Flora and Fauna Assessment Report

KDC Pty Ltd

Narrabri Solar Farm

Lot 489 DP 754944, 115 Airport Road, Narrabri NSW

19 January 2021

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Contents

Tables

Figures

Plates

Appendices

1. INTRODUCTION

1.1 PROJECT BACKGROUND

Kleinfelder has been engaged by KDC Pty Ltd (KDC) on behalf of Providence Asset Group to prepare a Flora and Fauna Assessment Report for a proposed solar farm located at Lot 489 DP 754944, 115 Airport Road, Narrabri NSW 2390 (**Figure 1**). The project will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) with Narrabri Shire Council as the determining authority.

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

- Study area – Lot 489 DP 754944 (30.1 ha).
- Subject site (development footprint) – area of the study area proposed for development (15 ha).
- Locality – land within a 5 km radius of the study area.

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 is located on the eastern boundary of the township of Narrabri within the Narrabri Shire Local Government Area (LGA). The study area is zoned 'RU1 – Primary Production under the *Narrabri Local Environmental Plan 2012* (LEP). The study area is approximately 30.1 ha in area, with the southern portion (approximately 15 ha) proposed as the subject site (development footprint).

The eastern boundary of the study area lies adjacent to Airport Road, immediately south of the Narrabri Airport (NAA). The southern boundary borders a number of residential lots that lie to the north of Kaputar Road. The western and northern boundaries of the study area border vacant land lying within Lots 490, 503 and 506 DP 754944 and Lot 7038 DP 1024282.

The vegetation within the study area is dominated by exotic grasslands with scattered trees and has been used for agricultural purposes (i.e. horses were grazing the site at the time of field survey). Two constructed dams are located in the north-east of the study area and an unnamed watercourse runs east west through the northern portion of the study area. The topography within the study area and surrounding lands is relatively flat. Site photographs are provided in **Appendix 1.**

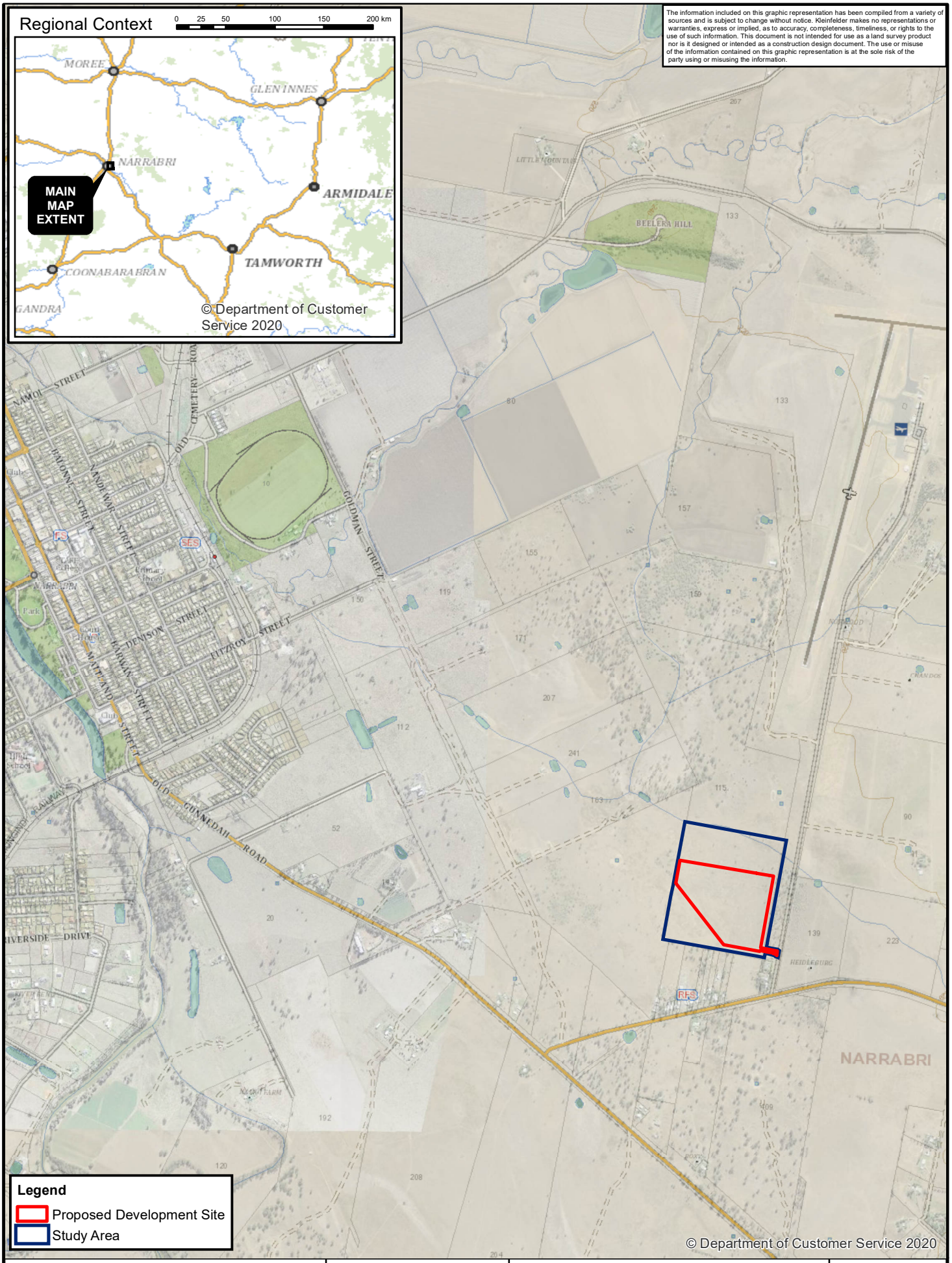
1.3 PROPOSED DEVELOPMENT

The Narrabri Solar Farm project will include a 5 MW grid-connected solar PV installation. The proposed project layout is approximately 15 ha in area and is provided in **Figure 3**. The location of the proposed solar farm is situated in the south of the study area. Proposed site access is from the south-eastern boundary off of Airport Road. Construction of a powerline is needed to facilitate the solar farm development and is proposed to extend from the south-western corner of the subject site through to neighbouring land.

1.4 REPORT OBJECTIVES

The objectives of the Flora and Fauna Assessment Report include:

- Describe the flora and fauna (and their habitats) present on, or likely to occur on the subject site.
- 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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NSW DFSI - 2020
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Locality

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Narrabri Solar Farm

FIGURE:

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Study Area and Subject Site

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FIGURE:
2

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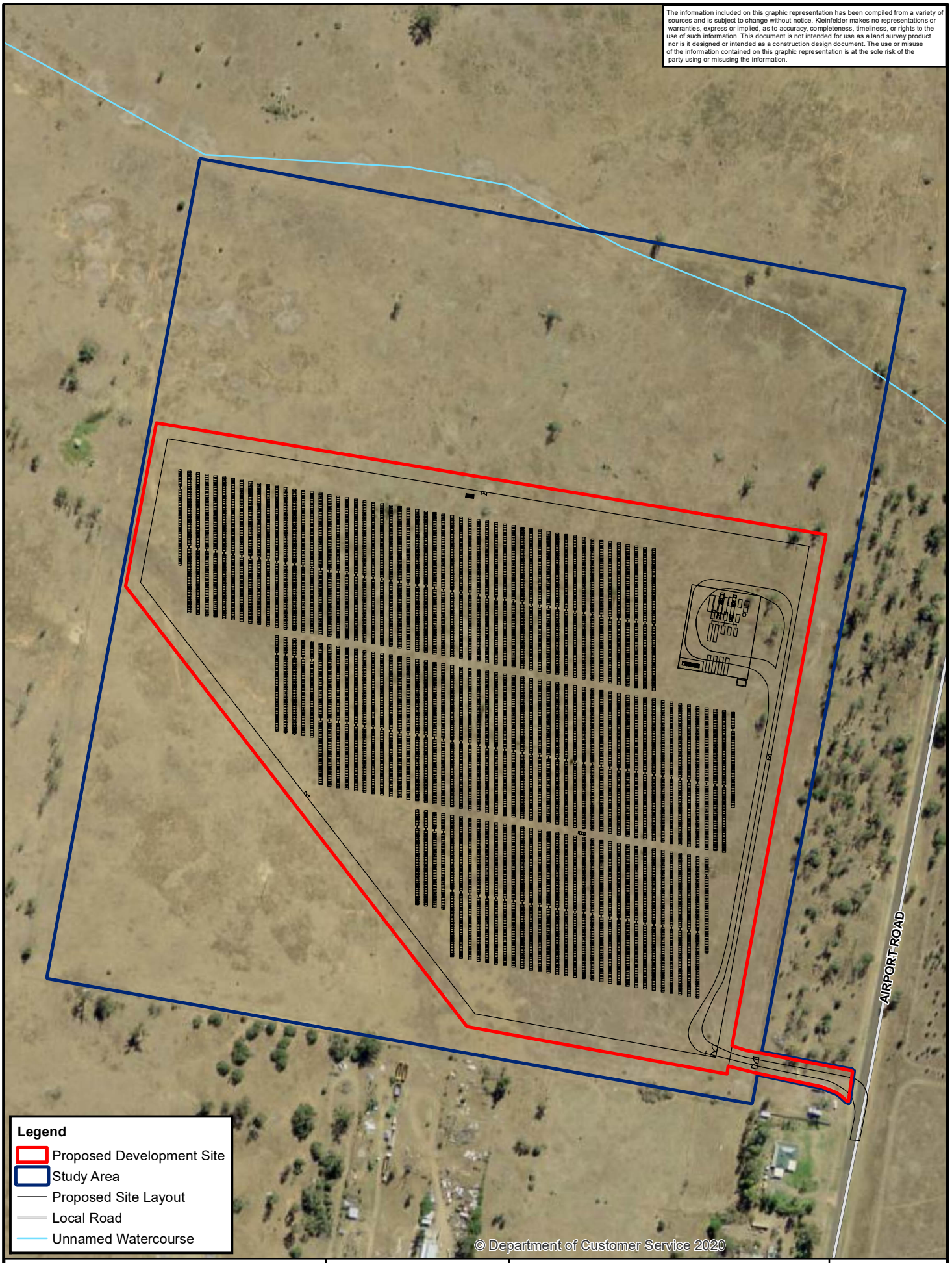

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Proposed Site Layout

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FIGURE:
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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 5 km buffer) were obtained from the on-line Protected Matters Search Tool (DAWE, 2020a). 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 Narrabri 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 while 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 occupy an areas approximately 15 ha; however, due to the prevalence of exotic vegetation (grasslands) it is estimated via GIS that the project will directly remove small areas of exotic groundcover vegetation, six trees and three stags, two of which contain hollows (further discussed in **Section 5.1.1**). Therefore, the project will not exceed the BOS threshold for the site (1 ha threshold for a minimum lot size of 100 ha) as determined by the NSW *Biodiversity Conservation Regulation 2017*.

In consideration of the criteria listed above, a Biodiversity Development Assessment Report (BDAR) is not required for the proposed development. 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 5 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 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.

Weed species recorded within the subject site during the current investigation are discussed in **Section 4**.

2.2.4 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.

2.2.5 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). This means that a controlled activity approval must be obtained from the NRAR before commencing the activity.

A mapped waterway runs through the northern portion of the study area in an east west direction. The proposed site layout has been designed to avoid the mapped waterway. No vegetation clearing or disruption to the creek is likely to occur as a result of the construction of the solar array or the grid connection.

Notwithstanding, the application of the WM Act and an assessment of indirect impacts of the proposed development on aquatic habitat and downstream aquatic habitats is provided in **Section 5.1**.

2.2.6 State Environmental Planning Policy (Koala Habitat Protection) 2020

State Environmental Planning Policy (Koala Habitat Protection) 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.

A Koala Plan of Management (KPoM) has not been prepared for the study area; therefore, provisions of Clause 9 of the SEPP (Koala Habitat Protection) is applicable to the proposed development. As such, Council must take into account the requirements of the Koala Habitat Assessment Guideline (DPIE, 2020b), or information prepared by a suitably qualified and experienced person in accordance with the guideline to determine if the land is classified as Highly Suitable Koala Habitat or Core Koala Habitat.

See **Section 4.9** for a summary of the Koala habitat assessment.

2.3 LOCAL PLANNING INSTRUMENTS

2.3.1 Narrabri Local Environmental Plan 2012

The study area is located within the Narrabri Shire Council LGA. The *Narrabri Shire LEP 2012* (LEP) is the principal legal document for controlling development at a Local Government level. The zoning provisions establish acceptability of uses and standards regulate the degree of development. Under the LEP, the study area is located within the designated flood planning area which permits development on land that is compatible with the land's flood hazard.

2.3.2 Narrabri Shire Council Development Control Plans

The Narrabri Shire Development Control Plans (DCP's) provide a clear guideline regarding the types of development that may occur on specific sites. DCP's are prepared and adopted by Council after consultation with the community. DCP's are supporting documents to Council's LEP.

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: *Border Rivers Gwydir / Namoi Regional Native Vegetation Map Version 2.0. VIS_ID 4467* (DPIE 2020d).
- 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 5 km radius of the study area (data retrieved 12/01/2021).
- The Department of Agriculture, Water and the Environment (DAWE, 2020a) Protected Matters Search Tool, which involved a search for matters of national environmental significance within a 5 km radius of the study area (conducted on 12/01/2021).
- 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.

3.2 FIELD SURVEY

3.2.1 Vegetation Assessment

A diurnal inspection of the subject site and surrounds was undertaken on 03 January 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, 2020b; DPIE, 2020c). Vegetation and habitats were compared with descriptions provided in the BioNet Vegetation Classification to identify Plant Community Types (PCTs).

Two 400 m² floristic plot/transects were sampled in accordance with Section 5.3.4 of the NSW Biodiversity Assessment Method (BAM) (OEH, 2017). 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.

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 4**.

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 GPS 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.

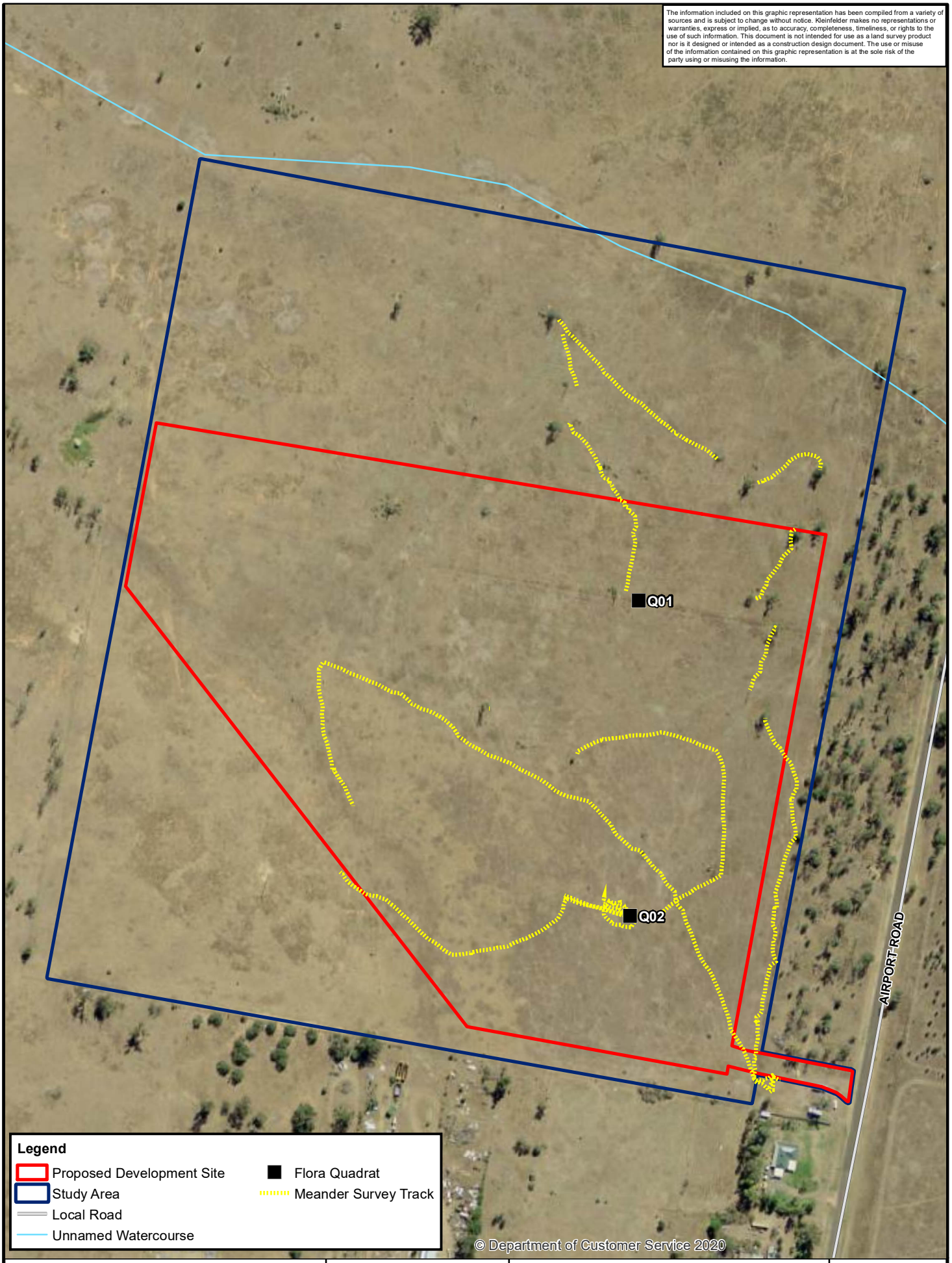
Diurnal opportunistic observations of fauna species and fauna activity such as scats, tracks, burrows or other traces were recorded during survey.

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.

The field survey was undertaken during an eight-hour survey period by one ecologist. While a low diversity of native and a high exotic flora species was recorded, a longer survey duration or multiple seasonal surveys would likely result in the detection of a greater diversity of species. The majority of the subject site is considered to be degraded and unsuitable for most threatened plant species known to occur in the locality; therefore, the survey effort that is recommended in *The NSW Guide to Surveying Threatened Plants* (OEH, 2016) is not considered to be applicable.

No targeted fauna surveys, microchiropteran bat surveys (i.e. Anabat), fauna trapping or targeted surveys for cryptic fauna species was undertaken, as the proposed development will avoid the watercourses and will not clear significant habitat features. No 'call playback' for arboreal fauna, large forest owl species were conducted. Given the historical use of the site for agricultural purposes and the limited amount of clearing required for the proposed development, the survey effort was considered adequate to assess the biodiversity values present.



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Survey Effort

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FIGURE:
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4. RESULTS

4.1 PLANT DIVERSITY

A total of 57 plant species were identified during the assessment. These were comprised of 20 exotics and 37 natives. A complete list of flora species is presented in **Appendix 2**. The majority of the exotic plant species were comprised of annual herbs and grasses associated with the grasslands. Native plant species were comprised mainly of grasses and herbs. Isolated native tree and shrub species are scattered throughout the north east of the subject site, with the majority located in the woodland area east of the development footprint.

4.2 WEEDS

Four High Threat Exotics (HTE) (DPIE 2020), two listed priority weeds (DPI 2020) and one listed Weed of National Significance (WoNS) (DAWE 2020d) were identified during the assessment:

- *Carthamus lanatus* Saffron Thistle (HTE and listed priority weed).
- *Opuntia stricta* Prickly Pear (HTE, listed priority weed and WoNS).
- *Paspalum dilatatum* Paspalum (HTE).
- *Urochloa muticus* Para Grass (HTE).

Mitigation measures to prevent the spread of weeds are presented in **Section 5.2.**

4.3 PLANT COMMUNITY TYPES

The regional vegetation mapping for the locality maps the grassland areas of the subject site as *Candidate Native Grasslands* and the south eastern boundary of the subject site is identified as *Brigalow Clay Plain Woodlands, PTC 35: Brigalow – Belah open forest/woodland on alluvial often gilgaied clay from Piliga Scrub to Goondiwindi, Brigalow Belt South Bioregion*. This community is dominated by Brigalow *Acacia harpophylla*, Belah *Casuarina cristata* and Bimble Box *Eucalyptus populnea* ssp. *Bimbil.*

The assessment determined that the regional vegetation mapping for the subject site is incorrect, with the majority of the subject site being comprised of exotic grassland vegetation with scattered *Callitris glaucophylla* White Cypress Pine (**Figure 5**). This vegetation is in a low condition state and is not commensurate with any native Plant Community Types (NSW Bionet Vegetation Classification - DPIE 2021).

The grasslands are dominated by *Cynodon dactylon* Couch. Although this species is a native species, it is also a very common pasture species in grazing paddocks. Other dominant exotic pasture species included *Paspalum dilatatum* Paspalum, *Urochloa panicoides* Liverseed Grass, *Panicum capillare* Witch Grass and *Vulpia myuros* (Rat's tail Fescue). Native grass species that occurred to a lesser extent included *Austrostipa verticillata* Slender Bamboo Grass*, Aristida ramosa* Purple Wire Grass*, Bothriochloa macra* Red-legged Grass*, Chloris truncata* Windmill Grass and *Chloris ventricosa.* Occasional native herb species included *Portulaca oleracea* Pigweed, *Boerhavia dominii* Tarvine, *Dysphania pumilio* Crumb Weed and *Tribulus terrestris* Caltrop*.* Common introduced herbs included *Sida spinosa*, *Sida rhombifolia* Paddy's Lucerne and *Lepidium africanum* Common Peppercress.

The shrub layer was largely absent, although infestations of *Lycium ferocissimum* African Box Thorn occurred around the base of some isolated trees. Three native chenopod species occurred occasionally in some areas: *Einadia hastata*, *Sclerolaena muricata* Black Roly-poly and *Sclerolaena birchii* Galvanised Burr.

The grasslands contain low densities of leaf litter and woody debris. In addition to the high coverage of exotic flora, this suggested that the site has a long history of agricultural use (i.e. grazing).

The woodland vegetation adjacent to the study area was dominated by *Callitris glaucophylla* White Cypress Pine with occasional *Acacia salicina* Sally Wattle and *Geijera parviflora* Wilga.

4.4 THREATENED ECOLOGICAL COMMUNITIES

The grasslands within the subject site are dominated by exotic species with scattered trees and do not contain the floristic structure or composition of any TEC's listed under the BC Act or the EPBC Act.

4.5 THREATENED FLORA SPECIES

No threatened flora species were identified within the subject site during the assessment.

A search of the BioNet Atlas of NSW Wildlife (DPIE, 2020a) returned three records of threatened plant species within a 5 km radius of the study area: *Dichanthium setosum* Bluegrass, *Swainsona murrayana* Slender Darling Pea and *Lepidium aschersonii* Spiny Peppercress. A "likelihood of occurrence" assessment determined that the study area is likely to be too degraded to support any populations of threatened species. It was concluded that habitat for threatened plant species does occur within the subject site (**Appendix 3**).

An EPBC Protected Matters Search returned a list of five threatened plant species predicted to occur within a 5 km radius of the study area (**Appendix 3** and **Appendix 4**). A "likelihood of occurrence' assessment determined that habitat is not present within the subject site for the predicted matters.

4.6 FAUNA HABITAT

The assessment revealed that the vegetation within the subject site is comprised mainly of exotic grassland with isolated scattered trees. At the time of the assessment, leaf-litter and woody debris was generally absent. A total of six dead stags were identified within the study area, three of which occur within the subject site, two of which contain hollows.

The subject site was found to lack vegetation with a complex structure, shrubs and midstorey species were generally absent. The habitat is likely to support a low diversity of native fauna, including birds and mammal species common within agricultural landscapes. In summary, the fauna habitat assessment determined the following:

- The isolated trees within the subject site may provide marginal foraging and nesting habitat for several common native bird species.
- The grasslands may provide foraging habitat for a range of native birds and terrestrial mammals such as macropods (Kangaroos and Wallabies).
- The grasslands may provide hunting habitat for native predatory birds, such as Falcons, Kestrels and Large Forest Owls.
- No nests, fallen logs or rocky outcrops were identified within the subject site.
- Three dead stags occur within the subject site, two of which contain hollows and potential roosting habitat for microchiropteran bats.

4.7 FAUNA SPECIES

Opportunistic fauna observations included sightings of common bird species such as:

- *Corvus coronoides* Australian Raven.
- *Eolophus roseicapilla* Galah.
- *Grallina cyanoleuca* Magpie Lark.
- *Rhipidura leucophrys* Willie Wagtail.
- *Coracina novaehollandiae* Black-faced Cuckoo Shrike.
- *Cacatua galerita* Sulphur Crested Cockatoo.
- *Manorina melanocephala* Noisy Miner.
- *Psephotus haematonotus* Red-rumped Parrot.
- *Struthidea cinerea* Apostle Bird.

No reptile or amphibian species were opportunistically identified during survey.

4.8 THREATENED FAUNA SPECIES

One BC Act listed vulnerable fauna species, *Haliaeetus leucogaster* White Bellied Sea Eagle was observed flying over the subject site. No nest trees or areas of large open water were identified within the subject site. Therefore, the subject site is not considered to provide nesting or foraging habitat for this species.

A search of the BioNet Atlas of NSW Wildlife (DPIE, 2020a) returned a list of 19 threatened fauna species that have previously been recorded within 5 km radius of the subject site. A "likelihood of occurrence" assessment determined that the subject site provides minimal roosting and foraging habitat for the *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat, a listed vulnerable species under the BC Act. Mitigation measures are presented in **Section 5.2** to reduce the potential for impacts to this species during the construction phase of the project.

The habitat is considered to be too degraded to support habitat for any other threatened fauna species. Justifications for this determination are presented in **Appendix 3** where the habitat requirements of threatened species are discussed individually.

4.9 KOALA HABITAT

One preferred Koala feed tree species listed for the Western Slopes and Plains Koala Management Area (DPIE 2020d) was identified during survey. White Cypress Pine occurs in scattered occurrences.

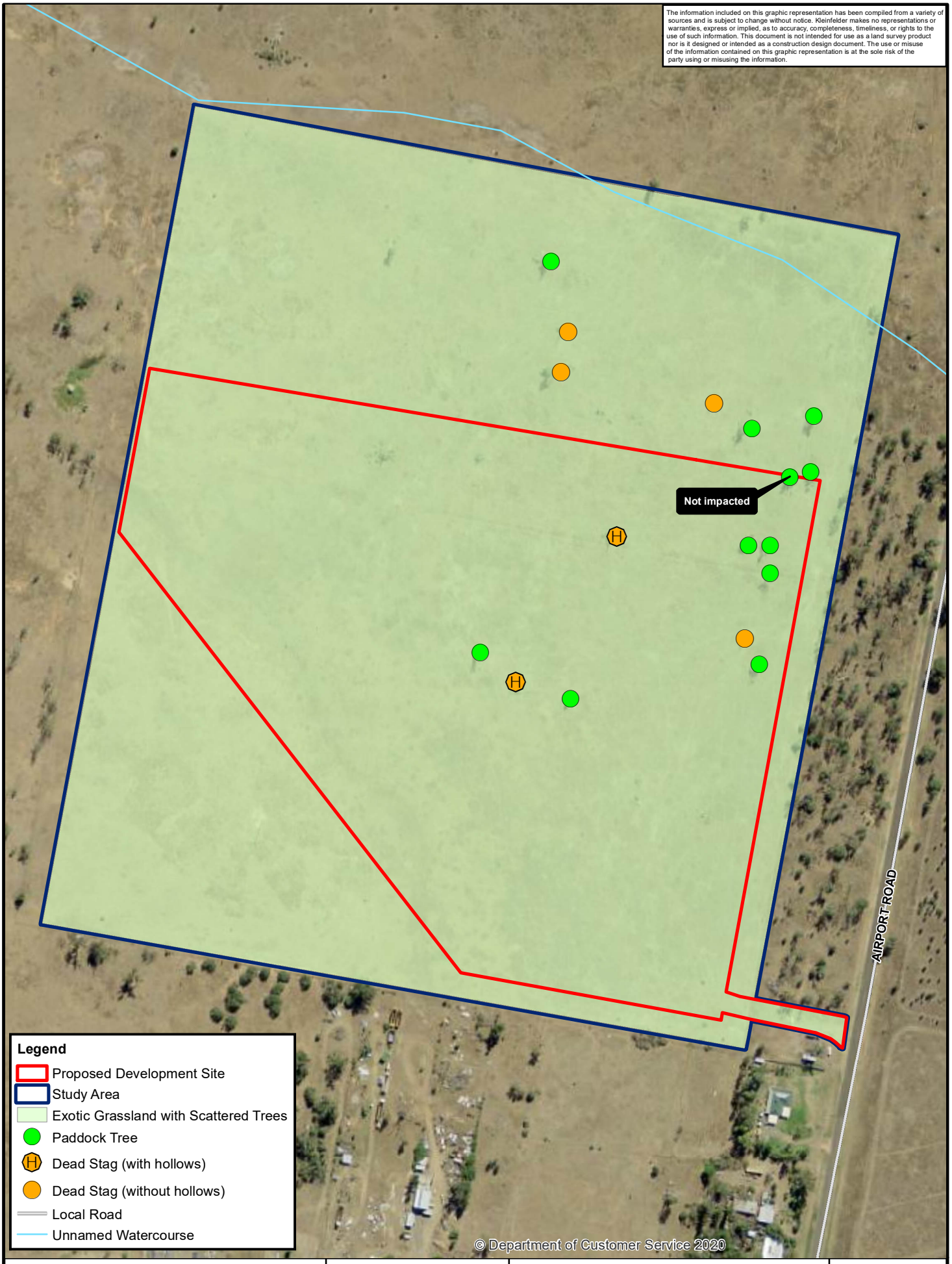
An assessment of Koala habitat within the subject site determined that no Highly Suitable Koala Habitat, or Core Koala Habitat is present. This is based on the following:

- No evidence of a resident population of Koalas was detected during the assessment (i.e. No Koala individuals, scats or scratch marks were identified).
- Few and scattered occurrences of only one Koala feed tree was identified within the subject site.
- Die to the isolated locations of the trees, better quality habitat for Koalas occurs outside the subject site.
- The trees within the subject site do not form part of an important habitat corridor that is likely to be utilised by Koalas.

4.10 EPBC ACT PROTECTED MATTERS

A 'likelihood of occurrence' assessment was conducted for all threatened species and migratory species returned by the EPBC Protected Matters Search (**Appendix 3** and **Appendix 4**). The habitats present within the subject site were considered to be too degraded for all species, with the exception of the Fork-tailed Swift *Apus pacificus* and the White-throated Needletail *Hirundapus caudacutus.*

Both of these bird species may forage aerially over a very wide range of habitats including vegetated and non-vegetated areas. The proposed development will not remove habitat features considered to be important to these species. The extent of foraging habitat is likely to be unaffected.



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Vegetation and Habitat Features

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FIGURE:
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5. DISCUSSION

5.1 IMPACT ASSESSMENT

5.1.1 Removal of Native Vegetation

Removal of native vegetation within the subject site will be limited to the removal of six trees (i.e. White Cypress Pine) and three dead stags, two of which contain hollows. A negligible amount of groundcover vegetation is required to be removed to accommodate the proposed development (**Figure 5**).

5.1.2 Impacts to Fauna

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

- Removal of three stags within the subject site, two of which contain hollows.
- Removal of six isolated trees within the subject site, the trees may provide marginal foraging and nesting habitat for common native bird species.
- Noise and lighting during the construction phase may cause minor disturbance to resident fauna within the locality and disrupt their natural behaviour.
- Pollution such as chemical spills from construction machinery may have adverse effects on the water quality and biota within the constructed dam and aquatic habitat.
- 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 the aquatic habitat.

Management measures are presented in **Section 5.2** to reduce the potential for these impacts.

5.1.3 Impacts to Threatened Species

One threatened species was identified during the assessment. The White Bellied Sea Eagle was overserved flying over the subject site. The subject site is not considered to provide foraging or nesting habitat for this species.

A “likelihood of occurrence” assessment determined that potential habitat occurs within the subject site for Yellow-bellied Sheathtail-bat. In accordance with Section 7.3 of the BC Act, an ‘assessment of significance’ determined that the proposed development is unlikely to have a significant impact on this species.

5.1.4 Impacts to Threatened Ecological Communities

No TEC’s listed under the BC Act and the EPBC Act were identified within the subject site.

5.1.5 Impacts to Aquatic Habitat

The proposed development has been designed to avoid directly impacting the mapped waterway within the study area. Potential indirect impacts include the following:

- The excavation of soil within the subject site during the construction phase has the potential to facilitate erosion and sediment movement. Runoff from the subject site has the potential to introduce nutrients and other toxins to aquatic habitats.
- The introduction of chemicals such as fuels for vehicles and machinery during the construction phase has the potential to cause pollution to downstream aquatic habitat.

Recommendations to reduce the potential for adverse environmental impacts to aquatic habitat are presented in **Section 5.2.**

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. The design of the solar panel

array will ensure that minimal trees and native vegetation will be removed within the subject site.

5.2.2 Vegetation Clearing Control

Prior to any vegetation clearing, a survey of the stags should be conducted in the development footprint by suitably qualified ecologist. If either of the stags contain fauna (including threatened species) they must be left standing for two nights after the surrounding vegetation has been cleared to encourage any native fauna species utilising the habitat hollows to self-relocate.

The felling of all habitat trees will be attended by a suitably qualified and experienced ecologist in order to ensure the safety of any fauna found to be in the hollows. Hollow bearing stags (i.e. trees) will be 'soft felled' by an experienced machine operator. The recommended soft felling procedure is as follows:

- The hollow-bearing tree is given several moderate nudges with an excavator to give a warning to any occupying native fauna.
- The hollow-bearing tree is then carefully watched, and any native fauna present is given an opportunity to self-relocate before the tree is felled.
- Once felled, all hollows will be inspected for native fauna species and if any are found, the animal will be relocated at an appropriate time of day (i.e. dusk for nocturnal species).
- If the animal is injured, it will be taken to a local veterinarian.
- The fauna should be removed and released at night into suitable habitat.

5.2.3 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 any water features 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.

5.2.4 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.

5.2.5 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 and / or water features.

5.2.6 Weed Management

The following recommendations are to be implemented during construction and operation to minimise the impact of weeds within the subject site:

- All vehicles should be cleaned prior to entering the site to prevent the introduction of new weed species.
- The site should be monitored during and after construction to ensure that THE, priority weeds for the region and WoNS are not introduced.

5.2.7 Offset Provisions

As described previously in **Section 2.2.2**, entry into the Biodiversity Offsets Scheme (BOS) is not required for the proposed development.

5.3 CONCLUSION

The proposed development will mainly affect areas of exotic grassland (agricultural land). The habitat is considered to be generally unsuitable habitat for threatened species; therefore, the proposed development is unlikely to cause a significant impact to any threatened species, populations or ecological communities listed under the NSW BC Act. Entry into the NSW BOS is not triggered by the proposed development.

No EPBC listed species, ecological communities, migratory species or important habitat for such entities was identified within the subject site. The assessment determined that impacts to MNES are unlikely; therefore, an EPBC referral to the Commonwealth Minister for the Environment is not recommended.

Avoidance and mitigation measures have been presented to reduce potential impacts to biodiversity values within the subject site and the environment.

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APPENDIX 1: SITE PHOTOGRAPHS

Plate 1: **Exotic grassland within the central portion of the study area**

Plate 2: **Isolated trees in the study area**

APPENDIX 2: FLORA SPECIES LIST

Table 1: Flora list

	Growth Form	*Species*	Q1		Q2		Random Meander
			Cov.	Abun.	Cov.	Abun.	
Exotic species							
1.	Exotic Cactus	*Opuntia stricta*					x
3.	Exotic Grass	*Paspalum dilatatum*					x
4.	Exotic Grass	*Panicum capillare*			0.1	20	
5.	Exotic Grass	*Urochloa panicoides*	10	1,000	20	10,000	x
6.	Exotic Grass	*Vulpia myuros*					x
7.	Exotic Herb	*Argemone ocroleuca*					x
8.	Exotic Herb	*Rapistrum rugosum*					
9.	Exotic Herb	*Carthamus lanatus*	0.1	10	1	5	
10.	Exotic Herb	*Cirsium vulgare*					x
11.	Exotic Herb	*Conyza bonariensis*	0.1	20			x
12.	Exotic Herb	*Gomphrena celisoides*			0.1	5	x
13.	Exotic Herb	*Lepidium africanum*			1	50	x
14.	Exotic Herb	*Polygonum aviculare*	0.1	20			x
15.	Exotic Herb	*Rapistrum rugosum*			0.1	2	
16.	Exotic Herb	*Sida rhombifolia*					x
17.	Exotic Herb	*Verbena bonariensis*					x
18.	Native Herb	*Sida trichopoda*	0.5	50	2	1,000	x
19.	Exotic Herb	*Solanum nigrum*					x
20.	Exotic Herb	*Tribulus terrestris*	0.5	200	2	1,000	x
21.	Exotic Shrub	*Lycium ferocissimum*					x
Native species							
1.	Native Chenopod	*Einadia hastata*					x
2.	Native Chenopod	*Sclerolaena birchii*	10	1,000			x
3.	Native Chenopod	*Sclerolaena muricata*	0.5	50	40	500	
4.	Native Grass	*Austrostipa verticillata*	1	50	2	1,000	x
5.	Native Grass	*Aristida ramosa*			5	100	x
6.	Native Grass	*Bothriochloa macra*			1	100	x
7.	Native Grass	*Chloris truncata*			5	1,000	
8.	Native Grass	*Chloris ventricosa*	0.1	50			x
9.	Native Grass	*Cynodon dactylon*	60	10,000	50	10,000	x
10.	Native Grass	*Dichelachne micrantha*					x
11.	Native Grass	*Dichanthium sericeum*	0.1	50			

	Growth Form	*Species*	Q1		Q2		Random Meander
			Cov.	Abun.	Cov.	Abun.	
12.	Native Grass	*Digitaria parviflora*			0.1	10	
13.	Native Grass	*Echinochloa colona*	2	1,000			x
14.	Native Grass	*Eragrostis sp.*			0.1	10	
15.	Native Grass	*Poa sp.*					x
16.	Native Grass	*Sporobolus creber*	0.5	100	0.1	10	x
18.	Native Herb	*Alternanthera denticulata*					x
19.	Native Herb	*Boerhavia dominii*			1	500	x
20.	Native Herb	*Calotis lappulacea*			1	100	x
21.	Native Herb	*Dysphania pumilio*	5	1,000	2	500	x
22.	Native Herb	*Einadia trigonos*					x
23.	Native Herb	*Oxalis perrenans*	1	500	1	500	x
24.	Native Herb	*Portulaca oleracea*			0.1	20	x
26.	Native Herb	*Solanum esuriale*	0.1	100			x
27.	Native Herb	*Sclerolaena birchii*			0.5	50	
28.	Native Herb	*Tetragonia tetragonioides*					x
29.	Native Herb	*Vittadinia cuneata*			0.1	5	
30.	Native Herb	*Wahlenbergia communis*			1	200	
31.	Native Herb	*Wahlenbergia gracilis*	0.1	50	0.5	100	x
32.	Native Herb	*Xerochrysum bracteatum*	0.1	5	0.1	5	
33.	Native Shrub	*Atriplex sp.*					x
34.	Native Shrub	*Abutilon oxycarpum*			0.1	20	
35.	Native Tree	*Acacia salicina*					x
36.	Native Tree	*Callitris glaucophylla*					x
37.	Native Tree	*Geijera parviflora*					x

*Notes: High Threat exotics (HTE) are classified in accordance with the DPIE HTE List and are in **bold**. Growth forms were classified in accordance with the DPIE growth forms data.*

APPENDIX 3: THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE'

Table 2: Likelihood of occurrence

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
Flora								
1.	*Androcalva procumbens*	V	V	-	PMST	Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. Recent collections made from the Upper Hunter region. Grows in sandy sites, often along roadsides. Recorded in *Eucalyptus dealbata* and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and Callitris area. Other associated species include *Acacia triptera, Callitris endlicheri, Eucalyptus melliodora, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea species, Exocarpos cupressiformis, Leptospermum parvifolium* and *Kunzea parvifolia.* **A readily identifiable species that is detectible at all times of year. The subject site lacks most of the species commonly associated with its occurrence. The species was not detected within the subject site during the assessment.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
2.	*Cadellia pentastylis*	V	V	-	PMST	Occurs along the western edge of the North West Slopes from north of Gunnedah to west of Tenterfield. The natural range of Ooline is from 24ºS to 30ºS in the 500 to 750 mm per annum rainfall belt. Forms a closed or open canopy mixing with eucalypt and cypress pine species. There appears to be a strong correlation between the presence of Ooline and low- to medium-nutrient soils of sandy clay or clayey consistencies, with a typical soil profile having a sandy loam surface layer, grading from a light clay to a medium clay with depth. **A readily identifiable species that is detectible at all times of year. The species was not detected within the subject site during the assessment.**	Low	Low
3.	*Dichanthium setosum* Bluegrass	V	V	2	BioNet, PMST	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It is associated with heavy basaltic black soils and red-brown loams with clay subsoil. It is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). **A readily identifiable species that is detectible at all times of year. The species was not detected within the subject site during the assessment.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
4.	*Lepidium aschersonii* Spiny Peppercress	V	V	2	BioNet, PMST	Species grows within open to dense forest, and sometimes within grasslands. Plants within the Narrabri regions are known to produce abundant of seed. Populations may disappear following a flood event but then reappear several seasons later. **The subject site has been grazed. The species was not detected within the site during the assessment. The site is considered to be too degraded to support a population of this species.**	Nil	Nil
5.	*Prasophyllum sp. Wybong* Leek Orchid	-	CE	-	PMST	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. A perennial orchid, appearing as a single leaf over winter and spring. Flowers in spring and dies back to a dormant tuber over summer and autumn. Known to occur in open eucalypt woodland and grassland. **The subject site has been grazed. The species was not detected within the site during the assessment. The site is considered to be too degraded to support a population of this species.**	Low	Low
6.	*Swainsona murrayana* Slender Darling Pea	V	V	2	BioNet, PMST	Found throughout NSW, it has been recorded in the southern riverine plain, the Hay plain as far north as Willandra National Park and in various localities between Dubbo and Moree. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. **A readily identifiable species that was detectable during the time of survey. The species was not detected within the subject site during survey.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
7.	*Tylophora linearis*	V	E	-	PMST	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.* **The subject site has been grazed. The species was not detected within the site during the assessment. The site is considered to be too degraded to support a population of this species.**	Low	Low
Threatened Ecological Communities								
1.	*Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions*	E	E	-	PMST	The structure of the community may vary from tall riparian woodlands to very open 'savanna like' grassy woodlands with a sparse midstorey of shrubs and saplings. Typically, these woodlands form mosaics with grasslands and wetlands, and are characterised by Coolibah (*Eucalyptus coolabah*) and, in some areas, Black Box (*E. largiflorens*). Other tree species may be present including River Cooba (*Acacia stenophylla*), Cooba (*A. salicina*), Belah (*Casuarina cristata*) and Eurah (*Eremophila bignoniiflora*). **This community was not detected within the subject site during the assessment.**	Nil	Nil

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
2.	*Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia*	E	E	-	PMST	Inland Grey Box Woodland includes those woodlands in which the most characteristic tree species, *Eucalyptus microcarpa* (Inland Grey Box), is often found in association with *E. populnea subsp. bimbil* (Bimble or Poplar Box), *Callitris glaucophylla* (White Cypress Pine), *Brachychiton populneus* (Kurrajong), *Allocasuarina luehmannii* (Bulloak) or *E. melliodora* (Yellow Box), and sometimes with *E. albens* (White Box). Shrubs are typically sparse or absent, although this component can be diverse and may be locally common, especially in drier western portions of the community. A variable ground layer of grass and herbaceous species is present at most sites. At severely disturbed sites the ground layer may be absent. **This community was not detected within the study area during the assessment.**	Nil	Nil
3.	*Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland*	-	CE	-	PMST	is strongly reliant on soil type as it is associated with fine textured, often cracking clays* derived from either basalt or quaternary* alluvium. The ecological community generally occurs on flat to low slopes, of no more than 5% (or less than 1 degree) inclination. As slope increases, grassy woodlands dominated by trees such as *Acacia pendula* (weeping myall), *Eucalyptus coolabah* (coolibah), *E. populnea* (poplar box) or *E. melliodora* (yellow box) occur. **This community was not detected within the subject site during the assessment.**	Nil	Nil

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
4.	*Poplar Box Grassy Woodland on Alluvial Plains*	-	E	-	PMST	Temperate to semi-arid grassy eucalypt woodland that is sparsely scattered inland of the Great Dividing Range from around Cowra in NSW to near Collinsville in Queensland. This eucalypt woodland is mainly associated with alluvial plains including back plains, higher terraces and levees along rivers, ephemeral watercourses and depressions. The ecological community varies from a grassy woodland to grassy open woodland with an overstorey dominated by *Eucalyptus populnea* (poplar/bimble box) and an understorey mostly composed of native perennial forbs and grasses but may include some shrubs and sedges, depending on the season, rainfall and location in the landscape. Patches of the ecological community generally lack a substantial mid (tall shrub) layer. **This community was not detected within the subject site during the assessment.**	Nil	Nil
5.	*Weeping Myall Woodlands*	-	E	-	PMST	Occurs on the inland alluvial plains west of the Great Dividing Range in NSW and QLD**, g**enerally on flat areas, shallow depressions or Gilgai's on raised alluvial plains. The Weeping Myall Woodlands range from open woodlands to woodlands, generally, 4 to 12m high. The overstorey is dominated by Weeping Myall (*Acacia pendula*) trees and in some cases this species may be the only tree canopy species. **This community was not detected within the subject site during the assessment.**	Nil	Nil

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
6.	*White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*	CE	CE	-	PMST	An open woodland community (sometimes occurring as a forest formation), in which the most obvious species are one or more of the following: White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi*. Intact sites contain a high diversity of plant species, including the main tree species, additional tree species, some shrub species, several climbing plant species, many grasses and a very high diversity of herbs. **This community was not detected within the subject site during the assessment.**	Nil	Nil
Birds								
1.	*Anseranas semipalmata* Magpie Goose	V	-	1	BioNet	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges.Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. **No wetland or nesting habitat within the subject site. More suitable habitat is available in surrounding lands.**	Low	Low
2.	*Artamus cyanopterus cyanopterus* Dusky Woodswallow	V	-	1	BioNet	Primarily inhabit dry, open eucalypt forests and woodlands with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris. Also found in farmland, usually at the edges of forest or woodland. **May aerially forage over the subject site. More suitable habitat is available in the study area and surrounding lands.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
3.	*Burhinus grallarius* Bush Stone-curlew	E	-	1	BioNet	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes.Nest on the ground in a scrape or small bare patch. **The subject site does not contain suitable habitat for this species.**	Nil	Nil
4.	*Chthonicola sagittate* Speckled Warbler	V	-	14	BioNet	The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understory, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. **The subject site does not contain suitable habitat for this species.**	Low	Low
5.	*Circus assimilis* Spotted Harrier	V	-	2	BioNet	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. **The subject site does not contain suitable habitat for this species.**		
6.	*Calyptorhynchus lathami* Glossy Black-Cockatoo	V	-	2	BioNet	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. **The subject site does not contain suitable habitat for this species.**		

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
7.	*Daphoenositta chrysoptera* Varied Sittella	V	-	5	BioNet	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. **The subject site is comprised of agricultural lands that contain few native trees. The habitat in the subject site is unsuitable for this species.**	Low	Low
8.	*Glossopsitta pusilla* Little Lorikeet	V	-	2	BioNet	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. **The subject site is comprised of agricultural lands that contain few native trees. The habitat in the subject site is unsuitable for this species.**	Low	Low
9.	*Lophoictinia isura* Square-tailed Kite	V	-	2	BioNet	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. **The subject site is comprised of agricultural lands that contain few native trees. The habitat in the subject site is unsuitable for this species.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
10.	*Polytelis swainsonii* Superb Parrot	V	-	2	BioNet PMST	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Nest in small colonies, often with more than one nest in a single tree. **The subject site is comprised of agricultural lands that contain few native trees. The habitat in the subject site is unsuitable for this species.**	Low	Low
11.	*Grantiella picta* Painted Honeyeater	V	V	1	BioNet PMST	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. This species is a specialist feeder on the fruits of mistletoes growing on woodland Eucalypts and Acacias. Prefers mistletoes of the genus Amyema. **The subject site is comprised of agricultural lands that contain few native trees. No mistletoe was identified. The habitat is considered to be too degraded to support this species.**	Low	Low
12.	*Pomatostomus temporalis temporalis* Grey-crowned Babbler (eastern subspecies)	V	-	9	BioNet	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. **May use the subject site for aerial foraging.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
13.	*Tyto longimembris* Eastern Grass Owl	V	-	2	BioNet	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy vegetative growth. If disturbed they burst out of cover, flying low and slowly, before dropping straight down again into cover. Always breeds on the ground. Nests are found in trodden grass, and often accessed by tunnels through vegetation. **The subject site is comprised of agricultural lands that contain few native trees and has been heavily grazed. The habitat is considered to be too degraded to support this species.**	Low	Low
14.	*Anthochaera phrygia* Regent Honeyeater	CE	CE	-	PMST	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. **The subject site is comprised of agricultural lands that contain few native trees. The habitat is considered to be too degraded to support this species.**	Low	Low
15.	*Botaurus poiciloptilus* Australasian Bittern	E	E	-	PMST	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha spp*.) and spikerushes (*Eleocharis spp*.). **No suitable aquatic habitat is present within the subject site.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
16.	*Calidris ferruginea* Curlew Sandpiper	E	CE	-	PMST	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. **No suitable estuarine habitat is present within the subject site.**	Low	Low
17.	*Falco hypoleucos* Grey Falcon	E	-	-	PMST	The Grey Falcon 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. Also occurs near wetlands where surface water attracts prey. **No suitable habitat is present within the subject site. May aerially forage over the subject site.**	Low	Low
18.	*Rostratula australis* Australian Painted Snipe	E	E		PMST	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. **No suitable aquatic habitat is present within the subject site.**	Low	Low
19.	*Stictonetta naevosa* Freckled Duck	V	-	1	BioNet	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally, rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. **No suitable aquatic habitat is present within the subject site.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
Mammals								
1.	*Chalinolobus dwyeri* Large-eared Pied Bat	V	V	-	PMST	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. **No cave habitat is present within the subject site.**	Nil	Nil
2.	*Dasyurus maculatus (SE mainland population)* Spot-tailed Quoll	V	E		PMST	This 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. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. **The subject site is comprised of agricultural lands that contain few native trees. The habitat is considered to be too degraded to support this species.**	Low	Low
3.	*Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)* Koala	V	V	2	BioNet PMST	In NSW, Koalas occur along the coast, extending west to the Darling Riverine Plains and Mulga Lands bioregions in the north of the state; to the Cobar Peneplain bioregion in the centre of the state; and to the Riverina and eastern most parts of the Murray-Darling Depression bioregions in the south. The koala is found in a variety of forest types. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. **No Koalas or evidence of Koalas were identified during assessment within the subject site.**	Low	Low

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
4.	*Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat	V	-	4	BioNet	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. **The subject site provides potential roosting and foraging habitat for this species.**	Moderate	Low
5.	*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. **The subject site is comprised of agricultural lands that contain few native trees. The habitat is considered to be too degraded to support this species.**	Low	Low
6.	*Pteropus poliocephalus* Grey-headed Flying-fox	V	V	1	BioNet PMST	Occurs across a wide range of habitat types along the eastern seaboard of Australia, depending on food availability. Fruit from myrtaceous trees and rainforest trees form the major components of their diet. **Potential marginal foraging habitat is present; however, no camps were detected. The habitat is not considered to be important to this species.**	Low	Low
Reptiles								

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
1.	*Anomalopus mackayi* Five-clawed Worm-skink	E	V	1	BioNet	Patchy distribution on the North West Slopes and Plains of north-east NSW and south-east Queensland, from the Ashford area west to Mungindi and Walgett in NSW and north to Dalby in Queensland. Close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils. May also occur in grassland areas and open paddocks with scattered trees. Live in permanent deep tunnel-like burrows and deep soil cracks, coming close to the surface under fallen timber and litter, especially partially buried logs. **No logs or fallen timber and no soil cracks or deep tunnels were identified during the assessment within the subject site. The subject site does not contain suitable habitat for this species.**	Low	Low
2.	*Hoplocephalus bitorquatus* Pale-headed Snake	V	-	1	BioNet	In NSW it has historically been recorded from as far west as Mungindi and Quambone on the Darling Riverine Plains, across the north west slopes, and from the north coast from Queensland to Sydney. A small number of historical records are known for the New England Tablelands from Glenn Innes and Tenterfield; however, the majority of records appear to be from sites of relatively lower elevation. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favor habitats close to riparian areas. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees. **The subject site does not contain suitable habitat for this species.**	Low	Low
Migratory Species								

No.	Species	Legal Status*		No. of Records	Source#	Habitat Preferences	Likelihood of occurrence	Potential Impact
		BC Act	EPBC Act					
1.	*Apus pacificus* Fork-tailed Swift	-	M	-	PMST	Forages aerially over a very wide range of habitats includes both vegetated and non- vegetated areas. **Potential aerial foraging habitat above the subject site.**	Moderate	Low
2.	*Hirundapus caudacutus* White-throated Needletail	-	M	-	PMST	Forages in high open spaces over varied habitat types. **Potential aerial foraging habitat above subject site.**	Moderate	Low
3.	*Motacilla flava* Yellow Wagtail	-	M	-	PMST	Typically inhabits inundated fields, saltmarsh and wetlands and occasionally coastal areas. **No suitable habitat within the subject site.**	Low	Low
4.	*Myiagra cyanoleuca* Satin Flycatcher	-	M	-	PMST	Found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. **No suitable habitat within the subject site.**	Low	Low
5.	*Rhipidura rufifrons* Rufous Fantail	-	M	-	PMST	Found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. **No suitable habitat within the subject site.**	Low	Low

APPENDIX 4: EPBC ACT PROTECTED MATTERS SEARCH REPORT

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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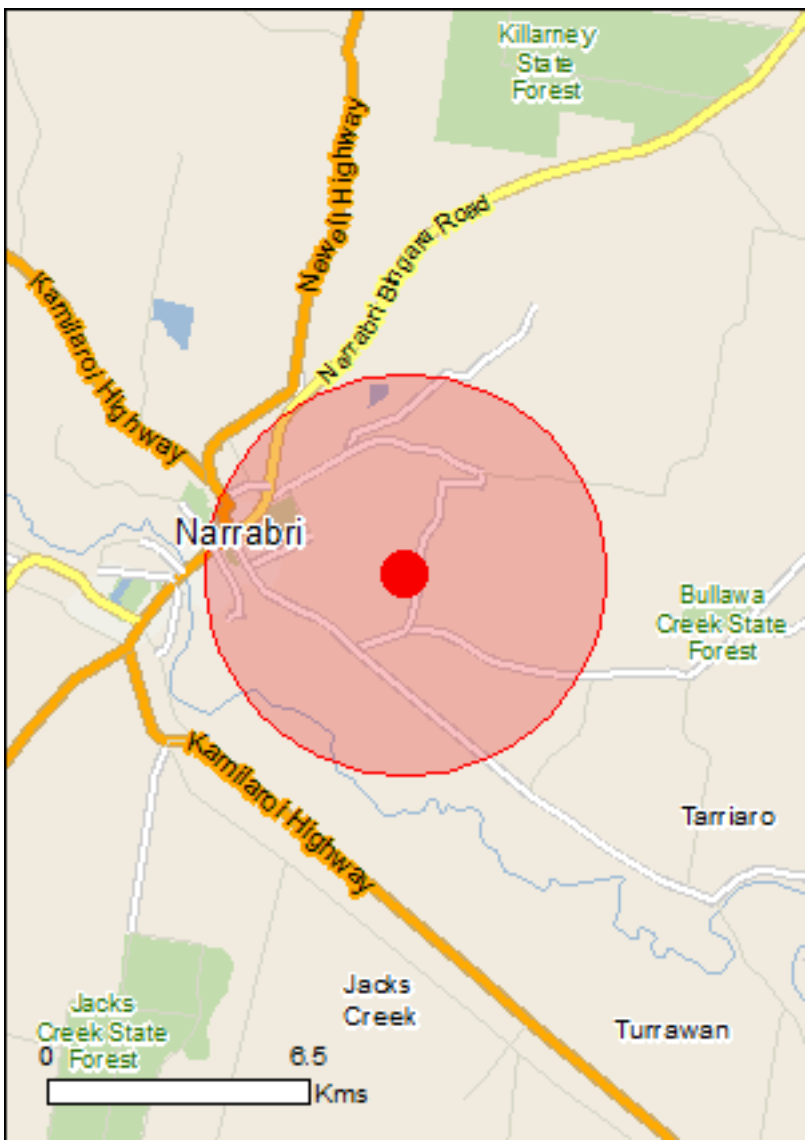

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates

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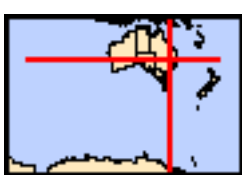

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	23
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	5
Commonwealth Heritage Places:	1
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	25
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	900 - 1000km upstream
Riverland	900 - 1000km upstream
The coorong, and lakes alexandrina and albert wetland	1100 - 1200km

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys pilligaensis Pilliga Mouse, Poolkoo [99]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Androcalva procumbens [87153]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Tylophora linearis [55231]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Scientific & Industrial Research Organisation
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Telstra Corporation Limited

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Narrabri Post Office and former Telegraph Office	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-30.33329 149.82248

Acknowledgements

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

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

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

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

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APPENDIX 5: ASSESSMENT OF SIGNIFICANCE (PURSUANT TO SECTION 7.3 OF THE BC ACT)

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 subject site are provided in the proceeding sub-sections.

Table 3: Factors addressed in the assessment of significance

Factor	Species	Population	Ecological Community
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.	X		
in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: 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 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			X
in relation to the habitat of a threatened species, population or ecological community: the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and 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 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	X		X
whether the proposed development or activity is likely to have an adverse effect any declared area of outstanding biodiversity value (either directly or indirectly).	NA	NA	NA
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.	X	X	X

Threatened Fauna

Table 4: *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat

Factors	Assessment of Significance
(a) Effect on life cycle	The subject site provides potential roosting and foraging habitat for the Yellow-bellied Sheatail-bat. The species was not detected within the subject site during the assessment; however, records of the species occur in the locality and suitable potential habitat has been identified within the two stags to be removed within the subject site. With the implementation of mitigation measures provided in **Section 5.2.2**, it is unlikely that the proposed development will adversely affect the lifecycle of the species, such that a local population would be at risk of extinction.
(c) (i) Habitat Removal	Large areas of suitable habitat for the species occur in the surrounding lands and the study area, which will be retained following the proposed development.
(c) (ii) Habitat Fragmentation	The two stags to be removed provide potential habitat only. With the implementation of mitigation measures provided in **Section 5.2.2, t**he proposed development will not cause further habitat fragmentation for the species within the locality.
(c) (iii) Habitat importance	The habitat to be is not considered important to the species within the locality. With the implementation of mitigation measures provided in **Section 5.2.2,** th**e r**emoval of two stags containing hollows is unlikely to put a local population at risk of extinction.
(d) Effect on biodiversity value	The proposed development does not occur within an Area of Outstanding Biodiversity Value (AOBV).
(e) KTP	The following KTPs are listed in order of their relevance to the species and the proposed development: • Removal of dead wood and dead trees. • Removal of native vegetation. Given that the subject site is already a highly modified environment the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts are likely to be negligible.
Conclusion	As the proposed development will not impact an area containing a known occurrence of the Yellow-bellied Sheathtail-bat and with the implementation of mitigation measures provided in **Section 5.2.2, t**he proposed development is considered unlikely to have a significant impact on this species in the locality.

APPENDIX 6: LICENSES AND PERMITS

Kleinfelder employees involved in the current study are licensed or approved under the *National Parks and Wildlife Act 1974* (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.