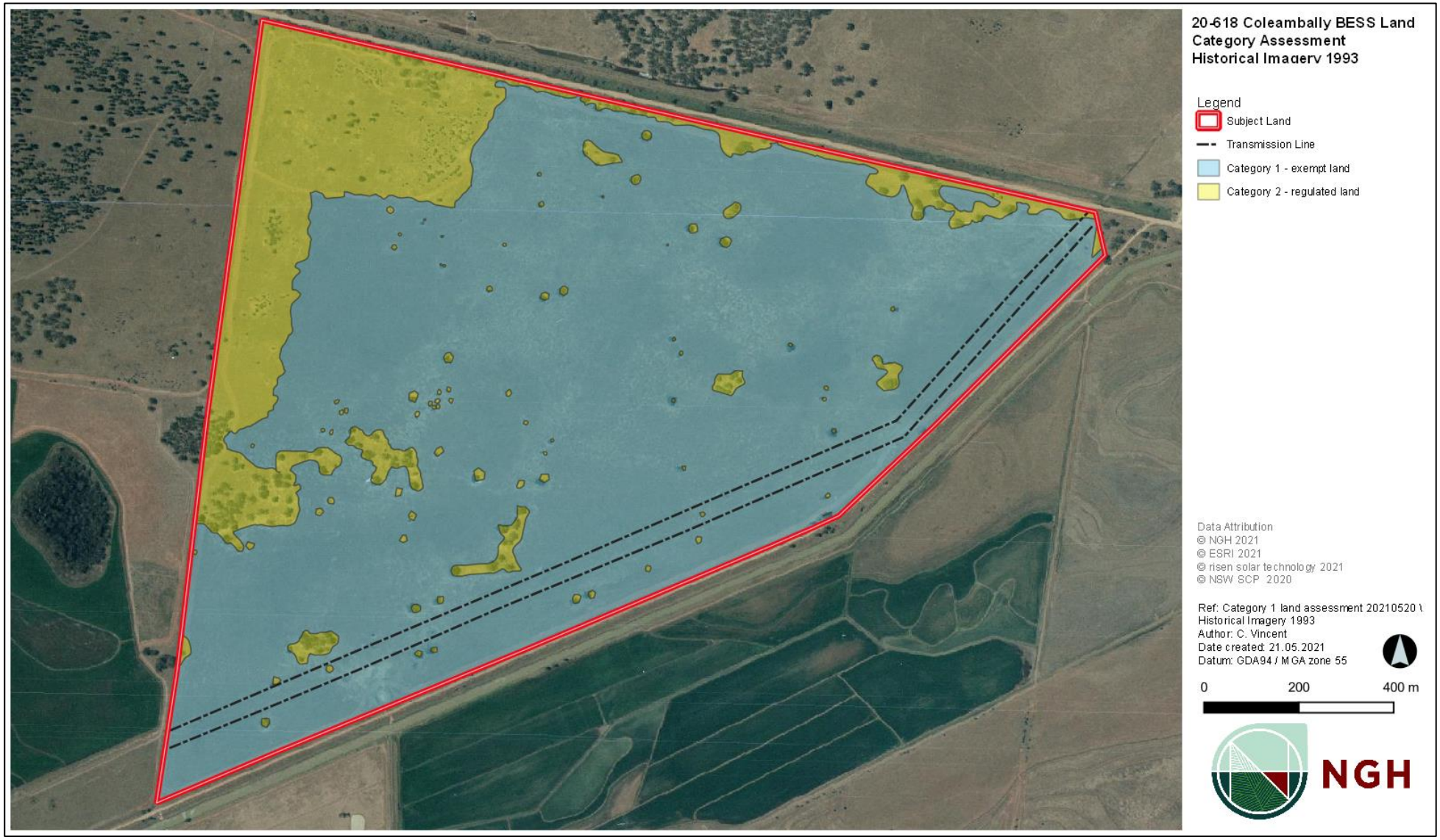


A.4 Native Vegetation Regulatory map

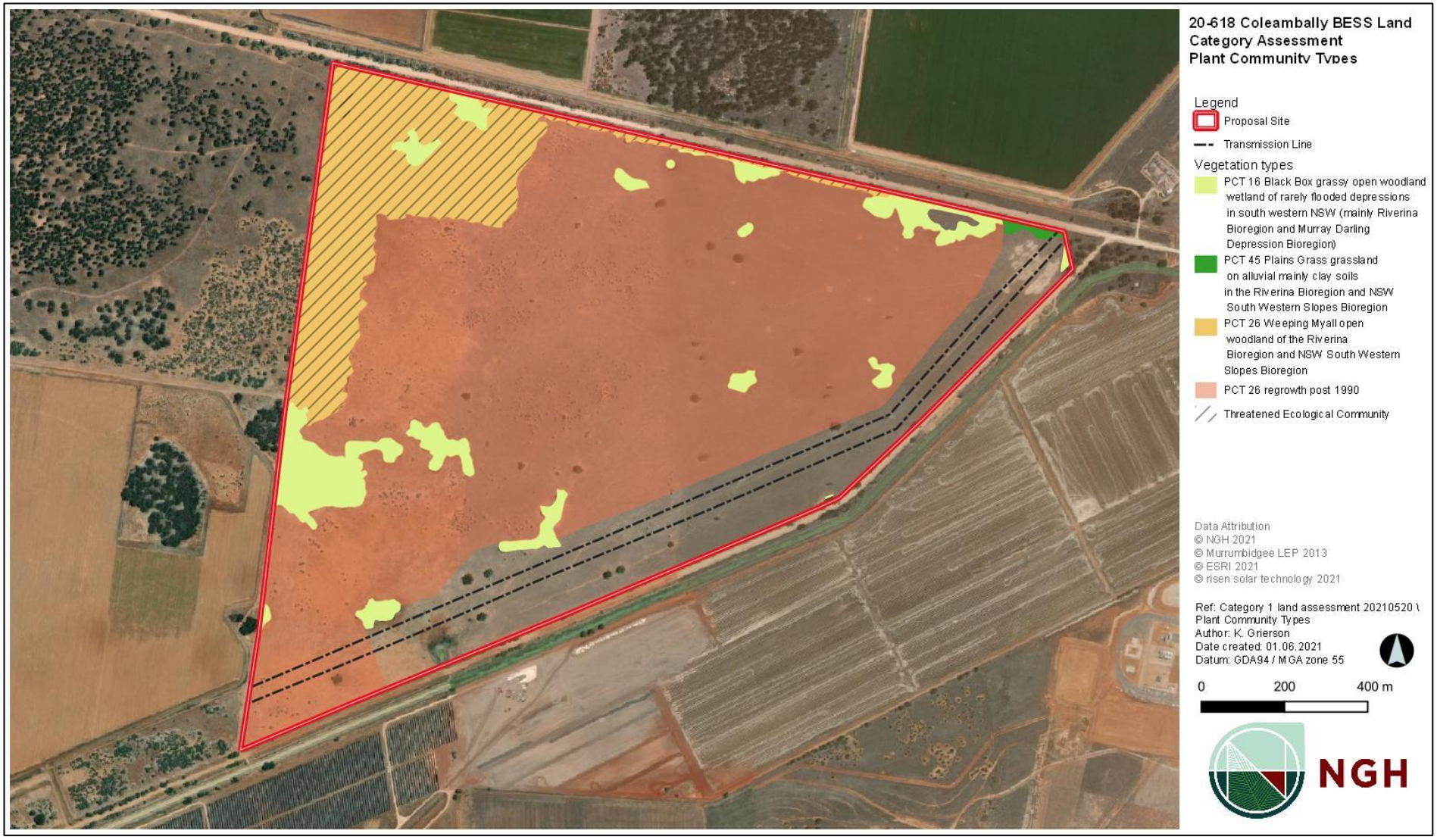
A.5 Aerial imagery 1977 (Spatial portal 2021)



A.6 Aerial Imagery 1993 (Spatial Portal 2021)



A.7 Plant Community Types (NGH)



A.8 Land Zoning Murrumbidgee LEP (2013)

A.9 BCD Endorsement

From:	Julie Gooding
To:	Nicola Smith
Subject:	Fwd: BCD Response - Coleambally Battery Energy Storage System (BESS) (SSD-23368211) Murrumbidgee - Land category assessment
Date:	Friday, 20 August 2021 10:04:14 AM

Fyi

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From: Miranda Kerr <Miranda.Kerr@environment.nsw.gov.au> on behalf of ROG South West Region Mailbox <rog.southwest@environment.nsw.gov.au>
Sent: Thursday, August 19, 2021 3:26:54 PM
To: Julie Gooding <julie.g@nghconsulting.com.au>; NGH Environmental <ngh@nghenvironmental.com.au>
Cc: Karl Okorn <karl.okorn@planning.nsw.gov.au>; ROG South West Region Mailbox <rog.southwest@environment.nsw.gov.au>
Subject: BCD Response - Coleambally Battery Energy Storage System (BESS) (SSD-23368211) Murrumbidgee - Land category assessment

Hi Julie

This is a response to the land category assessment for the Coleambally Battery Energy Storage System proposal site, submitted to the Department as Appendix D to the Scoping Report.

BCD agree with the results of the assessment (version dated June 2021). We appreciate the degree of rigour and detail provided in determining land categories on the proposal site.

The BAM accredited assessor should note that, regardless of the previous landuse, assessment of prescribed biodiversity impacts on Category 1-exempt land is required for a development where the BOS applies. Prescribed impacts are listed in Clause 6.1 of the *Biodiversity Conservation Regulation 2017* and requirements for the assessment of these impacts are set out in the BAM. For example, consideration should be given to feeding resources for painted honeyeater (*Grantiella picta*) associated with regenerating myall (*Acacia pendula*).

Please contact our team via rog.southwest@environment.nsw.gov.au if you have any questions.

Kind regards

Miranda Kerr
Senior Biodiversity Conservation Officer – South West

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Part time hours: I'm unavailable on Mondays

Contact the South West Planning Team about biodiversity planning matters by emailing rog.southwest@environment.nsw.gov.au

The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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A.2 BCD Correspondence

From:	Julie Gooding
To:	Nicola Smith
Subject:	Fwd: BCD Response - Coleambally Battery Energy Storage System (BESS) (SSD-23368211) Murrumbidgee - Land category assessment
Date:	Friday, 20 August 2021 10:04:14 AM

Fyi

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From: Miranda Kerr <Miranda.Kerr@environment.nsw.gov.au> on behalf of ROG South West Region Mailbox <rog.southwest@environment.nsw.gov.au>
Sent: Thursday, August 19, 2021 3:26:54 PM
To: Julie Gooding <julie.g@nghconsulting.com.au>; NGH Environmental <ngh@nghenvironmental.com.au>
Cc: Karl Okorn <karl.okorn@planning.nsw.gov.au>; ROG South West Region Mailbox <rog.southwest@environment.nsw.gov.au>
Subject: BCD Response - Coleambally Battery Energy Storage System (BESS) (SSD-23368211) Murrumbidgee - Land category assessment

Hi Julie

This is a response to the land category assessment for the Coleambally Battery Energy Storage System proposal site, submitted to the Department as Appendix D to the Scoping Report.

BCD agree with the results of the assessment (version dated June 2021). We appreciate the degree of rigour and detail provided in determining land categories on the proposal site.

The BAM accredited assessor should note that, regardless of the previous landuse, assessment of prescribed biodiversity impacts on Category 1-exempt land is required for a development where the BOS applies. Prescribed impacts are listed in Clause 6.1 of the *Biodiversity Conservation Regulation 2017* and requirements for the assessment of these impacts are set out in the BAM. For example, consideration should be given to feeding resources for painted honeyeater (*Grantiella picta*) associated with regenerating myall (*Acacia pendula*).

Please contact our team via rog.southwest@environment.nsw.gov.au if you have any questions.

Kind regards

Miranda Kerr
Senior Biodiversity Conservation Officer – South West

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Appendix B Tree clearing under LLS Act

AMDA INVESTMENTS PTY LTD
ABN 39 119 020 450
Yambil Street, Griffith 2680, NSW

Letter of Tree Cutting

To **Lena Li**

Level 1, 35 Miles Platting Road, Eight Mile Plains 4113, QLD
Project Development & Investment Director
Risen Energy (Australia) Pty Ltd

To whom it may concern:
As owners of AMDA Investments Pty Ltd and lot 100 on plan DP1139115, we , Timothy Hopwood and Deborah Hopwood, the landowner of this site, hereby confirm that, due to the reason that those trees were dying and falling on fence, we decided and removed those three trees within the north boundary of the land on 7/10/2021(date).

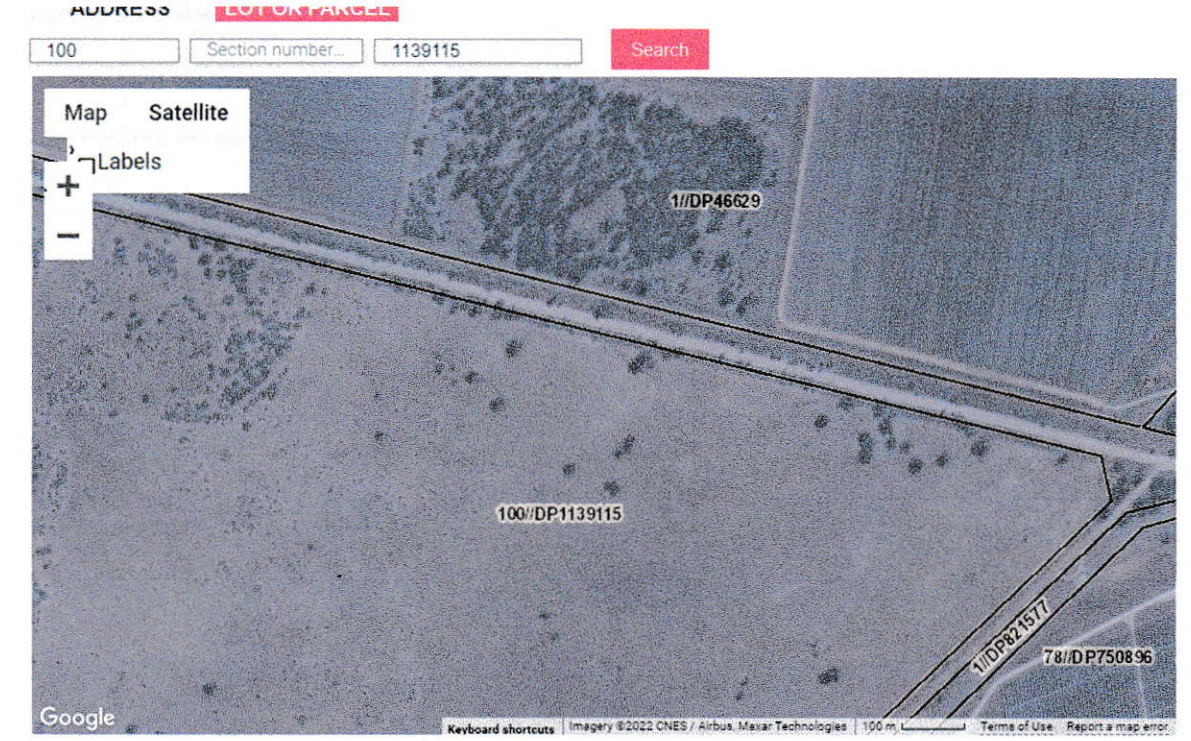
According to ***Rural Boundary Clearing Code for New South Wales,*** published on 26 August 2021, section 3 Application of land to the Rural Boundary Clearing Code, *the code will apply to any holding within a rural zone within Boundary Clearing Code Vegetation Map and within 25 meters of the holding's boundary with adjoining land.* Lot 100 falls in RU1 zoning, and it is within Boundary Clearing Zone (see Picture 1 in Appendix). The 3 trees are in the boundary of lot 100, so they can be removed by landowner.

Regards,
Timothy Hopwood & Deborah Hopwood

Sign Debbie Hopwood Date 17-2-2022

Sign Date 17-2-2022

Appendix:



Boundary Clearing Zone

Boundary clearing may be permissible/allowed under the Rural Boundary Clearing Code in these areas. You may only clear vegetation along your boundary in these areas in accordance with the Rural Boundary Clearing Code.

Non Boundary Clearing Zone

Clearing is not permissible/allowed under the Rural Boundary Clearing Code, as these areas are excluded from the Code.

Council Not Opted In

Clearing is not permissible/allowed under the Rural Boundary Clearing Code in these areas, as the council has not opted in to the Rural Boundary Clearing Code.

Picture 1

Appendix C Plot data and photos

C.1 Plot data

BAM Site Field Survey

Project:	coleambally	**Plot Identifier**	1	**Pic 20x20**		**Pic 20x50**	X		
Survey date:	20/10/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	JG+CV		**PCT:**	26	; Myall Derived Grassland				
GPS Easting	403991.247	**GPS Northing**	6155031.19		**Datum**	GDA94	**Zone**	55	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	clay/loam		**Slope**	flat		
LandF Element			**Soil Colour**	brown		**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing			
Cultivation	2		
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness	2		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Roadside

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Weeping Myall TEC

Dominant Species outside Plot	Weeping Myall

FUNCTION

Function attributes for	1

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	1
	Shrub (SG)	4
	Forb (FG)	6
	Grass & grasslike (GG)	7
	Fern (EG)	1
	Other (OG)	0
	TOTAL	19

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0.1
	Shrub (SG)	1
	Forb (FG)	10.3
	Grass & grasslike (GG)	48.2
	Fern (EG)	0.1
	Other (OG)	0
	TOTAL Native	59.7
	TOTAL 'HTE'	15

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	1	0
<5	0	0	N/A
Length of logs (m)	0	0	

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photos
Litter Cover	5m	10%	15.2%	2002
	15m	8%		7245
	25m	18%		7711
	35m	20%		6852
	45m	20%		5370
Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for 1

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Thre
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.2	20		Grass & grasslike (GG	No
vitt cune	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	4	150		Forb (FG)	No
aust aris	*Austrostipa aristiglumis*	Plains Grass	Poaceae	45	1000		Grass & grasslike (GG	No
cham drum	*Chamaesyce drummondi*	Caustic Weed	Euphorbiacea	0.1	30		Forb (FG)	No
acac pend	*Acacia pendula*	Weeping Myall	Fabaceae (Mi	0.1	1 overhang		Tree (TG)	No
hord	*Hordeum spp.*	A Barley Grass	Poaceae	5	1000	*		No
loli	*Lolium spp.*	A Ryegrass	Poaceae	15	1000	*		No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	10		Forb (FG)	No
atri sube	*Atriplex suberecta*		Chenopodiace	5	50		Forb (FG)	No
ente acic	*Enteropogon acicularis*	Curly Windmill Grass	Poaceae	0.5	50		Grass & grasslike (GG	No
arct cale	*Arctotheca calendula*	Capeweed	Asteraceae	0.1	20	*		No
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.2	50	*		No
echi plan	*Echium plantagineum*	Patterson's Curse	Boraginaceae	0.1	20	*		No
walw prol	*Walwhalleya proluta*		Poaceae	2	50		Grass & grasslike (GG	No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.2	2	*		No
sida	*Sida spp.*		Malvaceae	0.1	4	*		No
eina nuta lini	*Einadia nutans subsp. lin*	Climbing Saltbush	Chenopodiace	1	10		Forb (FG)	No
ench tome	*Enchylaena tomentosa*	Ruby Saltbush	Chenopodiace	0.3	5		Shrub (SG)	No
scle muri	*Sclerolaena muricata*	Black Rolypoly	Chenopodiace	0.2	5		Shrub (SG)	No
brom dian	*Bromus diandrus*	Great Brome	Poaceae	15		*		HTE
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.1	5		Grass & grasslike (GG	No
medi trun	*Medicago truncatula*	Barrel Medic	Fabaceae (Fab	0.3	4	*		No
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	2	*		No
sola esur	*Solanum esuriale*	Quena	Solanaceae	0.1	3		Forb (FG)	No
aven fatu	*Avena fatua*	Wild Oats	Poaceae	5		*		No
conv	*Convolvulus spp.*	A Bindweed	Convolvulacea	0.1	3	*		No
mair	*Maireana spp.*	Cotton Bush, Bluebush, Fissure-weed	Chenopodiace	0.4	1		Shrub (SG)	No
ryti seta	*Rytidosperma setaceum*	Small-flowered Wallaby-grass	Poaceae	0.2	4		Grass & grasslike (GG	No
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.3	20	*		No
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	0.2	20	*		No
medi mini	*Medicago minima*	Woolly Burr Medic	Fabaceae (Fab	0.2	20	*		No
ryti	*Rytidosperma spp.*		Poaceae	0.2	20		Grass & grasslike (GG	No
cirs vulg	*Cirsium vulgare*	Spear Thistle	Asteraceae	0.1	2	*		No
mars drum	*Marsilea drummondii*	Common Nardoo	Marsileaceae	0.1	5		Fern (EG)	No
scle birc	*Sclerolaena birchii*	Galvinized Burr	Chenopodiace	0.1	1		Shrub (SG)	No
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.1	5	*		No

BAM Site Field Survey									
Project:	coleambally	**Plot Identifier**	2	**Pic 20x20**		**Pic 20x50**	X		
Survey date:	20/10/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	JG+CV		**PCT:**	16	Black Box				
GPS Easting	403606.14	**GPS Northing**	6155066.76		**Datum**	GDA94	**Zone**	55	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	clay loam		**Slope**	flat		
LandF Element			**Soil Colour**	brown		**Aspect**			
LandF Pattern			**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation	2		
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness	2		
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Grazing

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	Black Box

FUNCTION		
Function attributes for	**2**	
BAM Attribute (20x20m plot)		
Count of Native Richness	**Stratum**	**Sum**
	Tree (TG)	**1**
	Shrub (SG)	**3**
	Forb (FG)	**7**
	Grass & grasslike (GG)	**4**
	Fern (EG)	**0**
	Other (OG)	**1**
	TOTAL	**16**
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	**Stratum**	**Sum**
	Tree (TG)	**18**
	Shrub (SG)	**3.1**
	Forb (FG)	**43.5**
	Grass & grasslike (GG)	**0.5**
	Fern (EG)	**0**
	Other (OG)	**0.1**
	TOTAL Native	**65.2**
	TOTAL 'HTE'	**0**

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	**Euc**	**Non Euc**	**Hollows**
>80	3	0	3
50-79	2	0	2
30-49	0	0	0
20-29	1	0	0
10-19	0	0	0
5-9	0	0	0
<5	1	1	N/A
Length of logs (m)	43	43	

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	4%	**28.2%**	8184
	15m	10%		5223
	25m	17%		3787
	35m	50%		3486
	45m	60%		5724
Bare ground cover	5m	14%	**7.6%**	
	15m	12%		
	25m	10%		
	35m	2%		
	45m	0%		
Cryptogam cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for 2

Abbreviation	Scientific Name	Common Name	Family		Abundance	Exotic	Growth Form	High Threat
euca largiflorens	*Eucalyptus largiflorens*	Black box	Myrtaceae	18	2		Tree (TG)	No
sisy erys	*Sisymbrium erysimoides*	Smooth Mustard	Brassicaceae	10	1000	*		No
ench tome	*Enchylaena tomentosa*	Ruby Saltbush	Chenopodiace	2	50		Shrub (SG)	No
hord	*Hordeum spp.*	A Barley Grass	Poaceae	15	1000	*		No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.5	20	*		No
eina nuta nuta	*Einadia nutans subsp. nu*	Climbing Saltbush	Chenopodiace	5	80		Forb (FG)	No
atri sube	*Atriplex suberecta*		Chenopodiace	35	800		Forb (FG)	No
malv	*Malva spp.*	Mallow	Malvaceae	0.2	40	*		No
aven	*Avena spp.*	Oats	Poaceae	1	1000	*		No
scle muri	*Sclerolaena muricata*	Black Rolypoly	Chenopodiace	0.8	25		Shrub (SG)	No
loli	*Lolium spp.*	A Ryegrass	Poaceae	25	1000	*		No
chen mura	*Chenopodium murale*	Nettle-leaf Goosefoot	Chenopodiace	0.1	5	*		No
sida	*Sida spp.*	Sida (corrugata)	Malvaceae	0.1	3	*		No
poly avic	*Polygonum aviculare*	Wireweed	Polygonaceae	0.1	4	*		No
sals aust	*Salsola australis*		Chenopodiace	0.1	1		Forb (FG)	No
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1	4	*		No
scle birc	*Sclerolaena birchii*	Galvinized Burr	Chenopodiace	0.3	30		Shrub (SG)	No
Eina nuta lini	*Einadia nutans subsp. lin*	Climbing Saltbush	Chenopodiace	3	60		Forb (FG)	No
walw prol	*Walwhalleya proluta*		Poaceae	0.2	30		Grass & grasslike	No
vitt	*Vittadinia spp.*	Fuzzweed	Asteraceae	0.2	10		Forb (FG)	No
sola esur	*Solanum esuriale*	Quena	Solanaceae	0.1	4		Forb (FG)	No
conv erub	*Convolvulus erubescens*	Pink Bindweed	Convolvulacea	0.1	2		Other (OG)	No
ryti	*Rytidosperma spp.*		Poaceae	0.1	5		Grass & grasslike	No
ente ramo	*Enteropogon ramosus*	Curly Windmill Grass	Poaceae	0.1	3		Grass & grasslike	No
lepi	*Lepidium spp.*	A Peppercress	Brassicaceae	0.1	1	*		No
Rhod cory	*Rhodanthe corymbiflora*	Small White Sunray	Asteraceae	0.1	1		Forb (FG)	No
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.1	5		Grass & grasslike	No

BAM Site Field Survey

Project:	coleambally	**Plot Identifier**	3	**Pic 20x20**		**Pic 20x50**	X		
Survey date:	20/10/2021		**Compass Orientation (head of 20x20 plot)**				78		
Recorders	JG/CV/ZR		**PCT:**	16	Black Box Woodland	Moderate			
GPS Easting	403701.949	**GPS Northing**	6155038.82		**Datum**	GDA94	**Zone**	55	

Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**	Clay loam		**Slope**	flat plain		
LandF Element			**Soil Colour**	Brown		**Aspect**			
LandF Pattern	Flat		**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	2	o	
Cultivation	2	o	
Soil erosion			
Firewood			
Grazing	2	nr	
Fire Damage			
Storm Damage			
Weediness	2	r	
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

farm

Age class of trees (DBH range) , Condition of Vegetation, Hollows

50-100

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

clearing, grazing

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

Function attributes for		3
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	2
	Shrub (SG)	3
	Forb (FG)	8
	Grass & grasslike (GG)	5
	Fern (EG)	0
	Other (OG)	0
	TOTAL	18
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	12.6
	Shrub (SG)	4.1
	Forb (FG)	42.4
	Grass & grasslike (GG)	20.4
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	79.5
	TOTAL 'HTE'	0.1

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	1
50-79	0	0	
30-49	0	0	
20-29	0	0	
10-19	0	0	
5-9	0	0	
<5	0	0	N/A
Length of logs (m)		4.5	

BAM Attributes (1 x 1m Plots)				
	Tape length	% cover	Average %	Photos
Litter Cover	5m	3%	9.6%	
	15m	5%		
	25m	15%		
	35m	10%		
	45m	15%		
Bare ground cover	5m	2%	12.4%	
	15m	5%		
	25m	10%		
	35m	20%		
	45m	25%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for 3

Abbreviation	Scientific Name	Common Name	Family		Abundance	Exotic	Growth Form	High Threat?
sisy erys	*Sisymbrium erysimoides*	Smooth Mustard	Brassicaceae	5	100	*		No
malv	*Malva spp.*	Mallow	Malvaceae	2	85	*		No
eina nuta lini	*Einadia nutans subsp. lin*	Climbing Saltbush	Chenopodiace	10	82		Forb (FG)	No
eina nuta nuta	*Einadia nutans subsp. nu*	Climbing Saltbush	Chenopodiace	6	70		Forb (FG)	No
hord	*Hordeum spp.*	A Barley Grass	Poaceae	15	1000	*		No
loli	*Lolium spp.*	A Ryegrass	Poaceae	5	1000	*		No
sonc oler	*Sonchus oleraceus*	Common Sowthistle	Asteraceae	0.1	2	*		No
atri sube	*Atriplex suberecta*		Chenopodiace	25	200		Forb (FG)	No
scle muri	*Sclerolaena muricata*	Black Rolypoly	Chenopodiace	3	53		Shrub (SG)	No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.8	20	*		No
conv	*Convolvulus spp.*	A Bindweed	Convolvulacea	0.1	64	*		No
ench tome	*Enchylaena tomentosa*	Ruby Saltbush	Chenopodiace	0.1	5		Shrub (SG)	No
sola nigr	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	4	*		No
euca larg	*Eucalyptus largiflorens*	Black Box	Myrtaceae	12.5	1		Tree (TG)	No
Sola esur	*Solanum esuriale*	Quena	Solanaceae	0.1	7		Forb (FG)	No
scle birc	*Sclerolaena birchii*	Galvinized Burr	Chenopodiace	1	24		Shrub (SG)	No
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	20	700		Grass & grasslik	No
Ryti	*Rytidosperma spp.*		Poaceae	0.1	6		Grass & grasslik	No
poly avic	*Polygonum aviculare*	Wireweed	Polygonaceae	0.1	2	*		No
vitt cune	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	1	35		Forb (FG)	No
sida	*Sida spp.*		Malvaceae	0.1	10	*		No
aven	*Avena spp.*	Oats	Poaceae	3	1000	*		No
echi plan	*Echium plantagineum*	Patterson's Curse	Boraginaceae	0.1	4	*		No
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.1	10		Grass & grasslik	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	3		Forb (FG)	No
walw prol	*Walwhalleya proluta*		Poaceae	0.1	4		Grass & grasslik	No
acac pend	*Acacia pendula*	Weeping Myall	Fabaceae (Mir	0.1	1		Tree (TG)	No
Lyci fero	*Lycium ferocissimum*	African Boxthorn	Solanaceae	0.1	1	*		HTE
Sals aust	*Salsola australis*		Chenopodiace	0.1	1		Forb (FG)	No
unid forb	*#N/A*	#N/A	#N/A	0.1	1		Forb (FG)	
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	0.1	4	*		No
Ente acic	*Enteropogon acicularis*	Curly Windmill Grass	Poaceae	0.1	3		Grass & grasslik	No
medi	*Medicago spp.*	A Medic	Fabaceae (Fab	0.1	1	*		No
Brom	*Bromus spp.*	A Brome	Poaceae	0.1	1	*		No
Lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	1	*		No
Chen mura	*Chenopodium murale*	Nettle-leaf Goosefoot	Chenopodiace	0.1	1	*		No
Lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	1	*		No
Trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.1	1	*		No

BAM Site Field Survey

Project:	coleambally	**Plot Identifier**	4	**Pic 20x20**		**Pic 20x50**	X	
Survey date:	20/10/2021		**Compass Orientation (head of 20x20 plot)**					
Recorders	JG/CV		**PCT:**	26	Roadside	weeping myall	moderate condition	
GPS Easting	403443.319	**GPS Northing**	6155159.93		**Datum**	GDA94	**Zone**	55
Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	clay loam		**Slope**	flat plain	
LandF Element			**Soil Colour**	brown/red		**Aspect**		
LandF Pattern			**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**	canal 50m to north east	

Plot Disturbance

	Severity	Age	Observational Evidence
Clearing	3	old	
Cultivation	1	old	
Soil erosion	0		
Firewood	0		
Grazing	2	nr	
Fire Damage	0		
Storm Damage	0		
Weediness	2	old	
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

road corridor

Age class of trees (DBH range) , Condition of Vegetation, Hollows

10-20 years

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

weeds road works

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

weeping myall eec

Dominant Species outside Plot	**Weeping myall eec**

FUNCTION		
Function attributes for	**4**	
BAM Attribute (20x20m plot)		
Count of Native Richness	**Stratum**	**Sum**
	Tree (TG)	**1**
	Shrub (SG)	**2**
	Forb (FG)	**18**
	Grass & grasslike (GG)	**8**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL	**29**
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	**Stratum**	**Sum**
	Tree (TG)	**1**
	Shrub (SG)	**0.4**
	Forb (FG)	**6**
	Grass & grasslike (GG)	**33**
	Fern (EG)	**0**
	Other (OG)	**0**
	TOTAL Native	**40.4**
	TOTAL 'HTE'	**10**

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	**Euc**	**Non Euc**	**Hollows**
>80	0	0	
50-79	0	0	
30-49	0	0	
20-29	0	4	
10-19	0	4	
5-9	0	3	
<5	1	2	N/A
Length of logs (m)		4.5	

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	2%	**17.2%**	
	15m	10%		
	25m	7%		
	35m	7%		
	45m	60%		
Bare ground cover	5m	40%	**23.8%**	
	15m	5%		
	25m	65%		
	35m	4%		
	45m	5%		
Cryptogam cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for 4

Abbreviation	Scientific Name	Common Name	Family		Abundance	Exotic	Growth Form	High Threat?
acac pend	*Acacia pendula*	Acacia pendula population in the Hunter catchment	Fabaceae (Mir	1	5		Tree (TG)	No
eina nuta lini	*Einadia nutans subsp. lini*	Climbing Saltbush	Chenopodiace	0.3	30		Forb (FG)	No
loli	*Lolium spp.*	A Ryegrass	Poaceae	5	1000	*		No
sals aust	*Salsola australis*			0.1	25		Forb (FG)	No
scle muri	*Sclerolaena muricata*	Black Rolypoly	Chenopodiace	0.1	8		Shrub (SG)	No
brom dian	*Bromus diandrus*	Great Brome	Poaceae	10	1000	*		HTE
ench tome	*Enchylaena tomentosa*	Ruby Saltbush	Chenopodiace	0.3	30		Shrub (SG)	No
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	1	100		Grass & grasslike (GG)	No
echi plan	*Echium plantagineum*	Patterson's Curse	Boraginaceae	0.1	25	*		No
vitt	*Vittadinia spp.*	Fuzzweed	Asteraceae	2	120		Forb (FG)	No
hord	*Hordeum spp.*	A Barley Grass	Poaceae	0.2	20	*		No
eina nuta nuta	*Einadia nutans subsp. nu*	Climbing Saltbush	Chenopodiace	0.2	20		Forb (FG)	No
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	1	300	*		No
cras sieb	*Crassula sp.*	Australian Stonecrop	Crassulaceae	0.2	1000		Forb (FG)	No
sola esur	*Solanum esuriale*	Quena	Solanaceae	0.1	8		Forb (FG)	No
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	1	160		Grass & grasslike (GG)	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	8		Forb (FG)	No
Medi	*Medicago spp.*	A Medic	Fabaceae (Fab	0.1	6	*		No
ryti hairy leaf	#N/A	#N/A	#N/A	0.5	80		Grass & grasslike (GG)	
cham drum	*Chamaesyce drummondi*	Caustic Weed	Euphorbiacea	0.1	4		Forb (FG)	No
aust aris	*Austrostipa aristiglumis*	Plains Grass	Poaceae	30	1000		Grass & grasslike (GG)	No
conv	*Convolvulus spp.*	A Bindweed	Convolvulacea	0.1	7	*		No
arct cale	*Arctotheca calendula*	Capeweed	Asteraceae	0.1	10	*		No
ente acic	*Enteropogon acicularis*	Curly Windmill Grass	Poaceae	0.1	10		Grass & grasslike (GG)	No
asteraceae	#N/A	Plover Daisy	#N/A	0.1	1		Forb (FG)	
aven	*Avena spp.*	Oats	Poaceae	4	1000	*		No
sida	*Sida spp.*	Corrugata	Malvaceae	0.1	3	*		No
aste juve unid.	#N/A	#N/A	#N/A	0.1	1		Forb (FG)	
Rhod cory	*Rhodanthe corymbiflora*	Small White Sunray	Asteraceae	0.1	4		Forb (FG)	No
Vitt	*Vittadinia spp.*	Fuzzweed	Asteraceae	0.1	4		Forb (FG)	No
erod crin	*Erodium crinitum*	Blue Crowfoot	Geraniaceae	0.1	1		Forb (FG)	No
tara offi	*Taraxacum officinale*	Dandelion	Asteraceae	0.1	1	*		No
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	0.1	6	*		No
cype	*Cyperus spp.*	Sedge	#N/A	0.2	10		Grass & grasslike (GG)	No
unid forb kk	#N/A	#N/A	#N/A	0.1	2		Forb (FG)	
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	2	100	*		No
epil bill	*Epilobium billardierianum*		Onagraceae	0.1	1		Forb (FG)	No
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	20	*		No
good	*Goodenia spp.*		Goodeniaceae	0.1	60		Forb (FG)	No
lepi	*Lepidium spp.*	A Peppercress	Brassicaceae	0.1	5	*		No
junc	*Juncus spp.*	A Rush	Juncaceae	0.1	20		Grass & grasslike (GG)	No
un id forb		Unid. Forb		0.1	1		Forb (FG)	
both macr	*Bothriochloa macra*	Red Grass	Poaceae	0.1	30		Grass & grasslike (GG)	No
atri sube	*Atriplex suberecta*		Chenopodiace	2	53		Forb (FG)	No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.1	1	*		No

BAM Site Field Survey									
Project:	coleambally	**Plot Identifier**	5	**Pic 20x20**		**Pic 20x50**			
Survey date:	20/10/2021		**Compass Orientation (head of 20x20 plot)**						
Recorders	JG/CV		**PCT:**	26	Roadside	ng myall Low Condition			
GPS Easting	403776.091	**GPS Northing**	6155119.86		**Datum**	GDA94	**Zone**	55	
Landform			**Soils**			**Drainage & Slope**			
Morphology			**Soil Texture**			**Slope**			
LandF Element			**Soil Colour**			**Aspect**			
LandF Pattern	Plain		**Soil Depth**			**Drainage**			
Microrelief			**Geology**			**Watercourses**			

Plot Disturbance			
	Severity	**Age**	**Observational Evidence**
Clearing	3	Roadside edge	
Cultivation	0		
Soil erosion	0		
Firewood	0		
Grazing	0		
Fire Damage	0		
Storm Damage	0		
Weediness	3		
Other	0		

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Roadside

Age class of trees (DBH range) , Condition of Vegetation, Hollows

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Myall TEC

Dominant Species outside Plot	**Weeping Myall**

FUNCTION		
Function attributes for		**5**
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	1
	Shrub (SG)	0
	Forb (FG)	11
	Grass & grasslike (GG)	6
	Fern (EG)	0
	Other (OG)	0
	TOTAL	18
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	2
	Shrub (SG)	0
	Forb (FG)	3.2
	Grass & grasslike (GG)	15.5
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	20.7
	TOTAL 'HTE'	50.1

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	1	N/A
Length of logs (m)		8.5 m	

BAM Attributes (1 x 1m Plots)			
	Tape length	% cover	Average %
Litter Cover	5m	1%	0.4%
	15m	1%	
	25m	0%	
	35m	0%	
	45m	0%	
Bare ground cover	5m	6%	1.8%
	15m	3%	
	25m	0%	
	35m	0%	
	45m	0%	
Cryptogam cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	
Rock Cover	5m	0%	0.0%
	15m	0%	
	25m	0%	
	35m	0%	
	45m	0%	

COMPOSITION & STRUCTURE

Species recorded for 5

Abbreviation	Scientific Name	Common Name	Family		Abundance	Exotic	Growth Form	High Threat?
acac pend	*Acacia pendula*	Weeping Myall	Fabaceae (Mi	2	8		Tree (TG)	No
brom dian	*Bromus diandrus*	Great Brome	Poaceae	50	1000	*		HTE
aven fatu	*Avena fatua*	Wild Oats	Poaceae	5	1000	*		No
walw prol	*Walwhalleya proluta*		Poaceae	0.3	30		Forb (FG)	No
Aust aris	*Austrostipa aristiglumis*	Plains Grass	Poaceae	15	1000		Grass & grasslik	No
loli	*Lolium spp.*	A Ryegrass	Poaceae	1	500	*		No
echi plan	*Echium plantagineum*	Patterson's Curse	Boraginaceae	0.1	10	*		No
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.1	8	*		No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	0.1	1	*		No
rume cris	*Rumex crispus*	Curled Dock	Polygonaceae	0.1	3	*		No
medi sati	*Medicago sativa*	Lucerne	Fabaceae (Fab	0.1	1			
trif arve	*Trifolium arvense*	Haresfoot Clover	Fabaceae (Fab	1	100	*		No
Erod crin	*Erodium crinitum*	Blue Crowfoot	Geraniaceae	0.1	4		Forb (FG)	No
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.2	50		Grass & grasslik	No
Ench tome	*Enchylaena tomentosa*	Ruby Saltbush	Chenopodiace	0.1	2		Forb (FG)	No
Vitt	*Vittadinia spp.*	Fuzzweed	Asteraceae	0.1	2		Forb (FG)	No
Cras colo	*Crassula colorata*	Stonecrop	Crassulaceae	0.1	20		Forb (FG)	No
oxal pere	*Oxalis perennans*		Oxalidaceae	0.1	8		Forb (FG)	No
atri sube	*Atriplex suberecta*		Chenopodiace	0.1	2		Forb (FG)	No
brom dian	*Bromus diandrus*	Great Brome	Poaceae	0.1	30	*		HTE
Trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	1	100	*		No
pseu lute	*Pseudognaphalium luteo*	Jersey Cudweed	Asteraceae	0.1	3		Forb (FG)	No
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	4	*		No
Aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.1	4		Grass & grasslik	No
Ryti	*Rytidosperma spp.*	Wallaby Grass	Poaceae	0.1	2		Grass & grasslik	No
Sola esur	*Solanum esuriale*	Quena	Solanaceae	0.1	1		Forb (FG)	No

BAM Site Field Survey

Project:	21-403	**Plot Identifier**	6			**Pic 20x50**	Yes	
Survey date:	8/12/2021	exotic	**Compass Orientation (head of 20x20 plot)**					
Recorders	CV/ZR	cv & zr	**PCT:**					
GPS Easting	404099.57	**GPS Northing**	6155168.33		**Datum**	GDA 94	**Zone**	55

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**			**Slope**	SE	
LandF Element			**Soil Colour**			**Aspect**	210SW	
LandF Pattern	Plain		**Soil Depth**			**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	3	0	
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness	3	0	
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use
Age class of trees (DBH range) , Condition of Vegetation, Hollows
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	

FUNCTION		
Function attributes for	**6**	
BAM Attribute (20x20m plot)		
Count of Native Richness	**Stratum**	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**2**
	Forb (FG)	**5**
	Grass & grasslike (GG)	**2**
	Fern (EG)	**0**
	Other (OG)	**1**
	TOTAL	**10**
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	**Stratum**	**Sum**
	Tree (TG)	**0**
	Shrub (SG)	**0.2**
	Forb (FG)	**0.4**
	Grass & grasslike (GG)	**0.2**
	Fern (EG)	**0**
	Other (OG)	**0.1**
	TOTAL Native	**0.9**
	TOTAL 'HTE'	**#REF!**

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	**Euc**	**Non Euc**	**Hollows**
>80	0	0	0
50-79	0	0	0
30-49	0	0	0
20-29	0	0	0
10-19	0	0	0
5-9	0	0	0
<5	0	0	N/A
Length of logs (m)		0	

BAM Attributes (1 x 1m Plots)				
	Tape length	**% cover**	**Average %**	**Photos**
Litter Cover	5m	40%	**27.0%**	3559
	15m	30%		3560
	25m	30%		3561
	35m	25%		3562
	45m	10%		3563
Bare ground cover	5m	5%	**19.0%**	
	15m	3%		
	25m	25%		
	35m	7%		
	45m	55%		
Cryptogam cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	**0.0%**	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for 6

Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
sonc	*Sonchus spp.*	Sowthistle	Asteraceae	3	500	*		No
aven	*Avena spp.*	Oats	Poaceae	0.1	20	*		No
echi	*Echinochloa spp.*		Poaceae	0.1	100	*		No
atri	*Atriplex spp.*	A Saltbush	Chenopodiace	0.1	4		Shrub (SG)	No
sola esur	*Solanum esuriale*	Quena	Solanaceae	0.3	300		Forb (FG)	No
malv	*Malva spp.*	Mallow	Malvaceae	3	700	*		No
wahl	*Wahlwhalia*		Poaceae	0.1	40		Grass & grasslike (GG)	No
marr vulg	*Marrubium vulgare*	White Horehound	Lamiaceae	3	1000	*		No
bras	*Brassica spp.*			0.1	10	*		No
boer	*Boerhavia spp.*		Nyctaginacea	0.1	15		Forb (FG)	No
ryti	*Rytidosperma spp.*		Poaceae	0.1	5		Grass & grasslike (GG)	No
eina	*Einadia spp.*		Chenopodiace	0.1	1		Forb (FG)	No
lepi	*Lepidium spp.*	A Peppercress	Brassicaceae	0.1	4	*		No
erod	*Erodium spp.*	Crowfoot	Geraniaceae	0.1	3		Forb (FG)	No
scle muri	*Sclerolaena*	Black Rolypoly	Amaranthace	0.1	5		Shrub (SG)	No
unid forb bipinnate	*#N/A*	#N/A	#N/A	0.1	1		Forb (FG)	
conv	*Convolvulus spp.*	A Bindweed	Convolvulacea	0.1	4		Other (OG)	No
phal	*Phalaris spp.*		Poaceae	0.1	5	*		No
lact serr	*Lactuca serriola*	Prickly Lettuce	Asteraceae	0.3	100	*		No
cony	*Conyza spp.*	A Fleabane	Asteraceae	0.1	10	*		No
medi	*Medicago spp.*	A Medic	Fabaceae (Fab	0.1	1	*		No

BAM Site Field Survey								
Project:	22-522 Coleambally	Plot Identifier	7	Pic 20x20		Pic 20x50	x	
Survey date:	8/11/2022		Compass Orientation (head of 20x20 plot)				201	
Recorders	CV & ZR		PCT:	16 Grassland Low				
GPS Easting	404284	GPS Northing	6155162		Datum		Zone	55
Landform			**Soils**			**Drainage & Slope**		
Morphology			Soil Texture	clay loam		Slope	flat	
LandF Element			Soil Colour	grey/light brown		Aspect		
LandF Pattern			Soil Depth			Drainage		
Microrelief			Geology			Watercourses	manmade canal within 40m	

Plot Disturbance			
	Severity	Age	Observational Evidence
Clearing	3		no trees, mown area around transmission station
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness			
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information	
Current land use	
mown area, edge of substation	
Age class of trees (DBH range) , Condition of Vegetation, Hollows	
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)	
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)	
Dominant Species outside Plot	austrostipa sp

Function attributes for	7

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	3
	Forb (FG)	7
	Grass & grasslike (GG)	5
	Fern (EG)	0
	Other (OG)	0
	TOTAL	15

BAM Attribute (20x20m plot)		
	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0
	Shrub (SG)	0.9
	Forb (FG)	0.7
	Grass & grasslike (GG)	1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	2.6
	TOTAL 'HTE'	0

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	0		
50-79	0		
30-49	0		
20-29	0		
10-19	0		
5-9	0		
<5	0		N/A
Length of logs (m)	0		

BAM Attributes (1 x 1m Plots)				
	Tape length	% cover	Average %	Photos
Litter Cover	5m	5%	15.0%	
	15m	30%		
	25m	5%		
	35m	15%		
	45m	20%		
Bare ground cover	5m	40%	9.8%	
	15m	3%		
	25m	3%		
	35m	0%		
	45m	3%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

Species recorded for	7							
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
aust scab	*Austrostipa scabra*	Speargrass	Poaceae	0.1			Grass & grasslike (GG)	No
vulp	*Vulpia spp.*	Rat's-tail Fescue	Poaceae	0.1	40	*		No
aust	*Austrostipa spp*	Speargrass	Poaceae	0.1	50		Grass & grasslike (GG)	No
brom hord	*Bromus hordeaceus*	Soft Brome	Poaceae	0.1		*		No
loli	*Lolium spp.*	A Ryegrass	Poaceae	0.2	50	*		No
aven	*Avena spp.*	Oats	Poaceae	0.15		*		No
sonc	*Sonchus spp.*	Sowthistle	Asteraceae	15	250	*		No
lact	*Lactuca spp.*		Asteraceae	0.1	100	*		No
trif	*Trifolium spp.*	A Clover	Fabaceae (Fab	12	100+	*		No
arct cale	*Arctotheca calendula*	Capeweed	Asteraceae	0.1	8	*		No
sola esur	*Solanum esuriale*	Quena	Solanaceae	0.1	2		Forb (FG)	No
unid forb	*Unidentified forb*			0.1	1		Forb (FG)	No
hord	*Hordeum spp.*	A Barley Grass	Poaceae	0.2	50	*		No
chlo trun	*Chloris truncata*	Windmill Grass	Poaceae	0.2	53		Grass & grasslike (GG)	No
rhod cory	*Rhodanthe corymbiflora*	Small White Sunray	Asteraceae	0.1	1		Forb (FG)	No
walw prol	*Walwhalleya proluta*		Poaceae	0.5	70		Grass & grasslike (GG)	No
scle	*Sclerolaena spp*		Caryophyllace	0.1	21		Shrub (SG)	No
mair	*Maireana spp.*	Cotton Bush, Bluebush, Fissure-	Chenopodiace	0.7	252		Shrub (SG)	No
unid forb	*Unidentified forb 2*			0.1	1		Forb (FG)	No
atri	*Atriplex spp.*	A Saltbush	Chenopodiace	0.1	1		Shrub (SG)	No
erod crin	*Erodium crinitum*	Blue Crowfoot	Geraniaceae	0.1	1		Forb (FG)	No
poly bell	*Polygonum bellardii*	Tree Hogweed	Polygonaceae	0.1	1	*		No
aust	*Austrostipa spp 2*	Speargrass	Poaceae	0.1	40		Grass & grasslike (GG)	No
eina	*Einadia spp.*		Chenopodiace	0.1	3		Forb (FG)	No
trif angu	*Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae (Fab	0.1	10	*		No
lepi afri	*Lepidium africanum*	Common Peppercress	Brassicaceae	0.1	2	*		No
cham drum	*Chamaesyce drummondii*	Caustic Weed	Euphorbiacea	0.1	1		Forb (FG)	No
medi	*Medicago spp.*	A Medic	Fabaceae (Fab	12		*		No

BAM Site Field Survey (All orange cells are for data entry, please do not edit other cells or work sheets as they contain formulas)

Project number:	22-522	**Plot Identifier:**	8	**Pic 20x20 Head (ID#)**		**Pic 20x50 Tail (ID#)**		
Survey date: (01/01/2021)	8/05/2023					**Compass Orientation (head of 20x20 plot):**	20	
Recorders (full name):	Jessie Russo		**PCT:**	26_Exotic		**Veg Zone condition (low, mod, high):**	low condition	
GPS Easting:	404286	**GPS Northing:**	6155216		**Datum (GDA)**	94	**Zone (54/55/56)**	55
Site location description (eg 2km west of Hay along Mid Western Highway)			Area surrounding Transgrid substation, north of Coleambally Solar Farm					

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	loam		**Slope**		
LandF Element			**Soil Colour**	dark brown		**Aspect**		
LandF Pattern			**Soil Depth**	Deep		**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing	1	O	Lack of trees, Weeping Myall regenerating near by
Cultivation	0		
Soil erosion	0		
Firewood	0		Fallen timber within the plot is old power poles
Grazing	0		
Fire Damage	0		
Storm Damage	0		
Weediness	2	R	
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Plot is located near a depression, depression was formed from previous excavation work

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**Weeping Myall (regenerating)**

BAM Site Field Survey (All orange cells are for data entry, please do not edit other cells or work sheets as they contain formulas)

Project number:	22-522	**Plot Identifier:**	9	**Pic 20x20 Head (ID#)**		**Pic 20x50 Tail (ID#)**		
Survey date: (01/01/2021)	8/05/2023					**Compass Orientation (head of 20x20 plot):**	5	
Recorders (full name):	Jessie Russo		**PCT:**	16_Low		**Veg Zone condition (low, mod, high):**		
GPS Easting:	404276	**GPS Northing:**	6155071		**Datum (GDA)**	95	**Zone (54/55/56)**	55
Site location description (eg 2km west of Hay along Mid Western Highway)			Area surrounding Transgrid substation, north of Coleambally Solar Farm					

Landform			**Soils**			**Drainage & Slope**		
Morphology			**Soil Texture**	Loam		**Slope**		
LandF Element			**Soil Colour**	Dark brown		**Aspect**		
LandF Pattern			**Soil Depth**	deep		**Drainage**		
Microrelief			**Geology**			**Watercourses**		

Plot Disturbance

	Severity	**Age**	**Observational Evidence**
Clearing			
Cultivation			
Soil erosion			
Firewood			
Grazing			
Fire Damage			
Storm Damage			
Weediness	2	R	
Other			

Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe **Age:** R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Additional information

Current land use

Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)

Recently slashed

Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)

Dominant Species outside Plot	**Black Box to the west, Planted Casuarina to the east**

FUNCTION

Function attributes for		9

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	4
	Forb (FG)	9
	Grass & grasslike (GG)	2
	Fern (EG)	0
	Other (OG)	0
	TOTAL	15

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0
	Shrub (SG)	1.5
	Forb (FG)	1.4
	Grass & grasslike (GG)	10.1
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	13
	TOTAL 'HTE'	0.2

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	0		
50-79	0		
30-49	0		
20-29	0		
10-19	0		
5-9	0		
<5	0		N/A
Length of logs (m)		0	

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photo ID #
Litter Cover	5m	80%	75.0%	
	15m	50%		
	25m	70%		
	35m	85%		
	45m	90%		
Bare ground cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

Total Cover (>100%)	101%
Native cover	13%
Exotic cover	13%
Other Ground Cover	75%

0.1%	63 x 63cm
0.5%	1.4 x 1.4m
1.0%	2 x 2m
5.0%	4 x 5m
25.0%	10 x 10m

COMPOSITION & STRUCTURE

Species recorded for 9

Genus	Species	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Enchylaena	tomentosa	*Enchylaena tomentosa*	Ruby Saltbush	Chenopodiaceae	0.3	20	0	Shrub (SG)	No
Chenopodium	murale	*Chenopodium murale*	Nettle-leaf Goosefoot	Chenopodiaceae	1	100	*		No
Avena	spp.	*Avena spp.*	Oats	Poaceae	5	100	*		No
Echium	plantagineum	*Echium plantagineum*	Patterson's Curse	Boraginaceae	1	200	*		No
Erodium	spp.	*Erodium spp.*	0	0	0.1	20	0	Forb (FG)	No
Sonchus	spp.	*Sonchus spp.*	0	Asteraceae	0.2	200	0	Forb (FG)	No
Sclerolaena	muricata	*Sclerolaena muricata*	Black Rolypoly	Chenopodiaceae	0.1	10	0	Shrub (SG)	No
Conyza	bonariensis	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No
Arctotheca	calendula	*Arctotheca calendula*	Capeweed	Asteraceae	0.1	3	*		No
Vittadinia	cuneata	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	0.1	3	0	Forb (FG)	No
Chamaesyce	drummondii	*Chamaesyce drummondii*	Caustic Weed	Euphorbiaceae	0.1	10	0	Forb (FG)	No
Solanum	esuriale	*Solanum esuriale*	Quena	Solanaceae	0.2	200	0	Forb (FG)	No
Maireana	spp.	*Maireana spp.*	Cotton Bush, Bluebush,	Chenopodiaceae	0.1	5	0	Shrub (SG)	No
Phalaris	spp.	*Phalaris spp.*	0	Poaceae	0.5	30	*		No
Einadia	nutans	*Einadia nutans*	Climbing Saltbush	Chenopodiaceae	0.4	40	0	Forb (FG)	No
Chloris	truncata	*Chloris truncata*	Windmill Grass	Poaceae	0.1	10	0	Grass & grasslike	No
Sanguisorba	minor subsp. muricata	*Sanguisorba minor subsp.*	Sheep's Burnet	Rosaceae	0.1	20	*		No
Panicum	spp.	*Panicum spp.*	Panicum	Poaceae	10	100	0	Grass & grasslike	No
Oxalis	perennans	*Oxalis perennans*	0	Oxalidaceae	0.1	30	0	Forb (FG)	No
Senecio	spp.	*Senecio spp.*	0	Asteraceae	0.1	1	0	Forb (FG)	No
Atriplex	semibaccata	*Atriplex semibaccata*	Creeping Saltbush	Chenopodiaceae	1	30	0	Shrub (SG)	No
Paspalum	dilatatum	*Paspalum dilatatum*	Paspalum	Poaceae	0.2	30	*		HTE
Lolium	perenne	*Lolium perenne*	Perennial Ryegrass	Poaceae	5	500	*		No
Sida	corrugata	*Sida corrugata*	Corrugated Sida	Malvaceae	0.1	10	0	Forb (FG)	No
Trifolium	spp.	*Trifolium spp.*	A Clover	Fabaceae (Faboideae)	0.1	5	*		No
Silybum	marianum	*Silybum marianum*	Variegated Thistle	Asteraceae	0.1	1	*		No
			0	0			0		FALSE
			0	0			0		FALSE
			0	0			0		FALSE

FUNCTION

Function attributes for		8

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of Native Richness	Tree (TG)	0
	Shrub (SG)	3
	Forb (FG)	6
	Grass & grasslike (GG)	2
	Fern (EG)	0
	Other (OG)	0
	TOTAL	11

BAM Attribute (20x20m plot)

	Stratum	Sum
Count of cover abundance (native vascular plants)	Tree (TG)	0
	Shrub (SG)	19.1
	Forb (FG)	0.9
	Grass & grasslike (GG)	45.4
	Fern (EG)	0
	Other (OG)	0
	TOTAL Native	65.4
	TOTAL 'HTE'	0.5

BAM Attribute (20 x 50m plot) Tree Stem Counts

DBH (cm)	Euc	Non Euc	Hollows
>80	0		
50-79	0		
30-49	0		
20-29	0		
10-19	0		
5-9	0		
<5	0		N/A
Length of logs (m)		43	

BAM Attributes (1 x 1m Plots)

	Tape length	% cover	Average %	Photo ID #
Litter Cover	5m	2%	2.2%	
	15m	1%		
	25m	1%		
	35m	5%		
	45m	2%		
Bare ground cover	5m	10%	6.0%	
	15m	20%		
	25m	0%		
	35m	0%		
	45m	0%		
Cryptogam cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		
Rock Cover	5m	0%	2.0%	
	15m	10%		
	25m	0%		
	35m	0%		
	45m	0%		

Total Cover (>100%)	122%
Native cover	65%
Exotic cover	47%
Other Ground Cover	10%

0.1%	63 x 63cm
0.5%	1.4 x 1.4m
1.0%	2 x 2m
5.0%	4 x 5m
25.0%	10 x 10m

COMPOSITION & STRUCTURE

Species recorded for 8

Genus	Species	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?
Dichanthium	sericeum	*Dichanthium sericeum*	Queensland Bluegrass	Poaceae	45	1000	0	Grass & grasslike	No
Austrostipa	spp.	*Austrostipa spp.*	A Speargrass	Poaceae	0.4	60	0	Grass & grasslike	No
Atriplex	semibaccata	*Atriplex semibaccata*	Creeping Saltbush	Chenopodiaceae	15	50	0	Shrub (SG)	No
Trifolium	spp.	*Trifolium spp.*	A Clover	Fabaceae (Faboideae)	0.1	500	*		No
Lactuca	serriola	*Lactuca serriola*	Prickly Lettuce	Asteraceae	5	400	*		No
Vicia	sativa	*Vicia sativa*	Common vetch	Fabaceae (Faboideae)	0.1	3	*		No
Panicum	capillare	*Panicum capillare*	Witchgrass	Poaceae	40	300	*		No
Sclerolaena	muricata	*Sclerolaena muricata*	Black Rolypoly	Chenopodiaceae	4	30	0	Shrub (SG)	No
Vittadinia	cuneata	*Vittadinia cuneata*	A Fuzzweed	Asteraceae	0.3	30	0	Forb (FG)	No
Wahlenbergia	spp.	*Wahlenbergia spp.*	Bluebell	Campanulaceae	0.1	20	0	Forb (FG)	No
Conyza	bonariensis	*Conyza bonariensis*	Flaxleaf Fleabane	Asteraceae	0.1	20	*		No
Sonchus	spp.	*Sonchus spp.*	0	Asteraceae	0.1	50	0	Forb (FG)	No
Maireana	brevifolia	*Maireana brevifolia*	0	Chenopodiaceae	0.1	20	0	Shrub (SG)	No
Trifolium	subterraneum	*Trifolium subterraneum*	Subterranean Clover	Fabaceae (Faboideae)	0.2	1000	*		No
Oxalis	spp.	*Oxalis spp.*	0	Oxalidaceae	0.2	500	0	Forb (FG)	No
Chamaesyce	drummondii	*Chamaesyce drummondii*	Caustic Weed	Euphorbiaceae	0.1	20	0	Forb (FG)	No
Medicago	spp.	*Medicago spp.*	A Medic	Fabaceae (Faboideae)	0.1	1000	*		No
Epilobium	billardierianum	*Epilobium billardierianum*	0	Onagraceae	0.1	2	0	Forb (FG)	No
Plantago	lanceolata	*Plantago lanceolata*	Lamb's Tongues	Plantaginaceae	0.1	2	*		No
Polygonum	aviculare	*Polygonum aviculare*	Wireweed	Polygonaceae	0.2	6	*		No
Solanum	nigrum	*Solanum nigrum*	Black-berry Nightshade	Solanaceae	0.1	1	*		No
Paspalum	dilatatum	*Paspalum dilatatum*	Paspalum	Poaceae	0.5	30	*		HTE
			0	0			0		FALSE
			0	0			0		FALSE
			0	0			0		FALS

C.2 Plot photos

BAM Plot 1	
Head of Plot	5 m Litter Plot
15m Litter Plot	25 m Litter Plot
35m Litter Plot	45 m Litter Plot

BAM Plot 2

Head of Plot

5 m Litter Plot

15m Litter Plot

25 m Litter Plot

35m Litter Plot	45 m Litter Plot
BAM Plot 3	
Head of Plot	5 m Litter Plot
15m Litter Plot	25 m Litter Plot

35m Litter Plot

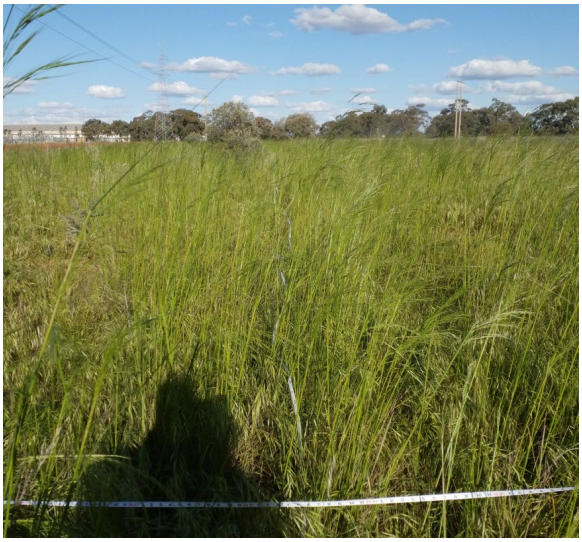
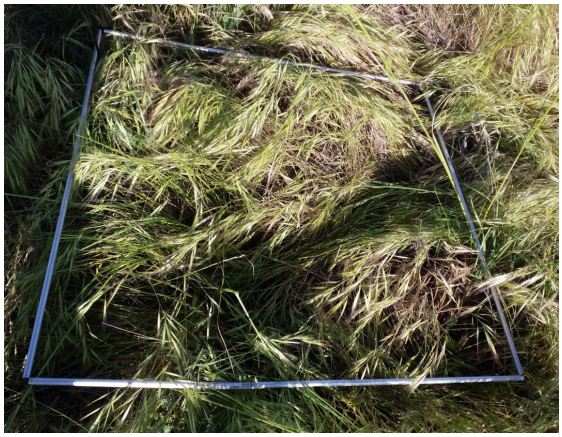
45 m Litter Plot

BAM Plot 4

Head of Plot

5 m Litter Plot

15m Litter Plot	25 m Litter Plot
35m Litter Plot	45 m Litter Plot
BAM PLOT 5	
Head of Plot	5 m Litter Plot

	
15m Litter Plot	25 m Litter Plot
	
35m Litter Plot	45 m Litter Plot

BAM PLOT 6	
Head of Plot	5 m Litter Plot
15m Litter Plot	25 m Litter Plot
35m Litter Plot	45 m Litter Plot

BAM PLOT 7

Head of Plot

5 m Litter Plot

15m Litter Plot

25 m Litter Plot

35m Litter Plot	45 m Litter Plot

BAM Plot 8	
Head of Plot	5m Litter Plot
15 m Litter Plot	25m Litter Plot
35m Litter Plot	45m Litter Plot
BAM Plot 9	
Head of Plot	5m Litter Plot

15 m Litter Plot

25m Litter Plot

35m Litter Plot

45m Litter Plot

C.3 Plot 8 VI Score comparison

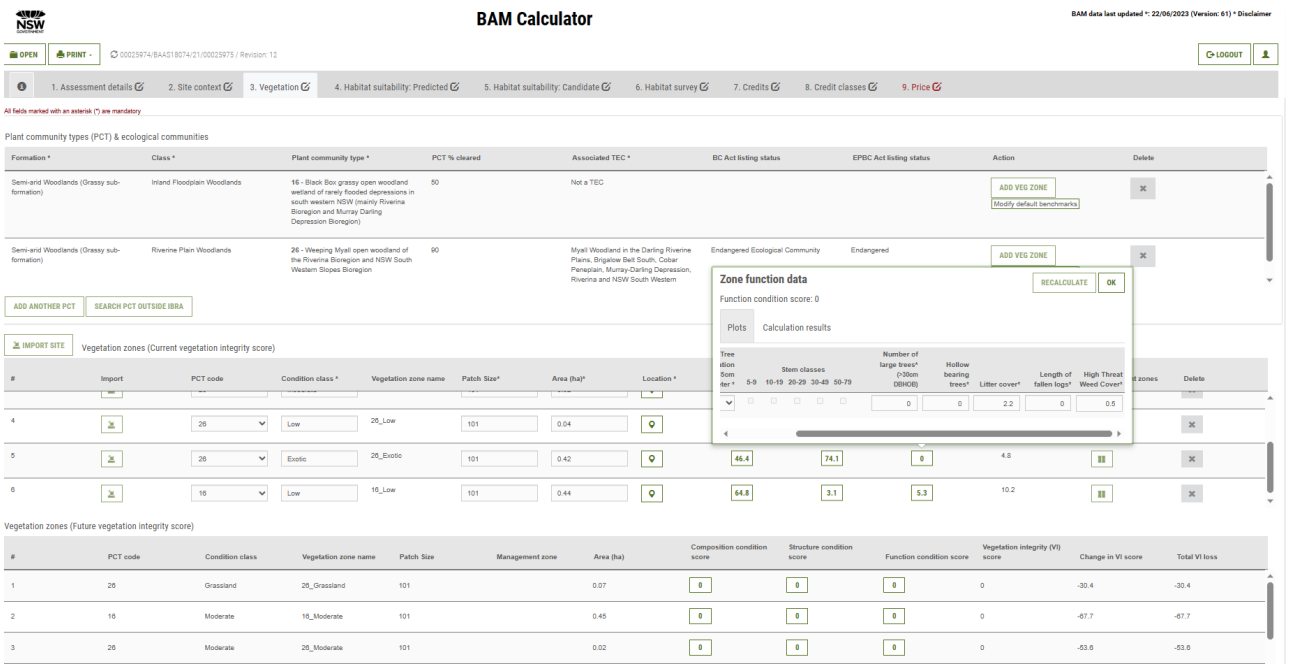


Figure 13-1 Plot 8 VI score without the power poles

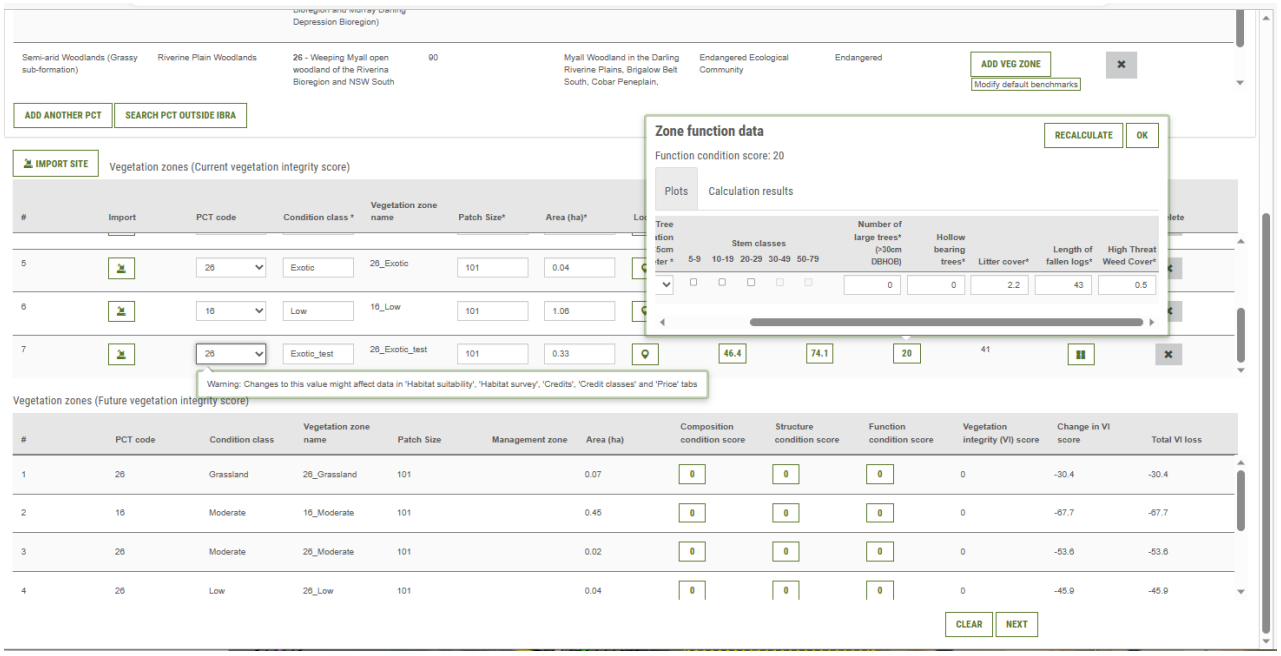


Figure 13-2 Plot 8 VI scores with the power poles

C.4 Random meander species list – 11 December 2020

Species	Common Name
Acacia pendula	Weeping Myall
Atriplex semibaccata	Creeping Saltbush
Austrostipa aristiglumis	Plains Grass
Austrostipa scabra	Speargrass
Avena fatua	Wild Oats
Boerhavia dominii	Tarvine
Brassica spp.	Brassica
Callitris glaucophylla	White Cypress Pine
Chloris truncata	Windmill Grass
Convolvulus spp.	A Bindweed
Einadia nutans	Climbing Saltbush
Enchylaena tomentosa	Ruby Saltbush
Enteropogon acicularis	Curly Windmill Grass
Erodium crinitum	Blue storksbill
Eucalyptus largiflorens	Black Box
Euphorbia drummondii	Caustic weed
Heliotropium europaeum	Potato Weed
Lepidium spp.	
Marrubium vulgare	White Horehound
Rytidosperma setaceum	Small-flowered Wallaby grass
Rytidosperma spp.	
Salsola australis	Prickly Saltwort
Sclerolaena birchii	Galvinized Burr

Species	Common Name
Sclerolaena muricata	Black Rolypoly
Senecio (*cunninghamii ?*)	Bushy Groundsel
Sida spp.	
Solanum elaeagnifolium	Silver-leaved Nightshade
Solanum esuriale	Quena
Vittadinia pterochaeta	Rough Fuzzweed
Walwhalleya proluta	
Xanthium spinosum	Bathurst Burr

C.5 Opportunistic fauna list

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Birds			
Australian Magpie	*Gymnorhina tibicen*	Not threatened	Not threatened
Australian Raven	*Corvus coronoides*	Not threatened	Not threatened
Australian Wood Duck	*Chenonetta jubata*	Not threatened	Not threatened
Black Kite	*Milvus migrans*	Not threatened	Not threatened
Black-faced Cuckooshrike	*Coracina novaehollandiae*	Not threatened	Not threatened
Black-shouldered Kite	*Elanus axillaris*	Not threatened	Not threatened
Blue-faced Honeyeater	*Entomyzon cyanotis*	Not threatened	Not threatened
Blue-winged Parrot	*Neopje,a chrysostoma*	Not threatened	Not threatened
Blue Bonnet	*Northiella haematogaster*	Not threatened	Not threatened
Crested Pigeon	*Ocyphaps lophotes*	Not threatened	Not threatened
Eastern Rosella	*Platycercys exumius*	Not threatened	Not threatened

Common Name	Scientific Name	BC Act Status	EPBC Act Status
Galah	*Eolophus roseicapilla*	Not threatened	Not threatened
Great Egret	*Ardea alba*	Not threatened	Not threatened
Grey Fantail	*Rhipidura albiscapa*	Not threatened	Not threatened
Grey Teal	*Anas gracilis*	Not threatened	Not threatened
Laughing Kookaburra	*Dacelo novaeguineae*	Not threatened	Not threatened
Magpie-lark	*Granllina cyanoleuca*	Not threatened	Not threatened
Nankeen Kestrel	*Falco cenchroides*	Not threatened	Not threatened
Noisy Minor	*Manorina melanocephala*	Not threatened	Not threatened
Pacific Black Duck	*Anas superciliosa*	Not threatened	Not threatened
Peaceful Dove	*Geopelia placida*	Not threatened	Not threatened
Pied Butcherbird	*Craticus nigrogularis*	Not threatened	Not threatened
Plumed Whistling Duck	*Dendrocygna eytoni*	Not threatened	Not threatened
Red-rumped Parrot	*Psephotus haematonotus*	Not threatened	Not threatened
Starling	*Sturnis vulgaris*	Exotic	Exotic
Sulphur-crested Cockatoo	*Cacatua galerita*	Not threatened	Not threatened
Superb Parrot	*Polytelis swainsonii*	BC – V	EPBC – V
Striated Pardalotte	*Pardalotus striatus*	Not threatened	Not threatened
Tree Martin	*Petrochelidon nigricans*	Not threatened	Not threatened
Weebill	*Smicrornis brevirostris*	Not threatened	Not threatened
Welcome Swallow	*Hirundo neoxena*	Not threatened	Not threatened
Western Gerygone	*Gerygone fusca*	Not threatened	Not threatened
White-faced Heron	*Egretta novaehollandiae*	Not threatened	Not threatened
White-plumed Honeyeater	*Lichenostomus penicillatus*	Not threatened	Not threatened

Common Name	Scientific Name	BC Act Status	EPBC Act Status
White-winged Chough	*Corcorax melanorhamphos*	Not threatened	Not threatened
Whistling Kite	*Haliastur sphenurus*	Not threatened	Not threatened
Willie Wagtail	*Rhipidura leucophrys*	Not threatened	Not threatened
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	Not threatened	Not threatened
Reptiles and Amphibians			
Bearded Dragon	*Pogona barbata*	Not threatened	Not threatened
Blue Tongued Lizard	*Tiliqua scincoides*	Not threatened	Not threatened
Common Death Adder	*Acanthophis antarcticus*	Not threatened	Not threatened
Common Eastern Froglet	*Crinia signifera*	Not threatened	Not threatened
Eastern Brown Snake	*Pseudonaia textillis*	Not threatened	Not threatened
Eastern Sign-bearing Froglet	*Crinia parinsignifera*	Not threatened	Not threatened
Red Belly Black	*Pseudechis porphyriacus*	Not threatened	Not threatened
Tree Crevice Skink	*Egernia striolata*	Not threatened	Not threatened

Appendix D Personnel

Name	Title	Qualifications	Role
Brendon True	Senior Ecologist	BAM Accredited Assessor (BAAS 18155)	Peer review of BDAR and BAM C.
Julie Gooding	Senior Ecologist	BAM Accredited Assessor (BAAS 18074) B. Science (Biological Sciences)	Direction in BAM assessment and BDAR. Field Ecologist Co-author BAM-C Case Owner
Clare Vincent	Environmental Consultant	Graduate Diploma (Environmental Management)	Field Ecologist GIS Mapping Primary Author
Zack Renner	Environment Consultant	Bachelor of Science in zoology and conservation biology	Field Ecologist
Jessie Russo	Senior Ecologist	BAM Accredited Assessor (BAAS 23017) B. Environmental Science (Land Resources)	Field Ecologist Co-author

Appendix E BAM calculator credit report

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00025974/BAAS18074/21/00025975

Assessment name
Coleambally BESS - BDAR RTS

BAM data last updated *
22/06/2023

Assessor Name
Julie Gooding

Report Created
25/07/2023

BAM Data version *
61

Assessor Number
BAAS18074

Assessment Type
Major Projects

BAM Case Status
Finalised

Assessment Revision
12

Date Finalised
25/07/2023

* 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	26_Grassland	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Grassland	0.07	1	

2	16_Moderate	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Moderate	0.45	1	
3	26_Moderate	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Moderate	0.02	1	
4	26_Low	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Low	0.04	1	
5	26_Exotic	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Exotic	0.42	1	
6	16_Low	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Low	0.44	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00025974/BAAS18074/21/00025975	Coleambally BESS - BDAR RTS	22/06/2023
Assessor Name	Report Created	BAM Data version *
Julie Gooding	25/07/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS18074	Major Projects	Finalised
Assessment Revision		Date Finalised
12		25/07/2023

* 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)
Barking Owl	Ninox connivens	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Black Falcon	Falco subniger	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Brolga	Grus rubicunda	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Diamond Firetail	Stagonopleura guttata	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Dusky Woodswallow	Artamus cyanopterus cyanopterus	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Grey Falcon	Falco hypoleucos	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Inland Forest Bat	Vespadelus baverstocki	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Little Eagle	Hieraaetus morphnoides	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Little Pied Bat	Chalinolobus picatus	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Magpie Goose	Anseranas semipalmata	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Major Mitchell's Cockatoo	Lophochroa leadbeateri	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Masked Owl	Tyto novaehollandiae	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion

Painted Honeyeater	Grantiella picta	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Pied Honeyeater	Certhionyx variegatus	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Scarlet Robin	Petroica boodang	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Spotted Harrier	Circus assimilis	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Square-tailed Kite	Lophoictinia isura	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Superb Parrot	Polytelis swainsonii	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
Swift Parrot	Lathamus discolor	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
Varied Sittella	Daphoenositta chrysoptera	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
White-throated Needletail	Hirundapus caudacutus	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Threatened species Manually Added

None added

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

Common Name	Scientific Name	Plant Community Type(s)
Regent Parrot (eastern subspecies)	Polytelis anthopeplus monarchoides	16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)
White-bellied Sea-Eagle	Haliaeetus leucogaster	26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion
		16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

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
Regent Parrot (eastern subspecies)	Polytelis anthopeplus monarchoides	Refer to BAR
White-bellied Sea-Eagle	Haliaeetus leucogaster	Refer to BAR

BAM Candidate Species Report

Proposal Details

Assessment Id 00025974/BAAS18074/21/00025975	Proposal Name Coleambally BESS - BDAR RTS	BAM data last updated * 22/06/2023
Assessor Name Julie Gooding	Report Created 25/07/2023	BAM Data version * 61
Assessor Number BAAS18074	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 12	Date Finalised 25/07/2023	

* 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
Ardeotis australis Australian Bustard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Austrostipa wakoolica A spear-grass	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Brachyscome papillosa Mossgiel Daisy	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Convolvulus tedmoorei Bindweed	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus leucoxylon subsp. pruinosa Yellow Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Lepidium monoplocoides Winged Peppercress	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Leptorhynchos orientalis Lanky Buttons	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Lophochroa leadbeateri Major Mitchell's Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Maireana cheelii Chariot Wheels	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Myotis macropus Southern Myotis	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Pilularia novae-hollandiae Austral Pillwort	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Polytelis swainsonii Superb Parrot	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Sclerolaena napiformis Turnip Copperburr	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Swainsona murrayana Slender Darling Pea	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Swainsona plagiotropis Red Darling Pea	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Swainsona sericea Silky Swainson-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Tyto novaehollandiae Masked Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Southern Myotis	Myotis macropus

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Menindee Nightshade	Solanum karsense	Habitat constraints Geographic limitations
Regent Parrot (eastern subspecies)	Polytelis anthopeplus monarchoides	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id
00025974/BAAS18074/21/00025975

Proposal Name
Coleambally BESS - BDAR RTS

BAM data last updated *
22/06/2023

Assessor Name
Julie Gooding

Report Created
25/07/2023

BAM Data version *
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Assessor Number
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BAM Case Status
Finalised

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25/07/2023

Assessment Revision
12

Assessment Type
Major Projects

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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
Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)												
2	16_Moderate	Not a TEC	67.7	67.7	0.45	PCT Cleared - 50%	High Sensitivity to Gain			1.75		13

6	16_Low	Not a TEC	10.2	10.2	0.44	PCT Cleared - 50%	High Sensitivity to Gain			1.75		0
											Subtotal	**13**
Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion												
1	26_Grassland	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	30.4	30.4	0.07	PCT Cleared - 90%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00		1

3	26_Moderate	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	53.6	53.6	0.02	PCT Cleared - 90%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00		1
4	26_Low	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	45.9	45.9	0.04	PCT Cleared - 90%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00		1

5	26_Exotic	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	4.8	4.8	0.42	PCT Cleared - 90%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00		0
											Subtotal	**3**
											Total	**16**

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
Austrostipa wakoolica / A spear-grass (Flora)									
26_Exotic	4.8	4.8	0.16			Endangered	Endangered	False	1
								Subtotal	**1**
Convolvulus tedmoorei / Bindweed (Flora)									
16_Moderate	67.7	67.7	0.17			Endangered	Not Listed	True	9
26_Exotic	4.8	4.8	0.16			Endangered	Not Listed	True	1

								Subtotal	**10**
Myotis macropus / Southern Myotis (Fauna)									
16_Moderate	67.7	67.7	0.45			Vulnerable	Not Listed	False	15
26_Moderate	53.6	53.6	0.02			Vulnerable	Not Listed	False	1
								Subtotal	**16**
Polytelis swainsonii / Superb Parrot (Fauna)									
16_Moderate	67.7	67.7	0.45			Vulnerable	Vulnerable	False	15
								Subtotal	**15**
Swainsona murrayana / Slender Darling Pea (Flora)									
16_Moderate	67.7	67.7	0.17			Vulnerable	Vulnerable	False	6
26_Exotic	4.8	4.8	0.16			Vulnerable	Vulnerable	False	1
								Subtotal	**7**
Swainsona plagiotropis / Red Darling Pea (Flora)									
16_Moderate	67.7	67.7	0.17			Vulnerable	Vulnerable	False	6
26_Exotic	4.8	4.8	0.16			Vulnerable	Vulnerable	False	1
								Subtotal	**7**

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00025974/BAAS18074/21/00025975

Proposal Name
Coleambally BESS - BDAR RTS

BAM data last updated *
22/06/2023

Assessor Name
Julie Gooding

Assessor Number
BAAS18074

BAM Data version *
61

Proponent Name(s)
Lena Li

Report Created
25/07/2023

BAM Case Status
Finalised

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12

Assessment Type
Major Projects

Date Finalised
25/07/2023

* 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
Convolvulus tedmoorei / Bindweed

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Polytelis anthopeplus monarchoides / Regent Parrot (eastern subspecies)
Haliaeetus leucogaster / White-bellied Sea-Eagle

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
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	0.6	0	3	3.00
16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not a TEC	0.9	13	0	13.00

16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

Inland Floodplain Woodlands This includes PCT's: 13, 15, 16, 83, 438, 454, 630	Inland Floodplain Woodlands >=50% and <70%	16_Moderate	Yes	13	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.
Inland Floodplain Woodlands This includes PCT's: 13, 15, 16, 83, 438, 454, 630	Inland Floodplain Woodlands >=50% and <70%	16_Low	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
Semi-arid Woodlands (Grassy sub-formation)	Tier 3 or higher threat status	16_Moderate	Yes (including artificial)	13	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Semi-arid Woodlands (Grassy sub-formation)	Tier 3 or higher threat status	16_Low	No	0	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

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
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Grassland	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.
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Moderate	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.

Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Low	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.
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Exotic	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
Semi-arid Woodlands (Grassy sub-formation)	Tier 1	26_Grassland	No	1	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Semi-arid Woodlands (Grassy sub-formation)	Tier 1	26_Moderate	No	1	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Semi-arid Woodlands (Grassy sub-formation)	Tier 1	26_Low	No	1	IBRA Region: Riverina, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Semi-arid Woodlands (Grassy sub-formation)	Tier 1	26_Exotic	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

Species	Vegetation Zone/s	Area / Count	Credits
Austrostipa wakoolica / A spear-grass	**26_Exotic**	0.2	1.00
Convolvulus tedmoorei / Bindweed	**16_Moderate, 26_Exotic**	0.3	10.00
Myotis macropus / Southern Myotis	**16_Moderate, 26_Moderate**	0.5	16.00
Polytelis swainsonii / Superb Parrot	**16_Moderate**	0.5	15.00
Swainsona murrayana / Slender Darling Pea	**16_Moderate, 26_Exotic**	0.3	7.00
Swainsona plagiotropis / Red Darling Pea	**16_Moderate, 26_Exotic**	0.3	7.00

Credit Retirement Options

Like-for-like options

Austrostipa wakoolica/ A spear-grass	Spp	IBRA region

	Austrostipa wakoolica/A spear-grass	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Endangered	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.
Convolvulus tedmoorei/ Bindweed	Spp	IBRA region	
	Convolvulus tedmoorei/Bindweed	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Flora	Endangered	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.
Myotis macropus/ Southern Myotis	Spp	IBRA region	
	Myotis macropus/Southern Myotis	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	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.
Polytelis swainsonii/ Superb Parrot	Spp	IBRA region	
	Polytelis swainsonii/Superb Parrot	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	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.
Swainsona murrayana/ Slender Darling Pea	Spp	IBRA region	
	Swainsona murrayana/Slender Darling Pea	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	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.

Swainsona plagiotropis/ Red Darling Pea	Spp		IBRA region
	Swainsona plagiotropis/Red Darling Pea		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Vulnerable	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.

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00025974/BAAS18074/21/00025975

Proposal Name
Coleambally BESS - BDAR RTS

BAM data last updated *
22/06/2023

Assessor Name
Julie Gooding

Assessor Number
BAAS18074

BAM Data version *
61

Proponent Names
Lena Li

Report Created
25/07/2023

BAM Case Status
Finalised

Assessment Revision
12

Assessment Type
Major Projects

Date Finalised
25/07/2023

* 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
Convolvulus tedmoorei / Bindweed

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Polytelis anthopeplus monarchoides / Regent Parrot (eastern subspecies)
Haliaeetus leucogaster / White-bellied Sea-Eagle

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
26-Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	0.6	0	3	3
16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Not a TEC	0.9	13	0	13

16-Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Inland Floodplain Woodlands This includes PCT's: 13, 15, 16, 83, 438, 454, 630	Inland Floodplain Woodlands >=50% and <70%	16_Moderate	Yes	13	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.
Inland Floodplain Woodlands This includes PCT's: 13, 15, 16, 83, 438, 454, 630	Inland Floodplain Woodlands >=50% and <70%	16_Low	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.

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

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Grassland	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.
	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Moderate	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.

	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Low	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.
	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	26_Exotic	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.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Austrostipa wakoolica / A spear-grass	**26_Exotic**	0.2	1.00
Convolvulus tedmoorei / Bindweed	**16_Moderate, 26_Exotic**	0.3	10.00
Myotis macropus / Southern Myotis	**16_Moderate, 26_Moderate**	0.5	16.00
Polytelis swainsonii / Superb Parrot	**16_Moderate**	0.5	15.00
Swainsona murrayana / Slender Darling Pea	**16_Moderate, 26_Exotic**	0.3	7.00
Swainsona plagiotropis / Red Darling Pea	**16_Moderate, 26_Exotic**	0.3	7.00

Credit Retirement Options

Like-for-like credit retirement options

Austrostipa wakoolica / A spear-grass	Spp	IBRA subregion
	Austrostipa wakoolica / A spear-grass	Any in NSW
Convolvulus tedmoorei / Bindweed	Spp	IBRA subregion
	Convolvulus tedmoorei / Bindweed	Any in NSW
Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW

Polytelis swainsonii / Superb Parrot	Spp	IBRA subregion
	Polytelis swainsonii / Superb Parrot	Any in NSW
Swainsona murrayana / Slender Darling Pea	Spp	IBRA subregion
	Swainsona murrayana / Slender Darling Pea	Any in NSW
Swainsona plagiotropis / Red Darling Pea	Spp	IBRA subregion
	Swainsona plagiotropis / Red Darling Pea	Any in NSW

Appendix F Hollow-bearing tree inventory

Name	Species	DBH (cm)	Small Hollow (<10cm)	Medium (10-20cm)	Large (>20cm)	Fissuring	Signs of use	Removed or retained
1	Black Box	50	1				-	Retained
2	Black Box	60		1			-	Retained
3	Black Box		3	1	1		-	Retained
4	Black Box			1			-	Retained
5	Black Box			1	1		-	Retained
6	Black Box				1		-	Retained
7	Black Box				1		-	Retained
8	Black Box			2	1		-	Retained
9	Black Box				1		-	Retained
10	Black Box		1	1			-	Retained
11	Stag			1			-	Retained
12	Black Box			1			bees	Retained
13	Black Box			1			-	Retained
14	Black Box		1					Retained
15	Black Box		2				-	Retained
16	Black Box		1				--	Retained
17	Black Box		1				-	Retained
18	Black Box			1			-	Retained
19	Black Box			1			-	Retained
20	Black Box			1			-	Retained

Name	Species	DBH (cm)	Small Hollow (<10cm)	Medium (10-20cm)	Large (>20cm)	Fissuring	Signs of use	Removed or retained
21	Black Box			1			bees	Retained
22	Black Box			1			bees	Retained
23	Black Box			1			-	Retained
24	Black Box		4	3				Retained
25	Black Box		6	4				Retained
26	Black Box		5	1				Retained
27	Black Box		6	2				Retained
28	Black Box		3	1				Retained
29	Black Box		1	2				Retained
30	Black Box		4	2				Depends on which TL is chosen
31	Black Box		5	4	3			Retained
32	Black Box			1	3			Retained
33	Black Box			3	1			Retained
34	Black Box		4					Depends on which TL is chosen
35	Black Box							Depends on which TL is chosen
36	Black Box							Depends on which TL is chosen
37	Black Box							Depends on which TL is chosen

Name	Species	DBH (cm)	Small Hollow (<10cm)	Medium (10-20cm)	Large (>20cm)	Fissuring	Signs of use	Removed or retained
38	Black Box							Depends on which TL is chosen

Appendix G EPBC Act protected matters search

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 29-Mar-2022

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	19
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	500 - 600km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	300 - 400km upstream from Ramsar site	In feature area
Riverland	400 - 500km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	500 - 600km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities			[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species			[Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area	In feature area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
FROG			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Litoria raniformis			
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat may occur within area	In feature area
PLANT			
Austrostipa wakoolica			
[66623]	Endangered	Species or species habitat may occur within area	In buffer area only
Brachyscome papillosa			
Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides			
Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area	In feature area
Maireana cheelii			
Chariot Wheels [8008]	Vulnerable	Species or species habitat may occur within area	In feature area
Swainsona murrayana			
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [15620]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Murrumbidgee Valley	National Park	NSW	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix H EPBC Act habitat assessment

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Herbs & Forbs				
Brachyscome papillosa **Mossgiel Daisy** **EPBC-V**	Primarily occurs in the Riverina from Mossgiel, to Murrumbidgee Valley National Park to Urana. The only known site in the South Western Slopes is Ganmain Reserve. It is found primarily in clay soils on plains with Bladder Saltbush and Leafless Bluebush, and also in grassland and in Inland Grey Bos-Cypress Pine woodland.	**Present** Damp areas on the margins of claypans in moist grassland in Riverina	**Unlikely** Suitable habitat present, but we have completed targeted surveys and not detected.	**No**

[1] Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

OEH threatened species database: http://www.threatenedspecies.environment.nsw.gov.au/index.aspx
SPRAT: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Swainsona murrayana **Slender Darling Pea** **EPBC-V**	Found throughout NSW, it has been 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. Found in grassland, herbland, and open Black-box woodland, often in depressions. Has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. 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. Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering.	Present Brown clay soil, Black box and grassland communities in Riverina	Unlikely Suitable habitat present, but we have completed targeted surveys and not detected.	No
Lepidium monoplocoides **Winged Peppercress** **EPBC-E**	This species is spread throughout the semi-arid western plains of NSW, in areas with an average annual rainfall of 300-500mm. They are found in seasonally moist to waterlogged sites only, on heavy fertile soils. Typically, in open woodlands with Bulloak and/or Eucalypts. Tussock grasses dominate the ground layer. They have also been found in wetland-grass communities in waterlogged grey-brown clay.	Present Black box woodland, tussock grasses and seasonally moist sites in the Riverina	Unlikely Suitable habitat present, but we have completed targeted surveys and not detected.	No

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Maireana cheelii **Chariot Wheels** **EPBC-V**	This species is mostly found between Deniliquin and Hay. Typically found on heavy, grey soils. They are also found on heavy brown to red-brown clay-loams, hard cracking red clay and other heavy texture-contrast soils. They grow in shallow depressions, often on eroded or scalded surfaces. They have been found on the edges of bare, windswept claypans, in shallow depressions of eroded surfaces.	Present Heavy grey clay soils and claypans or shallow depressions. West of Darlington Point, west of Jerilderie	Unlikely Suitable habitat present, but we have completed targeted surveys and not detected.	No
Grasses				
Austrostipa wakoolica **A Speargrass** **EPBC - E**	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. Flowers from October to December, mainly in response to rain. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans.*	Present Clay soil	Unlikely Suitable habitat, , but we have completed targeted surveys and not detected.	No
EECs				
Weeping Myall woodlands **EPBC - E**	The Weeping Myall Woodlands occur in a range from open woodlands to woodlands, generally 4-12 m high, in which Weeping Myall (Acacia pendula) trees are the sole or dominant overstorey species. Other common names for Weeping Myall include Myall, Boree, Balaar, Nilyah, Bastard Gidgee, and Silver Leaf Boree.	**Present** Acacia pendula trees present.	**Present**	Yes

Species	Description of habitat[1]	Presence of habitat	Likelihood of occurrence	Possible impact?
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia **EPBC - E**	The typical structure of the Grey Box (E. microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia ecological community is a woodland to open forest with a canopy dominated by eucalypts and an understorey with a moderately dense to sparse shrub layer and a ground layer of perennial and annual native forbs and graminoids.	**Absent** **No characteristic species of this TEC present.**	**Unlikely**	No
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland **E**PBC - CE	Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. In the Nandewar Bioregion, Grey Box (Eucalyptus microcarpa or E. moluccana) may also be dominant or codominant. The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated	**Absent** **No characteristic species of this TEC present.**	**Unlikely**	No
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions **EPBC - E**	Encompasses a number of closely-related woodland communities in which Buloke (Allocasuarina luehmannii) is usually the dominant or co-dominant tree. This community in the Riverina and Murray-Darling Depression Bioregions occurs from south-eastern South Australia through north-western and northern central Victoria into south central New South Wales.	**Absent** **No characteristic species of this TEC present.**	**Unlikely**	No

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Aves				
Botaurus poiciloptilus **Australasian Bittern** **EPBC – E**	In NSW, this species occurs along the coast and is frequently recorded in the Murray-Darling Basin, notably in floodplain wetlands of the Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Nests are built in secluded places in densely-vegetated wetlands on a platform of reeds.	Absent No wetlands within development site	Unlikely Lack of preferred habitat	No
Calidris ferruginea **Curlew Sandpiper** **EPBC - CE**	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh.	Absent No suitable waterbodies within development site	Unlikely Lack of preferred habitat	No
Falco hypoleucos **Grey Falcon** **EPBC - V**	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. 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.	Present Shrublands and woodlands present within development site	Possible Suitable habitat present and known in IBRA region.	Yes

[2] Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's *Species Profiles and Threats* database (SPRAT) unless otherwise stated.

OEH threatened species database: http://www.threatenedspecies.environment.nsw.gov.au/index.aspx
SPRAT: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Grantiella picta **Painted Honeyeater** **EPBC – V**	Inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	Absent No mistletoes present at high density (5 mistletoes/ha)	Unlikely Lack of abundant mistletoes within development site	No
Leipoa ocellata **Malleefowl** **EPBC-V**	Occurs in NSW in the south west centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. West of the Darling River a population also occurs in the Scotia mallee including Tarawi NR and Scotia Sanctuary and is part of a larger population north of the Murray River in South Australia. Further east, a population continues to persist in the Goonoo forest near Dubbo. Outside these areas, occasional records have been made in the Pilliga forests (most recently 1999), around Cobar (1991) and Goulburn River NP (1989) though the extent and status of populations in these areas are unknown. Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers. Mainly forage in open areas on seeds of acacias and other native shrubs (Cassia, Beyeria, Bossiaea), buds, flowers and fruits of herbs and various shrubs, insects (cockroaches, ants, soil invertebrates), and cereals if available. Incubate eggs in large mounds that contain considerable volumes of sandy soil.	Absent No Mallee woodlands with spinifiex or woodlands with dense canopys and sandy soils.	Unlikely Lack of preferred habitat	No

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Numenius madagascariensis **Eastern Curlew, Far Eastern Curlew** **EPBC – CE** **EPBC - M**	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. The Eastern Curlew mainly forages on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline. The Eastern Curlew roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. It occasionally roosts on reef-flats, in the shallow water of lagoons and other near-coastal wetlands.	Absent No suitable waterbodies within development site	Unlikely Lack of preferred habitat	No
Pedionomus torquatus **Plains – wanderer** **EPBC - CE**	Plains-wanderers inhabit sparse, treeless, lowland native grasslands which usually occur on hard red-brown clay soils. Grassland structure is much more important than floristic composition with the species showing a strong preference for sites with approximately 50% bare ground and most vegetation less than 5 cm in height and some widely-spaced plants up to 30 cm. The plains-wanderer occasionally occurs in other types of habitat such as in stubble; amongst low cereal crops; and in low, sparse chenopod shrubland.	Absent Lack of bare ground areas within development site.	Unlikely Lack of preferred habitat. No records within 10km	No

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Polytelis swainsonii **Superb Parrot** **EPBC – V**	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds 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 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.	Present Associated PCT 26 and suitably sized hollows within development site.	Present Associated PCT 26 and suitably sized hollows within development site. Many records within 10km of development site. One from 2012 approximately 220m from the development site. Detected during targeted surveys.	Yes
Rostratula australis **Australian Painted Snipe** **EPBC - E**	They feed in shallow water or at the waters' edge and on mudflats. Most records of Australian Painted Snipe are from temporary or infrequently filled freshwater wetlands and although they have occurred at many sites. Primarily occurs along the east coast from north Queensland (excluding Cape York) to the Eyre Peninsula in South Australia, including the majority of Victoria and NSW. In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. Inhabits inland and coastal shallow freshwater wetlands. The species occurs in both ephemeral and permanent wetlands, particularly where there is a cover of vegetation, including grasses, Lignum and Samphire. Individuals have also been known to use artificial habitats, such as sewage ponds, dams and waterlogged grassland. Nests on the ground amongst tall vegetation, such as grass tussocks or reeds.	Absent No wetlands within development site	Unlikely Lack of preferred habitat	No
Migratory Species				

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Actitis hypoleucos **Common Sandpiper** **EPBC - M**	A group of shorebirds (also called waders) which occupy a particular area of Botany Bay and includes the characteristic assemblage of the following 20 species: Bar-tailed Godwit (*Limosa lapponica*), Red Knot (*Calidris canutus*), Great Knot (*Calidris tenuirostris*), Sharp-tailed Sandpiper (*Calidris acuminata*), Curlew Sandpiper (*Calidris ferruginea*), Red-necked Stint (*Calidris ruficollis*), Common Sandpiper (*Actitis hypoleucos*), Terek Sandpiper (*Xenus cinereus*), Latham's Snipe (*Gallinago hardwickii*), Grey-tailed Tattler (*Heteroscelus brevipes*), Grey Plover (*Pluvialis squatarola*), Pacific Golden Plover (*Pluvialis fulva*), Common Greenshank (*Tringa nebularia*), Masked Lapwing (*Vanellus miles*), Marsh Sandpiper (*Tringa stagnatilis*), Ruddy Turnstone (*Arenaria interpres*), Pied Oystercatcher (*Haematopus longirostris*), Sooty Oystercatcher (*Haematopus fulinginosus*), Whimbrel (*Numenius phaeopus*), and Eastern Curlew (*Numenius madagascariensis*). Occurs on the relict muddy sand marginal shoal of the Georges River between Taren Point and Shell Point in Botany Bay. Some species identified within this community can also be found foraging and roosting at other locations within Botany Bay. In Botany Bay the shorebird community utilises roosting and foraging habitat (intertidal mud flats and sand flats),the proximity of mangroves (*Avicennia marina*) is important as roosting habitat.	Absent	Unlikely Lack of preferred habitat	No
Apus pacificus **Fork-tailed Swift** **EPBC - M**	This species breeds in the north-east and mid-east Asia and winters in Australia and southern New Guinea. It is a visitor to most parts of Western Australia. It is common in the Kimberley, uncommon to moderately common near north-west, west and southeast coasts and rare to scarce elsewhere. They never settle voluntarily on the ground and spend most of their lives in the air, living on the insects they catch in their beaks.	Present Found in a wide range of habitats and climatic zones.	Possible Suitable habitat	No Predominantly an aerial species

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Calidris acuminata **Sharp-tailed Sandpiper** **EPBC - M**	A group of shorebirds (also called waders) which occupy a particular area of Botany Bay and includes the characteristic assemblage of the following 20 species: Bar-tailed Godwit (*Limosa lapponica*), Red Knot (*Calidris canutus*), Great Knot (*Calidris tenuirostris*), Sharp-tailed Sandpiper (*Calidris acuminata*), Curlew Sandpiper (*Calidris ferruginea*), Red-necked Stint (*Calidris ruficollis*), Common Sandpiper (*Actitis hypoleucos*), Terek Sandpiper (*Xenus cinereus*), Latham's Snipe (*Gallinago hardwickii*), Grey-tailed Tattler (*Heteroscelus brevipes*), Grey Plover (*Pluvialis squatarola*), Pacific Golden Plover (*Pluvialis fulva*), Common Greenshank (*Tringa nebularia*), Masked Lapwing (*Vanellus miles*), Marsh Sandpiper (*Tringa stagnatilis*), Ruddy Turnstone (*Arenaria interpres*), Pied Oystercatcher (*Haematopus longirostris*), Sooty Oystercatcher (*Haematopus fulinginosus*), Whimbrel (*Numenius phaeopus*), and Eastern Curlew (*Numenius madagascariensis*). Occurs on the relict muddy sand marginal shoal of the Georges River between Taren Point and Shell Point in Botany Bay. Some species identified within this community can also be found foraging and roosting at other locations within Botany Bay. In Botany Bay the shorebird community utilises roosting and foraging habitat (intertidal mud flats and sand flats). For some species (Terek Sandpiper, Grey-tailed Tattler), the proximity of mangroves (*Avicennia marina*) is important as roosting habitat.	Absent	Unlikely Lack of preferred habitat	No
Calidris ferruginea **Curlew Sandpiper** **EPBC -M**	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh.	Absent	Unlikely Lack of preferred habitat	No
Calidris melanotos **Pectoral Sandpiper** **EPBC - M**	This species breeds in high-arctic tundra from the Yamal Peninsula eastwards to the Bearing Strait in Siberia and in arctic Alaska and Canada,. It is known to migrate mostly through the USA and mexico and spends most of its non-breeding months in South America. A small number of these birds are known to reach Australia and are believed to be concentrated in south-eastern Australia. This species prefers freshwater mudflats.	Absent	Unlikely Lack of preferred habitat	No
Gallinago hardwickii **Latham's Snipe, Japanese Snipe** **EPBC - M**	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity.	Absent	Unlikely Lack of preferred habitat	No

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Motacilla flava **Yellow Wagtail** **EPBC - M**	Widespread wagtail, favouring wet meadows, marshland, grassy and muddy lakeshores. Occurs in fields and often near livestock during migration. Important habitat is listed as mostly well watered open grasslands and the fringes of wetlands. Roosts in mangroves and other dense vegetation (DoE, 2015)	Marginal Field, wet areas at times	UnlikelySome suitable habitat present but not important habitat. No records within 10km.	No Minimal amount of potential foraging habitat to be removed.
Myiagra cyanoleuca **Satin Flycatcher** **EPBC - M**	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. It is also found in New Guinea.. The Satin Flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. The Satin Flycatcher is a migratory species, moving northwards in winter to northern Queensland and Papua New Guinea, returning south to breed in spring..	Absent	Unlikely Lack of suitable habitat	No
Fish				
Galaxius rostratus **Flathead Galaxias** **EPBC CE**	Below 150 m in altitude. Billabongs, lakes, swamps, and rivers, with preference for still or slow-flowing waters.	Absent	Unlikely- Suitable habitat not present.	No- Species unlikely to be impacted by the proposal.
Macquaria australasica **Macquarie Perch** **EPBC - E**	They are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries. The species spawn in spring or summer in shallow upland streams or flowing parts of rivers where the eggs which settle among stones and gravel of the stream or river bed.	Absent	Unlikely- Suitable habitat not present.	No- Species unlikely to be impacted by the proposal.
Mammals				

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Nyctophilus corbeni **Corben's Long-eared Bat, South-eastern Long-eared Bat** **EPBC - V**	Inhabits a variety of vegetation types, including mallee, bulloke Allocasuarina leuhmanni and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Present Box dominated area present, one tree in development footprint has a hollow	Unlikely Not known or predicted to occur in locality	No No hollow bearing trees to be removed
Phascolarctos cinereus ***Koala*** **EPBC - E**	In NSW it mainly occurs on the central and north coasts with some populations in the western region. The koala inhabits a range of eucalypt forest and woodland communities, including coastal forests, the woodlands of the tablelands and western slopes, and the riparian communities of the western plains.	Present Associated PCTs (16 and 26) on site. Feed tree species Black Box is within development site. Areas identified via survey as important habitat.	Possible Suitable habitat.	Yes
Amphibians				

Species and Status	Description of habitat[2]	Presence of habitat	Likelihood of occurrence	Potential for impact?
Litoria raniformis **Growling Grass Frog, Southern Bell Frog** **EPBC - V**	Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. During the breeding season animals are found floating amongst aquatic vegetation (especially cumbungi or Common Reeds) within or at the edge of slow-moving streams, marshes, lagoons, lakes, farm dams and rice crops. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks.	Absent Swamps/billabongs not present within development site. Excluded	Unlikely Lack of suitable habitat present	No

E EPBC = listed as Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

V EPBC = listed as Vulnerable under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

M EPBC = listed as Migratory under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

CE EPBC = listed as Critically Endangered under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999.*

Appendix I EPBC Act assessment of significant impact

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Conservation Act 1999* specifies factors to be taken into account in deciding whether a development is likely to significantly affect Endangered Ecological Communities, threatened species and migratory species, listed at the Commonwealth level. These assessments characterise the significance of likely impacts associated with the proposal on the following **Vulnerable** species:

- Mammals
    - Hollow dependant
        - Superb Parrot (*Polytelis swainsonii*) –EPBC – V

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
a) Will the action lead to a long-term decrease in the size of an important population of a species?
Superb Parrot
The National Recovery Plan for the Superb Parrot states that one of the main breeding areas is between Wagga Wagga and Toganmain Station, near Carathool along the Murrumbidgee River (Baker-Gabb, 2011). During breeding time (September to December) they are known to use Black Box as a foraging area up to 10km away from the nest sites. The development site is approximately 17.6km South of the Murrumbidgee River. Male birds are known to forage at least 9 km from their nesting colonies. During site surveys in October 2021, two Superb Parrots were seen flying from a Black Box tree within the development footprint. Approximately 10 Superb Parrots were also seen during the December surveys - this time flying over Boree (*Acacia pendula*) trees within the development site. Boree trees are known to be used for foraging in the non-breeding season. There are 74 Bionet records within the locality with Seven Superb Parrots records within 280m of the development site from 2008. Given this information it can be assumed the Superb Parrots within the proposal area may be a part of an important population as they occur in one of the main breeding areas. The proposal would involve the disturbance of up to approximately 4.97ha (using the TL with the highest clearance) of groundcover (of which up to 0.93ha consisting of the TL would be rehabilitated with pasture grasses post works).). There is ground cover suitable for foraging adjacent to the development footprint,and other HBTs within the Black Box patch near the substation The Superb Parrot is considered to be nomadic, dispersive, migratory and partly migratory. Their movements are said to be due to changes in food supply between breeding and non- breeding areas (Baker-Gabb, 2011). The National Recovery Plan (Baker-Gabb, 2011) states this species is known to dislike disturbance and has been recorded avoiding hollow use due to human presence. There would be short term impacts during construction from noise and human disturbance, The proposal, during operation, would have limited staff attending the BESS site intermittently. The proposal is not predicted to lead to a long-term decrease in the size of an important population.
b) Will the action reduce the area of occupancy of an important population of a species?
Superb Parrot
The proposal would involve the disturbance of approximately 4.97ha of groundcover (of which up to 0.93ha up to 0.93ha consisting of the TL would be rehabilitated with pasture grasses post works There is ground cover suitable for foraging adjacent to the development footprint, and other HBTs within the Black Box patch near the substation. The Superb Parrot is considered to be nomadic, dispersive, migratory and partly migratory. Their movements are said to be due to changes in food supply between breeding and non-breeding areas (Baker-Gabb 2011). The National Recovery Plan for states this species is known to dislike disturbance and has been recorded avoiding hollow use due to human presence. There would be short term impacts during construction from noise and human disturbance, The development site has had the presence of the landholder and vehicles driving through for several years. The proposal, during operation, would have limited staff attending the BESS site intermittently. The proposal is not predicted to reduce the area of occupancy of an important population.
c) Will the action fragment an existing important population into two or more populations?

Superb Parrot

The proposal would involve the disturbance/removal of approximately 4.97ha of groundcover (of which up to 0.93 ha up to 0.93ha consisting of the TL would be rehabilitated with pasture grasses post works) and disturbance/removal of up to 0.17ha of PCT 16 Black Box trees (including HBTs).. There is ground cover suitable for foraging adjacent to the development footprint, and other HBTs within the Black Box patch near the substation. The Superb Parrot is considered to be nomadic, dispersive, migratory and partly migratory. Their movements are said to be due to changes in food supply between breeding and non- breeding areas (Baker-Gabb 2011).

The National Recovery Plan for Superb Parrot (Baker- Gabb, 2011) states this species is known to dislike disturbance and has been recorded avoiding hollow use due to human presence. The development site has had the presence of the landholder and vehicles driving through for several years. The proposal, during operation, would have limited staff attending the BESS site intermittently. This species is highly mobile and will traverse open land. In this context the proposal is not likely to fragment an existing important population into 2 or more populations.

d) Will the action adversely affect habitat critical to the survival of a species?

Superb Parrot

The National Recovery Plan for the Superb Parrot, states habitat critical to the survival of the Superb Parrot can be divided into breeding and foraging habitat. Although there would be approximately 4.97ha potential loss of groundcover during the operation of the BESS, including disturbance/removal of up 0.17ha of PCT 16 Black Box trees (including HBTs) there is suitable foraging habitat present adjacent to the development footprint., and other HBTs within the Black Box patch near the substation This species is highly mobile and males during the breeding season are known to forage over 9km from the breeding sites. The proposal is not likely to significantly affect habitat critical to the survival of this species.

e) Will the action disrupt the breeding cycle of an important population?

Superb Parrot

Although there would be approximately 4.97haha potential loss of groundcover during the operation of the BESS, including disturbance/removal of up 0.17ha of PCT 16 Black Box trees (including HBTs) there is suitable foraging habitat present adjacent to the development site, and other HBTs within the Black Box patch near the substation. This species is highly mobile and males during the breeding season are known to forage over 9km from the breeding sites. This species is known to nest along the Murrumbidgee River and not in the vicinity of the proposal. The proposal is not likely to disrupt the breeding cycle of an important population.

f) Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

Superb Parrot

Although there would be approximately 4.97ha potential loss of groundcover during the operation of the BESS, including disturbance/removal of up 0.17ha of PCT 16 Black Box trees (including HBTs) near the substation there is suitable adjacent foraging habitat present. and other HBTs within the Black Box patch near the substation. The Superb Parrot is highly mobile and males during the breeding season are known to forage over 9km from the breeding sites.

The proposal is not predicted to impact the availability or quality of habitat to the extent this species is likely to decline.

g) Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

Cats and foxes are potentially present now. The proposal is unlikely to involve further introduction of invasive species that are harmful to these species becoming established in their potential habitat.

h) Will the action introduce disease that may cause the species to decline?

Koala feed tress would not be removed for the works. The proposal would therefore be unlikely to result in disease which may cause the species to decline.

i) Will the action interfere substantially with the recovery of the species?

Superb Parrot

The National Recovery Plan for Superb Parrot lists the following specific objectives:

- Determine population trends in the Superb Parrot.
- Increase the level of knowledge of the Superb Parrot's ecological requirements.
- Develop and implement threat abatement strategies.
- Increase community involvement in and awareness of the Superb Parrot recovery program.

The proposal would not interfere with any of these objectives.

Endangered species:

Fauna:

- Grey Falcon *Falco hypoleucos*, EPBC – E

Koala

- Koala (Phascolarctos cinereus) –EPBC – E

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
a) Will the action lead to a long-term decrease in the size of a population?
Grey Falcon
Grey Falcon was not detected within the development site during the site survey. However due to the size of the development site and seasonal conditions they may not have been detected. Suitable habitat for this species occurs within the development site. The proposal would impact on approximately 4.97ha of habitat (using the TL with the highest clearance) This includes grassland, woodland and exotic ground cover. Impacts to these species would occur as a reduction in foraging area. This would be approximately 4.97 ha during construction and 4.04ha during operation (the underground transmission line would be rehabilitated with pasture grasses post works). The development footprint has already been largely disturbed through agricultural practices and, as such, vegetation removed would be largely regenerative in nature. Some trees would be lost near the substation for the TL placement, however the majority of the trees would be retained. The remaining trees could be used as potential nesting habitat for this species. It is anticipated that post decommissioning the area would regenerate. Given the small area lost due to the placement of the BESS, the ability for the bird to travel large distances for foraging, the pre-disturbed condition of the development footprint, and that no trees would be removed for the proposal, it is considered that the proposed works would not lead to a long-term decrease in the size of a population of this species.
Koala
There is one recent (2004) record of the Koala approximately 586m from the development site area. The proposal area does not contain a key breeding population, a population that maintains genetic diversity or a population that is near the limit of the species range and so an important population is not considered to occur within the development site. The proposal would involve the disturbance of up to approximately 4.97 ha of groundcover. The proposal would involve the disturbance/removal of approximately 4.97ha of groundcover (of which up to 0.93 ha consisting of the TL would be rehabilitated with pasture grasses post works), and disturbance/removal of up to 0.17ha of PCT 16 Black Box trees.No long-term decrease in the size of population of these species is predicted to occur due to the proposed works.
b) Will the action reduce the area of occupancy of the species?
Grey Falcon

As noted above a relatively small area (4.04ha) would be taken up by the BESS during operation. This species would be able to fly over this area. The area where the underground transmission line is to be placed would be revegetated. The development footprint has been majorly disturbed through agricultural activity. Given this the proposal is not considered an action that would significantly reduce the area of occupancy of a threatened species.

Koala

There is one recent (2004) record of the Koala approximately 586m from the development site. No evidence of Koala activity was observed during the targeted survey and no important population is considered to occur within the development site. There would be security fencing placed on the BESS substation boundary.

No reduction of the area of occupancy of a population of these species is predicted to occur due to the proposed works.

c) Fragment an existing population into two or more populations?

Grey Falcon

The proposed works involve the placement of a BESS which would be approximately 4.04ha in size and a transmission line. The transmission line would be under-ground and the surface revegetated once practicable. The development footprint has been majorly disturbed through agricultural activity. This species would be able to fly over this area. No barriers to movement would occur and it is considered unlikely that the proposal would fragment an existing population into two or more populations.

Koala

There is one recent (2004) record of the Koala approximately 586m from the development site area. No evidence of Koala activity was observed during the targeted survey and no important population is considered to occur within the development site.

The proposal would involve the disturbance of approximately 4.97ha of groundcover (including up to 0.17ha of disturbance/removal Black Box trees near the substation).. Koalas home ranges vary depending on the quality of habitat and number of feed trees present. The areas can range from 0.2 ha to 15 ha. Security fencing would be placed around the BESS boundary; however, this fencing would not create a barrier for movement across the landscape. Similar ground cover vegetation surround the BESS and woodland vegetation would be retained along Ercildoune Road. No fragmentation of a population of the Koala is predicted to occur due to the proposed works.

d) Adversely affect habitat critical to the survival of a species?

Grey Falcon

No critical habitat has been detail for this species. Therefore, all habitat is assumed important. No known population occurs within the proposal area. However, as potentially suitable habitat occurs, all habitat within the proposal area is considered important. The proposed works would reduce a small amount of foraging habitat available for this species. The development footprint has already been largely disturbed through agricultural practices and, as such, vegetation removed would be largely regenerative in nature. Trees would not be removed for the proposal; thus, no nesting habitat would be impacted.

Koala

There is one recent (2004) record of the Koala approximately 586m from the development site area. No evidence of Koala activity was observed during the targeted survey and no important population is considered to occur within the development site.

The proposal would involve the disturbance of approximately 4.97 ha of groundcover. No trees would be removed. The proposal is predicted not to significantly adversely affect habitat critical to the survival of this species.

e) Disrupt the breeding cycle of a population?

Grey Falcon

The under-ground transmission line area would be revegetated as soon as is practicable. No trees would be removed for the proposal; thus, no nesting habitat would be impacted. The development footprint has already

been largely disturbed through agricultural practices. The proposal is not considered an action that would disrupt the breeding cycle of a population of this species.

Koala

The breeding season for the Koala peaks between September and February. There is one recent (2004) record of the Koala approximately 586m from the development site area. The proposal would involve the disturbance of approximately 4.97ha of groundcover. No trees would be removed. There was also no evidence of Koala presence identified during the targeted surveys.

The works are not likely to disrupt the breeding cycle of a population.

f) Will the action modify, destroy, remove, isolate or decrease the availably or quality of habitat to the extent that the species is likely to decline?

Grey Falcon

As noted above a relatively small area (4.04ha) would be taken up by the BESS during operation. These species would be able to fly over this area. The area where the underground transmission line is to be placed would be revegetated as soon as practicable. The development footprint has been majorly disturbed through agricultural activity. No trees would be removed. Given this the proposal is not considered an action that would modify, destroy, remove, isolate or decrease the availably or quality of habitat to the extent that the species is likely to decline.

Koala

No trees would be removed. Koalas home ranges vary depending on the quality of habitat and number of feed trees present. The areas can range from 0.2 ha to 15 ha (NSW Department of Environment and Climate Change 2008).

The proposal is not predicted to impact the availability or quality of habitat to the extent this species is likely to decline.

g) Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?

Establishment of a temporary construction site compound, specifically rubbish bins containing food, can potentially increase the risk of pest animals at the Proposal area (mostly cat and fox). Covered rubbish bins and regular waste removal during construction and operation would minimise this risk by removing the food source. Rabbit and fox numbers would be controlled through targeted pest management during the operational phase of the Proposal. There is a risk that invasive weeds could be established and spread within the site via seeds or plant parts on machinery during construction and via visitors during operation. However, a Pest and Weed Management Plan (PWMP) would be developed to prevent/minimise the spread of weeds. Following this PWMP the proposal is unlikely to result in the establishment of harmful invasive species within these species' habitat.

h) Will the action introduce disease that may cause the species to decline?

Koala feed tress would not be removed for the works. There is a risk that pathogens could be established and spread within the site via machinery during construction. However, with the implementation of the PWMP and hygiene protocols the action is unlikely to introduce any disease which may cause these species to decline.

i) Will the action interfere with the recovery of the species?

Grey Falcon

The 'Saving our Species' recovery strategy for the Grey Falcon lists the following survey action:

- Identify additional nesting locations through targeted survey in the Western Division.

The proposal would not interfere with these objectives.

Koala

The overall objective of the recovery plan is to reverse the decline of the koala in New South Wales, to ensure adequate protection, management and restoration of koala habitat, and to maintain healthy

breeding populations of koalas throughout their current range. Criteria to indicate that the health and viability of koala populations in NSW is improving will be:

- Maintenance of existing populations (i.e., no local extinctions)
- Improvement of the extent and quality of habitat and protection of priority habitats and sites
- An increase in the numbers of breeding females, together with a corresponding decrease in records of juvenile mortality
- An increase in the general health of animals in the wild (e.g., less overt signs of *Chlamydia* infection or other illness)
- An expansion in distribution and the presence of koalas in all areas of primary koala habitat
  An increase in community reports of koala sightings.

The proposal is not predicted to interfere with the recovery of this species.

Endangered TEC:

- Weeping Myall Woodlands

Table 1 Test of Significance

h) Will the action lead to a reduction in the extent of an ecological community?
Weeping Myall Woodlands
There is approximately 1.6 ha of Weeping Myall Woodland TEC at EPBC quality (hereon TEC) within the development site. Proposed works would amount to approximately 0.02ha of this TEC being cleared. This is 1.25% of the extent in the development site. An additional 2.47 ha Weeping Myall Woodland occurs along Ercildoune Rd and the Subject Land. Given the local context, the removal of 0.02 ha is not considered to lead to a significant reduction in the extent of the TEC.
i) Will the action fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines?
Weeping Myall Woodlands
The TEC is mainly along the roadside on both sides of Ercildoune Road. The clearing would consist of 0.02ha for an entrance road 8.7 m wide. The area to be cleared consists of groundcover only and no trees would be removed. Connectivity would still be maintained along the roadside reserve. The patches are already fragmented by Ercildoune Road. The works are not considered to result in any further fragmentation of this TEC.
j) Will the action adversely affect habitat critical to the survival of an ecological community?
Weeping Myall Woodlands
No National Recovery Plan exists and no habitat critical to the survival of the ecological community has been delineated. Therefore, it is assumed all habitat is important to the survival of the TEC. A small area of 0.02ha of the TEC that occurs on the roadside and in a paddock would be cleared for the works. Due to the small extent of clearing (0.02ha) within the local context (development site consists of approximately 1.6 ha of TEC) it is not considered an action that would significantly adversely affect habitat critical to the survival of this TEC.
k) Will the action modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels or substantial alteration of surface water drainage patterns?
Weeping Myall Woodlands
No trees would be removed for the works, only groundcovers would be cleared. Infrastructure would be put in place that would modify/destroy abiotic factors necessary for the TECs survival e.g., an access track would be created. However, given that the area of TEC is approximately 1.6 ha and the clearing is approximately 0.02 ha the impact is not considered significant. The retained vegetation would unlikely be modified by the construction of the access track.

l) Will the action cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting?

Weeping Myall Woodlands

No trees would be removed from the TEC so there would be no loss of functionally important canopy species. Undercover species would be cleared for the access tracks, but the understory species here are common and found consistently throughout the retained vegetation along Ercildoune Road. There is no hazard burning, or flora and fauna harvesting proposed.

The proposal has the potential to contribute to the spread of invasive species, mainly through the clearing of vegetation and transfer and introduction of plant material and soil on machinery. Mitigation measures have been recommended to prevent the spread of weeds on site. The proposal is not likely to lead to an increase in invasive fauna species. The proposal would therefore be unlikely to result in invasive species that would change the species composition of the TEC.

m) Will the action cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to:

a. Assisting invasive species, that are harmful to the listed ecological community, to become established; or

b. Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community?

Weeping Myall Woodlands

a. The proposal has the potential to contribute to the spread of invasive species, mainly through the clearing of vegetation and transfer and introduction of plant material and soil on machinery. Mitigation measures have been recommended to prevent the spread of weeds on site. The proposal would therefore be unlikely to result in invasive species that are harmful to the TEC.

b. Chemicals used onsite would include fuels, lubricants and (minimally) herbicides. Spills of these contaminants can alter soil health, affecting its ability to support plant growth. Sediment and chemical pollutants have the ability to mobilise and enter Tubbo Channel, the on-site farm dam or the road drains associated with Kook Road and Ercildoune Road. Activities with the potential for adverse water quality impacts would be managed through the development of site-specific sediment control plans and spill control plans. With these plans followed the proposal is not considered to cause a substantial reduction in the quality or integrity of an occurrence of the TEC.

n) Will the action interfere with the recovery of an ecological community?

Weeping Myall Woodlands

No National Recovery Plan exists for Weeping Myall Woodland. However, considering the small extent of works to be completed, with only 0.02 ha of TEC to be cleared, and the extent of it within the development footprint (1.6 ha), the works are not considered to significantly interfere with the recovery of this TEC.

Conclusion

The impacts of the proposal on the assessed threatened species listed under the EPBC Act are manageable. A significant impact is considered unlikely, based on the following conclusions:

- The amount of habitat to be removed or disturbed by the proposal is relatively small in the local context.
- No substantial further fragmentation or isolation of habitat would occur.
- The proposal would not interfere with the recovery of these species.
- No substantial reduction of quality or integrity of the TEC.
- No interference with the recovery of the TEC

Appendix J Atlas of Living Australia Bindweed Records

Notes	Habitat	Year	State
Flowers and fruit and leaf	“Plain. Clay loam. Herbfield. Associated species: {*Atriplex holocarpa, Zygophyllum iodocarpum, Plantago drummondii, Bulbine alata, Sclerolaena ventricosa, Euphorbia parvicaruncula, Pimelea simplex*”	2020	NSW
preserved	Ephemeral lake bed in small channel, dense grass/forbland"	1987	SA
preserved	"Stream channel in pediment system. E-facing, 1 degree slope. Dense boulder (> 250 mm) strew. Clayey sand. {*Acacia cambagei}, {Eucalyptus coolabah}, {Atalaya hemiglauca}* Open Woodland over *{Lepidium papillosum}, {Calotis plumulifera}*”	1996	SA
preserved	"Flood out in dunefield system. Sparse calcareous cobble (51-250 mm) strew. Medium heavy clay. {Eucalyptus coolabah} Low Woodland over {*Sclerolaena bicornis} var. {bicornis}, {Eragrostis setifolia}, {Eremophila bignoniiflora*}"	2008	SA
preserved	0	1989	SA
preserved	"Flood out in alluvial plain system. Loamy sand. {*Acacia victoriae*} Very Low Open Woodland over {*Rhagodia spinescens}, {Atriplex nummularia}* ssp. *{nummularia}, {Sclerolaena bicornis} var. {bicornis}, {Rhodanthe floribunda}, {Gnephosis eriocarpa}"*	1996	SA
preserved	0	1989	SA
preserved	"Shallow washway in gibber plain, deep friable cracking soil. Sheet gypsum along the creek bank - some water present"	2000	SA
	“{Atriplex} et al, low shrubland in floodout area"	1987	SA
Preserved flowers|buds|fruit|leaf	As below- could be same spot	1971	NSW
Preserved flowers fruit leaves	"Deep self-mulching grey clay on Darling River flood plain. (Flooded March 1971.)"	1971	NSW
Preserved	0	1996	SA
Prostrate rosettes very abundant locally.	“Shallow drainage depression. Gypsum crystals present."	2000	SA

Notes	Habitat	Year	State
Flowers and fruit. Locally common	"Broad stony floodplain. Associated species include *Indigofera linnaei*, *Swainsona burkei*, *Euphorbia tannensis*."	2010	QLD
preserved	0	1971	NSW
preserved	0	1970	NSW
preserved	0	1971	NSW
preserved	0	1969	NSW

Appendix K BDAR Compliance checklist

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
Introduction	Chapters 2 and 3	**Information**	
		Introduction to the biodiversity assessment including:	–
		☒ brief description of the proposal	1.1
		☒ identification of subject land boundary, including: ☒ operational footprint ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	1.2
		☒ general description of the subject land	2.1
		☒ sources of information used in the assessment, including reports and spatial data	1.4
		☒ identification and justification for entering the BOS	1.3

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Maps and tables	
		☒ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 1 -1
Landscape	Sections 3.1 and 3.2, Appendix E	**Information**	
		Identification of site context components and landscape features, including:	–
		☒ general description of subject land topographic and hydrological setting, geology and soils	2
		☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	2.2
		☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	2.3
		☒ rivers and streams classified according to stream order (as described in BAM Subsection	2.4

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		3.1.3(3.) and Appendix E)	
		☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	2.5
		☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	2.6
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	2.7
		☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	2.8
		☒ any additional landscape features identified in any SEARs for the proposal	2.7
		☒ NSW (Mitchell) landscape on which the subject land occurs	2.1

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	2.2, 3.3.1
		Maps and tables	
		☒ Site Map ☒ Property boundary ☒ Boundary of subject land ☒ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☒ Landscape features identified in BAM Subsection 3.1.3	

			Figure 1-1

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
			Figure 2-1
		☒ Location Map ☒ Digital aerial photography at 1:1,000 scale or finer ☒ Boundary of subject land ☒ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☒ Landscape features identified in BAM Subsection 3.1.3 ☒ Additional detail (e.g. local government area boundaries) relevant at this scale	Figure 2-1
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	–
		☒ IBRA bioregions and subregions ☒ rivers, streams and estuaries	Figure 2-1

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ wetlands and important wetlands ☒ connectivity of different areas of habitat ☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☒ areas of outstanding biodiversity value occurring on the subject land and assessment area ☒ any additional landscape features identified in any SEARs for the proposal ☒ NSW (Mitchell) landscape on which the subject land occurs	
		Data	
		☒ All report maps as separate jpeg files	–
		Individual digital shape files of:	–
		☒ subject land boundary	–
		☒ assessment area (i.e. subject land and 1500 m buffer area) boundary	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ cadastral boundary of subject land	–
		☒ areas of native vegetation cover	–
		☒ landscape features	–
Native vegetation	Chapter 4, Appendix A and Appendix H	**Information**	
		☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	Figure 3-1
		☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	Section 3.1 and 3.2
		☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	Section 3.3.1

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	Section 3.4
		☐ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	N/A
		For each PCT within the subject land, describe:	–
		☒ PCT name and ID	Section 3.3.3, Table 3-2 and Table 3-3
		☒ vegetation class	Section 3.3.3, Table 3-2 and Table 3-3
		☒ extent (ha) within subject land	Section 3.3.3, Table 3-2, Table 3-3 and Table 3-4
		☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	Section 3.3.3, Table 3-2, Table 3-3, Appendix C

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ plant species relied upon for identification of the PCT and relative abundance of each species	Section 3.3.3, Table 3-2, Table 3-3, Appendix C
		☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	Section 3.3.3, Table 3-2 and Table 3-3, Section 3.5, Table 3-6
		☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	Section 3.3.3, Table 3-2 and Table 3-3
		Describe the vegetation integrity assessment of the subject land, including:	–
		☒ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	Section 3.4
		☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	Section 3.4, Table 3-4
		☒ area (ha) of each vegetation zone	Table 3-4
		☒ assessment of patch size (as described in BAM Subsection 4.3.2)	Table 3-4

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	Table 3-4
		☐ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	N/A
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):	–
		☐ identify the PCT or vegetation class for which local benchmark data will be applied ☐ identify published sources of local benchmark data (if benchmarks obtained from published sources) ☐ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	N/A
		☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	N/A

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	N/A
		Maps and tables	
		☒ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	Figure 3-1
		☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 3-1
		☒ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Figure 3-4
		☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 3-4
		☒ Map of TEC distribution on the subject	Figure 3-5, Section 3.5, Table 3-6

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		land and table of TEC listing, status and area (ha)	
		☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	Figure 3-4, Table 3-4
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	–
		☒ composition condition score ☒ structure condition score ☒ function condition score ☒ presence of hollow bearing trees	Table 3-5
		Data	
		☒ All report maps as separate jpeg files	–
		☒ Plot field data (MS Excel format)	
		☒ Plot field datasheets	Appendix C

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Digital shape files of:	–
		☒ PCT boundaries within subject land	–
		☒ TEC boundaries within subject land	–
		☒ vegetation zone boundaries within subject land	–
		☒ floristic vegetation survey and vegetation integrity plot locations	–
Threatened species	Chapter 5	**Information**	
		Identify ecosystem credit species likely to occur on the subject land, including:	–
		☒ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	Section 4.1, Table 4-1
		☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	Section 4.1.1, Table 4-2

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ justification for addition of any ecosystem credit species to the list	N/A
		Identify species credit species likely to occur on the subject land, including:	–
		☒ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	Section 4.2.1, Table 4-3
		☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	Table 4-2
		☐ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	N/A
		☒ justification for addition of any species credit species to the list	Table 4-4
		From the list of candidate species credit species, identify:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)) ☒ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)) ☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.)) ☒ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	Table 4-5
		Present the outcomes of species credit species assessments from:	–
		☒ threatened species survey (as described in BAM Section 5.2.4)	Table 4-5
		☐ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	N/A

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Where survey has been undertaken include detailed information on:	–
		☒ survey method and effort (as described in BAM Section 5.3)	Section 4.2.4 and 4.2.5
		☐ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	N/A
		☐ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	Section 4.2.4 and 4.2.5
		☒ survey personnel and relevant experience	Appendix D
		☒ describe any limitations to surveys and how these were addressed/overcome	Section 4.2.5
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ justification of the use of an expert report ☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ all requirements of Box 3 have been addressed in the expert report	N/A
		Where use of local data is proposed (BAM Subsection 1.4.2):	–
		☐ identify relevant species ☐ identify data to be amended ☐ identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ justify use of local data in preference to VIS Classification or TBDC data	N/A
		☐ provide written confirmation from the decision-maker that they support the use of local data	N/A
		Species polygon completed for species credit species present within the subject land (assumed	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		present or determined on the basis of survey, expert report or important habitat map) ensuring that:	
		☐ the unit of measure for each species is documented	N/A
		for species assessed by area:	–
		☒ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	Figure 4-2
		☒ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	Section 4.2.5
		for species assessed by counts of individuals:	–
		☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	N/A
		☐ the method used to derive this number (i.e. threatened species survey or expert report)	N/A

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		and evidence-based justification for the approach taken	
		☐ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	N/A
		☐ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	N/A
		Maps and tables	
		☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	Table 4-1
		☐ the ecosystem credit species removed from the list	N/A
		☒ the sensitivity to gain class of each species	Table 4-1
		☒ Table detailing species credit species in	Table 4-3

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		accordance with BAM Section 5.2 and identifying:	
		☒ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	Table 4-2
		☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Table 4-5
		☒ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	Table 4-5
		☒ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	Figure 4-2
		Data	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Digital shape files of suitable habitat identified for survey for each candidate species credit species	–
		☒ Survey locations including GPS coordinates of any plots, transects, grids	
		☒ Digital shape files of each species polygon including GPS coordinates of located individuals	–
		☒ Species polygon map in jpeg format	–
		☒ Expert reports and any supporting data used to support conclusions of the expert report	
		☒ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	
Prescribed impacts	Chapter 6	**Information**	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		☒ karst, caves, crevices, cliffs, rocks and	Table 4-7

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		other geological features of significance (as described in BAM Subsection 6.1.1) ☒ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	
		☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	N/A
		☒ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	Table 4-7
		☒ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed	Table 4-7

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		impacts	
		☒ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	Table 4-7
		Where the proposed development is for a wind farm:	–
		☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	N/A
		☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	N/A
		☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species	N/A

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		(BAM Subsection 6.1.5(4.))	
		Where the proposal may result in vehicle strike:	–
		☒ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	Table 4-7
		Maps and tables	
		☒ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	Figure 7-2
		☒ Map showing location of potential vehicle strike locations	Figure 7-2
		☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	N/A
		Data	
		☒ Digital shape files of prescribed impact	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		feature locations	
		☒ Prescribed impact features map in jpeg format	–
Avoid and minimise impacts	Chapter 7	**Information**	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	–
		☒ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	Section 6.1.1
		☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	N/A
		☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	6.1.2

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	6.1.3
		☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	6.1.4
		☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	6.1.5
		☒ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	Section 6.1
		Maps and tables	
		☐ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	Table 9-1

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	Figure 6-1
		☒ Maps demonstrating indirect impact zones where applicable	Figure 7-1
		Data	
		Digital shape files of:	–
		☒ alternative and final proposal footprint	–
		☒ direct and indirect impact zones	–
		☒ Maps in jpeg format	–
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	**Information**	
		☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species	Section 7.1

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		habitat (as described in BAM Section 8.1)	
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	–
		☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	Section 7.2, Table 7-4
		☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	Table 7-4
		☒ reporting any limitations or assumptions, etc. made during the assessment	Section 8.2
		☒ identification of the threatened entities and their habitat likely to be affected	Section 7
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	–
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		associated with:	
		☒ karst, caves, crevices, cliffs, rocks and other features of geological significance	Section 7.3, Table 7-5
		☒ human-made structures	Section 7.3, Table 7-5
		☒ non-native vegetation	Section 7.3, Table 7-5
		☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Section 7.3, Table 7-5
		☒ movement of threatened species that maintains their life cycle	Section 7.3, Table 7-5
		☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	Section 7.3, Table 7-5
		☐ assessment of the impacts of wind turbine strikes on protected animals	N/A
		☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	Section 7.3, Table 7-5

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ evaluate the consequences of prescribed impacts	Section 7.3, Table 7-5
		☒ describe impacts that are uncertain	Section 7.3, Table 7-5
		☐ document limitations to data, assumptions and predictions	Section 8.2
		Maps and tables	
		☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 7-2
		Data	
		N/A	–
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	**Information**	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ techniques, timing, frequency and responsibility ☒ identify measures for which there is risk of failure ☒ evaluate the risk and consequence of any residual impacts	Section 9, Table 9-1, Table 9-2
		☒ document any adaptive management strategy proposed	Section 9.1.4, Table 9-3
		Identification of measures for mitigating impacts related to:	–
		☒ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.)) ☒ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☒ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	Section 9, Table 9-1
		☒ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	Table 9-3

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Maps and tables	
		☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	Table 9-1, Table 9-2
		Data	
		N/A	–
Impact summary	Chapter 9	**Information**	
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	–
		☐ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	Section 10
		☐ for each TEC, report the extent of the TEC in NSW	N/A
		☒ addressing all criteria in Subsection 9.1.2	Section 10.2, Table 10-1

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		for each threatened species at risk of an SAII present on the subject land	
		☒ for each threatened species, report the population size in NSW	Table 10-1
		☒ documenting assumptions made and/or limitations to information ☒ documenting all sources of data, information, references used or consulted ☒ clearly justifying why any criteria could not be addressed	Table 10-1
		☒ Identification of impacts requiring offset in accordance with BAM Section 9.2	Section 11.1, Table 11-1, Table 11-2
		☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	Section 11.2, Table 11-3
		☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3	Section 11.2, Table 11-3
		Maps and tables	

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☐ Map showing the extent of TECs at risk of an SAII within the subject land	N/A
		☒ Map showing location of threatened species at risk of an SAII within the subject land	Figure 10-1
		Map showing location of:	–
		☒ impacts requiring offset	Figure 11-1
		☒ impacts not requiring offset	Figure 11-1
		☒ areas not requiring assessment	Figure 11-1
		Data	
		Digital shape files of:	–
		☒ extent of TECs at risk of an SAII within the subject land	–
		☒ location of threatened species at risk of an SAII within the subject land	–
		☒ boundary of impacts requiring offset	–

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ boundary of impacts not requiring offset	–
		☒ boundary of areas not requiring assessment	–
		☒ Maps in jpeg format	–
Impact summary	Chapter 10	**Information**	
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–
		☒ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☒ change in vegetation integrity score (BAM Subsection 8.1.1) ☒ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	Table 3-5, Table 11-1
		☒ biodiversity risk weighting for each	Table 3-5, Table 11-2

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		☒ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	Table 11-2
		Maps and tables	
		☒ Table of PCTs requiring offset and the number of ecosystem credits required	Table 11-1
		☐ Table of threatened species requiring offset and the number of species credits required	Table 11-2
		Data	
		☒ Submitted proposal in the BAM Calculator	–
Biodiversity credit report	Chapter 10	**Information**	
		☒ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	Table 11-1, Table 11-2
		☒ BAM credit report in pdf format	Appendix E

BDAR section	BAM ref.	BAM requirement	Page reference(s) in the BDAR
		Maps and tables	
		☒ Table of credit class and matching credit profile	Table 11-1, Table 11-2
		Data	
		☒ BAM credit report in pdf format	Appendix E