Flora and Fauna Assessment Report
Pine Ridge Solar Farm

20214237

NCA21R123519

04 June 2021

KLEINFELDER
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Flora and Fauna Assessment Report
Pine Ridge Solar Farm

In relation to; Lot 7001 DP 1030846, Lot 219 DP 750615, Lot 285 DP 750615, Lot 284 DP 750615, Part Lot 209 DP 750615 and Part Lot 270 DP 750615

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Ben Stewart James Baldry	Dr. Gilbert Whyte	Dr. Gilbert Whyte

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Kleinfelder has been engaged by SLR Consulting, on behalf of Providence Asset Group, to prepare a Flora and Fauna Assessment Report (FFAR) for a potential for a potential sub-5MWac Solar Farm site located near the township of West Wyalong in the Riverina region of New South Wales (NSW) (**Figure 1**). This project will be assessed under Part 4 of the *Environment Planning and Assessment Act 1979* (EP&A Act) with Bland Shire Council as the consent authority.

The following terms are used throughout the report to describe geographical areas pertaining to the assessment (**Figure 2**):

- Study Area – defined as Part Lot 7001 DP 1030846, Lot 219 DP 750615, Lot 285 DP 750615, Lot 284 DP 750615, Part Lot 209 DP 750615 and Part Lot 270 DP 750615
- Subject Site – land pertaining to the proposed development area
- Locality – land within 10km of the Subject Site.

This report identifies flora, fauna and threatened species present, or likely to occur within the study area based on species and/or habitats detected during field surveys and threatened flora and fauna records from the locality. An assessment of the likely impacts on identified threatened species, habitat features, wildlife corridors and vegetation communities as a result of the proposed development has also been undertaken.

1.2 SITE DESCRIPTION

The Study Area occurs within the Bland Shire Council Local Government Area (LGA) and is zoned '*RU1 – Primary Production'* under the Bland Shire Council Local Environmental Plan 2011 (BSC LEP). The Study Area is approximately 22.75 hectares (ha) in area, with the southern portion (approximately 14.07 ha) proposed for development (**Figure 2**).

The northern and eastern boundaries of the Study Area border native vegetation, which follows the alignment of the Temora Lake Cargelligo Railway to the north. The southern boundary is bordered by predominantly cleared land (i.e. agricultural properties). The western boundary of the Study Area adjoins Wargin Rd. A small strip of remnant vegetation occurs along the western boundary of Lot 270 and Lot 219.

Two constructed dams occur adjacent to the proposed Subject Site on the western boundary of Lot 270 and southern boundary of Lot 284. No major wetlands or streams are mapped within the proposed Subject Site.

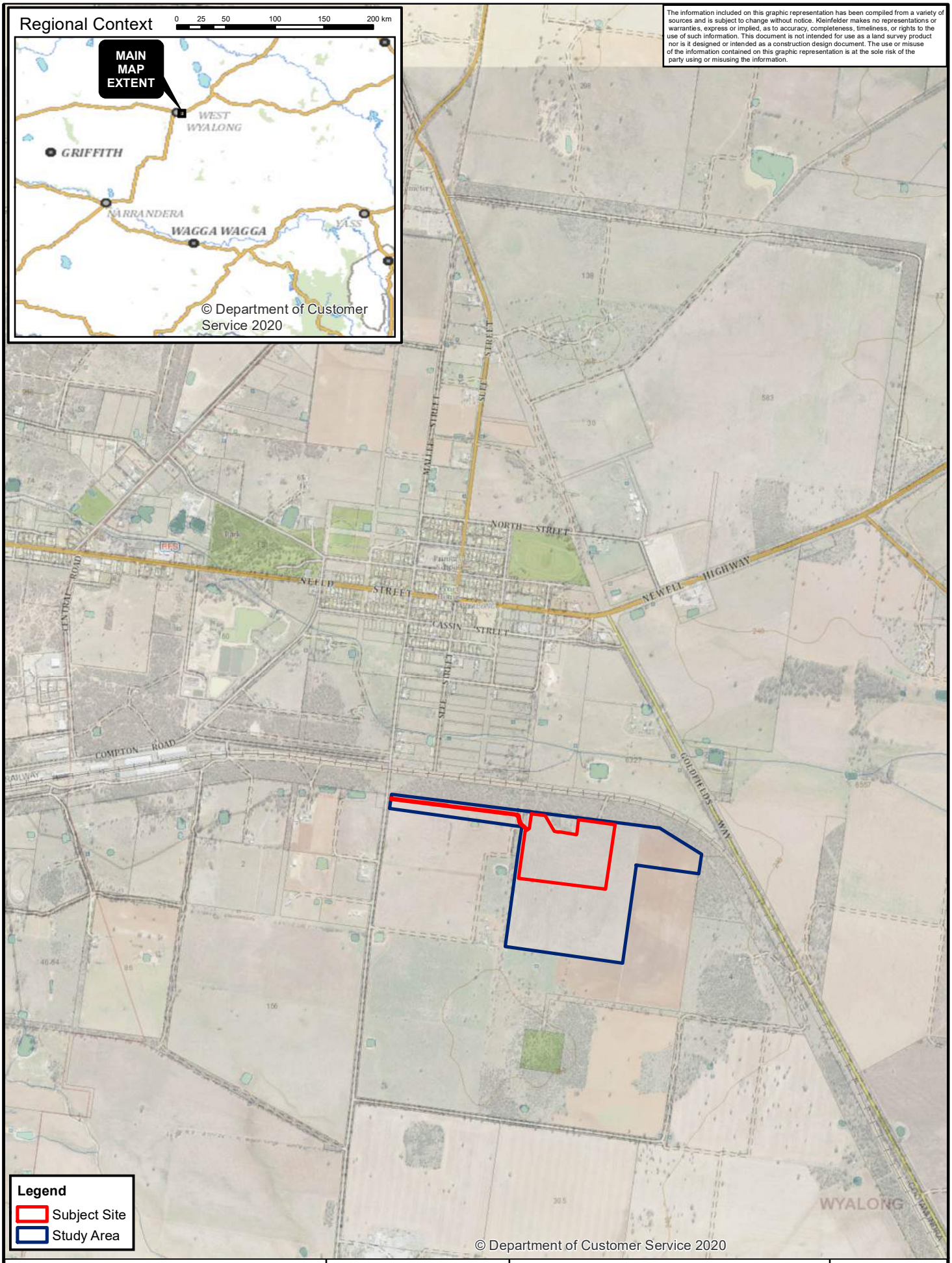
1.3 PROPOSED DEVELOPMENT

The proposed development will include the construction of a commercial sub 5MWac Solar Farm within the central portion of the Study Area as well as a grid connection site and access track extending eastward from Wargin Road. The proposed project layout is provided in **Figure 2**.

1.4 REPORT OBJECTIVES

The objectives of the FFAR include the following:

- Complete a desktop assessment including of relevant threatened biota and regional vegetation mapping.
- Describe the flora and fauna (and their habitats) present on, or likely to occur on the Subject Site.
- Identification of native vegetation, noting the extent and condition of plant community types, as well as the presence, condition and extent of any threatened ecological communities.
- Assess the relevance and value of the Subject Site for threatened species and ecological communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act).
- Assess the potential impacts of the proposed development on threatened species and ecological communities, pursuant to Section 7.3 of the BC Act (5-part test).
- Comment on the likely occurrence and relevance of matters of national environmental significance listed under the Commonwealth *Environment Planning and Biodiversity Conservation Act 1999* (EPBC Act).
- Describe steps to avoid and mitigate any identified impacts on flora and fauna and to protect the natural environment of the Subject Site.



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PROJECT REFERENCE: 20214326

DATE DRAWN: 2021/06/02 10:24 Version 1

DRAWN BY: GJoyce

DATA SOURCE:
NSW DFSI - 2020
NSW OEH - 2019

Locality

Providence Asset Group
Flora & Fauna Assessment Report
Pine Ridge Solar Farm
West Wyalong NSW

FIGURE:

1

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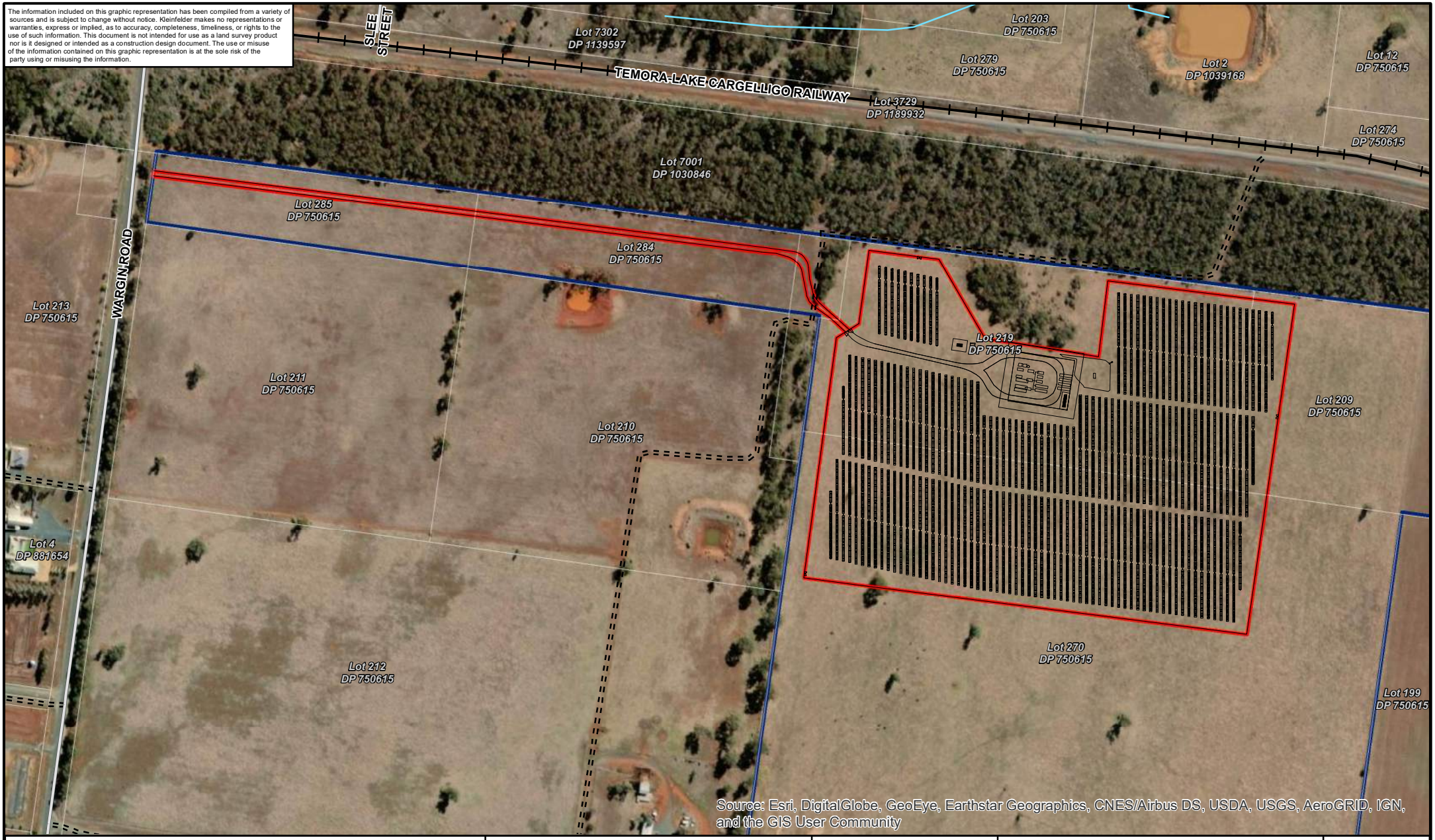

Legend

- Subject Site
- Study Area
- Proposed Site Layout
- Lot Boundaries (NSW DCDB)
- Unnamed Watercourse
- Local Road
- Track
- Railway Lines

Metres

0 25 50 100 150 200 250

N

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DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Proposed Site Layout

Providence Asset Group
Flora & Fauna Assessment Report
Pine Ridge Solar Farm
West Wyalong NSW

FIGURE:

2

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2 LEGISLATIVE CONTEXT

2.1 COMMONWEALTH LEGISLATION

2.1.1 *Environment Protection & Biodiversity Conservation Act 1999*

The purpose of the EPBC Act is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a proposal, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. An action that 'has, will have or is likely to have a significant impact on a Matter of National Environmental Significance (MNES) is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Minister for the Environment.

The EPBC Act identifies nine MNES:

- World heritage properties.
- National heritage places.
- Wetlands of international importance (Ramsar Wetlands).
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.

As part of the current assessment, MNES that are predicted to occur within the locality (applying a 10 km buffer) were obtained from the on-line Protected Matters Search Tool (DAWE 2021a). These records are discussed in **Section 4**. The EPBC Act has been further addressed in this assessment through:

- Field surveys for EPBC Act listed threatened biota and migratory species.
- Assessment of potential impacts on EPBC Act listed threatened species and migratory biota.
- Identification of suitable impact mitigation and environmental management measures for EPBC Act listed threatened species and migratory biota.

2.2 STATE LEGISLATION

2.2.1 *Environmental Planning and Assessment Act 1979*

The EP&A Act forms the legal and policy platform for proposal assessment and approval in NSW and aims to 'encourage the proper management, development and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and the *EP&A Regulation 2000*.

Development activities that require consent are assessed and determined in accordance with Part 4 of the EP&A Act. The determining authority for the project is Bland Shire Council.

2.2.2 Biodiversity Conservation Act 2016

The NSW BC Act, the NSW *Biodiversity Conservation Regulation 2017* (NSW BC Regulation) and amendments to the NSW *Local Land Services Act 2013* (LLS Act) commenced on 25 August 2017. The legislation aims to deliver "a strategic approach to conservation in NSW whilst supporting improved farm productivity and sustainable development". The NSW BC Act repeals several pre-existing Acts, most notably the NSW *Threatened Species Conservation Act 1995*, the NSW Nature Conservation Trust Act 2001 and the NSW *Native Vegetation Act 2003*.

In accordance with the NSW BC Act, entry into the Biodiversity Offsets Scheme (BOS) is not required for the proposed development due to the following:

- The proposed development is not deemed to be 'State Significant' under the NSW EP&A Act.
- The proposed development will not impact an Area of Outstanding Biodiversity Value (AOBV) as listed under Part 3 of the NSW BC Act.
- The proposed development is unlikely to cause a significant impact on a threatened species, population or ecological community, as listed under Schedules 1 and 2 of the NSW BC Act, as determined by application of a five-part-test of significance under Section 7.3 of the NSW BC Act.
- The proposed development will not impact areas mapped as having 'high biodiversity value' as indicated by the NSW Biodiversity Values Map (BV Map).
- The proposed development will result in the removal of 1.36 ha of native vegetation (further discussed in **Section 5.1.1**) therefore, the project will involve clearing of native vegetation that exceeds the BOS threshold for the site as determined by the NSW Biodiversity Conservation Regulation 2017.
- In consideration of the criteria listed above, a Biodiversity Development Assessment Report (BDAR) would usually be required for the proposed development, however the Subject Site meets the definition of category 1-exempt land under the NSW *Local Land Services Act 2013.* As such, a BDAR is not required. See **Section 2.2.3** for further detail.

As part of the current assessment, threatened species and ecological communities as listed under the NSW BC Act that have previously been recorded within the locality (applying a 10 km buffer) were obtained from the on-line BioNet Atlas of NSW Wildlife (DPIE, 2020a). These records are discussed in **Section 4** of this report. The NSW BC Act has been further addressed in this assessment through:

- Field surveys to assess the presence of threatened species, populations and ecological communities, as listed under Schedules 1 and 2 of the NSW BC Act, within the Subject Site.
- Assessment of potential impacts threatened species, populations and ecological communities, as listed under Schedules 1 and 2 of the NSW BC Act, as determined by application of a five-part-test of significance under Section 7.3 of the NSW BC Act.
- Identification of suitable impact mitigation and environmental management measures.

2.2.3 Local Land Services Act 2013

The Study Area exhibits historical and ongoing land use consistent with category 1 – exempt land under Section 60H of the *Local Land Services Act 2013* (LLS Act), which defines category 1-exempt land as follows:

- (1) Land is to be designated as category 1-exempt land if the Environment Agency Head reasonably believes that:
    - (a) the land was cleared of native vegetation as of 1 January 1990, or
    - (b) the land was lawfully cleared of native vegetation between 1 January 1990 and the commencement of this Part.
- (2) Land is to be designated as category 1-exempt land if the Environment Agency Head reasonably believes that:
    - (a) the land contains low conservation value grasslands, or
    - (b) the land contains native vegetation that was identified as regrowth in a property vegetation plan referred to in section 9 (2) (b) of the *Native Vegetation Act 2003*, or
    - (c) the land is of a kind prescribed by the regulations as category 1-exempt land.

For developments requiring some degree of land clearing as defined in Part 5A of the LLS Act, the BC Act stipulates under what conditions the BAM is to be used to determine possible entry into the BOS. In relation to category 1-exempt land, Clause 6.8(3) of the BC Act states:

- (3) The biodiversity assessment method is to exclude 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 any impacts prescribed by the regulations under section 6.3.

As the Native Vegetation Regulatory Map, which is intended to show the extent of areas of classified as category 1-exempt and category 2-regulated, is still under development, transitional arrangements require assessment against multiple data sources and field surveys. Classification of the Subject Site for the purposes of this development application as category 1-exempt was assessed using the following data sources:

- An ecological field survey (described in this report).
- Historical aerial photography - 1973, 1989, 1993, 1997, 2006, 2011 and 2015 (See **Appendix F**).
- 2011 Woody vegetation extent maps (**Plate 1**)
- 2017 Land Use Map (**Plate 2**)
- Native Vegetation Regulatory Map (showing no areas of vulnerable regulated, sensitive regulated or excluded land) (**Plate 3**)

In relation to Section 60H of the LLS Act, no aerial imagery was available for 1 January 1990. Consequently, images from 1973, 1989, 1993, 1997, 2006, 2011 and 2015 were assessed (**Appendix F**). Aerial imagery from 1973 shows the Subject Site to be extensively modified and cleared of native vegetation for cropping and/or pastural improvement purposes. A later image taken in 1989 shows similar land-use with few scattered trees,

demonstrating clear ongoing agricultural practices on the Subject Site. Post-1990 imagery shows consistent ongoing land use within the lot with more recent satellite imagery from 2006 and 2011 clearly showing cultivation furrows.

The NSW 2011 Woody Vegetation Extent (**Plate 1**) indicates no woody vegetation is mapped with the Subject Site with the exception of a single tree to the south (not proposed for removal). The 2017 Land Use Dataset (**Plate 2**) shows the development area proposed in the Subject Site is classified as 3.3.0 Cropping, which is consistent with aerial imagery. Finally, the Native Vegetation Regulatory Map **(Plate 3**) does not identify any sensitive regulated or vulnerable regulated land within the Subject Site.

Based on the above data sources, the Subject Site has been under regular cropping, grazing and pasture improvement since prior to 1990. Therefore, in accordance with the LLS Act, the Subject Site would meet the definition of category 1-exempt land.

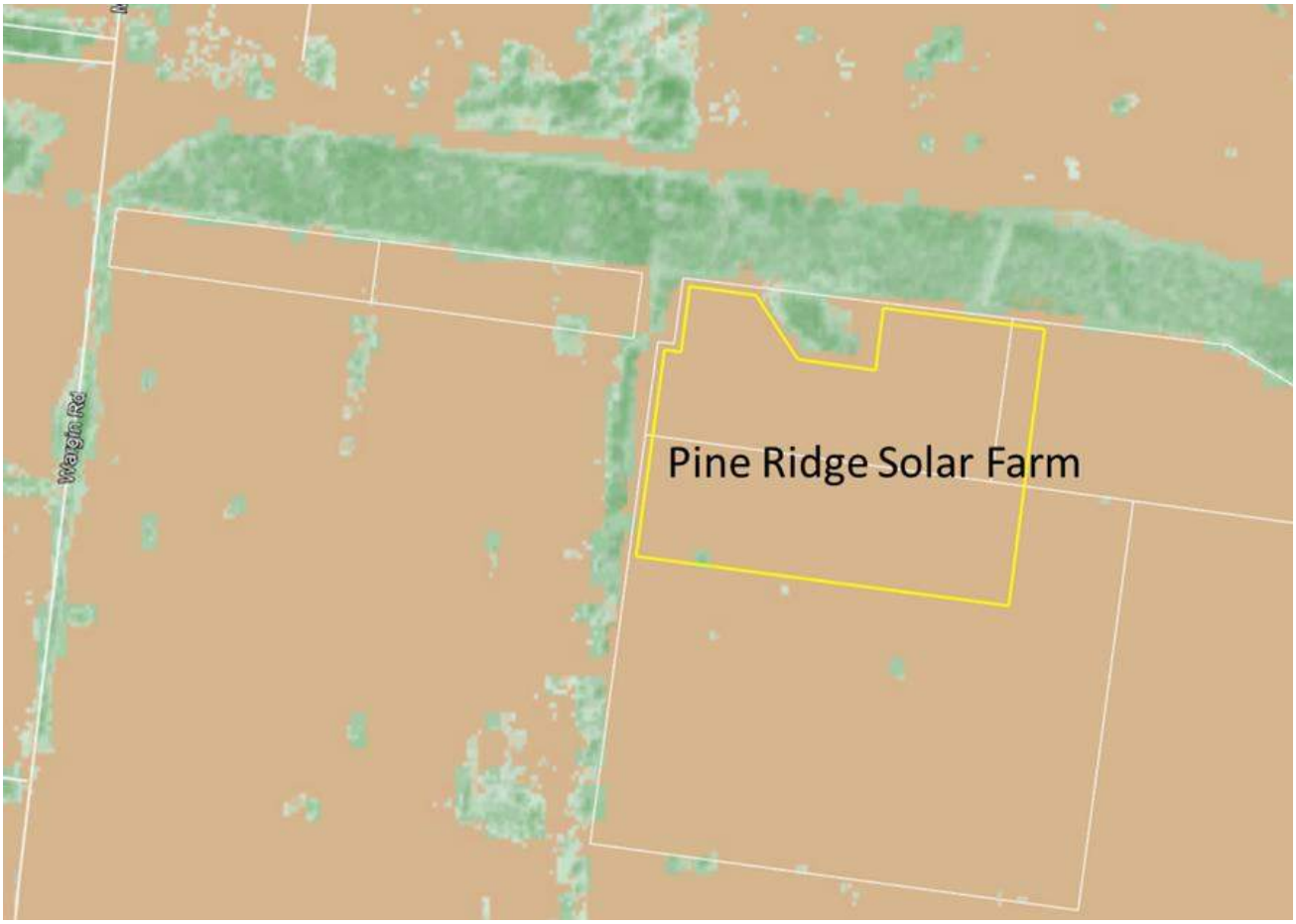


Plate 1 2011 Woody Vegetation (NSW Office of Environment and Heritage)

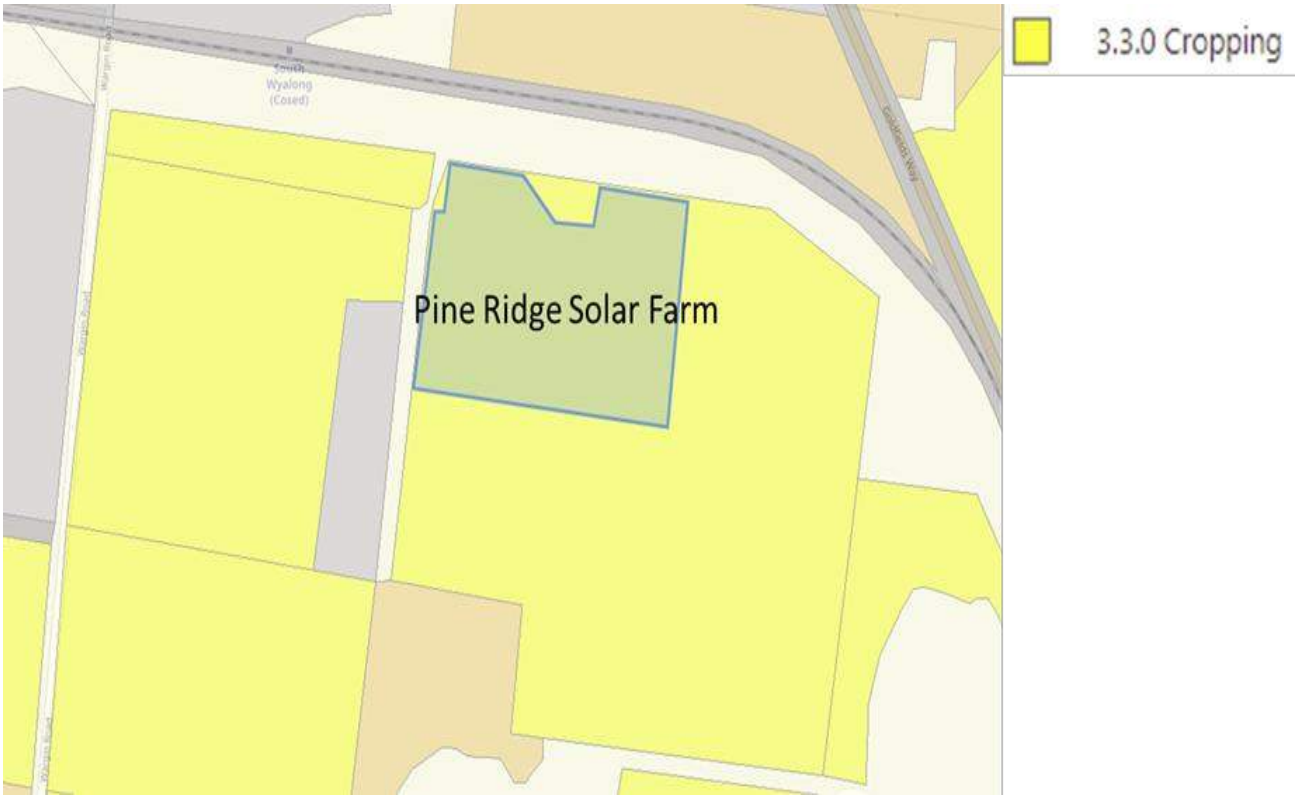


Plate 2 **2017 Land Use Map (NSW Sharing and Enabling Environmental Data in NSW)**

Plate 3 **Native Vegetation Regulatory Map (NSW Department of Industry & Environment)**

2.2.4 Biosecurity Act 2015

The NSW *Biosecurity Act 2015* provides a streamlined statutory framework to protect the NSW economy, environment and community from the negative impact of pests, diseases and weeds. The primary objective of the Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.

In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Exotic species recorded within the Subject Site during the assessment are discussed in **Section 4**.

2.2.5 National Parks and Wildlife Act 1974

The NSW *National Parks and Wildlife Act 1979* (NPWS Act) aims to conserve nature, objects, places or features (including biological diversity) of cultural value within the landscape. The Act also aims to foster public appreciation, understanding and enjoyment of nature and cultural heritage, and provides for the preservation and management of national parks, historic sites and certain other areas identified under the Act.

No areas of National Park estate occur within or adjacent to the Subject Site.

2.2.6 Water Management Act 2000

Controlled activities carried out in, on or under waterfront land are regulated by the NSW WM Act. The NSW Natural Resource Asset Regulator (NRAR) administers the WM Act and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to 'waterfront land' as a consequence of carrying out the controlled activity. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 m of the highest bank of the river, lake or estuary (NRAR, 2018). A controlled activity approval must be obtained from the NRAR before commencing an activity that will directly affect Waterfront land.

No natural watercourses occur within the Study Area (**Figure 2**), therefore the WM Act does not apply to the proposed development. An assessment of indirect impacts of the proposed development on aquatic habitat and downstream aquatic habitats is provided in **Section 5.1.5**

2.2.7 State Environmental Planning Policy (Koala Habitat Protection) 2021

State Environmental Planning Policy (Koala Habitat Protection) 2021 aims to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to support a permanent free-living population over their present range and reverse the current trend of Koala population decline.

The Bland Shire Council LGA is not listed under Schedule 1 of the Koala SEPP 2021 and therefore, is not associated with a Koala management area as per the SEPP. As such, the Koala SEPP 2021 does not apply to this assessment. Additionally, no NSW BioNet records of Koalas occur within the locality.

2.3 LOCAL PLANNING INSTRUMENTS

2.3.1 Bland Local Environmental Plan 2011

The Study Area is located within the Bland Shire Council LGA. The *Bland Local Environmental Plan 2011 (*Bland LEP) controls development within the Study Area through zoning and development controls. These controls are described in greater detail by the supporting *Bland Development Control Plan 2012* (Bland DCP).

2.3.2 Bland Development Control Plan 2012

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

3 MATERIALS AND METHODS

3.1 DESKTOP ASSESSMENT

Existing information on the flora and fauna of the subject site and the locality, including relevant threatened biota was obtained from:

- Regional vegetation mapping: State Vegetation Type Map: Central West/ Lachlan Region Version 1.4. VIS_ID 4468 (DPIE 2016).
- The BioNet Atlas of NSW Wildlife (DPIE, 2020a) for previous records of threatened species, populations and ecological communities (as listed under the BC Act) within a 10 km radius of the Subject Site (data retrieved 19/03/2021).
- The Department of the Environment and Energy (DAWE, 2021a) Protected Matters Search Tool, which involved a search for matters of national environmental significance within a 10 km radius of the subject site (conducted on 19/03/2021).
- Relevant published literature on threatened biota (see References).

The results of the database searches were used to compile a list of threatened species, populations and communities, as listed under the BC Act and EPBC Act that could potentially occur on the Subject Site, and their likelihood of occurrence (**Appendix B**).

3.2 FIELD SURVEY

3.2.1 Vegetation Assessment

A diurnal inspection of the Subject Site and surrounds was undertaken on 24 March 2021 to provide specific observations for this report. Native vegetation types were identified based on dominant flora species present within each structural layer (i.e. canopy, shrub and ground layers). Exotic or highly modified native vegetation was defined based on structure and species composition. Boundaries of vegetation types and communities were marked with a hand-held GPS and mapped using geographical information system (GIS) software.

Vegetation types were assessed against identification criteria for State and Commonwealth listed threatened ecological communities (DAWE, 2021b; DPIE, 2021d). Vegetation and habitats were compared with descriptions provided in the BioNet Vegetation Classification to identify Plant Community Types (PCTs).

Four (4) 400 m² floristic plot/transects were sampled in accordance with Section 5.3.4 of the NSW Biodiversity Assessment Method (BAM) (DPIE, 2020). Percentage cover and relative abundance was recorded for all plant species within each plot/transect. Plot/ transects were positioned to sample areas that were most representative of the floristic characteristics of each PCT. Additionally, a flora species list was compiled through a general walkover of the Study Area to help aid in the determination of PCTs.

Plant identification and nomenclature were based on species descriptions presented within The Flora of New South Wales Volumes 1 to 4 (Harden, 1993) and with reference to taxonomic updates in PlantNET - The Plant

Information Network System of Botanic Gardens Trust, Sydney, Australia (Botanic Gardens Trust, 2020). The locations of all floristic plot/ transects are presented in **Figure 3**

3.2.2 Fauna Habitat Assessment

The locations of any important habitat features, such as microbat roosting habitat, hollow-bearing trees, terrestrial refugia and nests/burrows were captured with a handheld Trimble device and photographed where appropriate.

Searches for potential habitat for threatened fauna species included but were not limited to:

- Koala feed trees.
- Foraging trees for threatened birds.
- Hollow-bearing trees.
- Potential roosts for microbats.
- Vegetated ponds, riparian vegetation and drainage lines for frogs and waterbirds.
- Woody debris, leaf litter and bush rock.

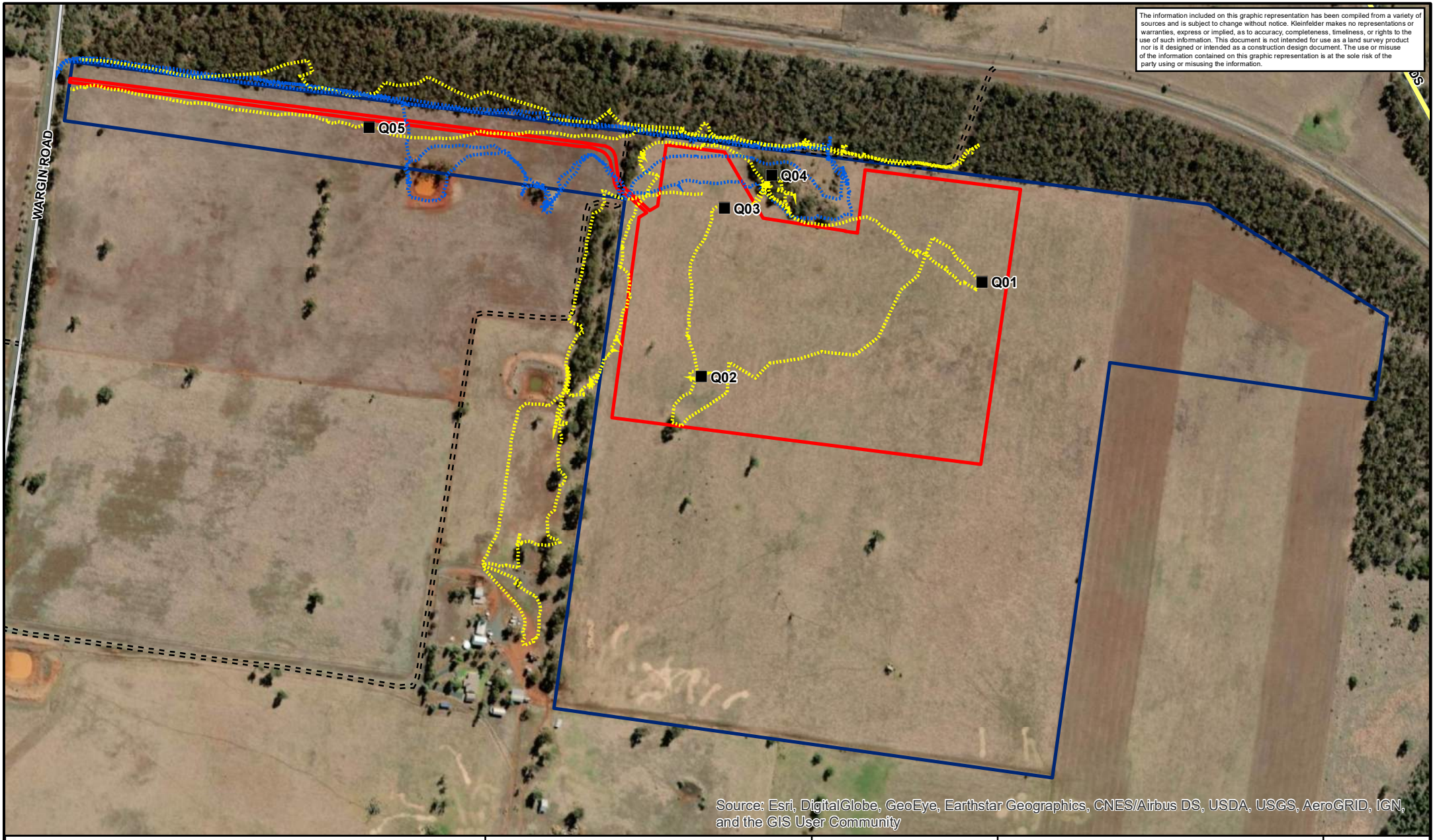
Diurnal opportunistic and incidental observations of fauna species were recorded during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces.

Spotlighting was undertaken by two ecologists for a one-hour period (two person-hours) over one night (24 March 2021) to determine the presence of nocturnal fauna within the Subject Site and its surrounds.

3.3 SURVEY LIMITATIONS

The survey techniques and survey effort applied for this study were commensurate with the nature and condition of the subject site. Due to these limitations, priority was given to habitat assessment for relevant threatened biota. A 'likelihood of occurrence' assessment was applied to all species previously recorded or predicted to occur within the locality based on State and Commonwealth information sources.

Nocturnal fauna surveys were completed over a one-hour period (two person hours) on the 24 March 2021. Given the limited vegetation complexity within the Subject Site, the survey effort was considered adequate to detect the fauna species most likely to be present



Legend

- Subject Site
- Study Area
- Plot Transects
- Meander Survey Tracks
- Spotlight Survey Tracks
- Arterial Road
- Local Road
- Track

Metres

0 25 50 100 150 200 250

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PROJECT REFERENCE: 20214237

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DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Survey Effort

Providence Asset Group
Flora & Fauna Assessment Report
Pine Ridge Solar Farm
West Wyalong NSW

FIGURE:

3

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4 RESULTS

4.1 PLANT DIVERSITY

A total of 57 plant species were identified during the assessment. These comprised of 17 exotic species and 40 native species. The majority of the native species cover, within the proposed development footprint, consisted of native grasses such as *Chloris truncata* (Windmill Grass), *Panicum queenslandicum* (Yadbila Grass) and *Sporobolus caroli* (Fairy Grass). Other common native species occurring within the proposed development footprint included *Eragrostis leptocarpa* (Drooping Lovegrass), *Dichanthium sericeum* (Queensland Bluegrass), *Euphorbia drummondii* (Caustic Weed), *Sclerolaena muricata* (Black Rolypoly) and *Atriplex semibaccata* (Creeping Saltbush).

Areas adjacent to the Subject Site were found to be vegetated with mallee woodland vegetation (i.e. along the northern boundary). The dominant native tree species identified during the walkover consisted of *Eucalyptus dumosa* (White Mallee), *Eucalyptus behriana* (Bull Mallee) and *Callitris glaucophylla* (White Cypress Pine). The dominant shrub species were *Dodonaea viscosa* (Sticky Hop-bush), *Daviesia genistifolia* (Broom Bitter Pea) and *Acacia oswaldii* (Miljee). Common groundcover species included *Calocephalus sonderi* (Pale Beauty-heads), and *Austrostipa elegantissima* (A spear-grass).

A comprehensive list of flora species is presented in **Appendix C**.

4.2 EXOTIC SPECIES

Of the 17 exotic species identified during the assessment, the following two species are listed on the BAM High Threat Weeds List for NSW (DPIE, 2020b):

- *Lycium ferocissimum* (African Boxthorn) – listed as manageable; and
- *Carthamus lanatus* (Saffron Thistle) – listed as unmanageable.

Additionally, three species identified during the assessment are listed as priority weeds (DPI, 2021) for the Riverina region – *L. ferocissimum* (African Boxthorn), *Nassella neesiana* (Chilean Needle Grass) and *Opuntia* stricta (Common Prickly Pear). Each of these three species are also listed as Weeds of National Significance (WoNS) (DAWE, 2021c).

The most abundant exotic species observed within the Study Area consisted of *Lycium ferocissimum*, *Nassella neesiana* (Chilean Needle Grass) and *Eragrostis cilianensis* (Stinkgrass). Minor infestations of *L. ferocissimum* were evident within the mallee community within Lot 219 which borders the proposed development footprint.

Mitigation measures to prevent the spread of weeds are presented in **Section 5.2.2**.

4.3 PLANT COMMUNITY TYPES

Regional Vegetation Mapping i.e. State Vegetation Type Map: Central West/ Lachlan Region Version 1.4. VIS_ID 4468 (DPIE 2016) indicates the entire Subject Site is mapped as exotic vegetation, with the wooded vegetation, outside of the Subject Site but within the northern portion of the Study Area, mapped as the following:

- PCT 177: Blue Mallee - Bull Mallee - Green Mallee very tall mallee shrubland of the West Wyalong region, NSW South Western Slopes Bioregion
- *PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW*

The site-based assessment determined that the regional vegetation mapping of the Subject Site (exotic vegetation) to be inaccurate. This is evidenced by the dominant coverage of native grass species: *Chloris truncata*, *Panicum queenslandicum* and *Sporobolus caroli*. Additionally, a walkover of the Subject Site confirmed the vegetation to be homogenous. Within the landscape, the Subject Site occurs on a flat low-lying area consisting of red clay soils. The plant community adjacent to the Subject Site, regionally mapped as PCT 355, also occurs within this landscape position on the same soil type. As such, it is believed that the Subject Site is a degraded form of PCT 355 (**Figure 4**). Additionally, ground-stratum species identified within the Subject Site, that are commensurate with PCT 355, include *Chloris truncata, Euphorbia drummondii* (Caustic Weed), *Portulaca oleracea* (Pig Weed) and *Einadia nutans* (Climbing Saltbush). Mid-stratum species include *Sclerolaena muricata* (Black Rolypoly) and *Enchylaena tomentosa* (Ruby Saltbush).

Refer to **Appendix A** for additional site photos

Plate 4 **PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW**

PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW (Degraded condition)	
Vegetation Formation and Class	Semi-arid Woodlands (Shrubby sub-formation) Sand Plain Mallee Woodlands
Area within Subject Site	14.07ha
Survey Effort	**Conducted: 4** plots/transects
Floristic description	The vegetation within the Subject Site is primarily characterised by its ground-stratum. The ground-stratum is characterised by the dominant species *Chloris truncata* (Windmill Grass), *Panicum queenslandicum* (Yadbila Grass) and *Sporobolus caroli* (Fairy Grass). Other species commonly present, but not dominating the ground-stratum, include *Eragrostis leptocarpa* (Drooping Lovegrass), *Dichanthium sericeum* (Queensland Bluegrass), *Euphorbia drummondii* (Caustic Weed), *Austrostipa platychaeta* (Flat-awn Speargrass). The most dominant shrubs that were present within the Subject Site were *Enchylaena tomentosa* (Ruby Saltbush), *Atriplex semibaccata* (Creeping Saltbush) and *Sclerolaena muricata* (Black Rolypoly). These species occurred as scattered individuals throughout the area. *Maireana brevifolia* and *Sclerolaena bicornis* (Goathead Burr) were also present in small abundances.
Condition within Subject Site	The vegetation within the Subject Site exists in a heavily modified condition due to previous land practices, i.e. clearing of remnant vegetation. As such, the canopy layer and majority of the shrubby midstorey is absent from this community. Only some native shrub and grass species typical of PCT 355 are still present.

PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW (Degraded condition)	
Justification for PCT selection	Majority of the floristic structure that still remains within the modified community resembles PCT 355. Additionally, the landscape position and soil texture and colour within the Subject Site is representative of PCT 355.
Status	**BC Act:** Not listed
	EPBC Act: Not Listed.
PCT % Cleared	95%

Vegetation surrounding the Subject Site (Study Area)

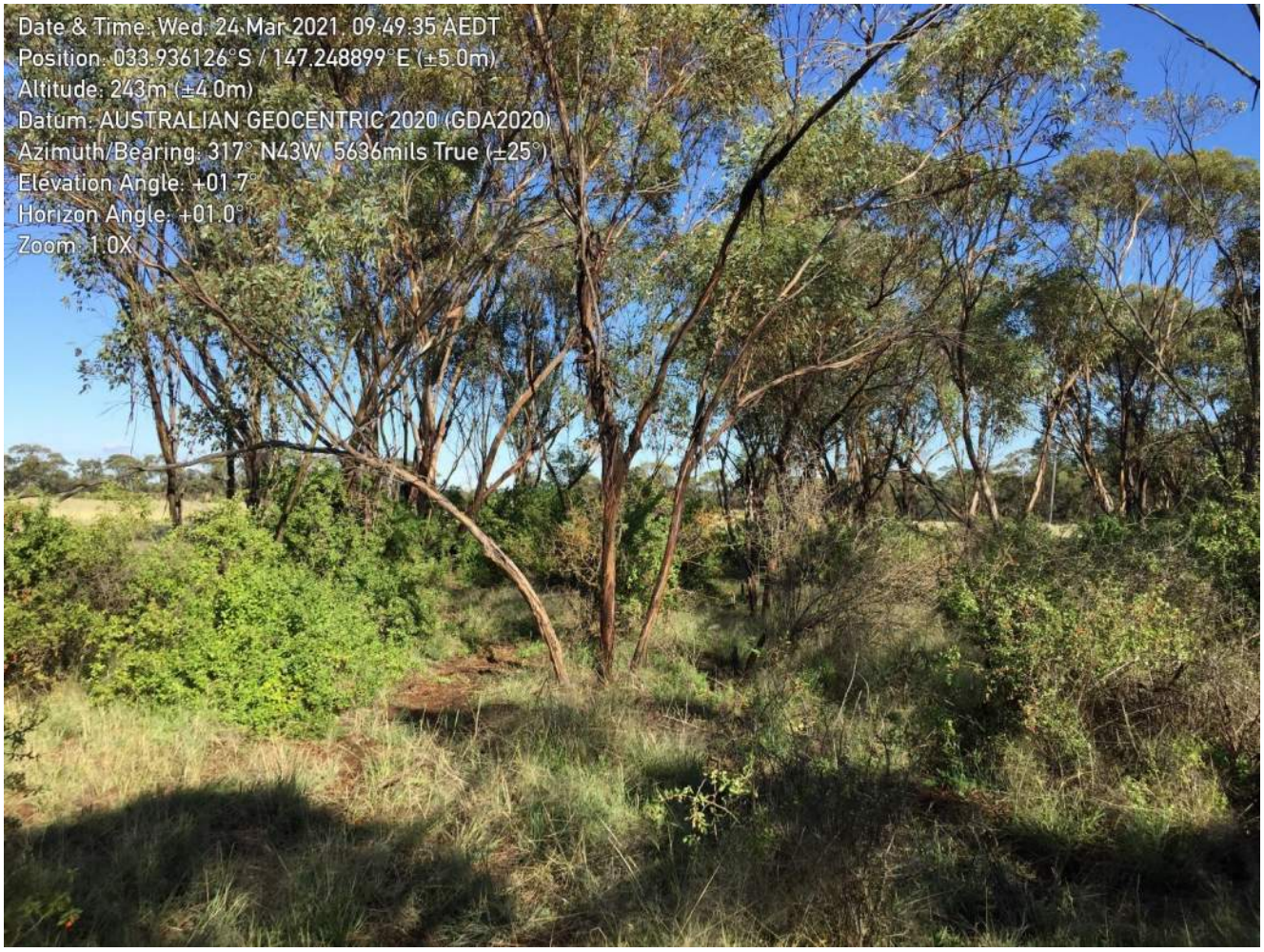
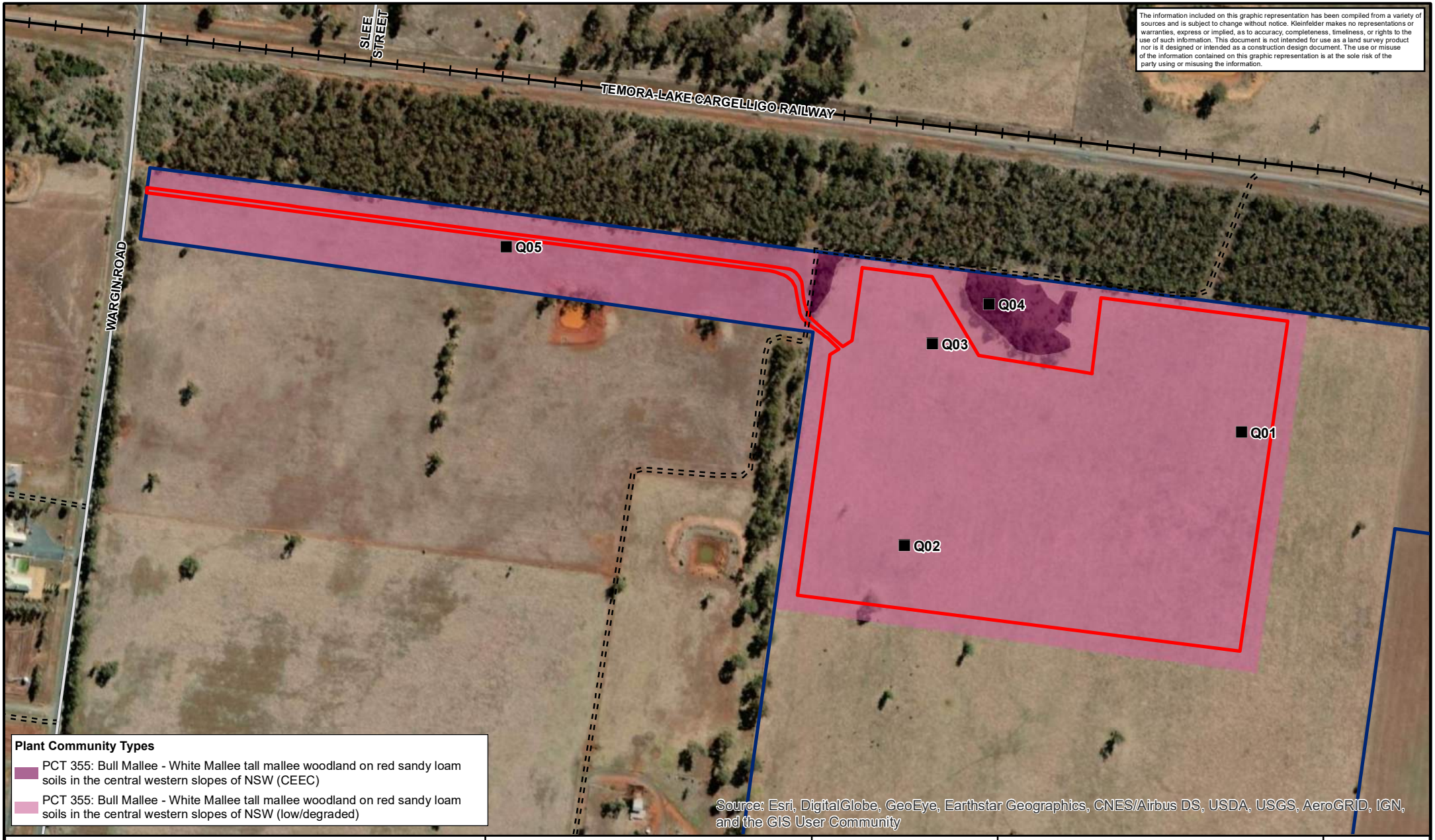


Plate 5 **PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW**

PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW (Moderate condition)	
Vegetation Formation and Class	Semi-arid Woodlands (Shrubby sub-formation) Sand Plain Mallee Woodlands
Area within Study Area	0.68 ha
Survey Effort	1 plot/transect

PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW (Moderate condition)	
Floristic description	The vegetation within this zone is characterised by a canopy layer dominated by *Eucalyptus behriana* (Bull Mallee) and *Eucalyptus dumosa* (White Mallee). Shrub species consisted of were *Enchylaena tomentosa* (Ruby Saltbush), *Atriplex semibaccata* (Creeping Saltbush), *Sclerolaena bicornis* (Goathead Burr) and *Maireana microphylla* (Small-leaf Bluebush). A high cover of *Lycium ferocissimum* (African Boxthorn) was present within the shrub layer. Native species such as *Sporobolus caroli (*Fairy Grass*)* and *Chloris truncata* (Windmill Grass) dominated the ground-layer. A small diversity of forbs were also present, including *Einadia nutans* (Climbing Saltbush) and *Portulaca oleracea* (Pigweed).
Condition within Subject Site	This community is considered to exist in a moderate condition. This is based on the incursion of exotic species, most notably African Boxthorn, and other species including *Lepidium africanum* (Common Peppercress) and *Medicago polymorpha* (Burr Medic), as well as the low diversity of native shrub and ground cover species, compared to the benchmark conditions.
Justification for PCT selection	The floristic structure, landscape position and soil colour and texture of the community are commensurate with PCT 355. Additionally, this PCT occurs within both the NSW Lower Western Slope IBRA region and Lower Slopes sub-IBRA region.
Status	**BC Act:** *Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion*. **This community within the Study Area constitutes the TEC.**
	EPBC Act: Not Listed.
PCT % Cleared	95%



Plant Community Types

- PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW (CEEC)
- PCT 355: Bull Mallee - White Mallee tall mallee woodland on red sandy loam soils in the central western slopes of NSW (low/degraded)

Legend

- Subject Site
- Study
- Plot Transects
- Local Road
- Track
- Railway Lines

Metres
0 25 50 100 150 200 250
N

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PROJECT REFERENCE: 20214237
DATE DRAWN: 2021/06/03 11:01 Version 1
DRAWN BY: GJoyce
DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Vegetation Communities and Habitat Features

Providence Asset Group
Flora & Fauna Assessment Report
Pine Ridge Solar Farm
West Wyalong NSW

FIGURE: 4

L:\GIS FOLDER\00 CLIENT FILES\132506_ProvidenceAssetGroup\20214237_FFAR_WestWyalongSolarFarm\Mapping\20214237_FFAR_Fig4_VegetationCommunities.mxd

4.4 THREATENED ECOLOGICAL COMMUNITIES

No Threatened Ecological Communities (TECs) were identified within the Subject Site. One threatened ecological community was identified to exist adjacent to the Subject Site within the Study Area:

- *Mallee and Mallee - Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion* – listed as critically endangered under the BC Act.

The wooded mallee vegetation existing within the Study Area, but outside of Subject Site, is commensurate with key characteristic criteria with the abovementioned TEC. Some of the characteristics of this TEC represented within this vegetation include its:

- Placement within the NSW South Western Slopes Bioregion.
- Floristic structure including a canopy co-dominated by *Eucalyptus behriana* (Bull Mallee) and *Eucalyptus dumosa* (White Mallee)
- Soil being red in colour and loamy in texture.

An 'Assessment of Significance' on direct and indirect impacts to threatened ecological communities is presented in **Appendix D.**

4.5 THREATENED FLORA SPECIES

No threatened flora species were identified within the Subject Site during the assessment. One threatened flora species, *Austrostipa wakoolica* – listed as endangered under both the BC and EPBC Act, was identified to occur within the Study Area. This species was identified within the remnant mallee vegetation bordering the western edge of Lot 270.

An 'Assessment of Significance' on direct and indirect impacts to threatened flora is presented in **Appendix D.**

4.6 FAUNA HABITAT

The Subject Site is characterised by an area predominantly native grassland with limited shrub cover and an absence of canopy species. No vegetated waterbodies, hollow-bearing trees, rocky outcrops or areas of fallen timber were identified to exist within the Subject Site. As such, the Subject site is considered largely unsuitable for threatened fauna species. Although, as the Subject Site is predominately native grassland, there is potential for native birds and macropods (Kangaroos and Wallabies) to utilise the Subject Site for foraging.

Amphibian species were identified within waterbodies of the Study Area during nocturnal surveys.. The site assessment was conducted following recent rainfall for the locality and as such amphibian activity was also detected in native grassland within the Subject Site.

Areas containing greater vegetation structure, i.e. remnant mallee communities, may provide more suitable habitat for local fauna dueto the presence of the following habitat features:

- Complex vegetation structure
- Habitat logs for terrestrial species

- Food resources such as nectar, pollen and seeds from large plant species such as *Eucalyptus behriana* (Bull Mallee) and *Eucalyptus dumosa* (White Mallee)

4.7 Fauna Species

A total of nine (9) fauna species were detected during the assessment. Fauna species comprised of the following:

- Seven (7) amphibian species.
- One (1) feral species – House Mouse (*Mus musculus*); and
- One (1) bird species.
- Fauna species were identified through both diurnal and nocturnal surveys. A complete list of fauna species is presented in **Appendix C.** An Assessment of Significance on direct and indirect impacts to threatened fauna is presented in **Appendix D**. Refer to **Appendix A** for photos of fauna detected during the assessment.

4.8 Threatened Fauna Species

Of the fauna species detected, one species is listed as vulnerable under both the BC and EPBC Act – the Superb Parrot (*Polytelis swainsonii*). This species was observed to be perched within the mallee woodland outside of the Subject Site, adjacent to Lot 270.

An 'Assessment of Significance' on direct and indirect impacts to threatened fauna is presented in **Appendix D**.

A search of the BioNet Atlas of NSW Wildlife (DPIE, 2021a) returned a list of seven threatened fauna species that have previously been recorded within 10 km of the Subject Site: Based on the lack of habitat features within the Subject Site, previously recorded threatened fauna species have a low – nil likelihood of utilising the Subject Site.

A "likelihood of occurrence" assessment on threatened fauna species is located in **Appendix B**.

4.9 Koala Habitat

Bland Shire Council LGA does not have an associated Koala Management Area under the Koala Habitat Protection SEPP 2021, and therefore does not have a list of Koala Food Trees as per Schedule 2 of the Koala SEPP. Additionally, vegetation within the Study Area is absent of any listed Koala Food Tree as per Schedule 2 of the SEPP. As such, the Subject Site and surrounds is considered to be unsuitable habitat for Koalas.

4.10 EPBC Protected Matters

One EPBC listed fauna species, the Superb Parrot (*Polytelis swainsonii*) (vulnerable) was detected within the Study Area. The proposed development is unlikely to have a significant impact on the species, local population or their foraging habitat.

Austrostipa wakoolika was identified within the Study Area but not within the Subject Site. The EPBC Assessment of Significance determined the proposed development is unlikely to have a significant impact on this species given the low condition of the Subject Site. Impacts to the above-mentioned matters of national environmental significance have been assessed as per the EPBC Act Significant Impact Guidelines (DoE 2013) in **Appendix E.**

5 DISCUSSION

5.1 IMPACT ASSESSMENT

5.1.1 Impacts to Native Vegetation

Removal of native vegetation within the Subject Site will predominantly consist of native grassland and shrubs. Through a strategic design process, the proposed development will not impact mature trees and thearea of native vegetation removal is limited to 1.36 ha (**Table 1**).

Table 1 – Vegetation (groundcover) removal for the proposed development

Activity	Length (m)	Width (m)	Qty	Area (m^2)
Trenching	1000	1	1	1000.0
Piling (3 string tracker)	0.153162	0.1016	1620	25.2
Piling (2 string tracker)	0.153162	0.1016	240	3.7
Access Road				515.4
Hard Stand & Stormwater detension basin catchment				11304.5
Security fence	1500	0.5	1	750.0
			Total (m^2)	13599
			Total (Ha)	1.36

Mitigation measures to minimise the potential for disturbance of native vegetation within the Subject Site are presented in **Section 5.2.2**.

5.1.2 Impacts to Fauna.

Direct impacts of the proposed development on fauna habitat includes the following:

- The removal of approximately 1.36 ha of native grassland vegetation, which may be utilised by birds and macropods for foraging, and for movement of amphibian species within the site.

Potential indirect impacts of the proposed development on resident fauna populations include the following:

- Noise and lighting during the construction phase may cause minor disturbance to resident fauna within the locality and disrupt their natural behaviour.
- Noise and lighting during the construction phase may disrupt any birds nesting within the remnant mallee woodland vegetation.
- Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of sediment. Sedimentation could adversely affect the water quality within any adjacent aquatic habitat.

Management measures are presented in **Section 5.2.2** to reduce the potential for these impacts.

5.1.3 Impacts to Threatened Species

No threatened species, or threatened species habitat, were identified within Subject Site during the assessment. Two threatened species were identified within the Study Area during the assessment, the Superb Parrot (*Polytelis swainsonii*) and *Austrostipa wakoolica.*

The Assessment of Significance for the Superb Parrot (**Appendix E**) determined that the Subject Site is largely free of trees and therefore lacks roosting, nesting and foraging habitats for the Superb Parrot. As such, the proposed development is unlikely to directly impact this species. A possible indirect impact of the proposed development on this species, is the incursion of weeds into the mallee woodland vegetation within and adjacent to the Study Area. Given the already disturbed nature of this mallee vegetation, the proposed development is considered unlikely to result in a significant impact to its suitability as Superb Parrot habitat. The potential of this indirect impact can be reduced further through the implementation of the impact amelioration methods outlined in **Section 5.2.2**.

Only one individual of *Austrostipa wakoolica* was identified during the assessment, outside of the Subject Site. A walkover of the Subject Site, including sampling floristics though BAM plots, determined that the vegetation was relatively homogenous throughout its extent, with the dominant ground cover species being *Chloris truncata, Panicum queenslandicum* and *Sporobolus caroli.* No areas within the Subject Site were observed to have concentrations of *Austrostipa spp.*, and as such, direct impacts to this species by the proposed development are expected to be negligible. Indirect impacts to individuals that may be present within the broader Study Area are also considered. An Assessment of Significance, pursuant to Section 7.3 of the BC Act (Appendix D) determined the impact of the proposed development on this species to negligible given that only a single individual was identified outside the Subject Site. Furthermore, the degraded grassland community within the Subject Site is considered unlikely to be suitable for this species.

5.1.4 Impacts to Threatened Ecological Communities

No TECs listed under the BC Act and EPBC Act were identified within the Subject Site. One TEC, *Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion*, listed as critically endangered under the BC Act, was identified to occur within the broader Study Area. An Assessment of Significance pursuant to Section 7.3 of the BC Act (**Appendix D**) determined the proposed development is unlikely to significantly impact this TEC given that:

- The strategic design of the proposed development avoids the clearing of vegetation within the Study Area that constitutes this TEC.
- The TEC already exists in isolated patches within the Study Area and therefore is unlikely to become further fragmentated as a result of the development.
- The TEC exists in a moderately disturbed state as a result of previous land management.

As such, the impact of the proposed development on this TEC is considered negligible.

5.1.5 Impacts to Aquatic Habitat

There are no direct impacts associated with the proposed development and natural watercourses or waterbodies within the Subject Site.

A number of waterbodies (dams) occur within the Study Area and adjacent to the Subject Site. Minor indirect impacts are possible during the construction phase of the proposed development and may include:

- The excavation of soil within the Subject Site during the construction phase has the potential to facilitate sediment movement through dust. Dust settling into the waterbodies can increased sedimentation and may reduce their water quality.

- Sedimentation of waterbodies through erosion is expected to be negligible as the dam walls are built up higher than areas proposed for developments.
- The potential for introduction of chemicals, such as fuels for vehicles and machinery, during the construction phase is expected to have minimal impact to aquatic habitat based on their distance from waterbodies within the Study Area. However, if pollutants were introduced to any aquatic habitat within the Study Area, impacts to are expected to great due to the small size of each waterbody, and their isolation, i.e. not connected to larger streams.

Recommendations to reduce the potential for adverse environmental impacts to aquatic habitat are presented in **Section 5.2.2**.

5.1.6 Cumulative Impacts

Cumulative impacts arise from the interaction of individual elements associated with the proposed development and the additive effects of other external projects. No other known projects within the locality are known to have relevance to this project that could exacerbate cumulative impacts.

5.2 IMPACT AMELIORATION

5.2.1 Avoidance Measures

Impacts on biodiversity values have been addressed through an iterative design process to avoid areas of higher biodiversity value within the Subject Site. Avoidance measures include the following:

- Design of the development to avoid the removal of native vegetation with high biodiversity value, i.e. mallee woodland constituting the TEC.
- Design of the development to avoid areas containing aquatic habitat.
- Design of the development to avoid the removal of well vegetated areas which may provide foraging habitat fauna a number of fauna species.

5.2.2 Mitigation Measures

5.2.2.1 Erosion Control

Mitigation measures to reduce soil erosion and pollutant run-off during construction activities should include:

- Installation of erosion and sediment control structures within 40 m of Subject Site prior to any construction works.
- Regular inspection of erosion and sediment control measures, particularly following rainfall events to ensure their ongoing functionality.
- The immediate removal offsite of any excavated materials.
- Avoid stockpiling of materials adjacent to native vegetation, but instead use areas that are already cleared/ disturbed.
- Undertake maintenance of silt fences and other mitigation measures to isolate runoff.

5.2.2.2 Dust Control

Specific measures to minimise the generation of dust and associated impacts on adjacent natural environments should include:

- Setting maximum speed limits for all traffic within the Subject Site to limit dust generation.
- Use of a water tanker to spray unpaved access tracks during the construction phase where required.
- Application of dust suppressants or covers on soil stockpiles.

5.2.2.3 Chemical Spills

Specific measures to minimise the potential for chemical spills and associated impacts on adjacent natural environments should include the following:

- All chemicals must be kept in clearly marked bunded areas.
- Regularly inspect vehicles and mechanical plant for leakage of fuel or oil.
- No re-fuelling of vehicles, washing of vehicles or maintenance of vehicles and plant to be undertaken within 20 m of natural drainage lines.

5.2.2.4 Vegetation Clearing (Tree Removal)

The following recommendations are to be implemented during vegetation clearing:

- Clearly identified and mark the boundaries of the proposed development footprint to avoid clearing into mallee woodland vegetation during the construction phase.
- Vegetation should be cleared in a way that will allow fauna species living in or near the clearing site enough time to move out of the area without additional human intervention.
- No clearing should occur during the early evening or at night.
- As low-lying areas of grassland within the Subject Site are utilised by burrowing amphibian species, especially following rainfall events, a suitably qualified ecologist should be present during earthworks to safely relocated fauna encountered during this stage.
- Additionally, vegetation and soil removed during the construction phase are likely to contain partly an exotic seed bank. To avoid the potential distribution of exotic species, topsoil removed during the construction phase should be disposed of appropriately.

5.2.2.5 Management of Weeds

Management of exotic weed species is crucial to ensure that further incursion into surrounding areas are avoided. Weed management should be implemented prior to, and during the construction phase. Follow up weed management should be implemented during the operation phase. The following points should be adhered to in regard to weed management:

- Weeds of National Significance (WoNS) should be prioritized for control as they have the greatest capacity to cause environmental harm. This should be undertaken prior to commencement of the construction phase. Additional control may be required during the construction phase as ground disturbance and movement of plant and machinery can facilitate the spread of weeds. Follow up control during the operational phase may also be required.

- NSW BAM High Threat Weeds and priority weeds for the Riverina region should be prioritized following the WoNS.
- All other exotic species identified during the assessment should be appropriately controlled during the construction phase, i.e. chemical control.
- Machinery should be washed, prior to entering the site and before leaving the site, to reduce the potential spread of weed species. A washing facility should be established on-site and wastewater disposed of appropriately.
- Chemical weed control should not be undertaken immediately following rainfall or with forecasted rainfall during the time in which weed control is to be undertaken. This will limit the potential for any off-target damage to native species, including fauna.
- If chemical control is to be undertaken in proximity to waterbodies, appropriate chemicals which are safe for aquatic fauna, i.e. amphibians, should be used.

A list of control methods for exotic species listed in NSW can be found on the NSW WeedWise website (DPI, 2021).

6 CONCLUSION

The proposed development is designed to limit the impact to native vegetation as best as possible. The proposed development will require the removal of approximately 1.36 ha of low-condition native vegetation within the Subject Site. The Study Area exhibits historical and ongoing land use consistent with category 1- exempt land under Section 60H of the *Local Land Services Act 2013* and therefore the proposed development does not require entry into the Biodiversity Offset Scheme. Additionally, the proposed development will not impact Areas of Outstanding Biodiversity or areas mapped on the NSW Biodiversity Values Map as having high biodiversity value.

The proposed development is unlikely to cause a significant impact on threatened species (*Austrostipa wakoolica* and Superb Parrot (*Polytelis swainsonii*)) or potentially suitable habitat for these species within the Study Area. The proposed development is designed to avoid areas containing vegetation commensurate with the threatened ecological community - *Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion* by avoiding direct impacts to areas of mallee woodland vegetation. Any indirect impacts arising from the proposed development to threatened species, their habitat or threated ecological communities are expected to be negligible. The assessment determined that impacts to MNES are unlikely; therefore, an EPBC referral to the Commonwealth Minister for the Environment is not recommended.

Mitigation measures have been detailed to reduce potential impacts to aquatic habitat and fauna associated with aquatic habitat within the Study Area. Additionally, weed management measures have been detailed to reduce the potential of incursion of weeds in surrounding areas.

7 REFERENCES

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APPENDIX A – SITE PHOTOGRAPHS

Plate 6 **Remnant mallee woodland on the western boundary of Lot 219.**

Plate 7 **Remnant mallee woodland community, dominated by *Eucalyptus behriana* (Bull Mallee) and *E. dumosa* (White Mallee), to the north of Lots 285, 284 and 219.**

Plate 8 **Crucifix Frog (*Notaden bennettii*) detected within the Study Area during the nocturnal survey.**

APPENDIX B – THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE'

THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE'

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the following databases:

- NSW Office of Environment and Heritage (OEH) BioNet Atlas: (http://www.bionet.nsw.gov.au/); and
- Department of Environment and Energy (DoTEE) Protected Matters search tool: (www.environment.gov.au/erin/ert/epbc/index.html).

An assessment was then made of the likelihood of the threatened species, populations, and ecological communities reported or modelled to occur in the locality occurring within the Study Area or using the habitat within the Study Area as an essential part of a foraging range.

The table below summarises the likelihood of threatened species and EPBC Act listed migratory species occurring within the Study Area based on the habitat requirements of each species. A brief definition of the likelihood of occurrence criteria is provided below:

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

Table B1 – Likelihood of occurrence

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
Flora								
1.	*Austrostipa metatoris,* *A Spear-Grass*	V	V	-	PMST	Most records occur in the Murray Valley with sites including Cunninyeuk Station, Stony Crossing, Kyalite State Forest (now part of Murrumbidgee Valley Regional Park) and Lake Benanee. Here, it grows in sandy areas; habitats include sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils.	Low	Potentially suitable habitat within areas containing mallee eucalypt vegetation adjacent to the Study Area.
2.	*Austrostipa wakoolica* A Spear-Grass	E	E	2	BioNet, PMST	This species is Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW. It 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.	**Known**	Identified to occur within the Study Area (mallee eucalypt vegetation), but outside of the proposed Subject Site, during the site-based assessment.
3.	*Eucalyptus leucoxylon* Yellow Gum	V	-	1	BioNet	It is restricted to several small areas between Barham and Euston. This species is not known from any protected area within NSW. It is a tree species which, in New South Wales, occurs at the bases of sandy rises and on loamy clay flats on the floodplains of the Murray River and its tributaries in the Riverina Bioregion.	Low	A single BioNet record occurs within the locality but is regarded as likely to be a planted specimen, as it is well outside of its natural range.
4.	*Tylophora linearis* -	V	E	-	PMST	The majority of records occur in the central western region. It grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens*, *Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii.*	Nil	No suitable habitat for this species occurs within the Study Area.
Birds								

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
1.	*Anseranas semipalmata* Magpie Goose	V	-	1	BioNet, PMST	This species prefers shallow wetlands, often which are centred around floodplains and rivers. This species will also occupy well-vegetated dams and wet grasslands. Breeding for this species is strongly influenced by water level and nests are usually formed in trees over deep water.	Low	Low BioNet records within the locality. Waterbodies observed within the Study Area were not well-vegetated. As such, no suitable breeding habitat occurs within the Study Area.
2.	*Anthochaera phrygia* Regent Honeyeater	CE	CE	1	BioNet, PMST	In NSW the species is confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks are seen occasionally in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests. Habitat for the species includes dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River She-oak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	Low	Limited foraging habitat occurs in wooded areas of the Study Area. No breeding habitat occurs within the Study Area. Low number of BioNet records.
3.	*Burhinus grallarius* The Bush Stone-Curlew	E	-	1	BioNet	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east, it is either rare or extinct throughout its former range. This species inhabits open forests and woodlands with a sparse grassy ground-layer and fallen timber.	Low	Potentially suitable habitat may occur within mallee eucalypt areas adjacent to the proposed development area. Low number of BioNet records.

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
4.	*Lophochroa leadbeateri* Major Mitchell's Cockatoo	V	-	3	BioNet, PMST	This cockatoo is found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. It feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines.	Low	Potential foraging habitat may occur within the Study Area based on the presence of food resources such as Saltbush species and exotic melon species. Low number of BioNet records.
5.	*Botaurus poiciloptilus* Australasian Bittern	E	E	-	PMST	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. It favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha spp*.) and spikerushes (*Eleocharis spp*.).	Nil	No suitable habitat for this species occurs within the Study Area due to the absence of dense wetland vegetation.
6.	*Calidris ferruginea* Curlew Sandpiper	E	CE	-	PMST	The species occurs along the entire coast of NSW, particularly in the Hunter Estuary, and freshwater wetlands in the Murray-Darling Basin. Breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving between August and November, and departing between March and mid-April. It generally occupies littoral and estuarine habitats, and in New South Wales can be found mainly in intertidal mudflats of sheltered coasts.	Nil	No suitable habitat for this species occurs within the Study Area. No BioNet records.
7.	*Falco hypoleucos* Grey Falcon	E	V	-	PMST	Medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. The species is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	Low	Marginal foraging habitat may be present within grassland areas of the Study Area. No BioNet records.

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
8.	*Grantiella picta* Painted Honeyeater	V	V	2	BioNet, PMST	The species is nomadic, occurring in low densities across most of NSW. Highest concentrations and almost all breeding occur on inland slopes of the Great Dividing Range. Habitat for the species includes Boree, Brigalow and Box Gum woodlands and Box-Ironbark forests.	Low	No suitable habitat for this species occurs within the Study Area. Low number of BioNet records.
9.	*Lathamus discolor* Swift Parrot	E1,P, 3	CE	-	PMST	A migratory species that travels to the mainland from March to October, the species breeds in Tasmania from September to January. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. *Eucalyptus robusta*, *Corymbia maculata* and *C. gummifera* dominated coastal forests are also important habitat.	Nil	No suitable habitat for this species is present within the Study Area. No BioNet records within the locality.
10.	*Leipoa ocellata* Malleefowl	E	V	-	PMST	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.	Low	Potentially suitable habitat may occur within the wooded mallee community in the northern portion of the Study Area. No habitat occurs within the proposed Subject Site. No BioNet records within the locality.
11.	*Numenius madagascariensis* Eastern Curlew		CE	-	PMST	The eastern curlew is Australia's largest shorebird and a long-haul flyer. It is easily recognisable, with its long, down-curved bill. The species takes an annual migratory flight to Russia and northeastern China to breed, arriving back home to Australia in August. Feeds in intertidal mudflats	Nil	No suitable habitat for this species occurs within the Study Area.
12.	*Oxyura australis* Blue-billed Duck	V	-	1	BioNet	Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. Partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer.	Low	No suitable habitat for this species is present within the Study Area.

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
13.	*Pezoporus occidentalis* Night Parrot	-	E	-	PMST	The distribution of the Night Parrot has not been well documented, but it is known to be restricted to arid and semi-arid Australia. It is known to occur within Spinifex grasslands in stony or sandy areas and samphire and chenopod associations on floodplains, salt lakes and clay pans. Suitable habitat is characterized by the presence of large and dense clumps of Spinifex, and it may prefer mature spinifex that is long and unburnt.	Nil	Suitable habitat for this species is not present within the Study Area due to the lack of Spinifex dominated grasslands. No BioNet records within the locality.
14.	*Polytelis swainsonii* Superb Parrot	V	V	2	BioNet, PMST	Slim medium-sized parrot (37 to 42 cm) with a long narrow tail and pointed backswept wings, the eastern subspecies is restricted to areas around the Murray River in South Australia, Victoria and NSW. The species nests within River Red Gum forests along the Murray, Wakool and lower Murrumbidgee Rivers. Principal foraging habitat is mallee woodlands, though foraging also occurs in riverine forests and woodlands	**Known**	Observed within the Study Area during the site-based assessment.
15.	*Rostratula australis* Australian Painted Snipe	E	E	-	PMST	Normally found in permanent or ephemeral shallow inland wetlands, either freshwater or brackish. The species nests on the ground amongst tall reed-like vegetation near water. Habitat for the species includes the fringes of swamps, dams and nearby marshy areas with cover of grasses, lignum, low scrub or open timber.	Nil	Marginal habitat for this species may occur around waterbodies within the Study Area. No BioNet records within the locality.
Mammals								
1.	*Dasyurus maculatus maculatus* (SE mainland population) Spotted-Tail Quoll	V	E	-	PMST	Found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania the species has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline	Nil	No suitable habitat for this species occurs within the Study Area.

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
2.	*Nyctophilus corbeni* Corben's Long-eared Bat	V	V	-	PMST	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.	Low	Potentially suitable habitat may occur within the mallee areas, however, no hollows were identified to occur within the Study Area. No BioNet records within the locality.
3.	*Phascolarctos cinereus* Koala	V,P	V	-	PMST	Fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	Nil	Unsuitable habitat for this species within the Study Area. Additionally, the wooded vegetation within, and surrounding, the Study Area is highly fragmented, which would hinder mobility of this species through the area. No BioNet records occur in the locality.
4.	*Pteropus poliocephalus* Grey-headed Flying-fox	V	V	-	PMST	Generally this species is found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. Inhabit subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Nil	Likely to be unsuitable foraging habitat for this species within the Study Area. Vegetation within the Study Area is likely to open and fragmented to support a camp. Additionally, no BioNet records for this species occur within the locality.

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
Reptiles								
1.	*Aprasia parapulchella* Pink-tailed Worm-lizard	V	V	-	PMST	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks.	Low	Native grassland areas do occur within the Study Area, however, no refugia (rocky outcrops or boulders) occur within proposed Subject Site and therefore likely to be unsuitable habitat.
Fish								
1.	*Macquaria australasica* Macquarie Perch		E	-	PMST	A riverine, schooling species, it prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks. Spawning occurs just above riffles (shallow running water). Populations may survive in impoundments if able to access suitable spawning site.	Nil	No suitable habitat for this occurs within the Study Area.
Migratory								
1.	*Hirundapus caudacutus* White-throated Needletail	P	V,C,J,K	P	PMST	Widespread in eastern and south-eastern Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground.	Low	This species may forage aerially above the Study Area. No BioNet records within the locality.
2.	*Motacilla flava* Yellow Wagtail	-	M	-	PMST	Data deficient species. However, other *Motacilla spp.* forage in short grass along swamp margins and saltmarshes. Other species in this genus breed in the northern hemisphere.	Nil	Unlikely suitable foraging and breeding habitat within the Study Area.
3.	*Myiagra cyanoleuca* Satin Flycatcher	-	M	-	PMST	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Nil	No suitable habitat for this species occurs within the Study Area.

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
Threatened Ecological Communities								
1	Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia.	-	E	-	PMST	It mostly occurs from central NSW, through northern/central Victoria into eastern South Australia. The ecological community occurs in two forms, a grassy woodland form and as a derived native grassland. The listed community's range intersects and intergrades* with that of several different grassland and grassy woodland ecological communities that together form an extensive grassy woodland belt in South-Eastern Australia.	Absent	This TEC is floristically dissimilar to vegetation within the Study Area
2	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	- CE	-	-	BioNet Vegetation Classification database	This community has a highly restricted distribution, with known occurrences falling with a region of less than 4000 km2 bounded by Lake Cowal - Temora - Ardlethan - Ungarie. The variant of the community dominated by Bull Mallee and White Mallee tends to occur on plains to the east and north of West Wyalong on red earths including the aeolian soil known as parna.	**Known**	Mallee vegetation directly adjacent to the proposed development area is floristically commensurate with a variation of this TEC in which *Eucalyptus behriana* and *E. dumosa* are dominant in the overstorey.
3	Poplar Box Grassy Woodland on Alluvial Plains.	-	E	-	PMST	The ecological community mostly now occurs as scattered remnant patches inland of the Great Dividing Range in New South Wales and Queensland, within the Brigalow Belt North, Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, NSW South Western Slopes and Riverina IBRA bioregions.	Absent	This TEC is floristically dissimilar to vegetation within the Study Area.
4	Weeping Myall Woodlands	-	CE	-	PMST	The Weeping Myall Woodlands occurs on the inland alluvial plains west of the Great Dividing Range in NSW and QLD. It occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Murray-Darling Depression, Nandewar and Cobar Peneplain Interim Biogeographic Regionalisation for Australia (IBRA) bioregions. The ecological community generally occurs on flat areas, shallow depressions or gilgais on raised alluvial plains.	Absent	This TEC is floristically dissimilar to vegetation within the Study Area.

	Species	Status*		Records**	Source***	Habitat	LoO	Summary
		BC	EPBC					
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	CE	-	PMST	Box-Gum Woodland is found from the Queensland border in the north, to the Victorian border in the south. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum and a generally grassy understorey. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles.	Absent	This TEC is floristically dissimilar to vegetation within the Study Area

APPENDIX C – FLORA AND FAUNA SPECIES LIST

Table C1 - Flora Species sampled within each flora plot. General species from the Study Area walkover are also included (without cover and abundance scores).

No.	Family	*Scientific Name*	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Cover	Cover	Cover	Cover	Cover	Cover	Cover
1.	Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed	Forb (FG)					0.1			
2.	Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	Exotic								
3.	Asteraceae	*Vittadinia cuneata*		Forb (FG)			0.1	15	0.1			
4.	Asteraceae	*Carthamus lanatus*	Saffron Thistle	HTW			0.3	20			0.2	30
5.	Boraginaceae	*Echium plantagineum*	Patterson's Curse	Exotic			0.1	5	0.1			
6.	Boraginaceae	*Heliotropium europaeum*	Potato Weed	Exotic								
7.	Brassicaceae	*Lepidium africanum*	Common Peppercress	Exotic			0.1	10			0.1	1
8.	Brassicaceae	*Brassica spp.*	Brassica	Exotic			0.1	10				
9.	Cactaceae	*Opuntia stricta*	Common Prickly Pear	Exotic								
10.	Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell	Forb (FG)			0.1	10				
11.	Chenopodiaceae	*Maireana microphylla*	Small-leaf Bluebush	Shrub (SG)							0.1	5
12.	Chenopodiaceae	*Enchylaena tomentosa*	Ruby Saltbush	Shrub (SG)					0.1		1	30
13.	Chenopodiaceae	*Sclerolaena bicornis*	Goathead Burr	Shrub (SG)	0.1	5	0.1	20	0.1			0.1
14.	Chenopodiaceae	*Sclerolaena muricata*	Black Rolypoly	Shrub (SG)			0.1	5	0.1		0.1	10

No.	Family	*Scientific Name*	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Cover	Cover	Cover	Cover	Cover	Cover	Cover
15.	Chenopodiaceae	*Dissocarpus paradoxus*	Cannonball Burr	Shrub (SG)								
16.	Chenopodiaceae	*Atriplex semibaccata*	Creeping Saltbush	Shrub (SG)			0.1	10	0.1		0.1	30
17.	Chenopodiaceae	*Chenopodium spp.*	Goosefoot, Crumbweed	Shrub (SG)								
18.	Chenopodiaceae	*Dysphania carinata*	Keeled Goosefoot	Exotic	0.1	40	0.1	10	0.1			
19.	Chenopodiaceae	*Einadia nutans*	Climbing Saltbush	Forb (FG)								
20.	Chenopodiaceae	*Maireana brevifolia*		Shrub (SG)							0.1	20
21.	Convolvulaceae	*Convolvulus angustissimus*		Other (OG)			0.1	10	0.1			
22.	Cucurbitaceae	*Cucumis myriocarpus subsp. leptodermis*	Paddy Melon	Exotic	0.1	5	0.1	5	0.1			
23.	Euphorbiaceae	*Chamaesyce drummondii*	Caustic Weed	Forb (FG)	0.1	50	0.1	15	2	100	0.1	50
24.	Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic	Exotic	0.2	100			0.5		0.1	50
25.	Haloragaceae	*Gonocarpus spp.*	Raspwort	Forb (FG)								
26.	Juncaceae	*Juncus aridicola*	Tussock Rush	Grass & grasslike (GG)								
27.	Myoporaceae	*Myoporum montanum*	Western Boobialla	Shrub (SG)								

No.	Family	*Scientific Name*	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Cover	Cover	Cover	Cover	Cover	Cover	Cover
28.	Myrtaceae	*Eucalyptus microcarpa*	Western Grey Box	Tree (TG)								
29.	Myrtaceae	*Eucalyptus behriana*	Bull Mallee	Tree (TG)								
30.	Myrtaceae	*Eucalyptus dumosa*	White Mallee	Tree (TG)								
31.	Oxalidaceae	*Oxalis perennans*		Forb (FG)			0.1	30	0.1			
32.	Poaceae	*Nassella neesiana*	Chilean Needle Grass	Exotic			1	100				
33.	Poaceae	*Chloris truncata*	Windmill Grass	Grass & grasslike (GG)	6	500	70	10000	40		55	1000
34.	Poaceae	*Eragrostis cilianensis*	Stinkgrass	Exotic	4	500	5	500	5	500		
35.	Poaceae	*Panicum queenslandicum*	Yadbila Grass	Grass & grasslike (GG)	87	10000	5	500	10		2	40
36.	Poaceae	*Sporobolus caroli*	Fairy Grass	Grass & grasslike (GG)	0.2	50	5	500	35		40	1000
37.	Poaceae	*Dichanthium sericeum*	Queensland Bluegrass	Grass & grasslike (GG)	0.2	100			1	100		
38.	Poaceae	*Avena sativa*	Oats	Exotic								
39.	Poaceae	*Eragrostis leptocarpa*	Drooping Lovegrass	Grass & grasslike (GG)			5	300	0.5	50	0.5	100
40.	Poaceae	*Austrostipa platychaeta*	Flat-awn Speargrass	Grass & grasslike (GG)					0.1	20		

No.	Family	*Scientific Name*	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Cover	Cover	Cover	Cover	Cover	Cover	Cover
41.	Poaceae	*Eleusine tristachya*	Goose Grass	Exotic					0.1		0.1	30
42.	Poaceae	*Rytidosperma spp.*		Grass & grasslike (GG)			0.1	45				
43.	Polygonaceae	*Rumex brownii*	Swamp Dock	Forb (FG)	0.1	5			0.1			
44.	Polygonaceae	*Polygonum aviculare*	Wireweed	Exotic							0.1	20
45.	Portulacaceae	*Portulaca oleracea*	Pigweed	Forb (FG)	0.1	50	0.1	20	2		0.1	40
46.	Solanaceae	*Lycium ferocissimum*	African Boxthorn	HTW - Manageable			0.1	3			0.1	2
47.	Zygophyllaceae	*Tribulus terrestris*	Cat-head	Exotic								
Flora (walkover)												
1.	Asteraceae	*Calocephalus sonderi*	Pale Beauty-heads	Forb (FG)								
2.	Asteraceae	*Rutidosis spp.*										
3.	Casuarinaceae	*Casuarina cristata*	Belah	Tree (TG)								
4.	Cupressaceae	*Callitris glaucophylla*	White Cypress Pine	Tree (TG)								
5.	Fabaceae (Faboideae)	*Daviesia genistifolia*	Broom Bitter Pea	Shrub (SG)								
6.	Fabaceae (Mimosoideae)	*Acacia oswaldii*	Miljee	Tree (TG)								
7.	Myrtaceae	*Melaleuca lanceolata*	Moonah	Shrub (SG)								

No.	Family	*Scientific Name*	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Cover	Cover	Cover	Cover	Cover	Cover	Cover
8.	Myrtaceae	*Melaleuca uncinata*	Broombush	Shrub (SG)								
9.	Poaceae	*Austrostipa elegantissima*	Feather Speargrass	Grass & grasslike (GG)								
10.	Poaceae	*Austrostipa wakoolica*	A spear-grass	Grass & grasslike (GG)								
11.	Sapindaceae	*Dodonaea viscosa*	Sticky Hop-bush	Shrub (SG)								

Table B2 Fauna Species List

No.	Scientific Name	Common Name	Status		Observation Type*
			BC	EPBC	
1.	*Crinia parinsignifera*	Eastern Sign-bearing Froglet	-	-	O, H
2.	*Limnodynastes dumerilii*	Eastern Banjo Frog	-	-	O
3.	*Limnodynastes interioris*	Giant Banjo Frog	-	-	O, H
4.	*Limnodynastes tasmaniensis*	Spotted Grass Frog	-	-	H
5.	*Litoria caerulea*	Green Tree Frog	-	-	O
6.	*Litoria peronii*	Peron's Tree Frog	-	-	O
7.	*Mus musculus**	House Mouse	-	-	O
8.	*Neobatrachus sudellae*	Sudell's Frog	-	-	O
9.	*Polytelis swainsonii*	Superb parrot	V	V	O

'*' Denotes an introduced species. Observation Type: O (Visual Observation), H (Heard whilst on site), E (Evidence recorded inc scats, tracks or markings), R (Recorded through the use of call detectors [level of confidence C: Confident, Pr: Probable, Po: Possible]).

APPENDIX D – ASSESSMENT OF SIGNIFICANCE (PURSUANT TO SECTION 7.3 OF THE BC ACT)

D.1 FACTORS OF ASSESSMENT - BIODIVERSITY CONSERVATION ACT 2016

The five factors considered in the test of significance under s.7.3 of BC Act are shown in the table below. The tests of significance for all threatened species, populations and ecological communities considered likely to occur within the Study Area are provided in the proceeding sub-sections.

Table D1: Factors addressed in the assessment of significance.

Factor	Species	Population	Ecological Community
(a) in the case of a **threatened species**, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	*Austrostipa wakoolica* **Table D2-3,** *Polytelis swainsonii* **Table D3-4**	-	-
(b) in the case of an **endangered ecological community or critically endangered ecological community**, whether the proposed development or activity: (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	-	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion **Table D4-5**	-
(c) in relation to the **habitat of a threatened species, population or ecological community**: (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality	*Austrostipa wakoolica* **Table D2-3** *Polytelis swainsonii* **Table D3-4**	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion **Table D4-5**	-
(d) whether the proposed development or activity is likely to have an adverse effect any declared **area of outstanding biodiversity value** (either directly or indirectly).	-	-	-

Factor	Species	Population	Ecological Community
(e) whether the proposed development or activity is or is part of a **key threatening process** or is likely to increase the impact of, a key threatening process.	*Austrostipa wakoolica* **Table D2-3** *Polytelis swainsonii* **Table D3-4**	Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion **Table D4-5**	-

D.2 THREATENED FLORA

Table D2-3 A spear-grass (*Austrostipa wakoolica*) – Endangered (BC Act).

Factor	Species
(a) Effect on life cycle of **threatened species**.	Only two historical records (from the early 1990s) occur within the locality of the Subject Site. One individual was identified to occur within the Study Area during the site-based assessment. This individual was recorded within remnant mallee woodland to the west of Lot 270.Given that a sizeable population was not identified within the Subject Site, the small size of the proposed development footprint and the potential for more suitable habitat within remnant mallee woodland in the surrounding area, it is unlikely that the proposed development would pose a significant impact on the life cycle of this species, such that a local population would be at risk of extinction.
(b) (i) Effect on extent of **EEC** or **CEEC**.	Not Applicable
(b) (ii) Effect on composition of **EEC** or **CEEC**.	Not Applicable
(c) (i) Extent of habitat removal or modification for **threatened species**, **population** or **ecological community**	The proposed development will result in the clearing of approximately 1.36 ha of likely unsuitable habitat for this species.
(c) (ii) Extent of fragmentation or isolation of habitat for **threatened species**, **population** or **ecological community.**	Within this species' natural range it inhabits open woodland and mallee communities on floodplains (DPIE, 2021b). As the proposed development avoids direct impacts to these areas, the proposed development is unlikely to significantly increase the level of fragmentation or isolation of available habitat for the species.
(c) (iii) The importance of habitat to **threatened species**, **populations** or **ecological community**.	Although targeted surveys for this species were not conducted as part of the assessment, the Subject Site was determined to be largely absent of mallee woodland. Select areas of the Study Area retain mallee woodland and a ground stratum that is likely to be more favourable for this species than the dense grass-dominated ground stratum existing within the Subject Site. As such, the Subject Site represents low condition habitat for this species. It is unlikely that the life cycle / reproductive success of this species' will be significantly impacted by the proposed development. Mallee woodland habitat of higher importance to this species is to be retained for its habitat value to threatened species within the locality.
***(d)* Area of Outstanding Biodiversity Value**	Not Applicable

Factor	Species
(e) **Key Threatening Processes**	The following Key Threatening Processes (KTPs) are listed in order of their relevance to the species and the proposed development: • Clearing of native vegetation • Invasion of native plant communities by exotic perennial grasses Given the small scale of proposed clearing and the previously disturbed nature of the vegetation within the Subject Site, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts are likely to be negligible
Conclusion	Given the high level of historical disturbance and the low condition of vegetation within the Subject Site, it is considered unlikely that the proposed activity will impact the life cycle of this species. Only one individual was identified

D.3 THREATENED FAUNA

Table D3-4 Superb Parrot (*Polytelis swainsonii*) – Vulnerable (BC Act).

Factor	Species
(a) Effect on life cycle of **threatened species**.	The Subject Site is absent of hollow-bearing trees which are crucial for the species to breed. Additionally, the core of the breeding population within the Riverina region is situated around the Murray, Edward and Murrumbidgee rivers (DPIE, 2021b). As such, the proposed development is not expected to have a significant effect on the life cycle of the threatened species, such as that a local population would decline.
(b) (i) Effect on extent of **EEC** or **CEEC**.	Not Applicable
(b) (ii) Effect on composition of **EEC** or **CEEC**.	Not Applicable
(c) (i) Extent of habitat removal or modification for **threatened species**, **population** or **ecological community**	The proposed development will result in the modification of approximately 1.36 ha of potential foraging habitat (grassland) for this species. No breeding habitat will be removed as a result of the proposed development.
(d) (ii) Extent of fragmentation or isolation of habitat for **threatened species**, **population** or **ecological community.**	The habitat (grassland) within the Subject Site is considered potential foraging habitat for this species. Other grassland areas directly surround the Subject Site and are connected to areas of mallee woodland. Given that the locality has historically been subject to clearing for agriculture, the landscape exists in a fragmented state. Given the size of the proposed development, and the availability of additionally foraging areas surrounding the Study Area, it is unlikely that fragmentation or isolation of habitat will occur, or increased, as a result of the proposed activity.

Factor	Species
(f) (iii) The importance of habitat to **threatened species**, **populations** or **ecological community**.	The habitat within the Study Area is not considered important for the species, based on the lack of breeding features (hollow-bearing trees).
***(g)* Area of Outstanding Biodiversity Value**	Not Applicable
***(h)* Key Threatening Processes**	The following Key Threatening Processes (KTPs) are listed in order of their relevance to the species and the proposed development: • Clearing of native vegetation • Invasion of native plant communities by exotic perennial grasses • Infection of native plants by *Phytophthora cinnamomi.* Given the small scale of proposed clearing and the previously disturbed nature of the vegetation within the Subject Site, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts are likely to be negligible
Conclusion	The Subject Site is not considered important breeding habitat due to the absence of hollow-bearing trees. The core breeding population for this species within the Riverina region breed along riparian corridors adjacent to the Murray, Edward and Murrumbidgee rivers. As such, the modification of approximately 1.36 ha is not considered to have a significant effect on the local population of this species.

D.4 THREATENED ECOLOGICAL COMMUNITIES

Table D4-5 Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion (CEEC, BC Act).

Factor	Species
(c) Effect on life cycle of **threatened species**.	Not Applicable
(d) (i) Effect on extent of **EEC** or **CEEC**.	The proposed development is unlikely to directly impact the extent (0.68 ha) of Mallee and Mallee-Broombush dominated woodland/shrubland within the Study Area. The design of the proposed development actively avoids impacting vegetation within the Study Area that is commensurate with this TEC. The agricultural management of the Subject Site has resulted in a low-condition derivative grassland community that is not commensurate of this TEC.

Factor	Species
(d) (ii) Effect on composition of **EEC** or **CEEC**.	Moderate condition vegetation that is representative of this CEEC is not based within the Subject Site and therefore, the composition of this vegetation is unlikely to be directly impacted by the proposed development. Indirect impacts to this community primarily relate to disturbance within the Subject Site resulting in increased exotic species abundance within the Study Area as a whole. The impact of this on the composition of this community is unlikely to be considered significant given that the CEEC is in a highly managed landscape and has a high proportion of existing exotic species within its understorey.
(e) (i) Extent of habitat removal or modification for **threatened species**, **population** or **ecological community**	The proposed development will not require the clearing of vegetation that is representative this CEEC within the Study Area.
(e) (ii) Extent of fragmentation or isolation of habitat for **threatened species**, **population** or **ecological community.**	Remnant vegetation within the locality exists in a fragmented state that has historically been subject to extensive clearing. Considering this, the development is unlikely to cause further fragmentation of this CEEC within the locality.
(i) (iii) The importance of habitat to **threatened species**, **populations** or **ecological community**.	The examples of this community within the Study Area retain an open canopy structure and a moderately disturbed understorey. It exists in two isolated patches that are relatively small in size (0.68 ha total). Given the small size and isolation of these patches, the CEEC within the Study Area is likely to represent marginal foraging habitat for threatened species within the locality. As such, the proposed development design does not involve clearing within this vegetation.
***(j)* Area of Outstanding Biodiversity Value**	Not Applicable
***(k)* Key Threatening Processes**	The following Key Threatening Processes (KTPs) are listed in order of their relevance to the TEC and the proposed development: • Historic and current degradation and fragmentation of remnants Invasion of native plant communities by exotic species Given the disturbed and isolated community of CEEC within the Study Area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts are likely to be negligible.
Conclusion	The Subject Site does not contain vegetation commensurate with this CEEC. As such, the proposed development is unlikely to directly impact the extent of the community within the locality. Moderate condition representation of this CEEC that exists within the Study Area will not be subject to clearing and instead is proposed to be retained (0.68ha). The potential indirect impact of exotic plant establishment within the CEEC as a result of adjacent disturbance within the Subject Site is considered negligible. This is in consideration of the already disturbed condition of the CEEC within the Study Area.

APPENDIX E – EPBC ASSESSMENT

SPECIES ASSESSED UNDER THE EPBC ACT SIGNIFICANT IMPACT GUIDELINES

The following pertains to Assessments of Significance for direct or indirect impacts to EBPC Act listed threatened species, populations and communities in association with the Pine Ridge Solar Farm Flora and Fauna Assessment.

The following species have been assessed under the EPBC Act Significant Impact Guidelines:

- Critically Endangered Species
  - N/A
- Endangered Species
  - A spear-grass (*Austrostipa wakoolica*)
- Vulnerable Species
  - Superb Parrot (*Polytelis swainsonii*)
- Migratory Species
  - N/A

ENDANGERED SPECIES – EPBC ACT ASSESSMENT OF SIGNIFICANCE

The EPBC Act Significant Impact Guidelines state:

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

1. *lead to a long-term decrease in the size of a population;*
2. *reduce the area of occupancy of the species;*
3. *fragment an existing population into two or more populations;*
4. *adversely affect habitat critical to the survival of a species;*
5. *disrupt the breeding cycle of a population;*
6. *modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;*
7. *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;*
8. *introduce disease that may cause the species to decline; or*
9. *interfere with the recovery of the species.*

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- A geographically distinct regional population, or collection of local populations; or
- a population, or collection of local populations, that occurs within a particular bioregion.

A spear-grass (*Austrostipa wakoolica*)

1. *Is the proposed development likely too, or have a chance to, lead to a long-term decrease in the size of a population?*

Based on the definition of a population of a species outlined above, the single individual identified during the assessment is unlikely to constitute a population for this species. Historically, only two other confirmed records of this species (from early 1990s) occurred within the locality. As such, the proposed development is unlikely to cause, or have a chance of causing, a long-term decrease in the size of a population.

2. *Is the proposed development likely too, or have a chance to, reduce the area of occupancy of the species?*

Based on the Subject Site consisting primarily of dense tussock-grass ground cover and absence of a shrub and canopy layer typical of the mallee woodland community in which the individual was detected in, it is unlikely that the proposed development will reduce the area of occupancy for this species. Additionally, the species is described as being associated with open woodland and mallee communities on floodplains within its natural range (DPIE, 2021b), rather than open tussock grassland areas.

3. *Is the proposed development likely too, or have a chance to, fragment an existing population into two or more populations?*

The individual detected during the assessment is not considered part of a local population, based on the absence of detection of other individuals during the assessment and the limited historic records (two from the early 1990s) within the locality. Given the relatively small development footprint and lack of detected of further individuals within the Study Area, it is unlikely the proposed development will fragment a local population, if one exists.

4. *Is the proposed development likely too, or have a chance to, adversely affect habitat critical to the survival of a species?*

As the Subject Site is considered unsuitable habitat for the species, it is unlikely that proposed development will affect habitat critical to the survival of this species, or a local population of this species.

5. *Is the proposed development likely too, or have a chance to, disrupt the breeding cycle of a population?*

Due to the absence of detection of more than one individual during the assessment, it is unlikely that a local population will be directly impacted by the proposed development, i.e. disruption of breeding / reproductive cycle. Additionally, direct impacts to habitat considered to be more suitable for the species, i.e. mallee woodland vegetation, will be avoided during the proposed development.

6. *Is the proposed development likely too, or have a chance to, modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?*

As mentioned in point 2, vegetation within the Subject Site is likely unsuitable habitat for this species. Any modification or impacts to the Subject Site is therefore unlikely to modify, destroy, remove, isolate or decrease the quality or availability of habitat suitable for the species. Habitat, which is considered more suitable, i.e. mallee woodland, will be avoided during the proposed development.

7. *Is the proposed development likely too, or have a chance to, result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?*

As ground disturbance / earthworks is part of the proposed development construction phase, there is the potential for incursion of exotic weed species into surrounding vegetation. Mitigation measures detailed in **Section 5.2.2** of this report discuss recommended courses of action to lessen the potential for the spread of weeds. If weed management is conducted appropriately, then the indirect impacts to potentially suitable habitat can be minimized.

8. *Is the proposed development likely too, or have a chance to, introduce disease that may cause the species to decline?*

The proposed development has the potential to introduce pathogens, i.e. *Phytophthora cinnamomi,* harmful to a range of species through soil disturbance and vegetation removal. The mitigation measures outlined in 5.2.2 discussing on-site machine washeries would help in abating the potential for pathogens to spread to and from site.

9. *Is the proposed development likely too, or have a chance to, interfere with the recovery of the species?*

As the current condition of the Subject Site is considered unsuitable habitat for this species, the modification of it through the proposed development is unlikely to interfere with the recovery of the species.

VULNERABLE SPECIES – EPBC ACT ASSESSMENT OF SIGNIFICANCE

The EPBC Act Significant Impact Guidelines state:

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

1. *lead to a long-term decrease in the size of an important population of a species;*
2. *reduce the area of occupancy of an important population;*
3. *fragment an existing important population into two or more populations;*
4. *adversely affect habitat critical to the survival of a species;*
5. *disrupt the breeding cycle of an important population;*
6. *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;*
7. *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;*
8. *introduce disease that may cause the species to decline; or*
9. *interfere substantially with the recovery of the species.*

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

1. key source populations either for breeding or dispersal;
2. populations that are necessary for maintaining genetic diversity, and/or
3. populations that are near the limit of the species range.

Superb Parrot (*Polytelis swainsonii*)

1. *Is the proposed development likely too, or have a chance to, lead to a long-term decrease in the size of an important population of a species?*

Given that the Subject Site is considered unsuitable breeding habitat for this species based on the absence of hollow-bearing trees, it is unlikely that the modification of the Subject Site will cause a long-term decrease in an important population of this species. While the Subject Site may represent potentially suitable foraging habitat, given that grass seeds and herbaceous plant constitute part of the specie's diet (DPIE, 2021b), other open grassland areas occur within locality.

2. *Is the proposed development likely too, or have a chance to, reduce the area of occupancy of an important population?*

The Superb Parrot may, on occasion, utilise areas within the Subject Site for foraging, but breeding habitat is absent. The main breeding areas for this species within the Riverina region include the riparian corridors along the Murrumbidgee River, Edward River and Murray River (DPIE, 2021b). As such, the Subject Site is not an area in which is dependant on by an important population of this species.

3. *Is the proposed development likely too, or have a chance to, fragment an existing population into two or more populations?*

As discussed in point 2, the Study Area is not considered an important area for a local population of this species based on absence of suitable breeding habitat. As such, the proposed development is unlikely to fragment an existing local population.

4. *Is the proposed development likely too, or have a chance to, adversely affect habitat critical to the survival of a species?*

As previous discussed, important habitat for this species constitutes areas of suitable breeding habitat, usually along riparian corridors containing large eucalypt species, such as River Red Gums or Box – Gum woodland areas (DPIE, 2021b). Only potential foraging habitat may occur within the Subject Site, therefore, the proposed development is unlikely to adversely affect habitat critical for this specie's survival.

5. *Is the proposed development likely too, or have a chance to, disrupt the breeding cycle of an important population?*

The proposed development is unlikely to disrupt the breeding cycle of an important population of this species, given that breeding resources are absent from the Subject Site.

6. *Is the proposed development likely too, or have a chance to, modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?*

The proposed development will modify approximately 1.36 ha of potentially suitable foraging habitat for this species. Given that it is unlikely a local population is reliant on resources for breeding within the Study Area and other potentially suitable foraging habitat occurs within the locality, it is unlikely that the pressures resulting from the proposed development will lead to species decline.

7. *Is the proposed development likely too, or have a chance to, result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?*

Any direct impacts resulting from the proposed development are unlikely to result in invasive species that harm the Superb Parrot. There is the potential for weed incursion into the surrounding grassland areas, however, this is expected to be negligible based on mitigations measures recommended in **Section 5.2.2.**

8. *Is the proposed development likely too, or have a chance to, introduce disease that may cause the species to decline?*

The proposed development is not expected to introduce disease leading to the species decline. Regardless, mitigation measures discussing vehicle / machinery washing to abate pathogen transfer are presented in **Section 5.2.2.**

9. *Is the proposed development likely too, or have a chance to, interfere substantially with the recovery of the species?*

It is not expected that the proposed development will interfere with the recovery of this species, given that it is not located within known breeding areas of an important population (riparian corridors along the Murrumbidgee, Edward and Murray rivers). Additionally, the modification of potential foraging habitat within the Subject Site is not considered to have a significant affect on local populations

APPENDIX F – HISTORICAL AERIAL IMAGERY

Legend

- Subject Site
- Study Area

Metres

0 25 50 100 150 200 250

N

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DATE DRAWN: 2021/06/02 10:28 Version 1

DRAWN BY: GJoyce

DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Historic Imagery - 1973 (NSW Spatial Services)

Providence Asset Group
Flora & Fauna Assessment Report
Pine Ridge Solar Farm
West Wyalong NSW

APPENDIX:

F-1

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Legend

- Subject Site
- Study Area

Metres

0 25 50 100 150 200 250

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DATA SOURCE:
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SLR Consulting - 2021

Historic Imagery - 1989 (NSW Spatial Services)

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West Wyalong NSW

APPENDIX:

F-2

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Legend

- Subject Site
- Study Area

Metres

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DATA SOURCE:
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SLR Consulting - 2021

Historic Imagery - 1993 (NSW Spatial Services)

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APPENDIX:

F-3

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Legend

- Subject Site
- Study Area

Metres

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DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Historic Imagery - 1997 (NSW Spatial Services)

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APPENDIX:

F-4

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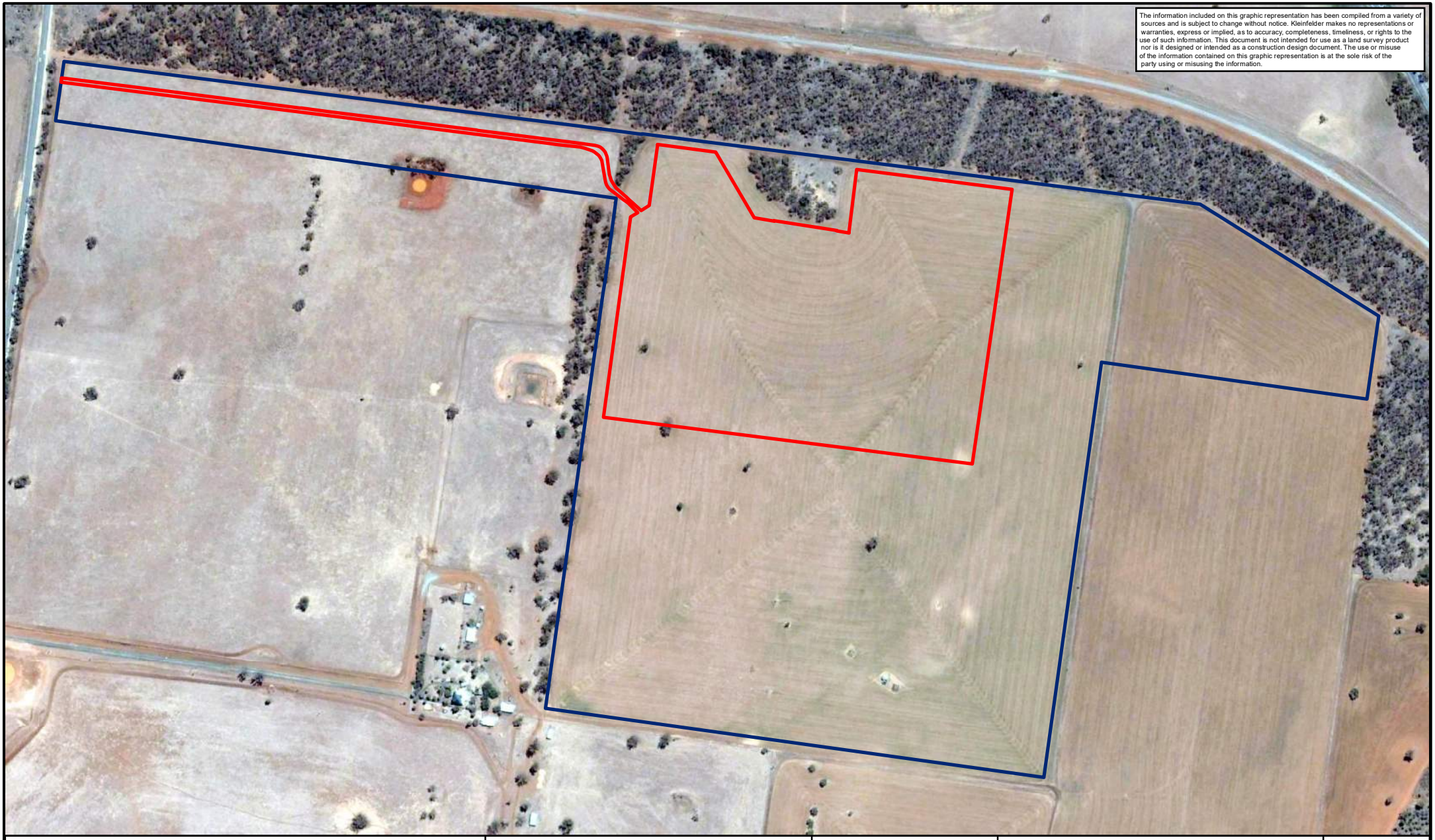

Legend

- Subject Site
- Study Area

Metres

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N

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DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Historic Imagery - 2006 (Google Earth)

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West Wyalong NSW

APPENDIX:

F-5

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Legend

- Subject Site
- Study Area

Metres

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DRAWN BY: GJoyce

DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Historic Imagery - 2011 (Google Earth)

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West Wyalong NSW

APPENDIX:

F-6

L:\GIS FOLDER\00 CLIENT FILES\132506_ProvidenceAssetGroup\20214237_FFAR_WestWyalongSolarFarm\Mapping\20214237_FFAR_APPENDIX_HistoricImagery_2011.mxd

Legend

- Subject Site
- Study Area

Metres

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DRAWN BY: GJoyce

DATA SOURCE:
NSW DFSI - 2021
SLR Consulting - 2021

Historic Imagery - 2015 (NSW Spatial Services)

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APPENDIX:

F-7

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APPENDIX G – STAFF CONTRIBUTIONS

The following staff were involved in the compilation of this report.

Name	Qualification	Title/Experience	Contribution
Ben Stewart	MMarSc&mgt	Ecologist (Botanist)	Field surveys, Lead author Flora and Fauna Assessment Report
James Baldry	MConsBio	Ecologist	Secondary Author
David Martin	MSc	Ecologist (Botanist)	Field surveys
Gilbert Whyte	BSc (Hons) PhD	Senior Ecologist	Field surveys, Report Review
Gayle Joyce	BSc (Forestry) (Hons)	GIS Specialist	GIS and figure preparation

APPENDIX H – LICENSE AND PERMITS

Kleinfelder employees involved in the current study are licensed or approved under the *Biodiversity Conservation Act 2016* (License Number: SL100730, Expiry: 31 March 2021) and the *Animal Research Act 1985* to harm/trap/release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.