Salvestro Planning

Gobbagombalin rezoning

Ecological constraints analysis

October 2019

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1. Introduction

1.1 Overview

GHD Pty Ltd (GHD) was engaged by Salvestro Planning to undertake an ecological constraints analysis for a proposed rezoning near Gobbagombalin on the northern outskirts of Wagga Wagga in southern NSW.

The project would include the potential rezoning of about 63.1 hectares of agricultural land, bound by Colin Knott Drive to the east and Old Narrandera Road to the north (see Figure 1). Preliminary investigations for the rezoning also include a buffer area to the south of the proposed rezoning area to encompass Gobbagombalin Lagoon, which would potentially be enhanced during future development.

To progress with the project, an environmental constraints analysis is required to identify potential environmental constraints associated with the rezoning and to inform future design options for the site.

1.1.1 Purpose of this report

The purpose of this report is to provide Salvestro Planning with an ecological constraints assessment to support ongoing and future planning for the rezoning of land near Gobbagombalin.

1.1.2 Scope and limitations

This report: has been prepared by GHD for Salvestro Planning and may only be used and relied on by Salvestro Planning for the purpose agreed between GHD and the Salvestro Planning as set out in section 1.1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Salvestro Planning arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.1.3 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.1.3 Assumptions

The services undertaken by GHD in connection with preparing this ecological constraints assessment:

- Were limited to those specifically detailed in section 1.1.2 of this report
- Assume that the an impact assessment report (including 5 part tests) would be prepared once the project progresses to the development application stage
- Did not include preparation of an environmental impact statement or Commonwealth referral.

1.2 The project

The proposal site is about 63.1 hectares and occurs in the developing suburb of Gobbagombalin, bound to the east by Colin Knott Drive and north by Old Narrandera Road (see Figure 1). The site is located in parts of Lot 51 DP 1106511 and Lot 3 DP 740219 and is divided by River Road, with 36.6 hectares located on the northern side and 26.5 hectares located on the southern side. The proposal site is privately owned.

1.2.1 Study area

The proposal site is located on the northern fringes of Wagga Wagga on land currently zoned as RU1 Primary Production under the *Wagga Wagga Local Environmental Plan 2010*. The site and surrounding area is predominantly used for agricultural practices such as cropping and grazing, with five residences located within the study area.

Gobbagombalin Lagoon in the southern section of the study area receives inflows from Dukes Creek to the north-east of the study area and overland flows from the Murrumbidgee River when it floods. The lagoon is currently used for irrigation and is surrounded by River Red Gum (*Eucalyptus camaldulensis*) woodland on the terrestrial fringes of the lagoon. It is located on the floodplain of the Murrumbidgee River about 250 metres to the east at its closest point.

Scattered remnant trees are located throughout the subject site, with small patches of woodland located in the eastern section and on the northern side of River Road, along Old Narrandera Road. The majority of the site is pasture improved.

Colin Knott Drive, on the eastern boundary of the site is a major local road that connects central Wagga Wagga to suburbs on the northern side of the Murrumbidgee River. It is also the connecting road to the Olympic Highway travelling north. Old Narrandera Road, a local sealed road, forms the northern boundary of the site, with River Road, an unsealed local access road, dividing the site.

Residential subdivisions are located on the northern side of Old Narrandera Road. The western boundary of the site is comprised of agricultural land.

The study area, for the purpose of this constraints assessment, includes the area of the proposal site and an additional buffer to the south of the site for potential enhancement during future development. The terrain of the study area varies from flat to undulating with a small hill in the eastern section of the study area.

The locality is defined as the area within a 10 kilometre radius of the proposal site.

1.3 Legislative context

1.3.1 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a mechanism for assessing the environmental impact of activities and developments, where 'matters of national environmental significance' (NES) may be affected by the proposed activities. If the project is likely to have a significant impact on a matter of NES it must be referred to the Commonwealth Minister for the Environment. After the referral is completed and assessed, the Commonwealth Minister determines whether further assessment and approval under the EPBC Act is required.

Matters of national environmental significance relevant to this habitat assessment include:

- Threatened species and ecological communities
- Migratory species

- Ramsar wetlands of international importance.

The proposal site is known to support a number of flora and fauna species listed under the EPBC Act, which are matters of national environmental significance. Other matters of national environmental significance may also occur.

An environmental impact assessment would be required to determine the potential impacts to any matters of NES within the proposal site, and whether a referral to the Commonwealth Minister for the Environment is required.

1.3.2 NSW legislation

Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) aims to conserve biodiversity and deliver ecologically sustainable development through a market based approach, particularly for high risk projects.

The BC Act lists a number of threatened species, populations and ecological communities to be considered when deciding whether there is likely to be a significant impact on threatened biota or their habitats. If a species of flora or fauna listed in the BC Act is identified, a review must be carried out of the factors set out to establish if there is likely to be a significant impact on that species, population, ecological community or habitat. If any of these could be impacted by the proposal, an assessment of significance that addresses the requirements of section 1.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) must be completed to determine the significance of the impact.

If a significant impact on a threatened species, population or ecological community is likely, a Species Impact Statement and potentially a Biodiversity Development Assessment Report (BDAR) must be completed and consultation with the NSW Office of Environment and Heritage (OEH) is required.

Fisheries Management Act 1994

The FM Act aims to conserve, develop and share the fishery resources of the State for the benefit of present and future generations including conserving fish stocks and fish habitat and promoting ecologically sustainable development.

The FM Act requires an assessment of whether threatened species of fish and marine vegetation, populations or ecological communities listed under the Act are likely to be affected by the proposal. If a significant impact on a threatened species, population or ecological community is likely, a SIS must be completed and consultation with NSW Department of Primary Industries (Fisheries and Aquaculture) is required.

Wagga Wagga Local Environmental Plan 2010

The proposal site is zoned as RU1 Primary Production under the *Wagga Wagga Local Environmental Plan 2010*. This objectives of this zone do not allow for potential residential development, hence the proposal to rezone the land for future development potential.

2. Methods

2.1 Desktop review

A search of relevant databases and previous reports was undertaken on 20 June 2019 to determine potential biodiversity constraints within a 10 kilometre radius (defined as the 'locality') of the project. The following databases were consulted:

- NSW BioNet Atlas of NSW Wildlife for records of threatened species listed under the BC Act in the locality
- OEH Threatened Species, Populations and Communities database for threatened ecological communities that may occur in the locality
- State Vegetation Type Mapping (SVTM), NSW Government Vegetation Information System (VIS) and OEH Spatial Data Catalogue for vegetation mapping in the study area
- NSW Department of Primary Industries (DPI) threatened species list and key fish habitat mapping for threatened species and aquatic ecological communities listed under the FM Act and which have the potential to be recorded in the locality
- The Commonwealth Department of the Environment and Energy (DotEE) Protected Matters Search Tool for matters of national environmental significance (MNES) listed under the EPBC Act which may occur in the locality
- National Herbarium of NSW, PlantNet database review for Rare or Threatened Australian Plants
- The DotEE directory of important wetlands
- The Commonwealth Bureau of Meteorology's Atlas of Groundwater Dependent Ecosystems (GDE)
- NSW OEH Threatened Species Profile Database
- *Wagga Wagga Local Environmental Plan 2010*
- Critical habitat registers:
  - DotEE – register of critical habitat
  - OEH – areas of outstanding biodiversity values (AOBVs)
  - NSW Department of Primary Industries (DPI) – register of critical habitat.

Database searches assist in overcoming some of the limitations associated with a short survey period, survey timing and the types of survey methods employed.

Previous reports

The following previous report was reviewed:

- *Wagga Wagga and North Wagga Wagga Murrumbidgee River levee upgrades ecological assessment*, completed by GHD on behalf of Wagga Wagga City Council, November 2012.

2.2 Field survey

Terrestrial flora and fauna surveys were undertaken by an ecologist on 21 June 2019. The primary objectives of the ecological constraints field surveys were to:

- Map vegetation and identify areas of conservation significance with reference to threatened ecological communities listed under the BC Act and EPBC Act

- Identify potential habitat for threatened flora and fauna species in the study area
- Consider areas of high ecological constraint that are likely to require avoidance during concept design.

2.2.1 Flora

Flora plots were undertaken in to characterise the vegetation in the study area. Two flora survey plots (20 metres by 20 metres) were surveys (see Figure 1).

Within the plot, the following vegetation and habitat characteristics were recorded:

- Description of vegetation
- Dominant canopy vegetation
- Dominant understorey vegetation
- Groundcover species cover and abundance
- Percent native and exotic plant cover
- Proportion of overstorey regeneration
- Any signs of previous disturbance and grazing.

Flora surveys enabled determination of the composition and extent of ecological communities occurring in the study area. The study area was investigated to identify vegetation communities present and to identify any areas with the potential to be classified as a threatened ecological community.

2.2.2 Fauna

Given that the project is currently an ecological constraints assessment, fauna surveys were limited to opportunistic observations and mapping of potential habitat types in the proposal site.

Incidental records for potential mammal, amphibian and reptile habitat were undertaken and recorded during flora surveys. Any indirect evidence of fauna (i.e. scats, feathers, fur, tracks, dens, nests, scratches, chew marks and owl wash) was recorded.

2.3 Habitat assessment

An assessment of the likelihood of occurrence was completed for listed species, populations and ecological communities with the potential to occur in the study area (Appendix B).

In assessing which of these species, populations and ecological communities are 'likely' to occur within the study area the following factors were taken into consideration:

- The presence of potential habitat within the study area
- Condition and approximate extent of potential habitat within the study area
- Species occurrence within the locality and region (including results of current and previous surveys and results of database searches and literature review).

Criteria used for assessment of the likelihood of occurrence are:

- *Recorded* – The species was observed in the study area during the current survey
- *High* – It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (ie. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10 kilometres) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration

- *Moderate* **–** Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (ie. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded
- *Low* **–** It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (within 10 kilometres). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (ie. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species is a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
- *None* – Suitable habitat is absent from the study area.

3. Existing environment

3.1 General description

3.1.1 Bioregion

The proposal site occurs within the South Western Slopes Biogeographic Region (IBRA). This bioregion extends from Albury in the south to Dunedoo in the northeast. Towns located in the bioregion include Wagga Wagga, Mudgee, Cootamundra, Parkes, Griffith and Young.

3.1.2 Terrain, geology and drainage

The study area is within the Junee Hills and Slopes Mitchell Landscape. General elevation is between 300 to 450 metres, with local relief to 60 metres. Typically this landscape features red gum and ironbark woodland on high rocky areas and open forest on slopes.

A natural lagoon (Gobbagombalin Lagoon) is located in the southern section of the study area, with two unnamed ephemeral drainage lines running through the site and draining into the lagoon. Dukes Creek also flows into the lagoon from the north-east of the study area. The Murrumbidgee River is located about 250 metres to the east of the proposal site at its closest point.

The study area is predominantly located within the geologic unit of Wantabadgery Granite, which comprise S-type, mafic and unfractionated granite from the Silurian period (NSW Department of Mineral Resources 2002). Surficial geology located in the south-eastern section of the study area is comprised of alluvium-gravel, sand, silt and clay.

3.1.3 Soils

The Junee Hills and Slopes Mitchell Landscape contains coarse siliceous sands amongst rock outcrop and tors and thin gritty red and yellow texture-contrast soils on slopes with harsh blocky subsoil (Mitchell 2002).

3.1.4 Climate

The study area has a mean annual rainfall of 571.5. Summers are generally warm to hot while winters are cold. The highest mean maximum monthly temperature is 31.9 degrees Celsius, occurring in January, while the lowest mean minimum monthly temperature is 2.8 degrees Celsius, occurring in July. Average rainfall is generally highest in October, with an average of 56.4 millimetres (BoM 2019).

3.2 Vegetation communities and flora survey results

3.2.1 Vegetation in the proposal site

A brief survey of the proposal site identified 34 flora species, of which 16 are native and 18 are introduced (Appendix A). No threatened flora species were identified during surveys in the study area.

There are three different plant community types (PCTs) present in the proposal site and study area and remnant paddock trees, particularly in the eastern section of the study area. Vegetation types present in the proposal site and study area, according to the NSW Plant Community Type (PCT) classification, include (see Figure 1):

- River Red Gum herbaceous-grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion (PCT 5)
- Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (PCT 277)
- White Box – Blakely's Red Gum – White Cypress Pine shrubby woodland on metamorphic hills in the Wagga Wagga – Cootamundra region of the NSW South Western Slopes (PCT 346)

Paddock trees throughout the study area primarily comprise Yellow Box (*Eucalyptus melliodora*) and Blakely's Red Gum (*E. blakelyi*). White Box (*E. albens*) and Kurrajong (*Brachychiton populneus*) trees are also present in lower numbers in the eastern section of the study area.

The small patch of vegetation to the north of River Road and south of Old Narrandera Road meets the classification criteria for the BC Act listed endangered ecological community of White Box Yellow Box Blakely's Red Gum woodland (Box-Gum Woodland). This woodland is classified as PCT 277 and does not meet the EPBC Act listing of the community due to the small size of the patch, lack of regeneration occurring and the dominance of introduced groundcover species.

Vegetation that classifies as PCT 346 is not included in the listing for Box-Gum Woodland and occurs on the rocky hill along the eastern boundary of the site. The woodland is dominated by Blakely's Red Gum with a highly degraded and predominantly introduced groundcover.

River Red Gum (*E. camaldulensis*) woodland in the study area occurs in two different states. Along Gobbagombalin Lagoon in the south of the study area it is present as large old growth trees with hollows. The patch to the north of River Road is present as younger regrowth trees containing no hollows. The understorey in these areas is degraded and dominated by introduced species. There is evidence of some regeneration occurring across this PCT.

Throughout the majority of the proposal site the groundcover had been pasture improved and is dominated by introduced groundcover species including Barley Grass (*Hordeum leporinum*), Wimmera Ryegrass (*Lolium rigidum*), Musky Crowfoot (*Erodium moschatum*) and Capeweed (*Arctotheca calendula*).

3.2.2 Listed weeds

One weed species listed under the Commonwealth *Biosecurity Act 2015*, was identified in the study area for the Riverina control area; Blackberry (*Rubus fruticosus*), which was recorded in small numbers in the rocky area along the eastern boundary of the proposal site. The duty for Blackberry is listed as a prohibition on dealings, which means the species must not be imported into the State or sold. Blackberry is also listed as a Weed of National Significance, which are prioritised weeds based on their invasiveness, potential for spread and environmental, social and economic impacts. This species is also listed as Weed of National Significance (WONS).

3.3 Fauna

3.3.1 Fauna habitats

Woodland

Woodland fauna habitats present in the study area occur as remnant native trees in a modified condition and regenerating woodland. Remnant paddock trees are also present throughout the study area.

Woodland habitats and to a lesser extent paddock trees, provide foraging, movement and potential breeding habitat for a variety of bird species. The mature trees in the study area provide nesting and foraging habitat for a range of woodland birds, arboreal mammals and microchiropteran bats.

Hollow-bearing trees are scattered through the study area and occur as isolated paddock trees and within the River Red Gum woodland along Gobbagombalin Lagoon in the south of the study area. There are 18 hollow-bearing trees in the proposal site (see Figure 1), all of which occur as remnant paddock trees. These trees are predominantly Yellow Box, with Blakely's Red Gum and White Box also present. Hollow-bearing trees also occur along the fringes of Gobbagombalin Lagoon is discussed below.

The River Red Gum woodland in the south of the study area is comprised of large old hollow-bearing trees along its length. These trees each contain numerous hollows, with large diameter hollows common throughout. These trees are providing potential nesting and roosting habitat for a wide variety of fauna including mammals, birds and owls.

The River Red Gum woodland in the south of the study area also contains woody debris which may provide potential habitat for reptiles such as snakes and skinks, as well as foraging habitat for woodland birds. There is minimal woody debris in other woodland areas and leaf litter is sparse.

The groundcover in the study area provides marginal foraging habitat for mammals such as the Eastern Grey Kangaroo (*Macropus giganteus*), with grassy areas also providing potential foraging habitat for woodland bird species in the study area.

Aquatic habitat

Gobbagombalin Lagoon in the south of the study area is a permanent waterbody connected to the Murrumbidgee River, which flows from east to west, south of the study area. The lagoon provides potential habitat for a variety of aquatic fauna species and contains fringing riparian vegetation and submerged woody debris to provide suitable habitat for fish species that may occur in the study area such as the Murray Cod (*Maccullochella peelii peelii*), Macquarie Perch (*Macquaria australasica*) and Golden Perch (*Macquaria ambigua*). These species favour habitats with slow-flowing, turbid waters and cover of vegetation or similar, as provided within the lagoons habitat.

Gobbagombalin Lagoon is part of the endangered aquatic ecological community in the natural drainage system of the lower Murray River catchment (Lowland Murray River aquatic ecological community). This community includes all native fish and aquatic invertebrates within all natural creeks, rivers, and associated lagoons, billabongs and lakes of the regulated portions of the Murray River (of which the Murrumbidgee River is a tributary), which includes Gobbagombalin Lagoon.

The lagoon also provides habitat for aquatic bird species. These areas provide foraging and breeding habitat for birds and other aquatic fauna species.

The ephemeral drainage lines in the proposal site and study area are generally degraded with high cover of introduced flora species. The drainage line in the western section of the proposal site is highly eroded and drains into a farm dam that contains minimal fringing vegetation.

During periods of flow, the drainage lines may provide habitat for frogs such as the Common Eastern Froglet (*Crinia signifera*), Eastern Sign-bearing Froglet (*Crinia parinsignifera*) and Spotted Marsh Frog (*Limnodynastes tasmaniensis*).

Rocky habitat

Rocky outcrops are present in the woodland area along the eastern boundary of the proposal site. The habitat is located on the eastern facing hill and is mostly comprised of large embedded boulders with a surrounding groundcover dominated by introduced species including Musky Crowfoot and Wimmera Ryegrass. Blackberry is also present in the area. It is unlikely this rocky habitat would provide habitat for threatened reptile species due to the rocks being large and embedded, and the highly degraded groundcover present.

3.3.2 Fauna species recorded

Incidental observations during the field surveys included nine bird species and one mammal species. Two introduced species were observed; Rabbit (*Oryctolagus cuniculus*) and Common Starling (*Sturnus vulgaris*).

No threatened fauna species were observed during surveys.

3.4 Threatened and migratory biota

3.4.1 Matters of national environmental significance

Listed species

Box-Gum Woodland is listed as critically endangered under the EPBC Act, however the patch of Box-Gum Woodland in the proposal site does not meet the EPBC Act listing of the community due to the small size of the patch, lack of regeneration occurring and the dominance of introduced groundcover species.

Although not recorded during current surveys, the vulnerable Superb Parrot (*Polytelis swainsonii*) is known to occur in the study area and locality. It has been observed nesting and breeding in large River Red Gum trees along River Road and surrounds. The species is known to breed in hollow-bearing trees along and within the vicinity of the Murrumbidgee River and to use River Red Gum and Box-Gum Woodland habitats as a flyway between patches of woodland to the south and north of the study area (see Figure 1).

The assessment of likelihood of occurrence identified nine bird species, two reptile species, one frog species, five mammal species, four fish species, seven plant species and three ecological community listed under the EPBC Act, that are known or likely to occur in the study area based on previous records and database searches. Of these, two bird species, one mammal species, one frog species and two fish species have a high or moderate likelihood of occurrence in the study area (Appendix B).

No assessment of significance guidelines (EPBC Act Policy Statement Matters of National Environmental Significance: Significant impact guidelines 1.1, DotE 2013) were applied to this assessment as this assessment is to highlight potential constraints associated with future development rather than impact assessment.

Migratory species assessment

Migratory species are protected under the international agreements to which Australia is a signatory, including the *Japan-Australia Migratory Bird Agreement* (JAMBA), the *China-Australia Migratory Bird Agreement* (CAMBA), the *Republic of Korea-Australia Migratory Bird Agreement* (RoKAMBA) and the *Bonn Convention on the Conservation of Migratory Species of Wild Animals.* Migratory species are considered matters of NES and are protected under the EPBC Act.

Four migratory bird species are considered likely to occur in the study area based on potential habitats observed (Appendix B).

3.4.2 NSW listed species, communities and population

The endangered ecological community of Box-Gum Woodland was recorded in the proposal site during field surveys, as listed under the BC Act. The community occurs as a small patch with a canopy of Yellow Box and a groundcover dominated by introduced species.

Gobbagombalin Lagoon is part of the Lowland Murray River aquatic ecological community, listed as endangered under the FM Act.

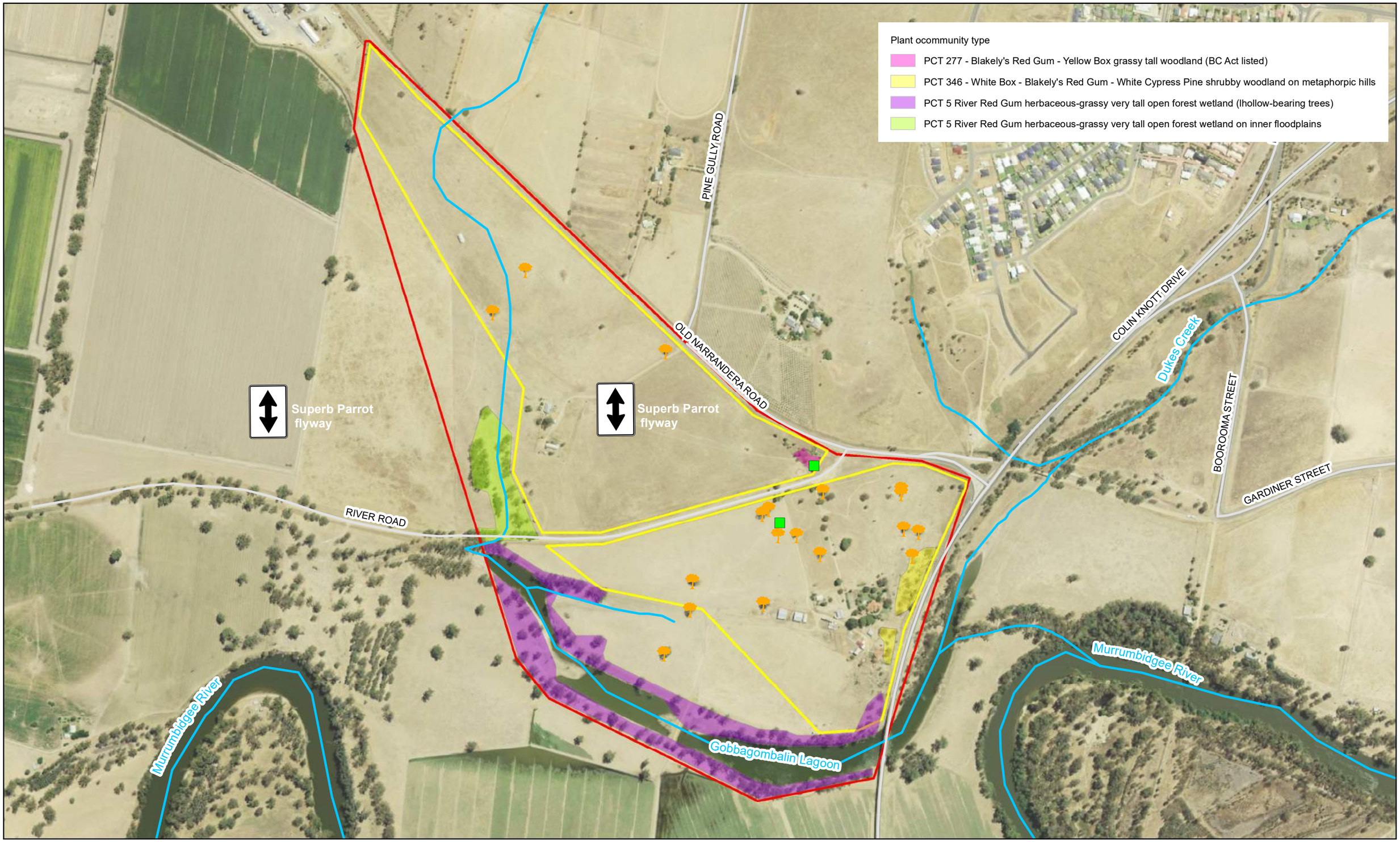
Although not recorded during current surveys, the vulnerable Superb Parrot and Barking Owl and endangered population of Squirrel Glider are known to occur in the study area and locality. These species are known to use habitat in the study area, as described in section 3.4.1, above.

The Squirrel Glider (*Petaurus norfolcensis*), listed as an endangered population in the Wagga Wagga local government area, is known to occur along the Murrumbidgee River corridor and in connected habitat, utilising hollow-bearing trees for denning. The species was not recorded during current surveys, however is highly likely to occur in the River Red Gum woodland in the south of the study area due to its connectivity to known habitat along the riparian corridor of the Murrumbidgee River.

The Barking Owl (*Ninox connivens*), listed as vulnerable under the BC Act, is known to occur along the Murrumbidgee River corridor and surrounding habitat, utilising large hollow-bearing trees for roosting and nesting. The species was not recorded during current surveys, however is highly likely to occur in the River Red Gum woodland in the south of the study area due to its connectivity to known habitat along the riparian corridor of the Murrumbidgee River.

The assessment of likelihood of occurrence identified 27 bird species, two reptile species, one frog species, eight mammal species, three fish species, eight plant species and four ecological community listed under the BC Act, that are known or likely to occur in the study area based on previous records and database searches. Of these, 15 bird species, four mammal species, one frog species, three fish species and one ecological community were recorded or have a high or moderate likelihood of occurrence in the study area (Appendix B).

No five part tests (assessment of significance under the BC Act) were conducted for threatened species or communities previously recorded or likely to occur within the study area. This assessment is to highlight the potential constraints associated with future maintenance rather than impact assessment.



Paper Size A3

0 100 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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LEGEND

- Flora plot
- Hollow-bearing tree
- Road
- Waterway
- Rezoning boundary (proposal site)
- Study area

Salvestro Planning
Gobbagombalin ecological constraints analysis

Job Number	23-16693
Revision	A
Date	04 Oct 2019

Ecological constraints in the study area

Figure 1

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Data source: NSW Government (LPI): Aerial photograph - 2017, roads, waterways - 2012. Created by:bturner

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4. Site ecological constraints

4.1 Summary of issues

The following issues were identified in the study area:

- The BC Act listed endangered ecological community Box-Gum Woodland occurs in the proposal site to the north of River Road
- Remnant vegetation in the proposal site and study area is known to support the EPBC Act and BC Act listed vulnerable Superb Parrot
- Remnant vegetation in the proposal site and study area is highly likely to support the vulnerable BC Act listed Barking Owl and the BC Act listed endangered population of the Squirrel Glider in the Wagga Wagga Local Government Area. It may also periodically to support a number of other threatened fauna species (see Appendix B)
- Gobbagombalin Lagoon in the study area has the potential to support EPBC Act and BC Act listed fish species, including the Murray Cod, Macquarie Perch and Trout Cod, and is part of the Lowland Murray River aquatic ecological community listed under the FM Act
- Clearing of remnant vegetation in the proposal site has the potential to remove the BC Act listed Box-Gum Woodland
- There are about 18 hollow-bearing trees within the proposal site that provide potential habitat for hollow dependant fauna. Numerous additional hollow-bearing trees are present along Gobbagombalin Lagoon, which provide known and potential habitat for fauna species including threatened species
- The drainage lines in the proposal site provide potential habitat for amphibian species during periods of flow

4.2 Recommendations

The following recommendations are provided following the ecological constraints analysis:

- Future design options should minimise the clearing of native vegetation as far as possible
- Future design options should minimise the impact to the Box-Gum Woodland endangered ecological community
- Future development should avoid tree removal along Gobbagombalin Lagoon and any modifications to the aquatic habitat of the lagoon itself
- Design options should avoid areas of high biodiversity constraint wherever possible, and minimise impact on threatened species habitat features including hollow-bearing trees
- Design areas should be limited to areas of low biodiversity constraint where practicable. This includes areas of introduced vegetation that has been pasture improved
- Future design options should be made to minimise the removal of mature hollow-bearing trees
  - Once a design has been selected, and a concept design prepared, targeted field surveys may be required to confirm the results of the ecological constraints assessment. This is likely to include targeted threatened species surveys at appropriate times for threatened and migratory biota known or considered likely to occur in the study area

- A formal assessment of the potential impacts on threatened species, populations and communities listed under the BC Act, FM Act and EPBC Act should be undertaken, the significance of these impacts should be assessed in accordance with relevant guidelines.
- Depending on the outcomes of the surveys and assessment, the following may be required:
  - A referral under the EPBC Act should be prepared if there is the potential for significant impacts on matters of national environmental significance
  - An assessment of significance under the BC Act on threatened species and ecological communities listed under the BC Act and/or FM Act that may be impacted
- A Biodiversity Development Assessment Report (BDAR) may be required under the NSW Biodiversity Offset Scheme to assess the potential impacts on listed species and ecological communities. This would be dependent on whether clearing thresholds of native vegetation are reached or if a significant impact is likely to threatened species, populations or ecological communities.

5. Conclusion

The field assessment indicated that ecological constraints exist for the proposal site. The woodland habitat meets the classification criteria for the BC Act listed endangered ecological community of White Box Yellow Box Blakely's Red Gum woodland (Box-Gum Woodland). The proposal site also contains 18 hollow-bearing trees, which provide habitat for a number of fauna species, including the EPBC and NC Act listed vulnerable Superb Parrot (known to occur in the area).

Gobbagombalin Lagoon forms part of the endangered aquatic ecological community in the natural drainage system of the lower Murray River catchment (Lowland Murray River aquatic ecological community)and is potential habitat for a variety of aquatic bird and fauna species.

This ecological constraints analysis provides recommendations for the proposed rezoning of the site including the completion of more detailed assessment and to minimise clearing of native vegetation for future design options.

The ecological constraints identified would not preclude the proposal site from being considered for residential development, subject to undertaking more detailed assessment, as outlined in this report.

6. References

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Appendices

Appendix A – Species lists

FLORA LIST

* Introduced species

Scientific Name	Common name	Cover in each plot		Opportunistic
		P1	P2	
Acacia dealbata	Silver Wattle		1	
*Arctotheca calendula**		40	5	
Aristida ramosa	Purple Wiregrass		2	
Asperula conferta	Common Woodruff			
Austrostipa scabra	Speargrass			✓
Bothriochloa macra	Red-leg Grass		5	
Brachychiton populneus	Kurrajong			✓
*Cenchrus clandestinus**	Kikuyu	2		
Chloris truncata	Windmill Grass		1	
Cynodon dactylon	Couch			✓
Digitaria divaricatissima	Umbrella Grass		<1	
*Echium plantagineum**	Paterson's Curse		<1	
Einadia nutans	Climbing Saltbush		<1	
*Erodium moschatum**	Musky Crowfoot			✓
Eucalyptus albens	White Box			✓
Eucalyptus blakelyi	Blakely's Red Gum			✓
Eucalyptus camaldulensis	River Red Gum			✓
Eucalyptus melliodora	Yellow Box		7	
*Heliotropium europaeum**	Potato Weed	<1		
*Hordeum leporinum**	40			
*Hypericum perforatum**	St John's Wort		<1	
*Hypochaeris radicata**	Catsear		<1	
*Lolium rigidum**	Wimmera Ryegrass	2		
*Malva parviflora**	Small-flowered Mallow	<1		
*Paspalum dilatatum**	Paspalum		20	
*Pinus radiata**	Radiata Pine			✓
Romulea rosea *	Onion Grass	<1	2	
*Rubus fruticosus**	Blackberry			✓
Rytidosperma sp.			5	
Setaria sp.*			2	
*Sonchus oleraceus**	Common Sowthistle	1		
Sporobolus creber	Slender Rat's Tail Grass		2	
Trifolium sp.*		<1		
*Urtica urens**	Small Nettle			✓

FAUNA LIST

* Introduced species

O = observed, W = heard, P = scat

Scientific Name	Common name	Incidental
BIRDS		
Cracticus tibicen	Australian Magpie	OW
Pelecanus conspicillatus	Australian Pelican	O
Corvus coronoides	Australian Raven	W
Sturnus vulgaris *	Common Starling	O
Eolophus roseicapillus	Galah	OW
Strepera graculina	Pied Currawong	OW
Cacatua galerita	Sulphur-crested Cockatoo	OW
Malurus cyaneus	Superb Fairy-wren	W
Corcorax melanorhamphos	White-winged Chough	OW
MAMMALS		
*Oryctolagus cuniculus**	Rabbit	P

Appendix B – Likelihoods of occurrence

An evaluation of the likelihood and extent of impact to threatened and migratory fauna recorded from within the Wagga Wagga City Council (BC Act threatened species); and within a 10 kilometre radius of the proposal site (EPBC Act threatened and migratory species). Records are from the EPBC Environmental Reporting Tool available from the Department of the Environment and Energy (DotEE) website. Ecology information has been obtained from the Threatened Species Profiles on the NSW OEH website (http://www.environment.nsw.gov.au/threatenedspecies/) and from the Species Profiles and Threats Database on the Commonwealth DotEE website (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl).

Status

- National - Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
- NSW - *Biodiversity Conservation Act 2016*
- E Endangered
- CE Critically Endangered
- EP Endangered population
- V Vulnerable
- Mi Migratory

Likelihood of occurrence in study area

Recorded – The species was observed in the study area during the current survey

High – It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (within 10 kilometres) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration

Moderate – Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (ie. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded

Low – It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (within 10 kilometres). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded

None – Suitable habitat is absent from the study area.

Flora

Species / Communities	Status		Habitat requirements	Likelihood of occurrence in the proposalproposal site and study area
	EPBC	BC		
Ecological communities				
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	E	Predominantly occurs on the drier edge of the temperate grassy eucalypt woodland belt (375-700 mm rainfall) ranging from central New South Wales through northern and central Victoria into South Australia. Grey Box Grassy Woodlands usually occur in flat to undulating landscapes, such as plains, low slopes and rises, or occasionally in drainage depressions. Patches of this community tend to occur on relatively productive soils.	**Low:** No Grey Box trees were recorded within the proposalproposal site and the community is not present in the study area.
Lowland Murray River aquatic ecological community	-	E (FM Act)	The ecological community includes all natural creeks, rivers, and associated lagoons, billabongs and lakes of the regulated portions of the Murray River below the Hume Weir, the Murrumbidgee River below Burrinjuck Dam, and the Tumut River below Blowering Dam, as well as all their tributaries and branches	**Known:** The listing of the community includes associated lagoons of the Murrumbidgee River downstream of Burrinjuck Dam, which includes the lagoon in the study area.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box-Gum Woodland)	CE	E	Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Commonly co-occurring eucalypts include *Eucalyptus bridgesiana, E. polyanthemos, E. rubida, E. pauciflora, E. cinerea, E. mannifera, E. macrorhyncha, E. microcarpa* and others.	**Known:** A patch of woodland dominated by Yellow Box trees is present in the subject site, which classifies for listing under the BC Act only due to the small size of the patch and dominance of introduced species in the groundcover.
Weeping Myall woodlands	E	E	The Weeping Myall Woodlands occurs on the inland alluvial plains west of the Great Dividing Range in NSW and QLD. It occurs in the Riverina, NSW South Western Slopes, Darling Riverine Plains, Brigalow Belt South, Murray-Darling Depression, Nandewar and Cobar	**Low:** No Weeping Myall was recorded within the proposal proposal site and the community is not present in the study area.

Species / Communities	Status		Habitat requirements	Likelihood of occurrence in the proposalproposal site and study area
	EPBC	BC		
			Peneplain Interim Biogeographic Regionalisation for Australia (IBRA) bioregions.	
Plants				
Austrostipa wakoolica A spear-grass	E	E	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve). Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST.	**Low:** Specific habitat requirements and associated species for this species are not present within the proposal siteproposal site. The site is highly modified and degraded, and it is unlikely that this species would persist on site.
Brachyscome muelleroides Mueller Daisy, Claypan Daisy	V	V	The Claypan Daisy occurs in the Wagga Wagga, Narranderra, Tocumwal and Walbundrie areas. Also occurs in north-central Victoria (only along the Murray from Tocumwal to the Ovens River). Grows in damp areas on the margins of claypans in moist grassland with Pycnosorus globosus, Agrostis avenacea and Austrodanthonia duttoniana. Also recorded from the margins of lagoons in mud or water, and in association with Calotis anthemoides. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST.	**Low:** No recent records for the Claypan Daisy exist in the Wagga Wagga area, and the species is considered locally extinct. It is unlikely that the species will occur within the proposal siteproposal site or in the wider study area
Caladenia arenaria Sand-hill Spider-Orchid	E	E	Caladenia arenaria is found mostly on the south west plains and western south west slopes. The original description is of a plant from Nangus, west of Gundagai (1865) and there is a report of the species from Adelong near Tumut. A record near Cootamundra needs	**Low:** The species is unlikely to occur in the study area due to its degraded nature, the dominance of introduced species and lack of favoured sandy habitat. No records

Species / Communities	Status		Habitat requirements	Likelihood of occurrence in the proposalproposal site and study area
	EPBC	BC		
			verifying. The Sand-hill Spider Orchid is currently only known to occur in the Riverina between Urana and Narranderra. Occurs in woodland with sandy soil, especially that dominated by White Cypress Pine (Callitris glaucophylla) This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST.	exist within the Wagga Wagga area, and the species has never been recorded in the study area.
Prasophyllum petilum Tarengo Leek Orchid	E	E	Natural populations are known from a total of four sites in NSW. These are at Boorowa, Captains Flat, Ilford and Delegate. Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock *Poa labillardieri*, Black Gum *Eucalyptus aggregata* and tea-trees *Leptospermum* spp. at Captains Flat and within the grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford. Apparently highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (Captains Flat and Ilford). This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** No records for this species exist in the Wagga Wagga region, and associated habitat and plant community types do not occur in the proposal siteproposal site or study area (Natural Temperate Grasslands, grassy woodlands in association with River Tussock). The species is highly susceptible to grazing, and is considered unlikely to persist in the highly modified and disturbed habitat present within the proposal siteproposal site. It is unlikely that this species would occur within the proposal siteproposal site or the wider study area.
Senecio garlandii Woolly Ragwort	-	V	This daisy is found between Temora, Bethungra and Albury and possibly Burrinjuck near Yass. The largest populations are at The Rock and Mt Tabletop (and surrounds). There is a single population in Victoria at Chiltern. Woolly Ragwort occurs on sheltered slopes of rocky outcrops. Two records for this species are recorded on NSWBionet, located in Wagga Wagga approximately 8	**Low:** Although two records exist for this species within 9 kilometres of the proposal siteproposal site and rocky outcrops are present, the proposal siteproposal site has previously been degraded and modified by agricultural processes and is unlikely to support the species.

Species / Communities	Status		Habitat requirements	Likelihood of occurrence in the proposalproposal site and study area
	EPBC	BC		
			kilometres and 8.7 kilometres south-east of the site respectively. The records were recorded from 2001 and 2008.	
Swainsona murrayana Slender Darling-pea	V	V	Found throughout NSW , it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. Occurs in grassland, herbland and open Black-box woodland. Associated with low chenopod shrubs *Maireana* species, wallaby-grass *Austrodanthonia* species and spear grass *Austrostipa* species. Flowers from spring to early summer. Grows on heavy grey or brown clay, loam, or red cracking clays. 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. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** Associated habitat components and species (chenopod shrublands) are not present within the proposal siteproposal site or are likely to be present in the wider study area, and as such it is unlikely that this species will occur in the proposal siteproposal site or study area.
Swainsona recta Small Purple-pea	E	E	Before European settlement, Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum Eucalyptus blakelyi, Yellow Box E. melliodora, Candlebark Gum E. rubida and Long-leaf Box E. goniocalyx. Grows in association with understorey dominants that include Kangaroo Grass Themeda australis, Poa tussocks Poa spp. and spear-grasses Austrostipa spp.	**Low:** records for this species in the area are historical, and the last record for this species occurred in 1900. It is unlikely that this species still occurs in the study area or within the proposal siteproposal site due to its degraded nature.

Species / Communities	Status		Habitat requirements	Likelihood of occurrence in the proposalproposal site and study area
	EPBC	BC		
			A historical record (1900) exists for this species on NSWBionet located in Wagga Wagga approximately 8 kilometres south-east of the proposal site	
Tylophora linearis	E	V	Majority of records occur in the central western region. Records from Goonoo, Pillaga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs. 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.* This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST.	**Low:** Associated habitat components for this species are not found within the proposal siteproposal site, and no records exist in the wider study area. It is unlikely that this species will occur within the proposal siteproposal site or the wider study area.

Fauna

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
Birds				
Australasian Bittern *Botaurus poiciloptilus*	E	E	This species favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day among dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.	**Low:** The species may occur within suitable riverine and wetland habitat present in the locality, however there is limited fringing vegetation available in the study area to provide suitable habitat for the species.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	
Australian Painted Snipe *Rostratula australis*	E	E	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground among tall vegetation, such as grasses, tussocks or reeds. Forages nocturnally on mud-flats and in shallow water. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** The species may occur within suitable riverine and wetland habitat present in the locality, however there is limited fringing vegetation available in the study area to provide suitable habitat for the species.
Barking Owl *Ninox connivens*	-	V	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils. Multiple sighting records exist for this species in the Wagga Wagga area on NSWBionet. Sightings range from between 1994 and 2004, and from 3.2 kilometres to 5.2 kilometres from the proposal site.	**High:** Multiple records exist for this species within proximity to the proposal siteproposal site. The Barking Owl prefers breeding habitat along timbered watercourses, and given the presence of large, hollow-bearing trees, and the proximity of the proposal siteproposal site to the Murrumbidgee River, it is considered likely that the species will occur within the proposal siteproposal site.
Black Falcon *Falco subniger*	-	V	Mostly occurring inland NSW. Inhabits woodland, shrubland and grassland in arid and semi-arid zones including agricultural land with scattered remnant trees. Usually associated with wetlands as they look for prey, and use standing dead trees to use as lookout posts. Habitat choice is often influenced by food availability. Four historical records from the Wagga Wagga area in 1978 for this species exist on NSWBionet. These records are all within 10 kilometres of the proposal siteproposal site.	**Low:** Given that records for the species are pre-2000, it is unlikely that the species will occur in the proposal siteproposal site. The species is more commonly found to the west.
Black-chinned Honeyeater (eastern subspecies)	-	V	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*Eucalyptus albens*), Grey Box (*Eucalyptus microcarpa*),	**Low:** Suitable habitat trees (Ironbark and Box dominant woodlands) are limited in the proposal siteproposal site, it is unlikely that the species will occur in the proposal siteproposal site. The species

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
Melithreptus gularis gulari			Yellow Box (*Eucalyptus melliodora*) and Forest Red Gum (*Eucalyptus tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. Two records from 2007 exist for this species in the study area approximately 4.7 kilometres from the proposal siteproposal site.	may occur in nearby suitable habitat in the study area, and may be an occasional visitor to the proposal siteproposal site.
Brown Treecreeper (eastern subspecies) *Climacteris picumnus Victoriae*	-	V	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range. The species mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species, and is also found in mallee and River Red Gum Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. They are usually not found in woodlands with a dense shrub layer. Multiple recent records exist for this species in the study area. A recent (2012) record is available approximately 700 metres from the proposal siteproposal site.	**Moderate:** This species is likely to occur, or be an occasional visitor to the proposal siteproposal site. Multiple nearby and recent records for this species exist within similar habitat to the habitat available on site.
Curlew Sandpiper *Calidris ferruginea*	CE	E	The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. The Curlew Sandpiper breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April. 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.	**Low:** The species is most commonly found in coastal areas and dur to a lack of records in the locality is unlikely to occur in the study area.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
Diamond Firetail *Stagonopleura guttata*	-	V	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects. The most recent (2007) Bionet Atlas record for this species occurs within Pomigalrna reserve, approximately 5.3 kilometres from the project. Other historical (pre-2000) records for the species exist within the study area.	**Moderate:** As this species is often found in riparian areas, it is likely that the Diamond Firetail will occur within the proposal siteproposal site or nearby study area due to its proximity to the Murrumbidgee River riparian area. The species is likely to utilise eucalypt woodland in the study area
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	-	V	Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.. A recent record for the species (2017) is available in the study area approximately five kilometres from the proposal siteproposal site. Other older records (pre-2000) are also available for the species from a similar area.	**Moderate:** The species may utilise eucalypt woodland in the study area as potential habitat. And is also known to occur in agricultural land.
Eastern Curlew *Numenius madagascarriensis*	CE	-	The Curlew is a migratory bird that travels from Australia to Russia. In Australia it is primarily coastal, residing in estuaries, bays, harbours, inlets and coastal lagoons.	**Low:** The species is most commonly found in coastal areas and dur to a lack of records in the locality is unlikely to occur in the study area.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			Forages on crabs and molluscs on mudflats (Marchant and Higgins, 1993). This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	
Flame Robin *Petroica phoenicea*	-	V	The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. A recent Bionet Atlas record (2012) exists in the study area approximately seven kilometres north of the proposal siteproposal site. Multiple historical records (pre-2000) also exist for this species in the study area.	**Moderate:** The species may utilise eucalypt woodland in the study area as potential habitat and is known to occur in agricultural areas.
Freckled Duck *Strictonetta naevosa*	-	V	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. 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	**Moderate:** Due to the presence of suitable riparian habitat within and immediately nearby to the proposal siteproposal site, it is likely that this species occurs either within the proposal siteproposal site, or within the wider study area.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			permanent waters such as lakes, reservoirs, farm dams and sewage ponds. A record for this species from 2003 exists within the study area approximately 3 kilometres south-east from the site.	
Gilbert's Whistler *Pachycephala inornata*	-	V	The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt. The eastern population extends from the central NSW mallee (Yathong, Nombinnie and Round Hill NRs), south and east through the Cocoparra Range to Pomingalama Reserve (near Wagga Wagga) then north through the South West Slopes east as far as Cowra and Burrendong Dam, to the Goonoo reserves (with scattered records as far north as Pilliga). Occasional records are also made of this species in the Capertee Valley. The species is also recorded in River Red Gum forests along the Murray River valley between Mathoura and Wentworth, with the eastern populations (between Mathoura and Barham) apparently isolated from other NSW populations. West of Swan Hill, this population may interact with populations found to the north of the Murray River west of Balranald and as far north as the Scotia country (Tarawi NR and Scotia Sanctuary). The Gilbert's Whistler occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests, though at this stage it is only known to use this habitat along the Murray, Edwards and Wakool Rivers. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including wattles, hakeas, sennas and hop-bushes. In woodland habitats, the understorey comprises dense patches of shrubs, particularly thickets of regrowth Callitris pine. Parasitic 'cherries' (Exocarpus species) appear	**Low:** As no records exist within the proposal siteproposal site, and no recent records exist within the wider study area or locality for this species, it is unlikely that this species will occur. The species is only known to utilise River Red Gum habitats along the Murray, Edward and Wakool Rivers

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			to be an important habitat component in Belah and Red Gum communities, though in the latter case other dense shrubs, such as Lignum and wattles, are also utilised. Historical records from 1979 to 1994 for this species exist in Pomingalarna Reserve approximately 5.2 kilometres from the proposal siteproposal site.	
Glossy Black-Cockatoo *Calyptorhynchus lathami*	-	V	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. 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. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta,* and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. Multiple records from Wiradjuri Reserve, approximately 4.2 kilometres from the proposal siteproposal site exist for this species. Records occurred from 2005 to 2007.	**Low:** No suitable feed trees (*Allocasurina*) were recorded on site, so this species is unlikely that this species will occur within the proposal siteproposal site. The species may be an occasional visitor to the area, and may utilise habitat for movement.
Glossy Ibis *Plegadis falcinellus*	Mi	-	The Glossy Ibis is the smallest Ibis known in Australia, and is generally located east of the Kimberly in Western Australia and Eyre Peninsula in South Australia. The species is known to be patchily distributed in the rest of Western Australia and is rare or a vagrant in Tasmania. The Glossy ibis prefers fresh water marshes at the edges of lakes, rivers, agoons, flood-plains, swamps, wet meadows and cultivated areas under irrigation, and is often found in the company of other Ibis species.	**Moderate:** The species is likely to occur within suitable riverine and wetland habitat present along the Murrumbidgee River, and due to the proximity of the proposal siteproposal site to the Murrumbidgee River the species may occur within or be an occasional visitor to the proposal siteproposal site.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
Hooded Robin *Melanodryas cucullata cucullata*	-	V	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies cucullata) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies picata. Two other subspecies occur outside NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Historical records for this species occur in the study area (within six kilometres from site) from 1979 to 2003)	**Low:** The species is unlikely to occur in the study area due to a lack of recent records and lack of structurally diverse habitat suitable for the species.
Little Eagle *Hieraaetus morphnoides*	-	V	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Multiple historical and some recent records exist for this species in the study area within approximately 1 kilometre to 8 kilometres from the proposal siteproposal site.. Record occur from 1979 to 2012, with the more recent most recent record for the species occurring 2.6 kilometres from the proposal siteproposal site.	**Moderate:** This species often occurs along riparian woodlands, and as such, given the proximity of the proposal siteproposal site to the Murrumbidgee River riparian area, it is likely that this species will occur within the proposal siteproposal site and wider study area.
Magpie Goose *Anseranas semipalmata*	-	V	The Magpie Goose is still relatively common in the Australian northern tropics, but had disappeared from south-east Australia by 1920 due to drainage and overgrazing of reed swamps used for breeding. Since the 1980s there have been an increasing number of records in central and northern	**Moderate:** The species is likely to occur within riverine and wetland habitat present along the Murrumbidgee River, and has previously been recorded adjacent to the study area. The species is

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			NSW. Vagrants can follow food sources to south-eastern NSW. 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. A record for this species from 2014 exists within the study area approximately 4 kilometres south-east from the site. The species has also been recorded in the lagoon on the eastern side of Colin Knott Drive (L. Maloney pers.com).	likely to only be an occasional visitor to the proposal siteproposal site.
Latham's Snipe	Mi	-	Occurs along the coast and west of the great dividing range. Non breeding visitor to Australia. Inhabit permanent and ephemeral wetlands up to 2000 metres above sea level. Typically in open, freshwater wetlands with low, dense vegetation (incl. swamps, flooded grasslands and heathlands). Can also occur in saline/brackish habitats and in modified or artificial habitats close to human activity.	**Low:** The species may occur within suitable riverine and wetland habitat present in the locality, however there is limited fringing vegetation available in the study area to provide suitable habitat for the species.
Little Lorikeet *Glossopsitta pusilla*	-	V	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs. 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	**Moderate:** Due to its nomadic movements, this species may occasionally occur within the proposal siteproposal site or the wider study area in suitable riparian eucalypt habitat.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Multiple historical records from between 1970 and 1994 exist for this species within the study area approximately 5 kilometres from the proposal site proposal site	
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	-	V	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Two historical records from 1998 and 1999 for this species exist within the wider study area, approximately four kilometres from the proposal site.	**Low:** The species may be an occasional visitor to the proposal site, however is unlikely to be dependent on any aspects of habitat present within the area due to a lack of foraging resources. The species is generally found further west.
Malleefowl *Leipoa ocellata*	V	E	Occurs in semi-arid to arid mallee country in the south-west of NSW. Its NSW stronghold is centred on Mallee Cliffs NP, extending east to Balranald and with scattered records north to Mungo NP. There are also populations near Dubbo (Goonoo forest). Occasional records exist from the Pilliga, around Cobar and Goulburn River NP. Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species.	**None:** No known populations of this species exist within the proposal site or study area, and no suitable mallee habitat is available. As such, this species is unlikely to occur.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers. This species is was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	
Painted Honeyeater *Grantiella picta*	V	V	Nomadic, occurring in low densities across most of NSW. Highest concentrations and almost all breeding occur on inland slopes of the Great Dividing Range. Inhabits Boree, Brigalow and Box Gum woodlands and Box-Ironbark forests. Specialist forager on the fruits of mistletoes, preferably of the Amyema genus. Nests in outer tree canopy. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*. This species is was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** No suitable feed trees with mistletoe were recorded on site. The species may be present within the proposal site as an occasional visitor, or in the wider study area where suitable habitat occurs, however is unlikely to be dependent on habitat in the proposal site.
Regent Honeyeater *Anthochaera phrygia*	CE	CE	The species 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. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST A historical record exists from 1980 for this species in the study area, approximately 3.7 kilometres from the proposal site.	**Low:** While the species may be an occasional visitor to the proposal site, it is unlikely that it will occur due to a lack of suitable habitat containing high canopy cover, and an abundance of mistletoes.
Scarlet Robin *Petroica boodang*	-	V	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and	**Moderate:** The species may utilise eucalypt woodland in the study area as potential habitat.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. A recent (2017) Bionet Atlas record for this species occurs within 5.5 kilometres to the south of the proposal site.	
Sharp-tailed Sandpiper	Mi	-	When in Australia, this species is distributed widespread along the coast. The species prefers habitat with muddy edges of fresh or brackish water. Forage in saltmarsh, grass or sedges. Also in sewage ponds and hypersaline environments. They are widespread in most regions of New South Wales (NSW) and Victoria, especially in coastal areas, but they are sparse in the south-central Western Plain and east Lower Western Regions of NSW, and north-east and north-central Victoria. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs. This species was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Moderate:** The species is likely to occur within suitable riverine and wetland habitat present along the Murrumbidgee River, and due to the proximity of the proposal site to the Murrumbidgee River the species may occur within or be an occasional visitor to the proposal site.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
Spotted Harrier *Circus assimilis*	-	V	Occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges. Individuals disperse widely in NSW and comprise a single population. 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. Preys on terrestrial mammals (eg bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. A record for this species from 2013 exists within the study area approximately 3 kilometres South-east from the proposal site.	**Moderate:** This species may occur in suitable open habitat bordering riparian woodlands present in the proposal site or wider study area.
Superb Parrot *Polytelis swainsonii*	V	V	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. In the Riverina 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. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. Multiple recent records of the species exist in the study area. This species is known to nest in large, old growth River Red	**Known:** This species is known to utilise large, hollow-bearing River Red Gum trees present within the study area as breeding, foraging and movement habitat. Woodland in the study area is known to provide a flyway for the species between patches of habitat in the locality.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			Gum trees along the Murrumbidgee River, of which some occur within the proposal site.	
Swift Parrot *Lathamus discolor*	CE	E	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Mugga Ironbark E. sideroxylon, and White Box E. albens. Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana and Blackbutt E. pilularis. Multiple records for this species occur at Charles Sturt University located approximately 3.3 kilometres north of the proposal site. These records occur from 2000, to a single recent record during 2017. A historical recording for this species was taken in 1996 at Pomnigalana Reserve approximately 4.2 kilometres South-west of the proposal site	**Moderate:** Multiple records exist for this species within the nearby Charles Sturt University campus, and as such it is likely that the Swift Parrot may utilise suitable foraging habitat (flowering gums) present within the project area or nearby study area.
Turquoise Parrot *Neophema pulchella*	-	V	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. A single record from 2017 exists for this species in the wider study area, recorded approximately 4.3 kilometres south of the proposal site.	**Moderate:** The species may utilise eucalypt woodland with adjoining grassland in the study area as potential habitat.
Varied Sittella *Daphoenositta chrysoptera*	-	V	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size	**Moderate:** The species may utilise eucalypt woodland in the study area as potential habitat.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades. 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. One historical record (1994) for the species is available from the study area, approximately 5.3 kilometres from the proposal site.	
White-throated Needletail *Hirundapus caudacutus*	Mi	-	The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. A large proportion of the White-throated Needletails of the nominate subspecies would occur in Australia as non-breeding visitors. Most White-throated Needletails spend the non-breeding season in Australasia, mainly in Australia, and occasionally in New Guinea and New Zealand, though it has been suggested that some may overwinter in parts of South-East Asia. As the Needletails that occur in Australia migrate from breeding areas in the Northern Hemisphere, they would be affected by global threats.	**Moderate:** The species may forage aerially above the study area.
Mammals				
Bilby *Macrotis lagotis*	V	Ex	Distribution of the Bilby is predominantly northern Australia in the Northern Territory, Queensland and Western Australia. Habitat is open tussock grassland on hills, Mulga *Acacia aneura* woodland/shrubland growing on ridges and hummock grasslands in plains and alluvial areas. Shelters in underground burrows. Feeds on invertebrates like termites and ants. Breeds depends on seasonal conditions and food availability.	**None:** The species is considered extinct in NSW, and is unlikely to occur in the study area.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST. The species is considered locally extinct	
Corben's Long-eared Bat *Nycotophilus corbeni*	V	V	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, bulloke 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. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** It is unlikely that this species will occur due to a lack of records and preferred habitat in the proposal site.
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	-	V	Inhabits various habitats from open grasslands to woodlands, wet and dry sclerophyll forests and rainforest. Essentially a cave bat but may also roost in road culverts, stormwater tunnels and other man-made structures. Only 4 known maternity caves in NSW, near Wee Jasper, Bungonia, Kempsey and Texas. Females may travel hundreds of kilometres to the nearest maternal colony. Hunts in forested areas for insects like moths and flying insects. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. A single Bionet Atlas record exists from 2013 for this species in the study area from within 6.6 kilometres of the proposal site.	**Moderate:** The species may utilise suitable eucalypt woodland in the study area for foraging.
Koala *Phascolarctos cinereus*	V	V	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the	**None** –The species is unlikely to inhabit the study area due to a lack of recent records in the locality and it is not known to occur in the LGA.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			Great Dividing Range. It was briefly historically abundant in the 1890s in the Bega District on the south coast of NSW, although not elsewhere, but it now occurs in sparse and possibly disjunct populations. Koalas are also known from several sites on the southern tablelands. 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. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST.	
Grey-headed Flying Fox *Pteropus poliocephalus*	V	V	Roosts in camps within 20km of a regular food source, typically in gullies, close to water and in vegetation with a dense canopy. Forages in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, swamps and street trees, particularly in eucalypts, melaleucas and banksias. Highly mobile with movements largely determined by food availability (Eby & Law, 2008). Will also forage in urban gardens and cultivated fruit crops. Multiple recent Bionet Atlas records (post-2016) exist for this species in the study area, many within 3 kilometres of the proposal site.	**Moderate:** Multiple records exist for this species in the study area, and may utilise suitable habitat within the proposal site for foraging and roosting, which is close to permanent water.
Inland Forrest Bat *Vespadelus baverstocki*	-	V	Believed to occur widely in all the mainland states, generally in areas with annual rainfall less than 400 millimetres. In Victoria it is confined to the extreme north west. In NSW it has been most regularly captured in the far south west, north from the Murray River to Menindee, and at least as far east as the Balranald-Ivanhoe Road. There is some evidence to suggest that this species also occurs in the central NSW mallee, centred on Nombinnie Nature Reserve, although there has been very little recent survey in this part of the state. The habitat requirements of this species are poorly known but it has been recorded from a variety of woodland formations, including Mallee, Mulga and River Red Gum. Most records are from drier woodland habitats with riparian	**Low:** It is unlikely that this species will occur due to a lack of records in the locality and records of the species this far east have not been confirmed. The species is generally found to the west.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			areas inhabited by the Little Forest Bat. However, other habitats may be used for foraging and/or drinking. A single Bionet Atlas record exists from 2007 for this species in the study area from within 3.8 kilometres of the proposal site.	
Southern Myotis *Myotis macropus*	-	V	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 kilometres inland, except along major rivers. Usually associated with permanent waterways at low elevations in flat/undulating country, usually in vegetated areas. Forages over streams and watercourses feeding on fish and insects from the water surface. Roosts in a variety of habitats including caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage, typically in close proximity to water. A single Bionet Atlas record exists from 2000 for this species in the study area from within 2.1 kilometres of the proposal site.	**Moderate:** Suitable riparian habitat utilised for foraging and roosting exists within the immediate study area. It is likely that this species occur within the proposal site (roosts in hollows) or wider study area.
Spotted-tail Quoll *Dasyurus maculatus maculatus*	E	V	It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common. Inhabits a range of environments including rainforest, open forest, woodland, coastal health and inland riparian forest, from the sub-alpine zone to the coastline. Den subject sites are in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males up to 3,500 ha, which are usually traversed along immensely vegetated creek lines. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** It is unlikely that this species will occur due to the fragmented nature of the study area being unsuitable to provide large enough home ranges for the species and the lack of records in the locality.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
Squirrel Glider in the Wagga Wagga LGA *Petaurus norfolcensis*	-	E	The extent of the endangered population is legally defined by the boundaries of the Wagga Wagga LGA. The distribution of the Squirrel Glider and its known or potential habitats within, or linked across, this boundary is not well defined. However, potential habitat occurs at low densities and is patchily distributed on public lands (TSRs, NPWS reserves, Bush Heritage Trust reserves), private lands and roadside corridors with remnant vegetation. Inhabits a wide range of open forest, woodland and riverine forest habitats. Utilise remnants of various sizes, including small remnants and even small stands of trees within Travelling Stock Reserves, roadside reserves or private land. Often utilise linear remnant vegetation along roadsides or rivers and streams. Multiple recent records (2016 and later) exist for this species in the study area, many of these are within 3 kilometres of the proposal site, along the Murrumbidgee River.	**High:** This species is known to occur in River Red Gum woodland habitat, and use hollow-bearing trees for denning. Due to the presence of hollow-bearing trees within the proposal site, and its connection and proximity to known haitat along the Murrumbidgee River, it is likely that this species will occur within the proposal site and study area.
Amphibians, Reptiles and Fish				
Flathead Galaxias *Galaxias rostratus*	CE	CE	The species is generally found mid-water in still and gently moving waters of small streams, lakes, lagoons, billabongs and backwaters. Its habitat consists of coarse sand or mud substrate and aquatic vegetation. It is thought that the species may be locally extinct from the lower Murray, Murrumbidgee, Macquarie and Lachlan Rivers. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** It is believed that this species is locally extinct from the lower Murrumbidgee River areas, and as such it is unlikely to occur within the proposal site or study area.
Macquarie Perch *Macquaria australasica*	E	E	Occurs in the upper reaches of the Lachlan, Murrumbidgee and Murray Rivers, and in parts of the Hawkesbury and Shoalhaven catchment areas. Inhabits river and lake habitats, especially the upper reaches of rivers and their tributaries. Requires clear water with deep, rocky holes and abundant cover (including aquatic vegetation, woody debris, large boulders and overhanging banks). Spawning occurs in	**Low**: The proposal site and study area lacks suitable riverine habitat and the species is not known to occur in the LGA or lower reaches of the Murrumbidgee River.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			spring and summer in shallow upland streams or flowing sections of river systems. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	
Murray Cod *Maccullochella peelii peelii*	V	-	Occurs throughout the Murray-Darling Basin. Can live in a wide range of habitats, from clear, rocky streams in the upper western slopes regions of New South Wales to the slow flowing, turbid rivers and billabongs of the western plains. Generally, they are found in waters up to 5m deep and in sheltered areas with cover from rocks, timber or overhanging banks. The presence of wood debris has been shown to be the primary factor determining Murray cod presence. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Moderate:** This species is known to occur in the Murrumbidgee River in the locality and may occur in the lagoon due to its connectivity to the river.
Pink-tailed Worm Lizard *Aprasia parapulchella*	V	V	Populations occur in the Queanbeyan/Canberra district, Cooma, Yass, Bathurst, Albury and West Wyalong areas. Inhabits grassland and open woodland with substantial embedded rock cover in sunny situations. Recorded in both native and non-native grasslands. Usually recorded under small rocks (150 - 600 mm basal area) shallowly embedded in the soil (2 - 5 cm, and use ant burrows under these rocks. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** The study area contains limited native grassland habitat with partially embedded rocks to provide suitable habitat for the species.
Southern Bell Frog *Litoria raniformis*	V	E	In NSW the species was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. A few yet unconfirmed records have also been made in the Murray Irrigation Area in recent years. The species is also found in Victoria, Tasmania and South Australia, where it has also become endangered.	**Moderate:** This species may occur in the proposal site and study area within suitable River Red Gum wetland habitat along the lagoon in the south of the study area.

Species	Status		Habitat requirements	Likelihood of occurrence in the proposal siteproposal site and study area
	EPBC	BC/FM		
			Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	
Striped Legless Lizard *Delma impar*	V	V	Occurs in the Southern Tablelands, South-west Slopes and possibly the Riverina. Found in natural or secondary grassland or open areas in grassy eucalypt woodland. May occur in modified grasslands with high exotic grass cover. Shelters in base of grass tussocks, under rocks or logs or in soil cracks (Smith and Robertson 1999). This species is known or was predicted to occur within a 10 kilometre radius of the proposal site using the PMST	**Low:** The study area contains limited native grassland habitat with partially embedded rocks or logs to provide suitable habitat for the species.
Trout Cod *Maccullochella macquariensis*	E	E	The species is endemic to the southern Murray-Darling river system, including the Murrumbidgee and Murray Rivers, and the Macquarie River in central NSW. They are often found close to cover and in relatively fast currents, especially in fairly deep water close to the bank, and often congregate around large woody debris (snags). Although the last known reproducing population of the species is confined to the Murray River, the species has been re-stocked into the Murrumbidgee River and is known to occur in the study area and locality.	**Moderate:** This species is known to occur in the Murrumbidgee River in the locality and may occur in the lagoon due to its connectivity to the river.

Appendix C – Background searches

Australian Government
Department of the Environment and Energy

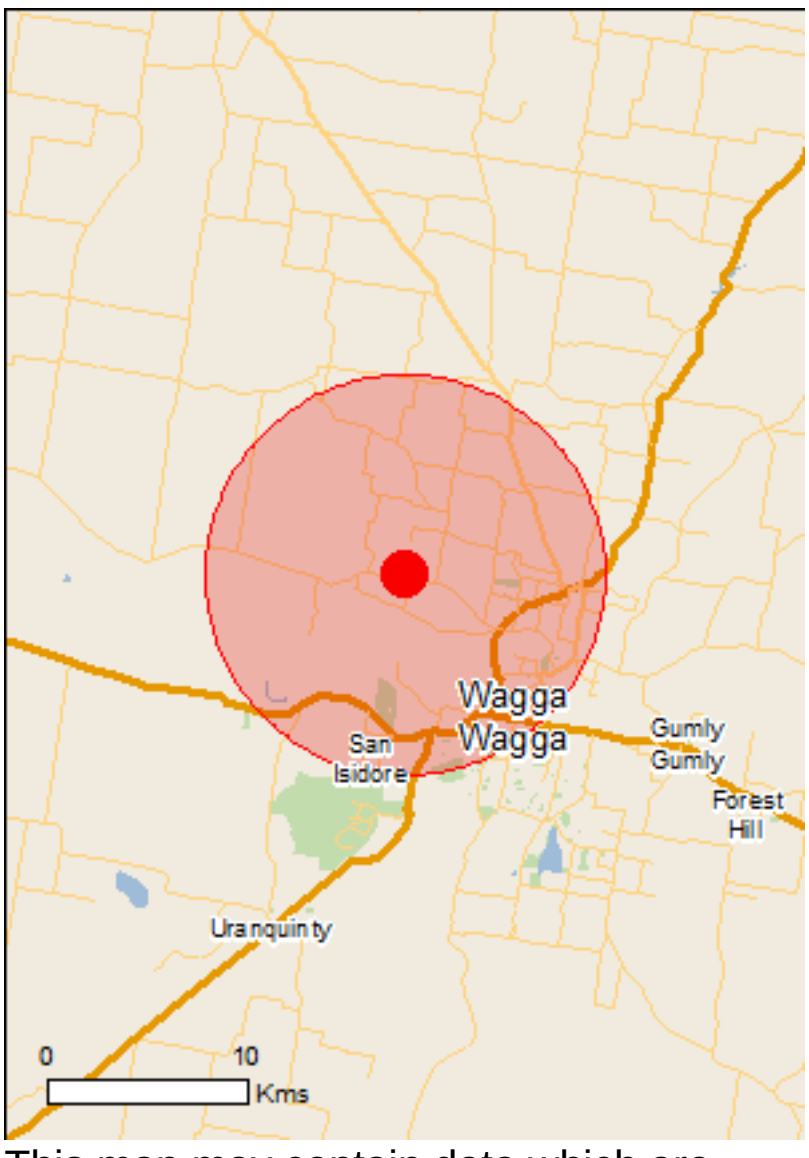
EPBC Act Protected Matters Report

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.

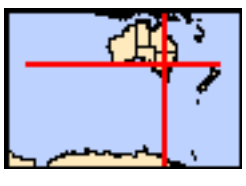
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 20/06/19 13:18:45



Coordinates

Buffer: 10.0Km



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:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	26
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:	8
Commonwealth Heritage Places:	None
Listed Marine Species:	17
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:	29
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	600 - 700km upstream
Hattah-kulkyne lakes	400 - 500km upstream
Riverland	500 - 600km upstream
The coorong, and lakes alexandrina and albert wetland	600 - 700km upstream

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
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	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 likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Breeding known to occur within area

Name	Status	Type of Presence
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
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 may 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
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Austrostipa wakoolica [66623]	Endangered	Species or species habitat may occur within area
Brachyscome muelleroides Mueller Daisy [15572]	Vulnerable	Species or species habitat may occur within area
Caladenia arenaria Sand-hill Spider-orchid [9275]	Endangered	Species or species habitat may occur within area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area
Tylophora linearis [55231]	Endangered	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Delma impar		
Striped Legless Lizard [1649]	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]		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
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 likely to 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 may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may 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 -
Commonwealth Land - Australian Broadcasting Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes
Defence - BLAMEY BARRACKS - KAPOOKA
Defence - WAGGA ARES DEPOT ; BLAMEY BKS -WAGGA WAGGA TRG DEP

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 area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat 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 likely to 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 may 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]		Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	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
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely 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		
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
Carduelis carduelis European Goldfinch [403]		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
Passer montanus Eurasian Tree Sparrow [406]		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

Name	Status	Type of Presence
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		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
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
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to 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
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		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

-35.06355 147.30681

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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Data from the BioNet BioNet Atlas website, which holds records from a number of custodians. The c
comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive
rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environ
Records of Threatened (listed on TSC Act 1995) ,Commonwealth listed ,CAMBA listed ,JAMBA listed
West: 147.24 East: 147.40 South: -35.14] returned a total of 260 records of 38 species.
Report generated on 20/06/2019 3:31 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic
Animalia	Aves	Anseranatidae	0199	*Anseranas semipalmata*	
Animalia	Aves	Anatidae	0214	*Stictonetta naevosa*	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*	
Animalia	Aves	Threskiornithidae	0178	*Plegadis falcinellus*	
Animalia	Aves	Accipitridae	0218	*Circus assimilis*	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*	
Animalia	Aves	Falconidae	0238	*Falco subniger*	
Animalia	Aves	Scolopacidae	0163	*Calidris acuminata*	
Animalia	Aves	Scolopacidae	0168	*Gallinago hardwickii*	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*	
Animalia	Aves	Cacatuidae	0270	*^Lophochroa leadbeateri*	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*	
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*	
Animalia	Aves	Psittacidae	0302	*^^Neophema pulchella*	
Animalia	Aves	Psittacidae	0277	*^^Polytelis swainsonii*	
Animalia	Aves	Strigidae	0246	*^^Ninox connivens*	
Animalia	Aves	Meropidae	0329	*Merops ornatus*	
Animalia	Aves	Climacteridae	8127	*Climacteris picumnus victoriae*	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*	
Animalia	Aves	Meliphagidae	8303	*Melithreptus gularis gularis*	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*	
Animalia	Aves	Pachycephalidae	0403	*Pachycephala inornata*	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*	
Animalia	Aves	Petroicidae	8367	*Melanodryas cucullata cucullata*	
Animalia	Aves	Petroicidae	0380	*Petroica boodang*	

Animalia	Aves	Petroicidae	0382	*Petroica phoenicea*
Animalia	Aves	Estrildidae	0652	*Stagonopleura guttata*
Animalia	Mammalia	Thylacomyidae	1106	*Macrotis lagotis*
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*
Animalia	Mammalia	Vespertilionidae	1382	*Vespadelus baverstocki*
Plantae	Flora	Asteraceae	6558	*Brachyscome muelleroides*
Plantae	Flora	Asteraceae	7097	*Senecio garlandii*
Plantae	Flora	Fabaceae (Faboideae)	3056	*Swainsona recta*

data are only indicative and cannot be considered a
Species Data Policy may have their locations denatured (^
ment and Heritage. Search criteria : Public Report of all Valid
or ROKAMBA listed Entities in selected area [North: -35.02

Common Name	NSW status	Comm. status	Records	Info
Magpie Goose	V,P		1	
Freckled Duck	V,P		1	
White-throated Needletail	P	C,J,K	1	
Glossy Ibis	P	C	4	
Spotted Harrier	V,P		1	
Little Eagle	V,P		13	
Black Falcon	V,P		4	
Sharp-tailed Sandpiper	P	C,J,K	1	
Latham's Snipe	P	C,J,K	1	
Glossy Black-Cockatoo	V,P,2		4	
Major Mitchell's Cockatoo	V,P,2		2	
Little Lorikeet	V,P		4	
Swift Parrot	E1,P,3	CE	11	
Turquoise Parrot	V,P,3		1	
Superb Parrot	V,P,3	V	30	
Barking Owl	V,P,3		5	
Rainbow Bee-eater	P	J	23	
Brown Treecreeper (eastern subspecies)	V,P		17	
Regent Honeyeater	E4A,P	CE	1	
Black-chinned Honeyeater (eastern subspecies)	V,P		3	
Varied Sittella	V,P		1	
Gilbert's Whistler	V,P		5	
Dusky Woodswallow	V,P		4	
Hooded Robin (south-eastern form)	V,P		5	
Scarlet Robin	V,P		7	

Flame Robin	V,P		4	
Diamond Firetail	V,P		6	
Bilby	E4,P	V	1	
Koala	V,P	V	1	
Squirrel Glider	V,P		38	
Squirrel Glider in the Wagga Wagga Local Government Area	E2,V,P		38	
Grey-headed Flying-fox	V,P	V	14	
Eastern Bentwing-bat	V,P		1	
Southern Myotis	V,P		1	
Inland Forest Bat	V,P		1	
Claypan Daisy	V	V	1	
Woolly Ragwort	V		2	
Small Purple-pea	E1	E	2	

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