Ralston Quarry, Quarry Solutions Pty Ltd

Biodiversity Development Assessment Report

Groundworks Plus

December 2019

OzArk Environment & Heritage Pty Limited

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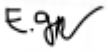
CERTIFICATION

I certify that I have prepared the contents of this BDAR and, to the best of my knowledge, it is in accordance with the *NSW Biodiversity Conservation Act 2016* and the Biodiversity Assessment Method (BAM). The information it contains is neither false nor misleading. It addresses, to the fullest extent possible, all matters affecting or likely to affect biodiversity as a result of the proposed activity. This BDAR has been prepared by a BAM Accredited Assessor.

BDAR prepared by	Emma Gray
Signed	
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EXECUTIVE SUMMARY

Quarry Solutions Pty Ltd (the proponent) proposes to develop a quarry at Lot 82 DP820705 Weenya Road, Mount Tenandra.

The proposal will clear up to 16.18 ha of native vegetation to develop the quarry, which includes all processing, stockpiling, extraction areas and Asset Protection Zones (APZs).

The proposal will be completed in two stages:

- Stage 1 – Development of southern extraction pit, processing and stockpiling areas to extract 2.3 million tonnes of hard rock products at 490 000 tpa. Proposed commencement in 2020 and duration of 5 years.
- Stage 2 – Development of northern extraction pit, processing and stockpiling areas to extract 2.2 million tonnes of hard rock products at 100 000 tpa. Proposed commencement in 2026 and duration of 20 years.

As the proposal will clear more than 2 ha of native vegetation (on a minimum lot size of 1000 ha), a Biodiversity Development Assessment Report (BDAR) is required to assess the impacts of the Proposal on biodiversity and the proponents offset obligations under the Biodiversity Offset Scheme.

The BDAR found that one Plant Community Type (PCT) was present on the subject site:

- PCT 49 - Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion.

This PCT is not part of any *Biodiversity Conservation Act* (BC Act) listed or *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) listed Threatened Ecological Communities.

Eight Strahler first order streams and one Strahler second order stream are mapped as occurring within the study area. These streams are all minor watercourses and are not mapped as Key Fish Habitat by the Department of Primary Industries - Fisheries.

An EPBC Act protected matters search identified 6 Threatened Ecological Communities, 21 threatened species and 9 listed migratory species that could possibly occur in the 10 km search area. Of these, 1 Endangered, 3 Vulnerable, 3 migratory and 4 marine species possibly occur, based on habitat available on the subject site. The significance of the proposed impact to these subject species and other threatened, migratory and marine species predicted to occur within a 10 km search area was assessed. No significant impact to a threatened, migratory or marine species likely to result in the extinction of a local population was identified. The residual ecological impacts of the proposal would be adequately mitigated using the management actions recommended.

11 Ecosystem Credit Species and 6 Species Credit Species were assumed to be present on the subject site. Due to the subject sites low VI score, no Ecosystem Credits are required to offset the proposal. However, 258 Species Credits are required to offset the proposal (48 credits for stage 1 and 210 credits for stage 2).

The Proponent must offset the impacts of the proposal prior to commencement of each stage by purchasing or retiring the correct number and type of species credits on the open market,

based on the like-for-like options. If the correct credits cannot be sourced, the Proponent may offset by paying an amount directly to the Biodiversity Conservation Trust.

This assessment covers the current form of the proposal. Any change to the scope of work may require re-assessment.

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1 Introduction

1.1 Background

Quarry Solutions Pty Ltd (the proponent) proposes to develop a quarry at Lot 82 DP820705 Weenya Road, Mount Tenandra. OzArk Environment & Heritage (OzArk) was engaged by Groundworks Plus (the client), on behalf of the proponent, to prepare the biodiversity assessment for the proposal. A preliminary assessment identified the need for a Biodiversity Development Assessment Report (BDAR), due to the proposed area of native vegetation clearing, which exceeds the threshold for entry into the NSW Biodiversity Offset Scheme (BOS) under the NSW *Biodiversity Conservation Act 2016* (BC Act). This report documents the assessment, which has been completed in accordance with the Biodiversity Assessment Method (BAM), and calculates the number of ecosystem and species credits of the proposal, and the Proponent's biodiversity offset requirement.

1.2 The Proposal

The subject site is located within the Coonamble Local Government Area (LGA) on Weenya Road, Mount Tenandra. The property is approximately 3 km from Tenandra State Forest to the west, with a mix of native vegetation patches and rural farmland in other directions (**Figure 1-1 and Figure 1-2**).

The proposal will be developed in two stages (see **Appendix I** for detailed design plans):

- Stage 1 – Development of southern extraction pit, processing and stockpiling areas to extract 2.3 million tonnes of hard rock products at 490 000 tpa. Proposed commencement in 2020 and duration of 5 years. Proponent will retire the offset obligation prior to commencement in 2020.

- Stage 2 - Development of northern extraction pit, processing and stockpiling areas to extract 2.2 million tonnes of hard rock products at 100 000 tpa. Proposed commencement in 2026 and duration of 20 years. Proponent will retire the offset obligation prior to commencement in 2026.

Activities in both stages will include extraction of Basalt resources to produce aggregate used in construction. Traditional quarrying methods will be used to produce material, including drill and blast of resource, processing using mobile crushing units and screening plants.

In total, the proposal will clear up to 16.18 ha of native vegetation for the development of the Quarry (8.64 ha in Stage 1 and 7.54 ha in Stage 2) and vegetation removal will involve clearing of all levels of vegetation. The existing access track was determined to be a sufficient width to allow vehicle and plant access. Therefore, no clearing of native vegetation will be required for any access tracks.

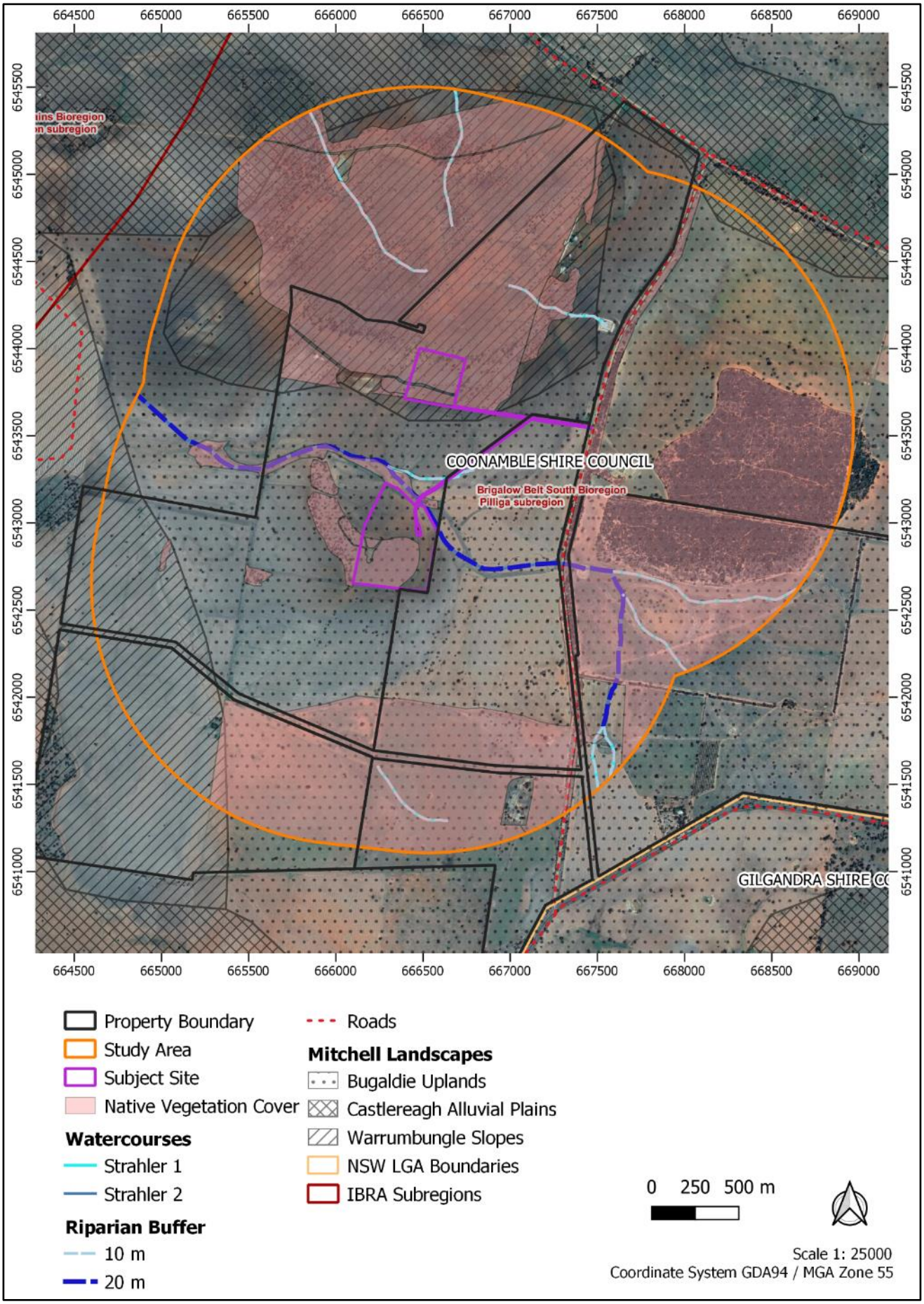

Figure 1-1. Location map showing the subject site, study area and key features.

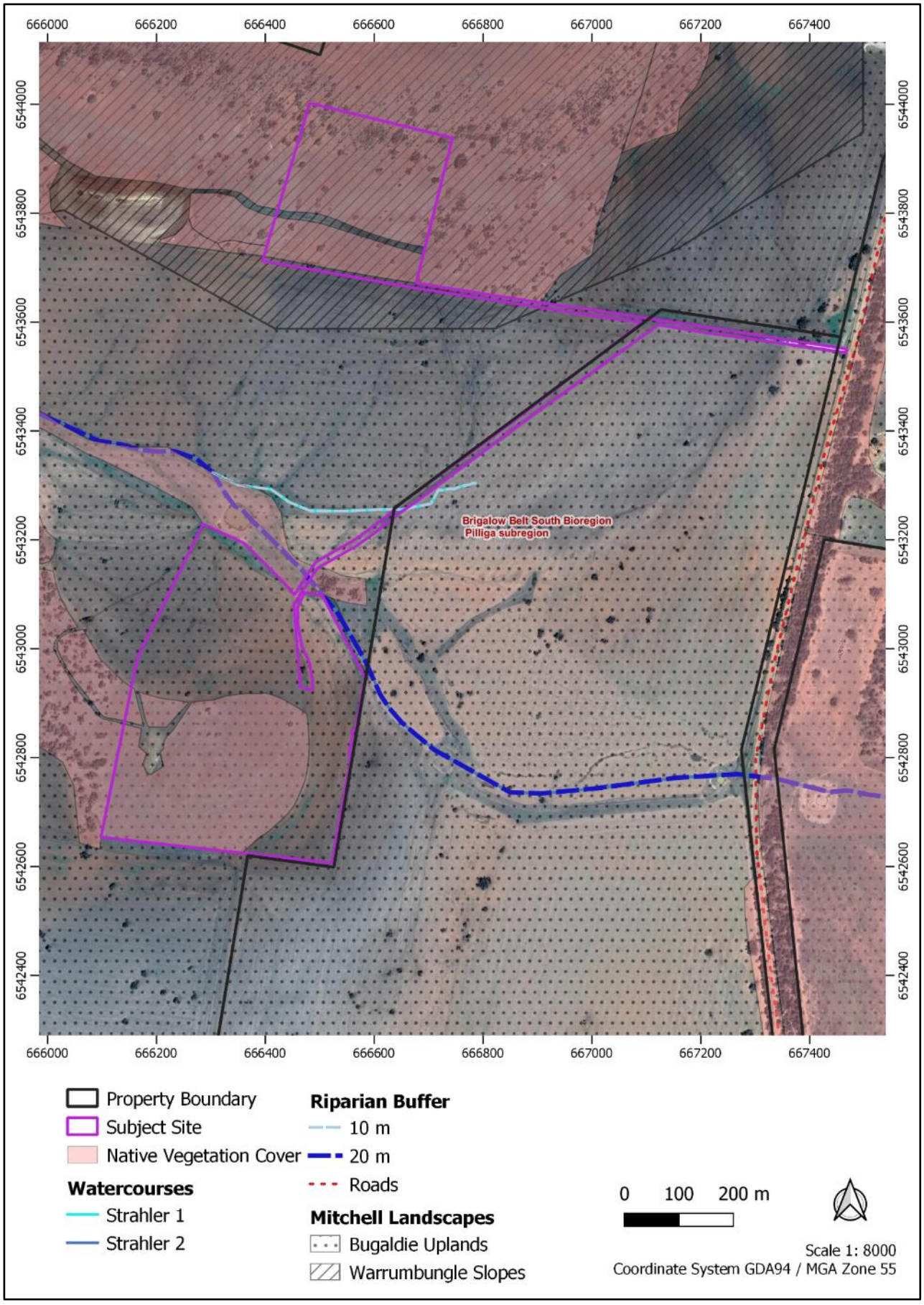

Figure 1-2. Site map showing subject site and key features.

1.3 Information Sources

Information and data sources used in this assessment include:

- On-site inspection and vegetation surveys undertaken on 24/10/2019
- State Vegetation Type Map: Central West / Lachlan Region V 1.4.
- NSW Government Web Map Service (WMS) layers for NSW Imagery (compiled imagery, NSW Property, NSW Base Map and NSW Topographic Map) (http://spatialservices.finance.nsw.gov.au).
- NSW BioNet Vegetation Classification (http://www.environment.nsw.gov.au/research/Visclassification.htm).
- NSW Threatened Biodiversity Data Collection (http://www.environment.nsw.gov.au/threatenedspeciesapp/).
- NSW BioNet Atlas (http://www.environment.nsw.gov.au/wildlifeatlas/about.htm).
- NSW Biodiversity Values Map (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap).
- Register of Declared Areas of Outstanding Biodiversity Value (AOBV) (http://www.environment.nsw.gov.au/criticalhabitat/CriticalHabitatProtectionByDoctype.htm).
- Flora of NSW (Harden 1991-2002) and Flora NSW Online (www.plantnet.rbgsyd.nsw.gov.au).

1.4 Relevant Terms

The following terms and definitions are used to describe the land assessed in this study.

Subject Site and **Development Footprint.** The area of land that is directly impacted by the proposed development, including any infrastructure required for construction.

Property boundary. The boundary of Lot 82 DP820705, within which the subject site occurs.

Study area. The study area refers to an area of land within a 1500 m buffer from the outside edge of the subject site. The study area is the area assessed for landscape context, including vegetation cover and connectivity.

10 km search area – the area within a 10 km radius of the subject site. This 10 km buffer has been used to search information sources to establish the landscape context of the subject site.

1.5 Site Identification

The site is identified under the *Coonamble Local Environment Plan* 2011 (Coonamble LEP) and on the NSW Planning Portal as follows.

- **Lot/Section/Plan No:** Lot 82 DP820705
- **Land Zoning:** RU1 Primary Production.
- **Minimum Lot Size:** 1000 ha
- **Terrestrial Biodiversity:** Biodiversity Value (Coonamble LEP 2011)

The location of the proposal is shown on the location map (**Figure 1-1**) and the site map (**Figure 1-2**).

Regulatory Context

This report addresses requirements under the following legislation.

- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);
- NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).
- NSW *Biodiversity Conservation Act 2016* (BC Act).
- NSW *Biodiversity Conservation Regulation 2017 (*BC Regulation).
- NSW *Fisheries Management Act 1994* (FM Act)
- NSW *Water Management Act 2000* (WM Act)
- NSW *Biosecurity Act 2015*
- NSW *Water Management Act 2000 (WM Act)*
- State Environmental Planning Policies (SEPP)
- Coonamble Local Environment Plan (LEP).

The Proposal will be assessed under Part 4 (Regional Development) of the EP&A Act. The BC Act requires all Regional Developments to be assessed in relation to the new Biodiversity Offsets Scheme (BOS), if entry is triggered by the location and/or size of the development. The *Biodiversity Conservation Regulation 2017* sets out the thresholds for entry into the BOS, which are as follows.

- If the amount of native vegetation proposed to be cleared exceeds the threshold area for the lot size for the LEP zone[1].
- When the development is located on land identified in the Biodiversity Value Map (https://www.lmbc.nsw.gov.au/Maps/), as defined by Clause 7.3 of the Regulation.
- If, in the absence of the above thresholds, the Proposal is likely to be a significant impact to threatened species, ecological communities or their habitat[2].

The development is on bushfire prone land, and as such, under Section 4.14 of the EP&A Act, the proponent will be required to address the relevant bushfire protection requirements of the Rural Fire Service Document *Planning for Bush Fire Protection*. It is assumed that Asset Protection Zones (APZ) are included in the development footprint supplied by the proponent for the purposes of this BDAR.

1.6 Objectives

The objective of this study was to aassess the subject site and proposed impacts to native vegetation in accordance with the Biodiversity Assessment Method (BAM) and to calculate the proponent's biodiversity offset requirements.

[1] The area threshold applies to all proposed native vegetation clearing (and other biodiversity impacts associated with a proposal), regardless of whether this clearing is across multiple lots. In the case of a subdivision, the proposed clearing must include all future clearing likely to be required for the intended use of the land after it is subdivided. This includes all areas for buildings, landscaping, access roads, asset protection zones and any infrastructure and fences.

[2] Based on the 'test of significance' in Section 7.3 of the BC Act. Proponents are only required to carry out the 'test of significance' for Regional Development proposals when the first two thresholds are not exceeded. The Biodiversity Offsets Scheme does not apply to exempt or complying development.

2 Methods

The ecological assessment was carried out in four stages:

1. Desktop searches and review of ecological databases and information to identify threatened species, populations or ecological communities listed in the NSW *Biodiversity Conservation Act 2016*, *Fisheries Management Act 1994* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* that have the potential to occur in the study area.
2. Field survey of the subject site to collate species lists for the purposes of identifying the vegetation communities present and target predicted threatened species and ecological communities. Where a threatened species or community or habitat feature is identified, document the nature and extent of the protected matter and describe its 'viable local population' or occurrence.
3. Preparation of a written Biodiversity Development Assessment Report (BDAR) that describes the impacts of the proposed activity on native vegetation and threatened species, populations and ecological communities, and provides recommendations to avoid, minimise and mitigate these impacts.
4. Preparation of a biodiversity credit report that identifies the credit classes for ecosystem credits and species credits within the subject site.

2.1 Personnel

OzArk Environment & Heritage Pty Ltd (OzArk) operates under NSW Scientific Research License 101908, and NSW Department of Primary Industries (DPI) Accreditation of a corporation as an animal research establishment Ref No. AW2017/012.

A field survey was completed by Ecologist Dr Emma Gray 24th of October 2019. The BDAR was completed by Emma Gray, an accredited BAM assessor and reviewed by Ecologist Coral Pearce and Environmental Scientist Jane Book. Key details of personnel are provided in **Table 2-1**.

Table 2-1. Summary of OzArk personnel qualifications.

Name	Position	CV Details
Dr Emma Gray	Ecologist	• Accredited BAM assessor – Accreditation #BAAS19069 • Doctor of Philosophy • Bachelor of Applied Science – Ecology – Queensland University of Technology • Rail Industry Worker Card • Worker on Foot Certification • WH&S Induction Training for Construction Work
Coral Pearce	Ecologist	• Doctor of Philosophy (in prep) • Master of Science – Ecology – Queensland University of Technology • Bachelor of Applied Science – Ecology – Queensland University of Technology • WH&S Induction Training for Construction Work
Jane Book	Environmental Scientist	• M Environmental & Business Management • B App Sci. (Hons) • 25 years' experience in natural resource management

2.2 Desktop review

Database searches were undertaken before the field assessment to determine the predicted species and also those previously recorded within 10 km of the subject land. The results of these searches led to the identification of key species for field survey effort and targeted searches. Results of the database searches are provided in **Appendix A**.

2.3 Field survey

2.3.1 Survey objectives

The objectives of the field survey were to:

- Identify native species and vegetation communities present.
- Describe the quality and value of the vegetation and the flora and fauna habitat at the development site.
- Determine if species, populations or ecological communities listed as threatened under the BC Act or EPBC Act are/may be present.
- Determine the significance of impact to any threatened entities present or likely to be present.

2.3.2 Vegetation survey methodology

Vegetation communities are identified in accordance with the online NSW Master Plant Community Type Classification (OEH, 2019b), which is the current state-wide vegetation classification system for Plant Community Types (PCT). This classification system is used for vegetation mapping, development assessment and site planning purposes. It describes over 1,500 PCTs across the state, and groups the vegetation communities into vegetation Class and Formation / Sub-formation as per Keith (2004).

In this study PCTs were identified on the basis of the following inputs:

- *Regional Scale State Vegetation Map: Central West / Lachlan Region V 1.3*. (OEH, 2019a), which provides predictive mapping of PCTs in and around the subject site. This mapping is indicative only. It is not necessarily accurate at a fine scale for the purposes of the current study.
- Professional ecological knowledge about locally-occurring vegetation types and landscape, soil and topographic patterns, including transitions from one community to another and potential for intergrades between plant communities.
- Field survey results confirming the flora species present, vegetation structure, landscape position and soil type at the subject site and the extent and condition of native vegetation.
- The BioNet Vegetation Classification database was used to identify the candidate vegetation communities likely to be present based on the site conditions (flora species present, vegetation structure, bioregion, and landscape position and soil type) and the relevant published PCT descriptions.

If any of the PCTs were identified as having potential to be part of a Threatened Ecological Community (TEC), the relevant identification guidelines (NSW Scientific Committee listing criteria and Commonwealth identification guides) were consulted to determine the status of the vegetation community present on the subject site. These guidelines provide the identification criteria used to positively identify the community as being part of the TEC. The criteria include location, species present, overstory species, weed cover, number and type of native species including whether certain ‘important’ native species are present.

Plant identification followed nomenclature in the Royal Botanic Gardens PlantNet online database (Royal Botanic Gardens and Domain Trust, 2019).

Nine vegetation plots were surveyed according to the Biodiversity Assessment Method (BAM) as follows:

- The survey plots consisted of nested 20m x 50m and 20m x 20m plots.
- Species composition and structure (species and percent cover) data collected from within 20m x 20m plot.
- Vegetation function data (size and number of trees, presence of hollow-bearing trees and woody debris) collected from within 20m x 50m plot.
- Percent of litter cover data collected within five 1m x 1m squares positioned at 5m, 15m, 25m, 35m and 45m points of 50m transect.
- The plots were positioned within the subject land and their GPS locations were recorded (GDA 94 / MGA Zone 55).

The plot locations were randomly selected whilst ensuring adequate survey effort within each vegetation zone (**Table 2-2**).

The location of the BAM vegetation plots are shown in **Figure 2-1**. The remainder of the subject land was traversed by foot to confirm the nature of vegetation (i.e. native or non-native).

Table 2-2. Minimum number of plots and transects required per zone area (OEH, 2017).

Vegetation zone area (ha)	Minimum number of plots/transects
<2	1 plot/transect
>2 – 5	2 plots/transects
>5 – 20	3 plots/transects
>20 – 50	4 plots/transects
>50 – 100	5 plots/transects
>100 – 250	6 plots/transects
>250 – 1000	7 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone

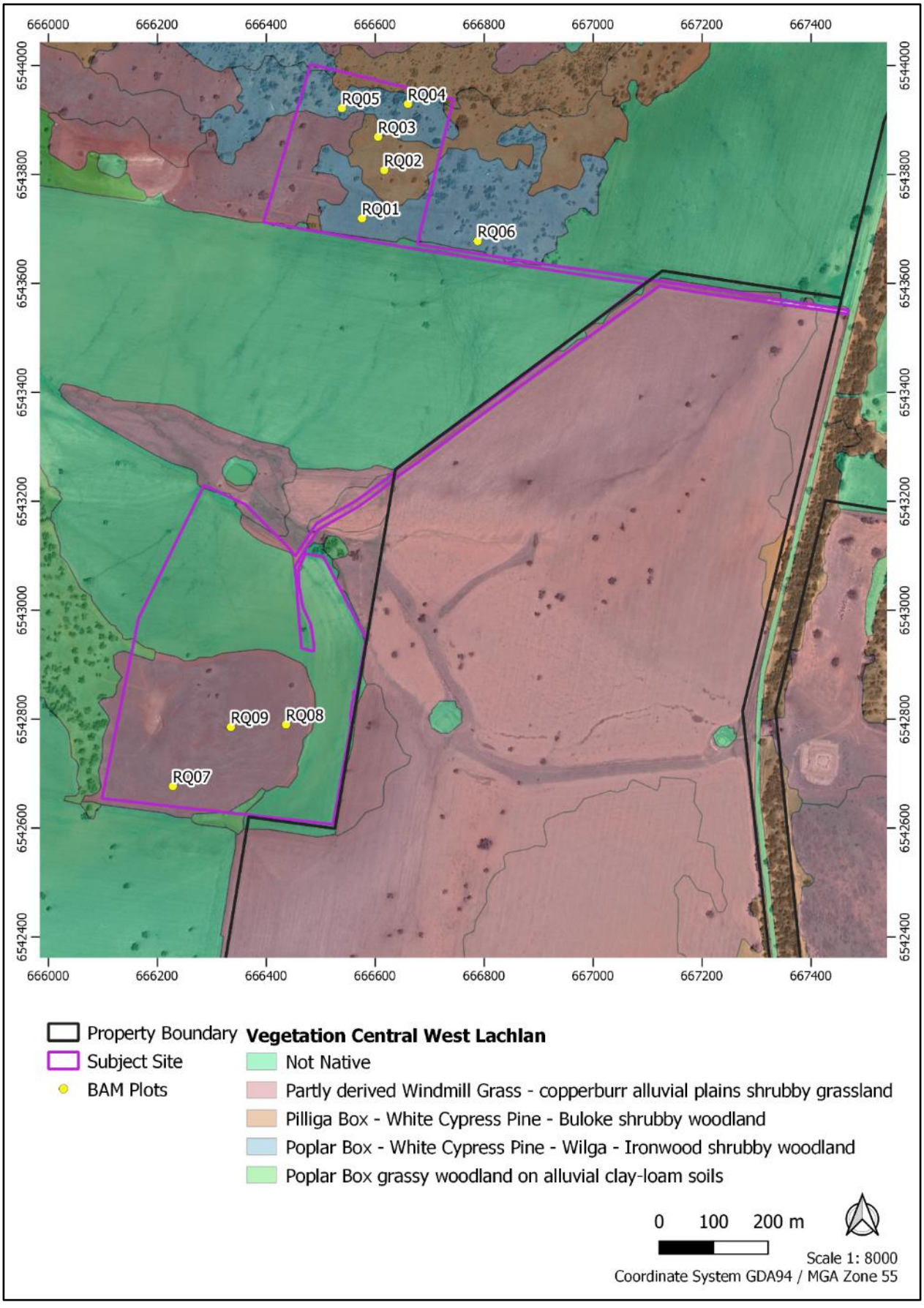

Figure 2-1. Predicted Plant Community Types mapped on the subject site based on State Vegetation Mapping (Central West Lachlan) and the location of the BAM vegetation plots.

2.3.3 Targeted fauna surveys

The subject site was searched for fauna while undertaking BAM plots and searching the subject site for habitat trees on foot. Birds were recorded as either present on the site, or as incidental, if recorded only as flying over (and not using) the subject site. Potential habitat such as rocks, loose bark and course woody debris was examined for cryptic species. Tracks and other areas of suitable substrate were searched for animal tracks. Other evidence of fauna presence on the subject site, such as scats, feathers and sloughed skins were also recorded. No formal frog surveys, trapping, nocturnal searches or acoustic bat surveys were undertaken.

2.3.4 Aquatic Surveys

The Strahler stream order of each watercourse that occurs within the study area was determined. Nine watercourses were mapped as occurring within the study area, including two watercourses that transect the subject site. The two watercourses that transect the subject site contained no water and were not flowing at the time of survey. Therefore, no aquatic surveys were undertaken.

2.4 Habitat assessment

The results of the desktop review and the field assessment were collated and reviewed in the context of local ecological knowledge to determine the likelihood of occurrence of threatened species (**Appendix D**). For instance, some threatened species may be predicted to occur locally but, on assessment of the site, key habitat elements or conditions are not present, in which case the species is assessed as not being present or impacted.

The likelihood of occurrence of threatened species was categorised as follows:

- 'Present' – the species was observed or has been previously recorded on the subject site.
- 'Assumed present' – the species was predicted to occur by the BAM calculator and suitable habitat features occurred within the subject site for that species.
- 'Absent' – habitat on-site and in the vicinity is unsuitable for the species.

EPBC listed fauna that were predicted to occur within 10 km of the subject site were also assessed for their presence or absence within the subject site (**Appendix E**).

2.5 Limitations

This study is based upon the species data available at the time of the study, and the environmental conditions, season, and time constraints imposed by the project for the field survey. Specific limitations on this study include the following:

- The field survey was completed over a single day in spring (24th October) 2019.
- Prevailing climatic conditions at the time of the field survey were extremely dry, which undoubtedly caused some species to be temporarily absent or difficult to detect. This may affect calculation of vegetation integrity.
- Fauna trapping, frog surveys and nocturnal spotlighting were not undertaken for the current assessment.
- Microbat ultrasonic call capture and analysis was not undertaken.

To overcome some of these limitations, a 'precautionary approach' for species presence has been adopted where required. If suitable habitat for a particular threatened species is present on the site or known to occur in the study area, then the species is assumed to also be present and the impact

assessment is completed on that basis. The above-mentioned constraints were also considered when preparing the recommendations of avoiding, minimising and mitigating potential impacts.

3 Landscape Features

3.1 Overview

A series of background searches were performed to comply with legal standards (**Table 3-1**).

Table 3-1. Environmental protection areas within the study area

Environmental Protection Areas	Presence in the Study Area
Land identified on the Biodiversity Values Map under the *NSW BC Act 2016*	No. (see **Appendix A**).
Area of Outstanding Biodiversity Value (AOBV) under the *NSW BC Act 2016*	No.
Watercourse mapped as Key Fish Habitat (KFH) and/or within the extent of an aquatic Endangered Ecological Community, listed under the *Fisheries Management Act 1994.*	No
An area reserved or dedicated under the *National Parks and Wildlife Act 1974* or *Wilderness Act 1987*.	No.
Is the proposal located within land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for preservation of other environmental protection purposes.	No.
A World Heritage Area.	No.
Environmental Protection Zones in environmental planning instruments.	Yes. Parts of the subject site are mapped as areas of terrestrial biodiversity in the Coonamble LEP (see **Appendix A**).
Lands protected under *NSW State Environmental Planning Policy*.	Yes Coonamble LGA is an LGA to which SEPP 44 – Koala Protection applies.
Lands protected under *SEPP Sydney Drinking Water Catchment*.	No.
Aquatic reserves dedicated under the *Fisheries Management Act 1994.*	No.
Wetland areas dedicated under the Ramsar Wetlands Convention.	No.
Land subject to a conservation agreement under the *National Parks and Wildlife Act 1974.*	No.
Land identified as State Forest under the *Forestry Act 1916.*	No.
Acid sulphate area.	No.

3.2 Bioregion

The study area is situated in the Brigalow Belt South Bioregion, Pilliga subregion as per the Interim Biogeographic Regionalisation of Australia (IBRA) (Thackway & Cresswell, 1995). The Pilliga subregion is characterised by geology, landforms, soil types and vegetation as described in **Table 3-2**.

Table 3-2. Description of the Pilliga subregion (OEH, 2019b).

Brigalow Belt South Bioregion				
Subregion	**Geology**	**Landform**	**Soils**	**Vegetation**
Pilliga	Horizontal Jurassic quartz sandstones, limited shales, Tertiary basalt caps and plugs plus the sediments derived from these rocks.	Stepped sandstone ridges with low cliff faces and high proportion of rock outcrop. Long gentle outwash slopes intersected by sandy stream beds and prior stream channels. A few patches of heavy clay. Includes the spectacular mountain landscape of volcanic domes, plugs and dykes in the Warrumbungles.	Shallow black earths and red loams on basalts. Extensive harsh texture contrast soils, linear patterns of deep yellow sand, stony red brown earths.	White Box with White Cypress Pine and Kurrajong on the basalt hills. Blue-leaved Ironbark, White Gum, Black Cypress Pine, Whitewood, and Rough-barked Apple on stony sandstone plateau and streams. Narrow-leaved Ironbark, White Cypress Pine, Red Stringy Bark, patches of mallee and broom heath on gentler sandstone slopes. Pilliga Box with Grey Box, Poplar Box, Fuzzy Box, Bull Oak, Rosewood, Wilga and Budda on heavier soils in the west and north. River Red Gum lines all streams.

3.3 Mitchell Landscapes

Landscapes with relatively homogenous geomorphology, soils and broad vegetation types in NSW have been classified and mapped at a 1:250 000 scale. These landscapes are referred to as the Mitchell Landscapes (Mitchell , 2002).

The subject site occurs within the Bugaldie Uplands and Warrumbungle Slopes. Castlereagh Alluvial Plains occurs within the wider study area (**Figure 1-1**). The characteristics of these landscapes are described in **Table 3-3**.

Table 3-3. Mitchell Landscapes of the study area and subject land (Mitchell, 2002).

Landscape Feature	Description		
Mitchell Landscape	**Bugaldie Uplands**	**Warrumbungle Slopes**	**Castlereagh Alluvial Plains**
Geology and Soils	Stepped stony ridges on Jurassic quartz sandstone with some conglomerate, shale and occasional interbedded basaltic volcanic rocks. Thin discontinuous soils with stony, sandy profiles and low nutrients. Down slope texture-contrast soils are more common typically with harsh clay subsoils and deep uniform or gradational yellow-brown sands on the valley floors.	Stony debris slopes with brown loamy matrix and brown texture-contrast soils on foot slopes with gravelly sands and loamy sands in alluvium.	Dark yellow-brown silty clay with patches of sand and carbonate nodules deposited from suspended sediments in floodwater, often with gilgai. Slightly elevated areas with red-brown texture-contrast soils.
Landform	General elevation 350 to 490m local relief 50 to 150m, extensive joint controlled stream network. Abundant outcrop on ridge tops	Ridges and valleys rising to the Warrumbungle Tops Ecosystem, the lower part of a central volcanic complex of trachyte, basalts and pyroclastics with a diameter of about 25km. Radial drainage pattern, general elevation 580 to 1000m, local relief 50 to 250m.	Holocene fluvial sediments of backplain and channelised backplain facies of the Marra Creek Formation associated with the Castlereagh River main alluvial fan and distributary stream system, relief 1 to 3m
Vegetation	Patches of Green Mallee *(Eucalyptus viridis*) and White Mallee *(Eucalyptus dumosa*), clumps of Curracabah (*Acacia concurrens*) and Motherumbah (*Acacia cheelii*) amongst Red Ironbark *(Eucalyptus sideroxylon*) and Black Cypress Pine (*Callitris endlicheri*) with shrubby understorey including Rusty Spider Flower (*Grevillea floribunda*), Mint Bush (*Prostanthera* sp.), Nodding Blue Lily (*Stypandra glauca*) and Rock Fern (*Cheilanthes sieberi*) on ridges and stony slopes. Narrow-leaved Ironbark *(Eucalyptus crebra*), Red Stringybark *(Eucalyptus macrorhyncha*), Black Cypress Pine (*Callitris endlicheri*), Brown Bloodwood (*Corymbia trachyphloia*) and Rough-barked Apple (*Angophora floribunda*) on the sandy flats. White Box *(Eucalyptus albens*) and Port Jackson Fig (*Ficus rubiginosa*) on the volcanics.	Woodlands of White Box *(Eucalyptus albens*), Narrow-leaved Ironbark *(Eucalyptus crebra*), White Cypress Pine (*Callitris glaucophylla*) and Acacia (*Acacia* sp.) on upper slopes. Yellow Box *(Eucalyptus melliodora*), Red Stringybark *(Eucalyptus macrorhyncha*), Blakely's Red Gum *(Eucalyptus blakleyi*), Rough-barked Apple (*Angophora floribunda*) and River Oak (*Casuarina cunninghamiana*) on lower slopes and stream edges. Scribbly Gum *(Eucalyptus rossii*) and Brown Bloodwood (*Corymbia trachyphloia*) on lower sandstone slopes. Abundant grasses in all communities.	Open grasslands with scattered Coolibah *(Eucalyptus microtheca*), Black Box *(Eucalyptus largiflorens*), River Cooba (*Acacia stenophylla*), Bimble Box *(Eucalyptus populnea*), Belah (*Casuarina cristata*), Lignum (*Muehlenbeckia cunninghamii*), saltbush (*Atriplex* sp.), Warrior Bush (*Apophyllum anomalum*) and Myall (*Acacia pendula*).

3.4 Geology, Cave, Karst and Soil Features

The underlying geology and soil typical of the study area has been described in **Table 3-2** and **Table 3-3**. There were rocky outcrops recorded throughout the site, however no caves or karst formations were detected on the subject site or within the section of the property that was assessed.

The Coonamble LEP does not identify any soil hazard at the subject site (based on the NSW Planning Portal, accessed 2/12/2019).

3.5 Biodiversity Values Map

The Biodiversity Values Map identifies land with high biodiversity value, as defined by the *Biodiversity Conservation Regulation 2017*. The subject site does not contain land identified on the Biodiversity Values Map (See **Appendix A**).

3.6 Areas of Outstanding Biodiversity Value

The site does not contain any currently listed areas of outstanding biodiversity (AOBV).

3.7 Native Vegetation Cover

Native vegetation cover was assessed within the study area and subject site and estimated as the amount of native vegetation (woody and non-woody vegetation, including regrowth and plantations comprised of plants native to New South Wales) (see **Figure 1-1**). A summary of the vegetation cover estimate is provided in **Table 3-4**. For the purposes of the BAM, the native vegetation cover class has been determined as >30-70%.

Table 3-4. Native vegetation cover estimate in the study area.

Vegetation Cover Type	Description	Area Within Study Area (ha)	Total area of Study Area (ha)	% of Study Area native vegetation
Native woody and non-woody	Regrowth and remnant native vegetation	668.31	1438.63	46.45

3.8 Rivers, Streams, Wetlands and Key Fish Habitat

Eight Strahler first order streams and one Strahler second order stream are mapped as occurring within the study area (**Figure 1-1**). These streams are all minor watercourses and are not mapped as Key Fish Habitat (KFH) by the Department of Primary Industries - Fisheries (DPI Fisheries).

Sediment runoff (caused by ground disturbance/vegetation removal by the proposal) may flow into watercourses within the study area and indirectly impact surrounding watercourses. However, if standard mitigation measures are implemented, the likelihood of this is occurring is low.

There are no wetlands within the study area or surrounding 10 km search area.

3.9 Groundwater Dependant Ecosystems

Groundwater plays an important ecological role in directly and indirectly supporting terrestrial and aquatic ecosystems. Groundwater sustains terrestrial and aquatic ecosystems by supporting vegetation and providing discharge to channels, lacustrine and palustrine wetlands, and both the estuarine and marine environment. Aquifer ecosystems are inherently groundwater dependent (QLD Department of Environment and Heritage Protection, 2017).

There are no mapped aquatic Groundwater Dependent Ecosystems (GDEs) within the subject site or study area (**Figure 3-1**). However, there is one high potential terrestrial GDE within the study area approximately 400 m east of the subject site.

The Coonamble LEP (NSW Planning Portal, 2019) indicates that the development footprint is not within any area mapped as groundwater vulnerable land. The proposal does not include the extraction of groundwater or any operations likely to impact on the quality of groundwater.

The proposal is not therefore likely to impact on any groundwater dependant ecosystem within the study area.

3.10 Connectivity Features

The subject site is located within paddock areas (that have been historically cleared and currently used as cropping land) and patches of native vegetation. Native vegetation at the southern end of the subject site is regrowth vegetation. Only the ground stratum is present and there is a moderate density of exotic species. The southern area of native vegetation is part of a larger patch of native vegetation extending to 28.9 ha. Native vegetation at the northern end of the property has not been as significantly cleared and contains ground and mid strata species with sporadic cover of upper canopy species. The northern area of native vegetation is part of a larger patch of native vegetation extending to 272 ha (**Figure 1-1**).

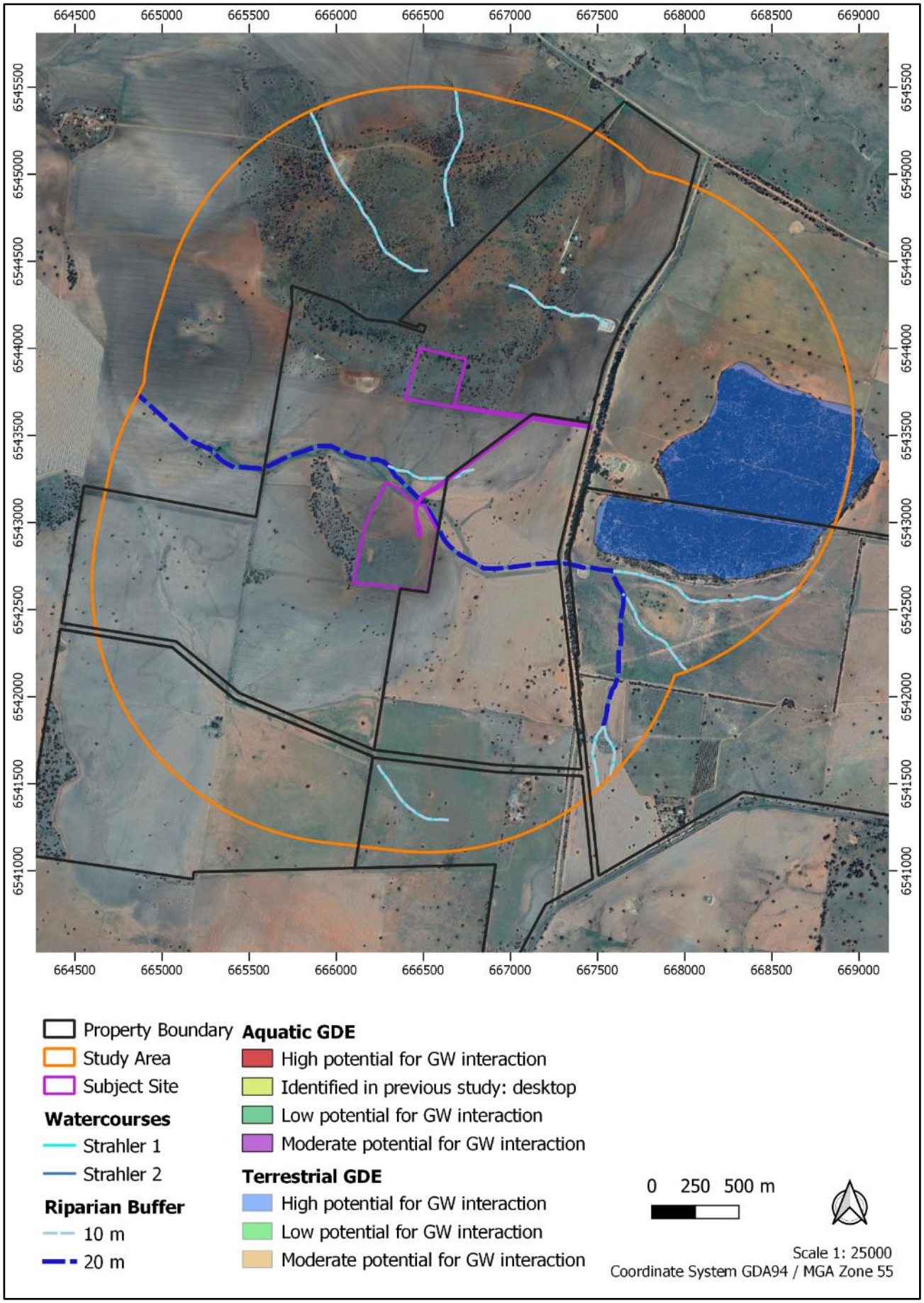

Figure 3-1. Watercourses and groundwater dependent ecosystems of the study area.

3.11 Climate

The field assessment was undertaken on 24th October 2019. Weather conditions at the time of the survey were hot, dry and sunny, reaching a maximum temperature of 33.7° C at Coonamble Airport Weather Station, the closest weather station (Station ID 051161) to the subject site (Bureau of Meteorology, 2019).

Climate statistics have been recorded at Coonamble Airport Weather Station (station 049000) since 1997 by the Bureau of Meteorology (BOM).

The study area experiences warm to hot summers, with the highest mean maximum temperature of 35.3 °C experienced in January. Winters are cool, with temperatures in the coolest month (July) ranging from a minimum of 3.6 °C to a mean maximum of 17.3 °C (Bureau of Meteorology, 2019).

An average of 533.9 mm of rainfall is recorded annually at Coonamble Airport Weather Station. BOM statistics show that consistent rainfall is experienced throughout the year, with no obvious wet or dry season (Bureau of Meteorology, 2019). The mean climate statistics recorded at Coonamble Airport Weather Station are presented in **Figure 3-2**.

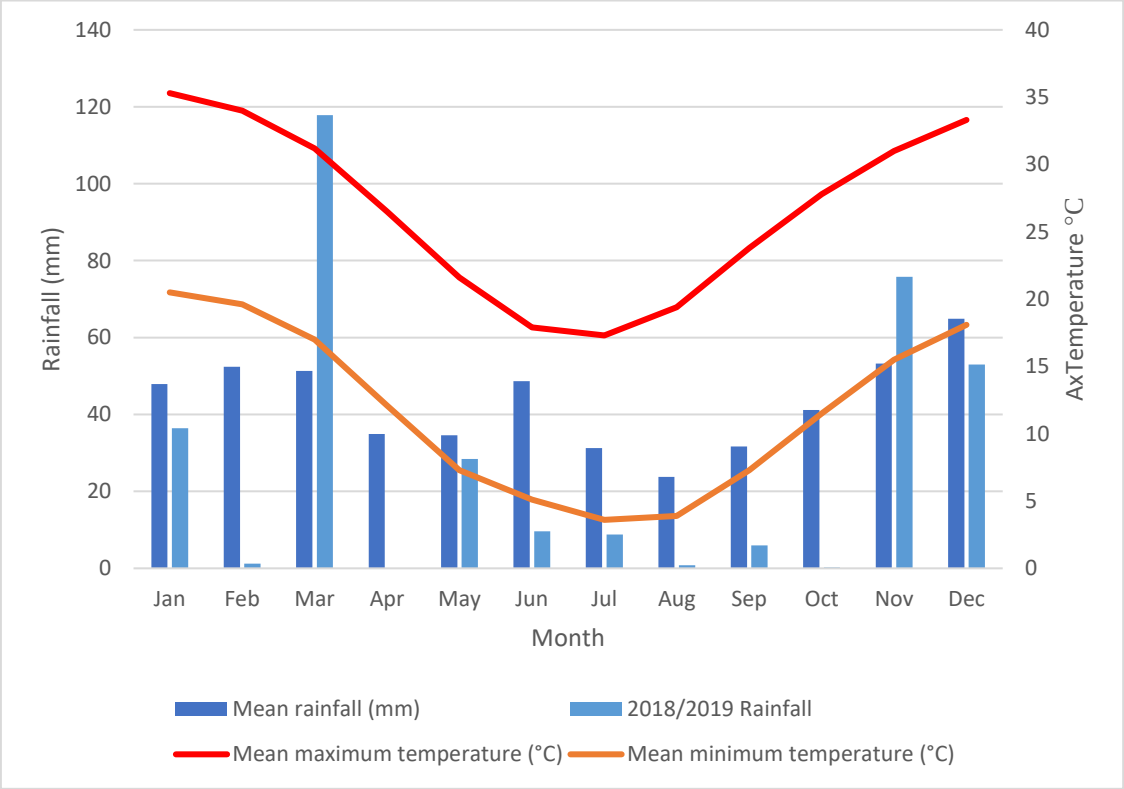

Figure 3-2. Climate data for Coonamble Airport Weather Station showing mean minimum and maximum temperatures and rainfall (Bureau of Meteorology, 2019).

4 Native Vegetation

4.1 Plant Community Types

The Regional Scale State Vegetation Map: Central West Lachlan V1.4 (OEH, 2015) mapping predicts three PCT's occur within the subject site:

- PCT 49 - Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
- PCT 88 - Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
- PCT 98 - Poplar Box - White Cypress Pine - Wilga - Ironwood shrubby woodland on red sandy-loam soils in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
- PCT 244 - Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

PCT 88, 98 and 244 were determined not to be present on the subject site due to the absence of dominant associated species such as *Eucalyptus populnea*, *Eucalyptus pilligaensis*, *Allocasuarina luehmannii* and mature *Callitris glaucophylla*.

Instead, based on the results of the present fieldwork, one PCT was determined to be present on the subject site. PCT 49 - Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion, occurs across most of the property, except for already cleared access tracks and areas dominated by exotic species. It is described in **Table 4-1** and its extent mapped in **Figure 4-1.**

Further description of this PCT, photographs and data sheets completed in the field are provided in **Appendices B** and **C**.

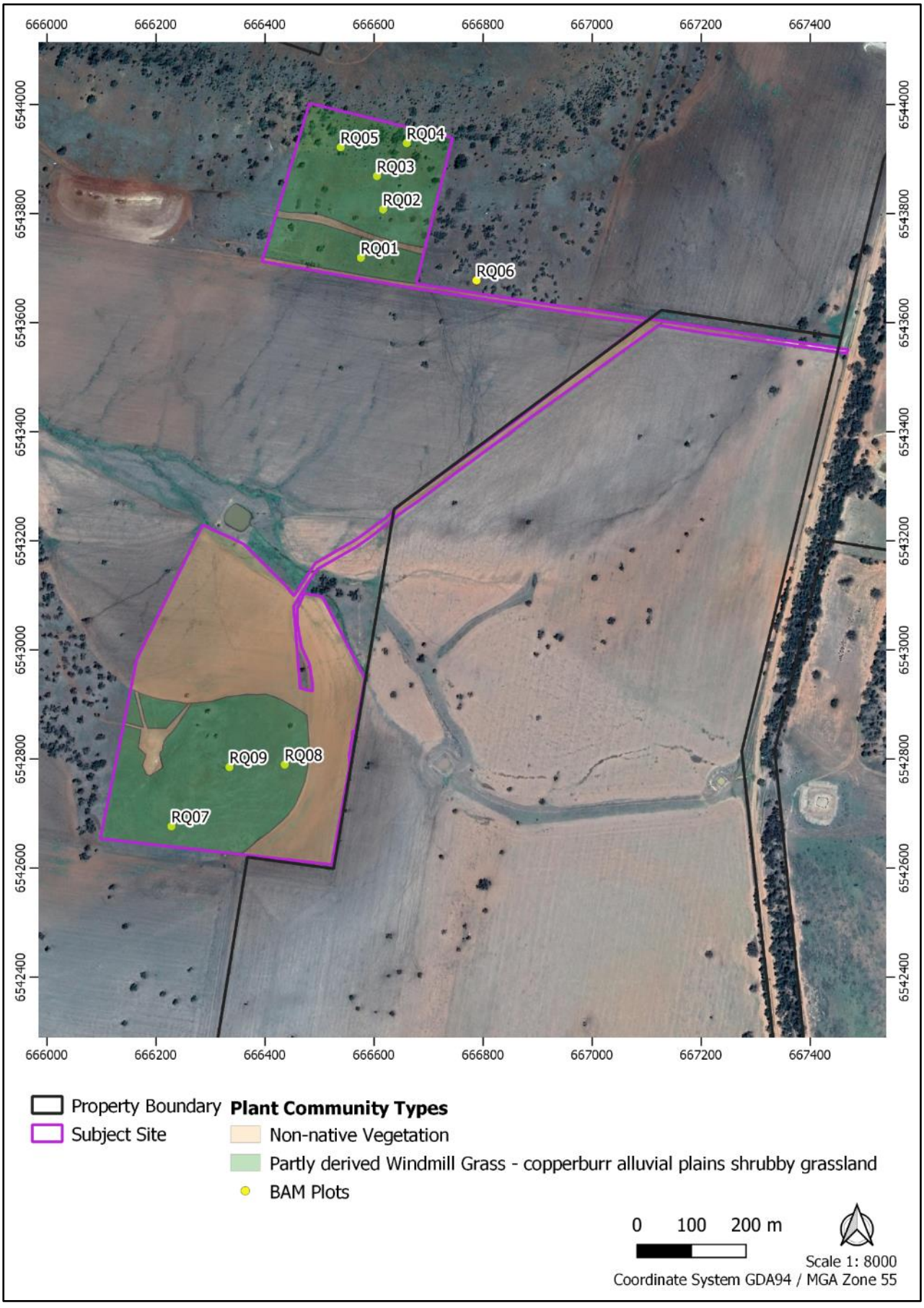

Figure 4-1. Plant Community types determined to be present at the site based on vegetation survey.

Table 4-1. Plant Community Type present within the subject site.

PCT ID	PCT Name	Vegetation Formation	TEC Status	Justification of Identification	Current NSW Extent (ha)
49	Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Grasslands	Not a TEC	• Existing state vegetation mapping of the study area shows the subject site is partly mapped as PCT 49. • Lack of Pilliga Box and/or Poplar Box in the upper stratum that would be diagnostic of PCT 88, 98 or 244. • Many species associated with PCT 49 occur within the subject site, including *Austrostipa scabra*, *Enteropogon acicularis, Sclerolaena muricata, Sclerolaena birchii, Sida trichopoda, Solanum esuriale, Daucus glochidiatus, Geijera parviflora and Alectryon oleifolius*.	30000

Description

Tussock grassland dominated by Windmill Grass (*Chloris Truncata*), Curly Windmill Grass (*Enteropogon acicularis*), Button Grass (*Dactyloctenium radulans*), Small Burrgrass (*Tragus australianus*), Fairy grass (*Sporobolus mitchellii*), Corkscrew Grass (*Austrostipa scabra subsp. scabra*), *Sporobolus elongatus* and other grass species. Forbs species include *Daucus glochidiatus*, *Boerhavia repleta*, *Lepidium fasiculatum* and *Convolvulus spp*. Scattered small shrubs include Black Roly Poly (*Sclerolaena muricata*) and Galvanized Burr (*Sclerolaena birchii*), *Atriplex leptocarpa*, *Atriplex muelleri*, *Vachellia farnesiana*, *Sida trichopoda* and *Solanum esuriale*. Scattered trees include Poplar Box (*Eucalyptus populnea subsp. bimbil*) and Coolabah (*Eucalyptus coolabah*) and scattered tall shrubs include River Cooba (*Acacia stenophylla*) and Wilga (*Geijera parviflora*). Occurs on alluvial clay soils and brown earth soils on slight rises of the floodplains of the rivers in the Darling Riverine Plain Bioregion and in the Brigalow Belt South Bioregions mainly in the dry sub-tropical and temperate (hot summer) climatic zone. Grades into chenopod shrublands further west or into woodlands on less flooded areas. Weeds infest some locations. Similar grasslands occur in far north western NSW probably derived from chenopod shrublands (see ID183). This community has been substantially reduced in extent due to cropping and is considered to be a vulnerable due to continued clearing for crops. It is poorly represented in protected areas.

4.2 Vegetation Zones, Patch Size and Vegetation Integrity

Three vegetation zones are recognised as occurring within the subject site, comprising 1 PCT in different condition states:

- Vegetation Zone 1 – PCT 49 in poor condition. Vegetation in this zone has been historically cleared and now occurs as a derived grassland. There are no mature or juvenile trees and no shrubs present. There is more native vegetation cover in the ground layer than exotic cover; however, there is a moderate density of exotic species such as Wild Oats (*Avena fatua*), Paterson's Curse (*Echium plantagineum*), Small-flowered mallow (*Malva parviflora*), Turnipweed (*Rapistrum rugosum*), *Brassica sp*., and *Opuntia sp*. A total of three plots were conducted within Vegetation Zone 1 following the BAM, as summarised in **Table 4-2**.
- Vegetation Zone 2 – PCT 49 in moderate condition. There is sparse tree cover and a good diversity of shrubs (predominantly *Sclerolaena sp.*). There are several native species in the ground layer (likely less than average due to prolonged drought) and, as per Vegetation Zone 1, a moderate density of exotic species. One plot was conducted within Vegetation Zone 2 following the BAM, as summarised in **Table 4-2**.
- Vegetation Zone 3 – PCT 49 in moderate condition. There is scattered tree cover (predominantly Inland Rosewood, *Alectryon oleifolius*) and a good diversity of shrubs (including large Wilga, *Geijera parviflora* and *Sclerolaena sp*.). There are several native species in the ground layer (likely less than average due to prolonged drought), as well as several exotic weeds, particularly Variegated Thistle (*Silybum marianum*) and *Opuntia sp*. A total of five plots were surveyed within Vegetation Zone 3 following the BAM (**Table 4-2**). Plot RQ06 is now just outside the subject site; however, it was determined to occur within an extension of Zone 3. Its data has been retained to provide information about the land immediately adjacent to existing access tracks.

The patch size (the estimated area of connected vegetation) has been determined using GIS software. According to the BAM, a patch of woody vegetation is defined by a gap of more than 100 m between the next area of intact native vegetation, while non-woody vegetation is defined by a 30 m gap.

Native vegetation on the subject site is a partly derived grassland, with the southern area containing just groundcover (Vegetation Zone 1) and the northern area containing grassland with sparse to scattered woody vegetation (Vegetation Zone 2 and 3). Vegetation Zone 1 is part of a larger patch of native vegetation extending to 28.9 ha, while Vegetation Zones 2 and 3 are part of a larger patch of native vegetation extending to 272 ha (see **Table 4.2** and **Figure 4.2**).

Table 4-2. Vegetation zones, patch size and number of BAM plots completed.

Vegetation Zone	PCT	Condition	Connected Patch Size (ha)	Patch Size Class	Zone Area Proposed to be Impacted (ha)	Number BAM Plots Completed	Vegetation Integrity
1	49	Poor	28.9	25 – 100 ha	8.64 ha	3	2.9
2	49	Moderate 1	272	≥100 ha	1.97 ha	1	9.4
3	49	Moderate 2	272	≥100 ha	5.57	3	10.4

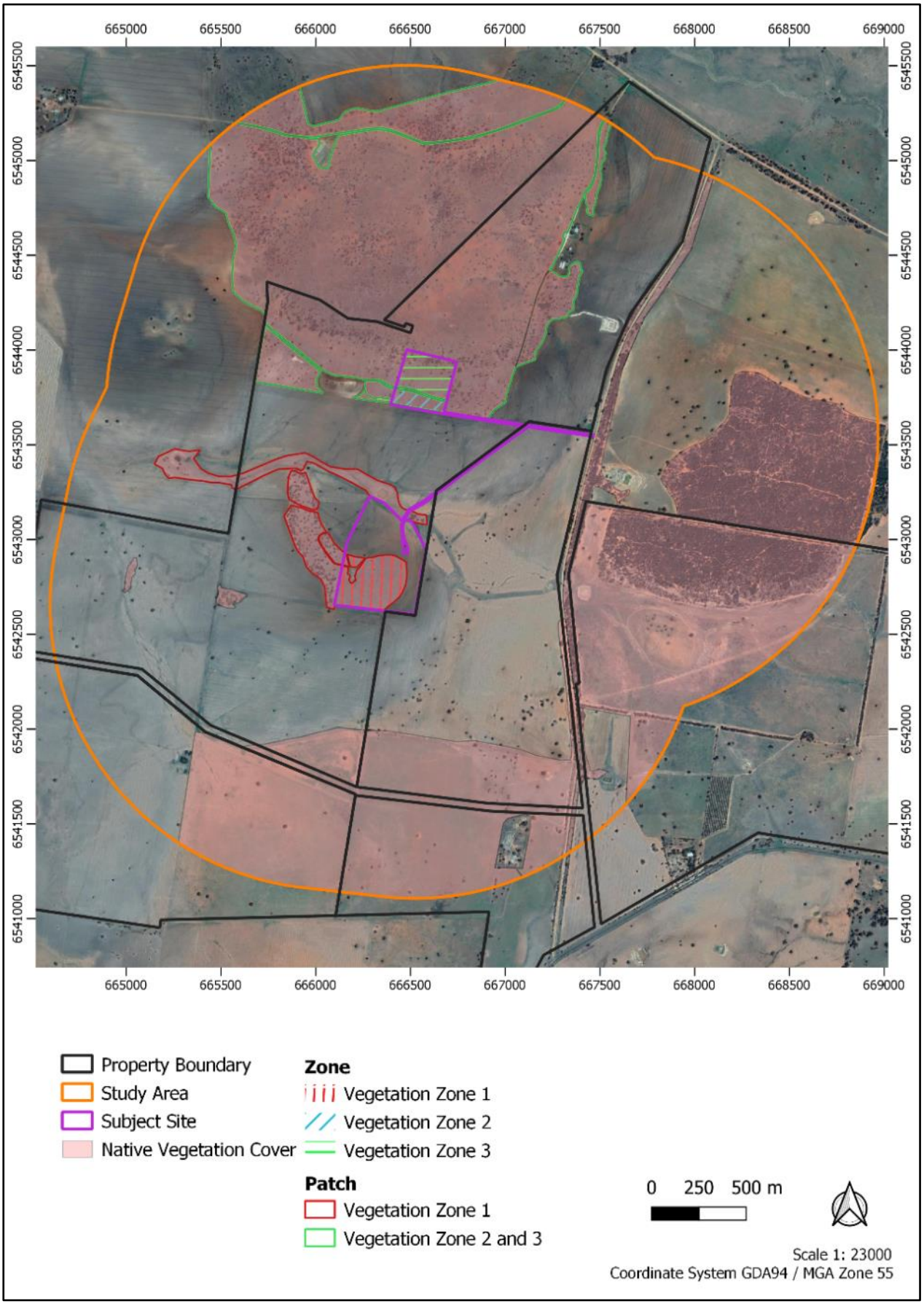

Figure 4-2. Vegetation zones and patches within the subject site and study area.

4.3 Flora Species Observed

The field survey identified a total of 27 flora species within the subject site. Of these, 19 species were native and 8 were exotic. Dryer than average climatic conditions in the months leading up to the survey probably impacted on results. It is likely that additional diversity and cover of grasses and forbs, particularly annual native and exotic species, would have been detected under more average climatic conditions.

Prickly Pear (*Opuntia sp.*), a high threat weed, was recorded within plot RQ02, RQ03 and RQ08 and throughout the subject site at low density. The proponent has a general biosecurity duty to prevent, eliminate or minimize any biosecurity risk they may pose. The proponent / land manager should also mitigate spread from their land and the plant should not be bought, sold, grown, carried or released into the environment.

Photographs and a list of all flora species observed during the field assessment are provided in **Appendices B** and **C**.

4.4 Threatened Ecological Communities

PCT 49 is associated with two Threatened Ecological Community (TECs):

- BC Act Listed, Endangered – Artesian Springs Ecological Community in the Great Artesian Basin.
- BC Act Listed, Endangered – Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-darling Depression, Riverina and NSW South Western Slopes.

The Artesian Springs EEC is not present on the subject site, as there are no artesian springs within the subject site and the site is not within the NSW mapped distribution of the community. The Myall Woodland EEC is not present on the subject site as Weeping Myall (*Acacia pendula*) does not occur on the site.

5 Threatened Species

For the purpose of credit calculations, these species are listed as either ecosystem credit species or species credit species, where:

- An ecosystem credit species is a species whose likelihood of occurrence can be predicted by vegetation surrogates and landscape features, or for which targeted survey has a low probability of detection. A targeted survey is not required for these species (NSW Office of Environment and Heritage, 2017).
- A species credit species is a species whose likelihood of occurrence cannot be predicted by vegetation surrogates and/or landscape features and can be reliably detected by survey. A targeted survey or expert report is required to confirm presence/absence of these species (NSW Office of Environment and Heritage, 2017).

5.1 Habitat Features Present

The subject site was assessed for its potential to provide habitat for flora and fauna known or predicted to occur in the study area. Habitat features including rock outcrops, caves and overhangs, hollow-bearing trees, wetlands including dams, and watercourses were recorded, if present.

The subject site does not contain any caves, overhangs or wetlands. Two dry minor, non-perennial watercourses were mapped as occurring on the subject site but contained no water during the survey.

The whole subject site contained scattered rocks and loose gravel; however, larger rock outcrops occurred within zone 2 and 3. This likely provide habitat for a range of fauna, especially reptiles.

No hollow-bearing trees were recorded within the subject site. The lack of hollow bearing trees means there is no roosting / breeding habitat on the subject site for species that require this feature.

5.2 Ecosystem Credit Species

In total, 13 ecosystem credit species were required to be assessed as being either present or absent on the subject site based on observations made during the field assessment, current DPIE information of habitat constraints of the species and professional judgement (**Table 5-1**). A full habitat assessment for each species listed in **Table 5-1** is provided in **Appendix D**.

Table 5-1. Ecosystem credit species predicted to occur and their nature of presence within the subject land.

Scientific Name	Common Name	Species presence
Anseranas semipalmata	Magpie Goose	Absent
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Assumed Present
Circus assimilis	Spotted Harrier	Assumed Present
Epthianura albifrons	White-fronted Chat	Assumed Present
Falco hypoleucos	Grey Falcon	Assumed Present
Grus rubicunda	Brolga	Assumed Present
Haliaeetus leucogaster	White-bellied Sea-Eagle (foraging)	Absent
Hieraaetus morphnoides	Little Eagle (foraging)	Assumed Present
Lophochroa leadbeateri	Major Mitchell's Cockatoo (foraging)	Assumed Present
Polytelis swainsonii	Superb Parrot (foraging)	Assumed Present
Rostratula australis	Australian Painted Snipe	Assumed Present
Saccolaimus flaviventris	Yellow-belled Sheathtail-bat	Assumed Present
Sminthopsis macroura	Stripe-faced Dunnart	Assumed Present

5.3 Species Credit Species

In total, 9 species credit species were required to be assessed as being present or absent on the subject site. Assessment for each species has been made based on observations made during the field assessment, current DPIE information of habitat constraints of the species and

professional judgement. All species credit species requiring assessment are listed in **Table 5-2**. The full habitat assessment for each species is listed in **Appendix D**. Species polygons for each species assumed to be present are provided in **Appendix J**.

Table 5-2. Species credit species predicted to occur and their nature of presence within the subject site.

Scientific Name	Common Name	Species presence
Ardeotis australis	Australian Bustard	Assumed Present
Burhinus grallarius	Bush Stone-curlew	Assumed Present – zone 3. Absent – zone 1 and 2
Digitaria porrecta	Finger Panic Grass	Assumed Present
Haliaeetus leucogaster	White-belled Sea-eagle (breeding)	Absent
Hieraaetus morphnoides	Little Eagle (breeding)	Assumed present – zone 2 and 3. Absent – zone 1
Lophochroa leadbeateri	Major Mitchell's Cockatoo	Absent
Polytelis swainsonii	Superb Parrot (breeding)	Absent
Swainsona murrayana	Slender Darling Pea	Assumed Present
Swainsona sericea	Silky Swainson-pea	Assumed Present

6 Impact Summary

6.1 Offset Scheme Threshold

The Proposal will not impact on land mapped on the Biodiversity Values Map.

The Proposal has been assessed against the relevant vegetation clearing thresholds under the NSW Biodiversity Offset Scheme (BOS). The thresholds applicable to different lot size categories for the land zoning are provided in **Table 6-1** (NSW Office of Environment & Heritage, 2017). The subject site is currently zoned RU1 (primary production), with a minimum lot size of 1000 ha. Clearing of 2 ha or more of native vegetation will require entry into the BOS. The Proposal will clear up to 16.18 ha of native vegetation; thus, entry into the BOS is required.

Table 6-1. Area clearing thresholds for entry into the Biodiversity Offset Scheme.

LEP Minimum Lot Size	Threshold Area of Clearing
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

6.2 Avoidance, minimisation and mitigation

The following avoidance measures have been integrated into the design and/or are suggested for the implementation of the project:

- The proposed impact area has been reduced in the planning phase to minimise impact to native biodiversity and Aboriginal Heritage.

In addition, the following minimisation methods have been or will be implemented:

- Before starting work, erect a physical vegetation clearing boundary with a suitable material such as temporary fencing, flagging tape, or similar.
- Vegetation will be removed in a manner that avoids damage to surrounding vegetation, ensuring disturbance to vegetation and soil is kept to a minimum.

Table 6-2 outlines recommended environmental safeguards to reduce impacts on vegetation, soil and biodiversity. All other indirect impacts to biodiversity are managed through the provisions of the site based environmental management plan

Table 6-2. Recommended environmental safeguards.

Impact	Environmental Safeguard	Timing
Clearing and prevention of over-clearing	1. All personnel are to be inducted to be aware that disturbance of any stand of native vegetation outside the development footprint, or otherwise unauthorised disturbance, could have legislative consequences if done without approval. Evidence of all personnel receiving an induction would be kept on file (signed induction sheets). 2. Before start of work, clearly identify the extent of permitted vegetation clearing and areas to be retained as native vegetation. 3. A pre-clearing process and unexpected threatened species finds procedure is recommended. Any fauna found during the disturbance are to be allowed (or assisted) to relocate into adjoining habitat. 4. Vegetation will be removed in such a way to avoid unnecessary damage to surrounding vegetation. 5. Where possible, vegetation to be removed will be mulched on-site and re-used to stabilise disturbed areas. 6. Natural regeneration of any bare soil or cleared areas will be encouraged through retention of native vegetation material on site and brush-matting.	Pre-construction
Bushfire protection	7. Ensure vegetation management for bushfire protection is consistent, as far as practicable, with biodiversity protection and remove only the necessary vegetation to achieve fuel reduction.	

Soil management	8. An erosion and sediment control plan will be developed to comply with Council requirements and/or Landcom's Managing Urban Stormwater, Soils & Construction Guidelines 'The Blue Book' (Landcom, 2004).	Pre-construction
Damage to native vegetation outside of impact zone	9. Stockpile and compound sites are to be located within the assessed subject site and preferentially according to the following criteria: o At least 40 m away from the nearest waterway. o In areas of low ecological conservation significance (i.e. previously disturbed land). o On relatively level ground. 10. Stockpiling of materials and equipment, and parking of vehicles, is to be avoided within the dripline (extent of foliage cover) of any tree.	Construction
Introduction and spread of significant weeds and pathogens	11. Inspection and control of environmental weeds in accordance with a site environmental management plan and subject to requirements of Council. 12. Construction machinery (bulldozers, excavators, trucks, loaders and graders) would be clean, and soil- and weed-free, before entry to the work site. 13. Any herbicide use is to be in accordance with the requirements on the label. Any person carrying out herbicide application would be appropriately trained and competent in its use.	Construction
Disturbance to fallen timber, dead wood and bush rock	14. All bush rock encountered on site is to be relocated to the edge of the disturbance area to enhance habitat and regeneration. 15. If threatened bats are detected, stop work immediately and either leave the area undisturbed until the individuals have dispersed or engage suitably qualified personnel to attempt their removal.	Pre-construction Construction
Threatened species	16. If the impact footprint changes from the current extent assessed in the study, re-assessment of the potential impact of the activity would be needed to ensure impacts to threatened species are not inadvertently caused, given that suitable habitat for threatened species occurs elsewhere on the property. 17. Enforce driver code of conduct, including 40 km/h speed limits on access roads to reduce the risk of vehicle strikes.	Construction

6.3 Impacts to Wetlands, Watercourses and Aquatic habitat

There are no wetlands on the subject site or within the study area. Any potential for indirect impact to nearby watercourses from erosion and sedimentation related to construction activities will be avoided and minimised by developing and implementing an erosion and sediment control plan.

6.4 Impacts to Native Vegetation

There is one PCT within the subject site, PCT 49 - Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion. This PCT is not part of any Threatened Ecological Communities. Up to 16.18 ha of native vegetation in this PCT is required to be cleared.

6.5 Serious and Irreversible Impacts

The Guidance to assist a decision-maker to determine a serious and irreversible impact (NSW Office of Environment and Heritage, 2017) and the NSW threatened species data collection has been used to determine which threatened species require further assessment for SAII.

No species assumed to be present on the subject site require SAII assessment.

6.6 Prescribed impacts

The Biodiversity Regulation 2017 lists nine impacts as prescribed impacts that must be avoided, minimised and mitigated. These prescribed impacts and their relevance to the Proposal are described in **Table 6-3.**

Table 6-3. Prescribed impacts of the proposal.

Prescribed Impacts	Site Assessment	Mitigation Measure
Impacts on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance.	No karsts, caves, crevices, cliffs or other features of geological significance present on the subject site or within the study area.	None required.
Impacts of development on the habitat of threatened species or ecological communities associated with rocks.	Rock outcrops occur within the subject site. However, species identified at the site do not rely on rock outcrops for habitat.	*Table 6-2* *Mitigation measures 1, 3 and 15.*
Impacts of development on the habitat of threatened species or ecological communities associated with human made structures.	No human made structures will be disturbed by the Proposal.	None required.
Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation.	Non-native vegetation on the subject site may provide marginal habitat for several of the ecosystem credit species listed in Table 5-2. Mitigation measures will be implemented.	*Table 6-2.* *Mitigation measures 1-7, 9, 15, 17-18.*
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.	The Proposal will reduce connectivity by a minimal amount, with passage of fauna possible across adjoining native vegetation.	*Table 6-2.* *Mitigation measures 1 – 7, 9, 14, 16-17.*
Impacts of the development on movement of threatened species that maintains their life cycle.	None associated with the proposal	None required.
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities.	The site layout provides appropriate buffers from riparian zones. Water bodies found on site do not support TECs or Threatened Species. Impact will be minimal following the implementation of appropriate mitigation measures.	*Table 6-2.* *Mitigation measure 8-9.*

Impacts of wind turbine strikes on protected animals.	None associated with the Proposal.	None required.
Impact of vehicle strikes on threatened species of animals or on animals that are part of a TEC.	The possibility of vehicle strikes on animals exists both during the construction and operational phases of the Proposal. Mitigation measures for this include driver code of conduct and speed limits within site.	*Table 6-2.* *Mitigation measure 19*

6.7 Indirect impacts

The main impacts of the proposal are expected to be contained within the subject site, provided there is adequate demarcation of the construction area and identification of all non-construction areas. Disturbance from machinery and construction activities will occur, such as noise and dust. However, these impacts will be minimised by following environmental safeguards proposed in **Table 6-2**.

Potential for indirect impact to any nearby watercourse will be managed and minimised by the development and implementation of an erosion and sediment control plan, as described in **Table 6-2**.

6.8 Key threatening processes

The *BC Act* and EPBC Act provides for the identification and listing of key threatening processes. A threatening process is defined as a key threatening process if it threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community.

Key Threatening Processes (KTP's) at the NSW State and Federal level will be exacerbated by the proposal. A summary of the proposed impacts relating to the relevant key threatening processes is given in **Table 6-4**. **Appendix G** lists all KTP and includes explanations as to why many have been assessed as not being present in the study area or exacerbated by the proposal.

Threats exacerbated by poor biosecurity controls will be potentially exacerbated by the proposal. Quarry solutions has strict plant movement protocol to ensure the biosecurity duty of care obligations are meet. This is includes thoroughly washing plant and equipment prior to transfer and completing relevant inspections prior accepting new equipment at each site.

Table 6-4. Key threatening processes exacerbated by the proposal.

Name	NSW status	Comm status	KTP Present in Study Area?	Exacerbated by Proposal?
Anthropogenic Climate Change	KTP	KTP	YES	**NON-SIGNIFICANT IMPACT**
Bushrock removal	KTP		YES	**NON-SIGNIFICANT IMPACT**
Clearing of native vegetation	KTP	KTP	YES	**INON-SIGNIFICANT MPACT** Up to 16.18 ha of native vegetation will be cleared.
Importation of Red Fire Ants *Solenopsis invicta*	KTP	KTP	POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Infection by *Psittacine Circoviral* (beak and feather) Disease	KTP	KTP	POTENTIAL	**POTENTIAL IMPACT**

affecting endangered psittacine species and populations				Machinery used on site can potentially act as a transport for biosecurity risks
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Invasion and establishment of exotic vines and scramblers	KTP		POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*	KTP		POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Invasion of native plant communities by exotic perennial grasses	KTP		POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* into NSW	KTP		POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Invasion, establishment and spread of Lantana	KTP		POTENTIAL	**POTENTIAL IMPACT** Machinery used on site can potentially act as a transport for biosecurity risks
Removal of dead wood and dead trees	KTP		YES	**NON-SIGNIFICANT IMPACT** Some dead wood and trees are likely to be removed.

6.9 Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, Matters of National Environmental Significance (MNES) and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government DoEE.

A summary of these matters and whether the proposal is likely to impact them is provided in **Table 6-5**.

The EPBC Act protected matters search has identified, six TECs, 21 threatened species and nine listed migratory species that could possibly occur in the 10 km search area (**Appendix A**). Of these, one Endangered, three Vulnerable, three migratory and four marine species possibly occur, based on habitat available on the subject site (**Appendix E**). An assessment of impact significance has been undertaken for these listed species following EPBC guidelines, as summarised in **Table 6-6** and further detailed in **Appendix F.**

Table 6-5. Impacts to matters of national environmental significance.

Factor	Potential impact
Any impact on a World Heritage property?	NIL
Any impact on a National Heritage place?	NIL
Any impact on a wetland of international importance?	NIL
Any impact on a listed threatened species or communities?	Non-significant impact (Section 6.9).
Any impacts on listed migratory species?	Non-significant impact (Section 6.9)
Any impact on a Commonwealth marine area?	NIL
Does the proposal involve a nuclear action (including uranium mining)?	NIL
Additionally, any impact (direct or indirect) on Commonwealth land?	NIL
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	NIL

Table 6-6. Impacts to EPBC Listed Endangered, Vulnerable, Migratory and Marine species

Species name	Common name	EPBC Status	Assessment of significance
Hirundapus caudactus	White-throated Needletail	Vulnerable	No significant impact
Polytelis swainsonii	Superb Parrot	Vulnerable	No significant impact
Rostratula australis	Australian Painted-snipe	Endangered	No significant impact
Swainsona murrayana	Slender Darling-pea	Vulnerable	No significant impact
Apus pacificus	Fork-tailed Swift	Migratory/marine	No significant impact
Calidris melanotos	Pectoral Sandpiper	Migratory/marine	No significant impact
Gallinago hardwickii	Latham's Snipe	Migratory/marine	No significant impact
Ardea ibis	Cattle Egret	Marine	No significant impact
Chrysococcyx osculans	Black-eared Cuckoo	Marine/migratory	No significant impact
Haliaeetus leucogaster	White-bellied Sea-Eagle	Marine	No significant impact
Merops ornatus	Rainbow Bee-eater	Marine	No significant impact

7 Biodiversity Credit and Offset Report

7.1 Management Zones

The BAM considers future vegetation condition of different areas of the development footprint when calculating biodiversity credits and offsets. It has been assumed that all vegetation within the development footprint will be managed the same; i.e. cleared. Therefore, offset requirements have been assessed assuming only one management zone:

- Quarry and associated infrastructure, including processing, stockpiling, extraction areas and Asset Protection Zones (APZ). All native vegetation assumed to be completely cleared to ground level.

7.2 Vegetation Integrity Assessment

Vegetation integrity (VI) scores have been calculated for each vegetation zone based on patch size, area to be impacted, vegetation composition, structure and function, as defined below.

Patch size – Area in hectares of total vegetation zone patch (i.e. the connected woody and non-woody vegetation).

Area – Area within the property that will be subject to clearing, modification or other treatment by the Proposal. There is only one management zone as described above.

Composition – Score calculated based on species richness, i.e. the number of native species present.

Structure – Score calculated based on the cover (%) of each native species growth form.

Function – Score calculated based on habitat features, i.e. presence of tree sizes, hollow trees, coarse woody debris, litter cover (%) and high threat weed cover (%).

Benchmark data for the PCTs is also used in this calculation.

Data required for the calculation was collected in the field using the BAM, as described above. The VI assessment for each vegetation zone including the loss of VI due to the Proposal, averaged across the construction and APZ areas, is shown in **Table 7-1**.

Table 7-1. Vegetation Integrity (VI) assessment

Vegetation Zone	PCT	Area of Zone to be Impacted (ha)	Assessed VI Score	Management Zone	Future VI Score	Change in VI Score	Total Change in VI Score
1	49	8.64	2.9	Quarry and associated infrastructure	0	-2.9	-2.9
2	49	1.97	9.4	Quarry and associated infrastructure	0	-9.4	-9.4
3	49	5.57	10.4	Quarry and associated infrastructure	0	-10.4	-10.4

7.3 Ecosystem Credit Summary

The Ecosystem Credits required for the proposal are summarised in **Figure 7-1**. Based on the low VI score of each zone, no Ecosystem Credits are required to offset the proposal.

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion								
1	49_Poor	2.9	8.6	0.25	High Sensitivity to Potential Gain	1.75		0
2	49_Moderate2	10.4	5.6	0.25	High Sensitivity to Potential Gain	1.75		0
3	49_Moderate1	9.4	2.0	0.25	High Sensitivity to Potential Gain	1.75		0

Figure 7-1. Ecosystem credits requiring offsetting (copied from BAM Calculator, 2019).

7.4 Species Credit Summary

The Species Credits required for the proposal are summarised in **Figure 7-2.** Six Species Credit Species were assumed to be present on the subject site, generating a total of 258 Species Credits that require offsetting.

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits
Ardeotis australis / Australian Bustard (Fauna)						
49_Poor	2.9	8.64	0.25	2	False	12
49_Moderate2	10.4	5.57	0.25	2	False	29
49_Moderate1	9.4	1.97	0.25	2	False	9
					Subtotal	**50**
Burhinus grallarius / Bush Stone-curlew (Fauna)						
49_Moderate2	10.4	5.57	0.25	2	False	29
					Subtotal	**29**
Digitaria porrecta / Finger Panic Grass (Flora)						
49_Poor	2.9	8.64	0.25	2	False	12
49_Moderate2	10.4	5.57	0.25	2	False	29
49_Moderate1	9.4	1.97	0.25	2	False	9
					Subtotal	**50**
Hieraaetus morphnoides / Little Eagle (Fauna)						
49_Moderate2	10.4	5.57	0.25	1.5	False	22
49_Moderate1	9.4	1.97	0.25	1.5	False	7
					Subtotal	**29**
Swainsona murrayana / Slender Darling Pea (Flora)						
49_Poor	2.9	8.64	0.25	2	False	12
49_Moderate2	10.4	5.57	0.25	2	False	29
49_Moderate1	9.4	1.97	0.25	2	False	9
					Subtotal	**50**
Swainsona sericea / Silky Swainson-pea (Flora)						
49_Poor	2.9	8.64	0.25	2	False	12
49_Moderate2	10.4	5.57	0.25	2	False	29
49_Moderate1	9.4	1.97	0.25	2	False	9
					Subtotal	**50**

Figure 7-2. Ecosystem credits requiring offsetting (copied from BAM calculator, 2019).

7.5 Offset Requirement

An offset is required for six Species Credit Species, as indicated above. The Proponent must offset the impacts of the development by purchasing or retiring the correct number and type of species credits on the open market, based on the like-for-like options for each species (see **Appendix K**). If the correct credits cannot be sourced, the proponent may offset by paying an amount directly to the Biodiversity Conservation Trust. However, there are premiums and additional costs attached to doing so.

The proposal is a staged development and as such the proponent intends to retire the offset obligation for each stage separately (see **Table 7-2**). Prior to stage 1 commencement in 2020, all of the Species Credit Species within zone 1 (49_poor) will be retired. Prior to stage 2 commencement in 2026, all of the Species Credit Species within zone 2 (49_moderate1) and zone 3 (49_moderate2) will be retired.

Table 7-2. Species Credits requiring offset for each stage of the proposal.

Stage	Zone	Species Credit Species	Species Credits
1	1 (49_poor)	Australian Bustard	12
1	1 (49_poor)	Finger Panic Grass	12
1	1 (49_poor)	Slender Darling Pea	12
1	1 (49_poor)	Silky Swainson-pea	12
2	2 (49_moderate1)	Australian Bustard	9
2	2 (49_moderate1)	Finger Panic Grass	9
2	2 (49_moderate1)	Little Eagle (breeding)	7
2	2 (49_moderate1)	Slender Darling-pea	9
2	2 (49_moderate1)	Silky Swainson-pea	9
2	3 (49_moderate2)	Australian Bustard	29
2	3 (49_moderate2)	Bush Stone-curlew	29
2	3 (49_moderate2)	Finger Panic Grass	29
2	3 (49_moderate2)	Little Eagle	22
2	3 (49_moderate2)	Slender Darling Pea	29
2	3 (49_moderate2)	Silky Swainson-pea	29

8 Summary and conclusions

The following summary of findings and conclusions are provided to assist with ongoing project planning.

The proposal will clear up to 16.18 ha of native vegetation to develop a quarry within Lot 82 DP820705 Weenya Road, Mount Tenandra. The native vegetation consists of one Plant Community Type:

- PCT 49 - Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion.

This PCT is not part of any BC Act listed or EPBC Act Listed Threatened Ecological Communities.

Eight Strahler first order streams and 1 Strahler second order stream are mapped as occurring within the study area. These streams are all minor watercourses and are not mapped as Key Fish Habitat by the Department of Primary Industries - Fisheries.

An EPBC Act protected matters search identified, 6 TECs, 21 threatened species and 9 listed migratory species that could possibly occur in the 10 km search area. Of these, one Endangered, three Vulnerable, three migratory and four marine species possibly occur, based on habitat available on the subject site. The significance of the proposed impact to these subject species and other threatened, migratory, wetland and marine species predicted to occur within a 10 km search area was assessed. No significant impact to a threatened, migratory or marine species likely to result in the extinction of a local population was identified. The residual ecological impacts of the proposal would be adequately mitigated using the management actions recommended.

11 Ecosystem Credit Species and 6 Species Credit Species were assumed to be present on the subject site. Due to the subject sites low VI score, no Ecosystem Credits are required to offset the proposal. However, 258 Species Credits are required to offset the proposal (48 credits for stage 1 and 210 credits for stage 2).

The Proponent must offset the impacts of the proposal prior to commencement of each stage by purchasing or retiring the correct number and type of species credits on the open market, based on the like-for-like options. If the correct credits cannot be sourced, the Proponent may offset by paying an amount directly to the Biodiversity Conservation Trust.

This assessment covers the current form of the proposal. Any change to the scope of work may require re-assessment.

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Appendix A: Database search results

EPBC Protected matters report

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.

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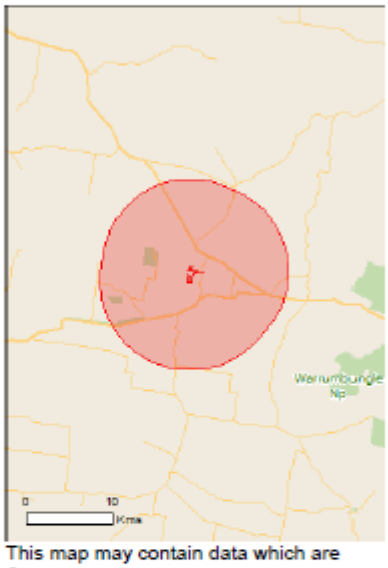

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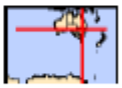


Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	21
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the 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:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	21
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	800 - 900km upstream
Riverland	700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland	900 - 1000km 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
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat may 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
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Rostratula australis		
Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat may occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat may occur within area
Homoranthus darwinioides		
[12974]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to 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
Delma impar		
Striped Legless Lizard, Striped Snake-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		

Name	Threatened	Type of Presence
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	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 may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

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 likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
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 may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may 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 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
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
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-31.238548 148.744168,-31.232604 148.744854,-31.234292 148.747344,-31.229815 148.75421,-31.228861 148.745369,-31.225925 148.745884,-31.226365 148.749403,-31.228641 148.749146,-31.229815 148.758416,-31.230475 148.758158,-31.230109 148.754639,-31.234585 148.747773,-31.235686 148.748631,-31.236567 148.74906,-31.239135 148.748631,-31.238695 148.744168,-31.238548 148.744168

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.

BioNET Atlas search – threatened species predicted to occur within the Brigalow Belt South Bioregion, Pilliga IBRA subregion.

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.
+Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable.
-Number of Records: P = predicted to occur.

Scientific Name	Common Name	NSW status.	Comm. Status	Records
Crinia sloanei	Sloane's Froglet	V,P	E	1
Aprasia parapulchella	Pink-tailed Legless Lizard	V,P	V	P
Hoplocephalus bitorquatus	Pale-headed Snake	V,P		2
Leipoa ocellata	Malleefowl	E1,P	V	61
Anseranas semipalmata	Magpie Goose	V,P		2
Oxyura australis	Blue-billed Duck	V,P		P
Stictonetta naevosa	Freckled Duck	V,P		P
Phaethon rubricauda	Red-tailed Tropicbird	V,P	C	1
Apus pacificus	Fork-tailed Swift	P	C,J,K	4
Hirundapus caudacutus	White-throated Needletail	P	C,J,K	46
Ephippiorhynchus asiaticus	Black-necked Stork	E1,P		1
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	1
Ixobrychus flavicollis	Black Bittern	V,P		1
Plegadis falcinellus	Glossy Ibis	P	C	1
Circus assimilis	Spotted Harrier	V,P		24
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P	C	3
Hamirostra melanosternon	Black-breasted Buzzard	V,P,3		1
Hieraaetus morphnoides	Little Eagle	V,P		38
Lophoictinia isura	Square-tailed Kite	V,P,3		35
^^Falco hypoleucos	Grey Falcon	E1,P,2		1
Falco subniger	Black Falcon	V,P		7
Grus rubicunda	Brolga	V,P		P
Ardeotis australis	Australian Bustard	E1,P		2
Burhinus grallarius	Bush Stone-curlew	E1,P		2
Rostratula australis	Australian Painted Snipe	E1,P	E	1
Gallinago hardwickii	Latham's Snipe	P	C,J,K	2
Limosa limosa	Black-tailed Godwit	V,P	C,J,K	P
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		2
^^Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		773
^^Lophochroa leadbeateri	Major Mitchell's Cockatoo	V,P,2		19
Glossopsitta pusilla	Little Lorikeet	V,P		114
Lathamus discolor	Swift Parrot	E1,P,3	CE	4
Neophema pulchella	Turquoise Parrot	V,P,3		191
Polytelis swainsonii	Superb Parrot	V,P,3	V	48
Ninox connivens	Barking Owl	V,P,3		76
Ninox strenua	Powerful Owl	V,P,3		10
Tyto novaehollandiae	Masked Owl	V,P,3		9
Merops ornatus	Rainbow Bee-eater	P	J	156

Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		265
Chthonicola sagittata	Speckled Warbler	V,P		347
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	66
Epthianura albifrons	White-fronted Chat	V,P		8
Grantiella picta	Painted Honeyeater	V,P	V	15
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		6
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V,P		779
Daphoenositta chrysoptera	Varied Sittella	V,P		111
Pachycephala inornata	Gilbert's Whistler	V,P		4
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		133
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V,P		78
Petroica boodang	Scarlet Robin	V,P		10
Petroica phoenicea	Flame Robin	V,P		4
Stagonopleura guttata	Diamond Firetail	V,P		82
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	6
Sminthopsis macroura	Stripe-faced Dunnart	V,P		P
Phascolarctos cinereus	Koala	V,P	V	378
Cercartetus nanus	Eastern Pygmy-possum	V,P		34
Petaurus norfolcensis	Squirrel Glider	V,P		53
Aepyprymnus rufescens	Rufous Bettong	V,P		2
Bettongia lesueur graii	Boodie, Burrowing Bettong (mainland)	E4,P	X	1
Macropus dorsalis	Black-striped Wallaby	E1,P		6
Petrogale penicillata	Brush-tailed Rock-wallaby	E1,P	V	53
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	5
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		61
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	30
Chalinolobus picatus	Little Pied Bat	V,P		22
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		P
Nyctophilus corbeni	Corben's Long-eared Bat	V,P	V	92
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		P
Vespadelus troughtoni	Eastern Cave Bat	V,P		15
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		16
Leporillus apicalis	Lesser Stick-nest Rat	E4,P	X	1
Leporillus conditor	Greater Stick-nest Rat	E4,P	V	2
Pseudomys oralis	Hastings River Mouse	E1,P	E	1
Pseudomys pilligaensis	Pilliga Mouse	V,P	V	171
Cynanchum elegans	White-flowered Wax Plant	E1	E	P
Tylophora linearis		V	E	126
Lepidium aschersonii	Spiny Peppercress	V	V	1
Eriocaulon australasicum	Austral Pipewort	E1	E	P
Bertya opponens	Coolabah Bertya	V	V	211
Monotaxis macrophylla	Large-leafed Monotaxis	E1		2
Indigofera efoliata	Leafless Indigo	E1,3	E	3

Swainsona murrayana	Slender Darling Pea	V	V	5
Swainsona sericea	Silky Swainson-pea	V		2
Acacia flocktoniae	Flockton Wattle	V	V	2
Acacia pendula	Acacia pendula population in the Hunter catchment	E2		P
^^*Myriophyllum implicatum*		E4A,2		P
Commersonia procumbens		V	V	152
Eucalyptus camaldulensis	Eucalyptus camaldulensis population in the Hunter catchment	E2		P
Eucalyptus cannonii	Capertee Stringybark	V		3
Homoranthus darwinioides		V	V	87
Homoranthus prolixus	Granite Homoranthus	V	V	1
^^*Cymbidium canaliculatum*	Cymbidium canaliculatum population in the Hunter Catchment	E2,P,2		1
^^*Diuris tricolor*	Pine Donkey Orchid	V,P,2		4
Prasophyllum sp. Wybong		P	CE	P
^^*Pterostylis cobarensis*	Greenhood Orchid	V,P,2		43
Dichanthium setosum	Bluegrass	V	V	1
Digitaria porrecta	Finger Panic Grass	E1		18
Polygala linariifolia	Native Milkwort	E1		7
Muehlenbeckia costata	Scrambling Lignum	V		1
Pomaderris queenslandica	Scant Pomaderris	E1		37
Boronia granitica	Granite Boronia	V,P	E	1
Philotheca ericifolia		P	V	261
Zieria ingramii	Keith's Zieria	E1	E	277
Thesium australe	Austral Toadflax	V	V	2

BioNET Atlas search – threatened ecological communities predicted to occur within the Brigalow Belt South Bioregion, Pilliga IBRA subregion.

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species. ⁺Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable. ⁻Number of Records: P = predicted to occur.

Community	NSW Status	Comm. Status	Records
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	E3	E	K
Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions	E3		K
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	E3		K
Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion	E4B	CE	K
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E3	E	K
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E3	E	K
Pilliga Outwash Ephemeral Wetlands in the Brigalow Belt South Bioregion	E3		K
White Box Yellow Box Blakely's Red Gum Woodland	E3	CE	K

BioNET Atlas search – key threatening processes predicted to occur within the Brigalow Belt South Bioregion, Pilliga IBRA subregion.

Threat	NSW Status	Comm. Status	Records
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, Manorina melanocephala (Latham, 1802)	KTP	KTP	P
Alteration of habitat following subsidence due to longwall mining	KTP		P
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		P
Anthropogenic Climate Change	KTP	KTP	P
Bushrock removal	KTP		P
Clearing of native vegetation	KTP	KTP	P
Competition and grazing by the feral European Rabbit, Oryctolagus cuniculus (L.)	KTP	KTP	P
Competition and habitat degradation by Feral Goats, Capra hircus Linnaeus 1758	KTP	KTP	P
Competition from feral honey bees, Apis mellifera L.	KTP		P
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		P
Herbivory and environmental degradation caused by feral deer	KTP		P
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		P
Importation of Red Imported Fire Ants Solenopsis invicta Buren 1972	KTP	KTP	P
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	P
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	P
Infection of native plants by Phytophthora cinnamomi	KTP	KTP	P
Introduction of the Large Earth Bumblebee Bombus terrestris (L.)	KTP		P
Invasion and establishment of exotic vines and scramblers	KTP		P
Invasion and establishment of Scotch Broom (Cytisus scoparius)	KTP		P
Invasion and establishment of the Cane Toad (Bufo marinus)	KTP	KTP	P
Invasion of native plant communities by African Olive Olea europaea subsp. cuspidata (Wall. ex G. Don) Cif.	KTP		P
Invasion of native plant communities by Chrysanthemoides monilifera	KTP		P
Invasion of native plant communities by exotic perennial grasses	KTP		P
Invasion of the Yellow Crazy Ant, Anoplolepis gracilipes (Fr. Smith) into NSW	KTP		P
Invasion, establishment and spread of Lantana (Lantana camara L. sens. Lat)	KTP		P
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	P
Loss of Hollow-bearing Trees	KTP		P
Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		P
Predation and hybridisation by Feral Dogs, Canis lupus familiaris	KTP		P
Predation by Gambusia holbrooki Girard, 1859 (Plague Minnow or Mosquito Fish)	KTP		P
Predation by the European Red Fox Vulpes Vulpes (Linnaeus, 1758)	KTP	KTP	P
Predation by the Feral Cat Felis catus (Linnaeus, 1758)	KTP	KTP	P
Predation, habitat degradation, competition and disease transmission by Feral Pigs, Sus scrofa Linnaeus 1758	KTP	KTP	P
Removal of dead wood and dead trees	KTP		P

Biodiversity Values Map.

Areas marked as purple are areas of biodiversity value. The blue polygon indicates the subject site.

NSW GOVERNMENT

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	23/10/2019 10:01 AM		**BDAR Required***
Total Digitised Area	40.77	ha	
Minimum Lot Size Method	LEP		
Minimum Lot Size	1000	ha	
Area Clearing Threshold	2	ha	
Area clearing trigger Area of native vegetation cleared	Unknown #		Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no		no
Date of the 90 day Expiry	N/A		

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is "likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOGET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016*.

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

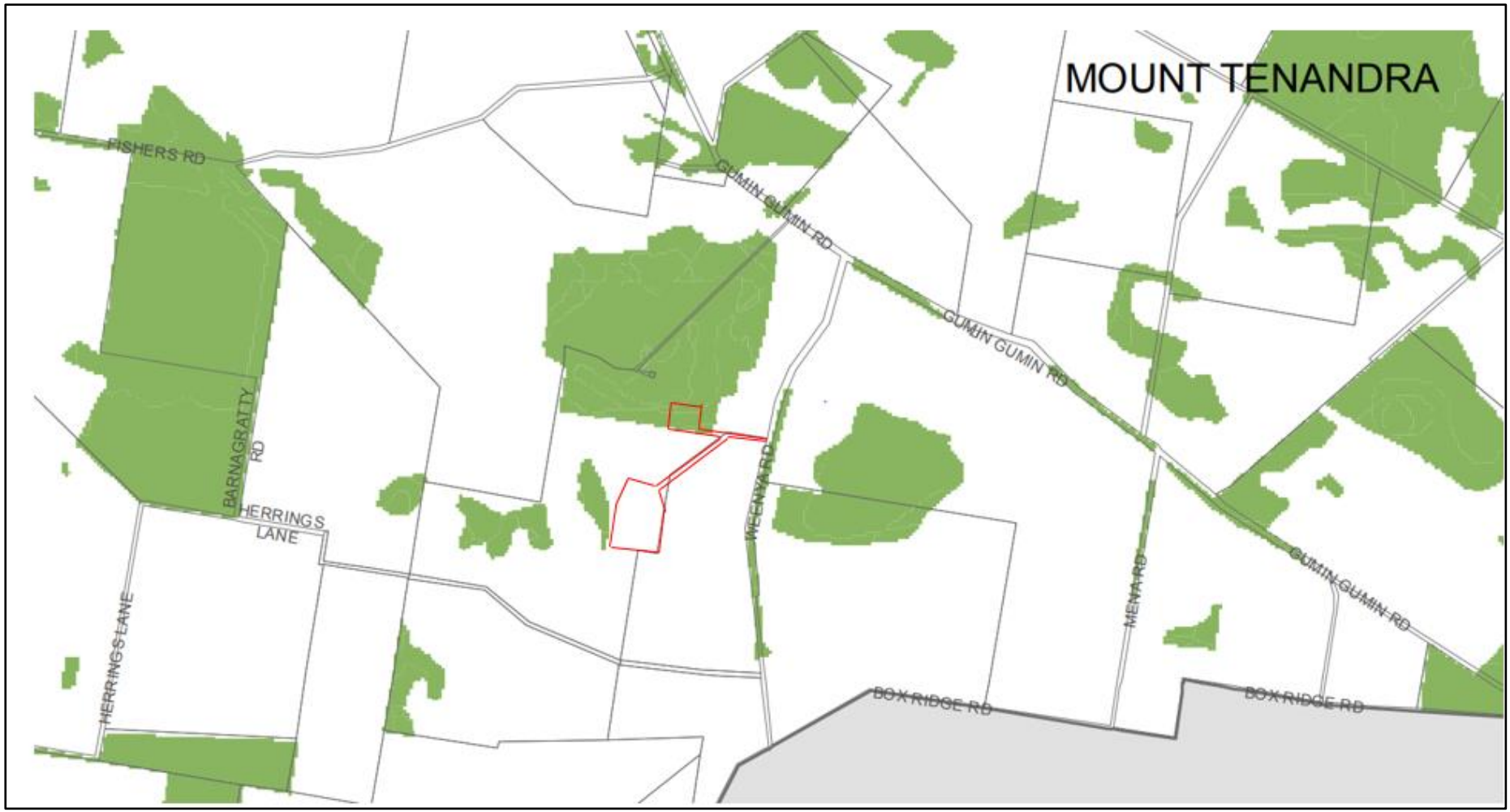
I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature_____ Date: 23/10/2019 10:01 AM

Coonamble Local Environmental Plan 2011 – Biodiversity Map.

Areas marked as green are areas of biodiversity value. The red polygon indicates the subject site boundary

.



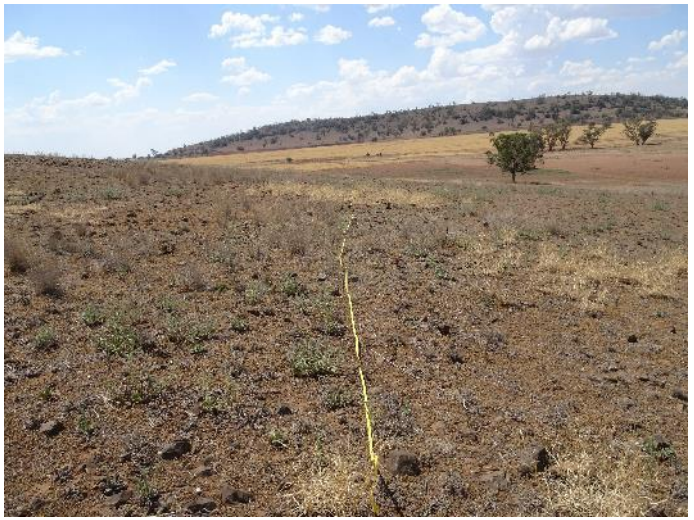
Appendix B: Vegetation plot locations

Plot Name	PCT	Easting (Zone 55)	Northing (Zone 55)	Photographs	
RQ01	49	-3113.73	148.44936		

RQ02	49	-3113.681	14844.961		

RQ03	49	-3113.648	14844.953		
RQ04	49	-3113.615	148.44987		

RQ05	49	-3113.621	14844.911		
RQ06	49	-3113.75	14845.07		

RQ07	49	-3114.297	14844.728		
RQ08	49	-3114.234	14844.857		

RQ09	49	-3114.237	14844.793		

Appendix C: Field survey results

Flora species list

These species were identified on the subject site during the October 2019 field survey:

FG = Forb, GG = Grass and Grass-like, SG = Shrub, TG = Tree, EG = Fern, OG = Other
N = Native, E = Exotic, THE = High Threat Exotic

Growth form code*	Species name	Common name	Native (N)/ Exotic E/ High Threat Weed (HTW)
SG	*Sclerolaena muricata*	Black Rolypoly	N
SG	*Sclerolaena anisacanthoides*	Yellow Burr	N
SG	*Sclerolaena birchii*	Galvanized Burr	N
SG	*Sclerolaena sp.*		N
FG	*Medicago polymorpha*	Burr Medic	E
FG	*Rapistrum rugosum*	Turnip Weed	E
FG	*Silybum marianum*	Variegated Thistle	E
FG	*Malva parviflora*	Small-flowered Mallow	E
FG	*Sida trichopoda*	Hairy Sida	N
FG	*Sida corrugata*	Corrugated Sida	N
GG	*Austrostipa scabra*	Speargrass	N
TG	*Alectryon oleifolius*	Western Rosewood	N
SG	*Geijera parviflora*	Wilga	N
FG	*Opuntia sp.*	Cactus	HTE
FG	*Wahlenbergia sp.*	Bluebell	N
FG	*Solanum esuriale*	Quena	N
TG	*Brachychiton populneus*	Kurrajong	N
TG	*Angophora floribunda*	Rough-barked Apple	N
FG	*Daucus glochidiatus*	Native Carrot	N
TG	*Callitris glaucophylla*	White Cypress Pine	N
FG	*Einadia sp.*	Saltbush	N
FG	*Echium plantagineum*	Paterson's Curse	E
FG	*Brassica sp.*		E
GG	*Avena fatua*	Wild Oats	E
FG	*Erodium crinitum*	Blue Storksbill	N
GG	*Austrostipa blackii*		N
GG	*Enteropogon acicularis*	Windmill Grass	N

Fauna species list

These species were identified on the site during the October 2019 field survey:

Class	Species Name	Common Name
Ave	*Platycercus eximius*	Eastern Rosella
Ave	*Cracticus torquatus*	Grey Butcherbird
Ave	*Northiella haematogaster*	Bluebonnet
Mammal	*Bos taurus*	Cow

BAM Plot Datasheets

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ01	Zone ID 49 Moderate
Photo # ✓		Plot dimensions 20 x 50	
Datum GDA94	Zone 55	Plot bearing along midline 62° NE	
Easting - 3113.73	Northing 148.44936	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid floodplain Grasslands
Plant Community Type	PCT 49 — Condition state Moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): (20 x 20 m) / 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	0
	Shrubs	4
	Grasses etc	1
	Forbs	1
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	0
	Shrubs	7.1
	Grasses etc	0.2
	Forbs	0.2
	Ferns	0
	Other	0
High threat weed cover		0%

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable size): (20 x 50 m) / 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total #
	>20cm**	0
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	15	5	8	5	5	7.6
	Bare ground	20	90	70	80	90	70
	Cryptogam	0	0	0	0	0	0
	Rock	6	4	15	10	10	9.4

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	2	NR	Microrelief
Cultivation	0		Slope
Grazing (native / stock)	1	R	Aspect
Soil erosion	1	R	Soil surface texture
Firewood removal	0		Soil colour
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	2	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Derived community. No trees in Plot but several scattered throughout the zone.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ01		Zone ID 49 module 1	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
SG	Sclerolaena SP.	2	15	N	M
SG	Sclerolaena muricata	3	10	N	M
SG	Sclerolaena aniscanthoides	2	15	N	M
FG	Medicago Polymorpha	0.1	1	E	L
FG	Rapistrum rugosum	0.2	4	E	L
FG	Silybum marianum	5		E	L
FG	Malva parviflora	0.1	1	E	L
SG	Sclerolaena birchii	0.1	5	N	M
GG	Austrostipa scabra	0.2	10	N	L
FG	Sida trichopoda	0.2	20	N	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ02	Zone ID 49, module 2
Photo # ✓		Plot dimensions 20×50	
Datum GDA94	Zone 55	Plot bearing along midline 93° E	
Easting -3113.681	Northing 148 44.961	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid Floodplain Grasslands
Plant Community Type	PCT49 — Condition state Moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): (20 x 20 m) 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	1
	Shrubs	4
	Grasses etc	1
	Forbs	2
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	5
	Shrubs	6.4
	Grasses etc	10
	Forbs	0.2
	Ferns	0
	Other	0
High threat weed cover		0.2%

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable size): (20 x 50 m) 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-) +	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) +	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	25	8	70	12	4	23.8
	Bare ground	15	40	20	60	90	45
	Cryptogam	0	0	0	0	0	0
	Rock	12	18	8	20	1	11.8

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	
Clearing (incl. logging)	2	NR	Landform Bottom of Hill
Cultivation	0		Microrelief
Grazing (native / stock)	1	R	Slope Slight Southward slope
Soil erosion	0		Aspect
Firewood removal	0		Soil surface texture Fine Sand/clay
Fire (ground stratum, mid, canopy burnt?)	0		Soil colour Brown
Storm damage	0		Site drainage
Weediness	1	R	Distance to nearest water
			Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Similar to RQ01, except that tree layer is present within plot. Bottom of slope.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ02		Zone ID 43 moderate 2	
GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
FG	Sida corrugata	0.1	5	N	L
FG	Rapistrum rugosum	0.1	2	E	L
SG	Sclerolaena birchii	1	3	N	M
GG	Austrostipa scabra	10		N	L
TG	Alectryon oleifolius	5		N	V
SG	Geijera parviflora	5		N	M
SG	Sclerolaena sp.	0.2	10	N	M
FG	Malva parviflora	0.1	1	E	L
SG	Sclerolaena muricata	0.2	2	N	M
FG	Silybum marianum	1	20	E	L
FG	Sida trichopoda	0.1	1	N	L
FG	Opuntia sp.	0.2	cluster	E	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ03	Zone ID 49_moderate2
Photo # ✓		Plot dimensions 20 x 50	
Datum GDA 94	Zone 55	Plot bearing along midline 103°E	
Easting -3113.648	Northing 14844.953	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid floodplains Grasslands
Plant Community Type	Pct 49 — Condition state Moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m (circled) | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	1
	Shrubs	2
	Grasses etc	1
	Forbs	2
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	0.2
	Shrubs	10.2
	Grasses etc	25
	Forbs	0.2
	Ferns	0
	Other	0
High threat weed cover		0.5 %

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m (circled) | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-) +	Presence of <5cm stems records regeneration
10 - 19	(+/-) +	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) +	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total #
	>20cm**	0

Length of logs	Total (m)
	0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	8	20	0	6	4	7.6
	Bare ground	60	15	40	28	20	32.6
	Cryptogam	0	0	0	0	0	0
	Rock	25	0	25	10	16	15.2

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing		
Clearing (incl. logging)	2	NR	Landform	Slope
Cultivation	0		Microrelief	Southward slope
Grazing (native / stock)	2	R	Slope	
Soil erosion	0		Aspect	
Firewood removal	0		Soil surface texture	fine sand/clay
Fire (ground stratum, mid, canopy burnt?)	0		Soil colour	Brown
Storm damage	0		Site drainage	
Weediness	2	R	Distance to nearest water	
			Distance to nearest rock outcrop /cave	

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Scattered Geijera and Acacia trees.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ03		Zone ID 49 [illegible]	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
SG	Geijera parviflora	10		N	M
SG	Sclerolaena birchii	0.2	5	N	M
GG	Austrostipa scabra	25		N	L
FG	Silybum marianum	5		E	L
TG	Alectryon oleifolius	0.2	1	N	U
FG	Wahlenbergia sp.	0.1	2	N	L
FG	Solanum esuriale	0.1	5	N	L
FG	Opuntia sp.	0.5	5	E	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)

Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).

Abundance for each species with ≤5% cover: 1, 2, 3, 4, .. 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems

N=native, E=exotic, HTE=high threat exotic

All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc

Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ04	Zone ID 49, moderate2
Photo # ✓		Plot dimensions 20 x 50	
Datum GDA 94	Zone 55	Plot bearing along midline 273°W	
Easting -3113.615	Northing 14844.987	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid floodplains Grasslands
Plant Community Type	Pct 49 — Condition state Moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): (20 x 20 m) / 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	2
	Shrubs	1
	Grasses etc	1
	Forbs	1
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	15
	Shrubs	20
	Grasses etc	10
	Forbs	0.2
	Ferns	0
	Other	0
High threat weed cover		0%

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable size): (20 x 50 m) / 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) +1	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) +	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) +	Count as one stem where tree is multistemmed
< 5	(+/-) +	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total #
	>20cm**	0
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	5	8	8	10	2	6.6
	Bare ground	20	10	10	5	62	21.4
	Cryptogam	15	12	5	8	5	9
	Rock	64	65	40	55	20	48.8

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform Slope
Clearing (incl. logging)	1	TVR	Microrelief
Cultivation	0		Slope Steeper slope
Grazing (native / stock)	1	R	Aspect
Soil erosion	0		Soil surface texture fine / sandy clay
Firewood removal	0		Soil colour Brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	1	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes more vegetation cover. The site is located further upslope and is also rockier than plots below.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ04		Zone ID 49 moderate 2	
GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
SG	Geijera Parviflora	20		N	~~SG~~ M
TG	Brachychiton Populneus	10		N	U ~~TG~~
TG	Angophora floribunda	5	overhang	N	~~M~~ U
GG	Austrostipa scabra	10		N	L
FG	Silybum marianum	0.1		E	L
FG	Medicago Polymorpha	1	50	E	L
FG	Sida corrugata	0.2	10	N	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ05	Zone ID 49_moderate2
Photo # ✓		Plot dimensions 20 x 50	
Datum GDA94	Zone 55	Plot bearing along midline 89°E	
Easting - 3113.621	Northing 14844.911	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid Floodplain Grasslands
Plant Community Type	Pct 49 — Condition state moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m (10 x 40 m)

		Sum values*
Native Richness (count of native species)	Trees	3
	Shrubs	1
	Grasses etc	1
	Forbs	3
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	11.5
	Shrubs	25
	Grasses etc	20
	Forbs	1.2
	Ferns	0
	Other	0
High threat weed cover		0%

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m (10 x 100 m)

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) 1	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-)	Presence of <5cm stems records regeneration
10 - 19	(+/-) +	Record # trees with hollows, not number of hollows
5 - 9	(+/-) +	Count as one stem where tree is multistemmed
< 5	(+/-) +	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) 8m

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	4	5	6	12	4	6.2
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	1	NR	Microrelief
Cultivation	0		Slope Slopes to south
Grazing (native / stock)	1	R	Aspect
Soil erosion	0		Soil surface texture fine sand/clay
Firewood removal	0		Soil colour Brown/orange
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	1	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Similar to RQ03 and RQ04.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ05		Zone ID 49_moderate2	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
SG	Geijera parviflora	25		N	M
TG	Brachychiton populneus	10		N	V
TG	Alectryon oleifolius	1	2	N	U
GG	Austrostipa scabra	20		N	L
FG	Silybum marianum	1	25	E	L
FG	Solanum esuriale	0.1	1	N	L
FG	Daucus glochidiatus	1	10	N	L
FG	Sida corrugata	0.1	10	N	L
TG	Callitris glaucophylla	0.5	1 ~~100~~	N	~~M~~ V

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ06	Zone ID 49 moderate 2
Photo # /		Plot dimensions 20x50	
Datum GDA 94	Zone 55	Plot bearing along midline 84°E	
Easting -3113.75	Northing 14845.07	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	semi-arid floodplain wetlands
Plant Community Type	Pct 49 — Condition state Moderate

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): (20 x 20 m) / 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	1
	Shrubs	3
	Grasses etc	1
	Forbs	1
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	10
	Shrubs	1.4
	Grasses etc	0.1
	Forbs	0.2
	Ferns	0
	Other	0
High threat weed cover		0%

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable size): (20 x 50 m) / 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) 1	Record stems for living trees only, and for all species
30 - 49	(+/-) +	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	6	4	18	10	8	9.2
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform Plain
Clearing (incl. logging)	2	NR	Microrelief
Cultivation	0		Slope
Grazing (native / stock)	2	R	Aspect
Soil erosion	0		Soil surface texture Fine sand/clay
Firewood removal	0		Soil colour Brown/orange
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	2	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

A bit rocky. very dry.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ06		Zone ID 49_moderate 2	
GF code	**Genus species** (tick if photographed or sample taken)	**Cover %**	**Abund** (count)	**N, E, HTE**	**Stratum**
FG	Silybum marianum	5		E	L
SG	Sclerolaena muricata	4	5	N	M
SG	Sclerolaena birchii	0.2	10	N	M
SG	Sclerolaena anisacanthoides	0.2	10	N	M
FG	Rapistrum rugosum	0.1	3	E	L
TG	Alectryon oleifolius	10	3	N	U
FG	Einadia sp. nutans	0.2	15	N	L
GG	Austrostipa scabra	0.1	10	N	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ07	Zone ID 4a2 Poor
Photo # /		Plot dimensions 20 x 50	
Datum GDA94	Zone 55	Plot bearing along midline 78° G	
Easting -3114.297	Northing 14844.728	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid floodplain Grasslands
Plant Community Type	Pct 49 — Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	0
	Shrubs	0
	Grasses etc	1
	Forbs	2
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	0
	Shrubs	0
	Grasses etc	10
	Forbs	5.2
	Ferns	0
	Other	0
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Function plot (1000m²)

Dimensions (circle applicable site): 20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	2	2	5	6	7	4.4
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform Plain
Clearing (incl. logging)	3	NR	Microrelief
Cultivation	0		Slope
Grazing (native / stock)	1	R	Aspect
Soil erosion	0		Soil surface texture Hard / compacted clay loam
Firewood removal	0		Soil colour Brown / tan
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Grassland. No trees. High weed cover.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ07		Zone ID 49_ Poor	
GF code	***Genus species*** (tick if photographed or sample taken)	**Cover %**	**Abund** (count)	**N, E, HTE**	**Stratum**
GG	Austrostipa scabra	10		N	L
FG	Dencrs glochidiatus	5		N	L
FG	Echium Plantagineum	5		E	L
FE	Brassica sp.	1		E	L
GG	Avena fatua	2		E	L
FE	Erodium cmitum	0.2	10	N	L
FG	Rapistrum rugosum	1	25	E	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ08	Zone ID 49 Poor
Photo # ✓		Plot dimensions 20x50	
Datum GDA 94	Zone 55	Plot bearing along midline 345° N	
Easting -3114.234	Northing 148.44857	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid Floodplain Grasslands
Plant Community Type	Pct 49 — Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): (20 x 20 m) / 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	0
	Shrubs	0
	Grasses etc	2
	Forbs	0
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	0
	Shrubs	0
	Grasses etc	5.1
	Forbs	0
	Ferns	0
	Other	0
High threat weed cover		0.1 %

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): (20 x 50 m) / 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	3	4	3	2	3	3
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform Plain
Clearing (incl. logging)	3	NR	Microrelief
Cultivation	0		Slope
Grazing (native / stock)	2	NR	Aspect
Soil erosion	0		Soil surface texture Clay loam
Firewood removal	0		Soil colour Brown/tan
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Grassland. A lot of cow poo. very dry. Scattered rocks. Quite a lot of bare ground

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BAM Plot - Field Survey Sheet

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Date 27/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ08		Zone ID 49_Poor	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
FG	Echium Plantagineum	5		E	L
GG	Austrostipa bladieri	5		N	L
GG	Enteropogon acicularis	0.1	5	N	L
FG	Brassica SP.	5		E	L
FG	Opuntia SP.	0.1	1	E	L
GG	Avena fatua	0.5	25	E	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry		
Recorders EG		Plot ID # RQ09	Zone ID 49_Poor
Photo # ✓		Plot dimensions 20 x 50	
Datum GDA94	Zone 55	Plot bearing along midline 300°NW	
Easting -3114.237	Northing 14844.793	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	Brigalow Belt South
Subregion	Pilliga
Likely Vegetation Class	Semi-arid floodplain wetlands
Plant Community Type	Pct 49 — Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): (20 x 20 m) 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	0
	Shrubs	0
	Grasses etc	1
	Forbs	1
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	Trees	0
	Shrubs	0
	Grasses etc	5
	Forbs	10
	Ferns	0
	Other	0
High threat weed cover		0%

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): (20 x 50 m) 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total #
	>20cm**	0
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	4	6	3	2	6	4.2
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform Top of small rise
Clearing (incl. logging)	3	NR	Microrelief
Cultivation	0		Slope
Grazing (native / stock)	2	R	Aspect
Soil erosion	0		Soil surface texture Clay/loam
Firewood removal	0		Soil colour Brown/tan
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness			Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Grassland, No trees.

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BAM Plot - Field Survey Sheet

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Date 24/10/2019	Survey Name Ralston Quarry				
Recorders EG		Plot ID # RQ09		Zone ID 42 Poor	
GF code	***Genus species*** (tick if photographed or sample taken)	**Cover %**	**Abund** (count)	**N, E, HTE**	**Stratum**
GG	Austrostipa Scabra	5		N	L
FG	Brassic sp.	0.1	5	E	L
FG	Daucus glochidiatus	10		N	L
FG	Malva Parviflora	0.1	1	E	L

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)

Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).

Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems

N=native, E=exotic, HTE=high threat exotic

All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. *Genus* sp1, *Genus* sp2 etc

Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

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Appendix D: Threatened species assessment

Assessment of presence/absence of threatened species predicted to occur by the BAM calculator.

Ecosystem Credit Species

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
Anseranas semipalmata	Magpie Goose	V		No	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. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation. **Absent - The subject site is within the known distribution of the species and an associated vegetation community (PCT 49) is present. Two watercourses transect the subject site. However, the watercourses are Strahler 1st and 2nd order, un-named, ephemeral streams which are unlikely to support the species.**	Absent
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		No	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. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed. Nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints.**	Assumed present
Circus assimilis	Spotted Harrier	V		No	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs	Assumed Present

				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. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (e.g. bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Can occur in both native grassland and agricultural land.**	
Epthianura albifrons	White-fronted Chat	V	Yes	Gregarious species usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground). Two to three eggs are laid in each clutch, and the complete nesting cycle from nest-building to independent young is approximately 50 days. Birds can breed at one year of age and are estimated to live for five years. **Assumed present - The subject site is within the known distribution of the species an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Unlikely habitat due to lack of nearby wetland. However, possible habitat when grassland floods. There are also two records within 10 km of the subject site.**	Assumed Present
Falco hypoleucos	Grey Falcon	E	No	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Utilizes shrubland and grassland.**	Assumed Present
Grus rubicunda	Brolga	V	No	The Brolga was formerly found across Australia, except for the south-east corner, Tasmania and the south-western third of the country. It is still abundant in the northern tropics, but very sparse across the southern part of its range. Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on	Assumed Present

				wetlands too, especially shallow swamps, where they will forage with their head entirely submerged. They feed using their heavy straight bill as a 'crowbar' to probe the ground or turn it over, primarily on sedge roots and tubers. They will also take large insects, crustaceans, molluscs and frogs. The nest comprises a platform of grasses and sticks, augmented with mud, on an island or in the water. Two eggs are laid from winter to autumn. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Unlikely habitat due to lack of nearby wetland. However, possible habitat when grassland floods. The species can utilize dry grassland and ploughed paddocks.**	
Haliaeetus leucogaster	White-bellied Sea-Eagle (foraging)	V	No	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. **Absent** - **The species occurs within the IBRA bioregion and is associated with PCT 49. However, this species is unlikely to be present due to the lack of proximity to large water bodies, including rivers, swamps, lakes and the sea.**	Absent
Hieraaetus morphnoides	Little Eagle (foraging)	V	No	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. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints.**	Assumed Present

Lophochroa leadbeateri	Major Mitchell's Cockatoo (foraging)	V		No	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. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Can inhabit treed and treeless areas. Wattles and small cypress pines scattered across subject site (particularly zone 2 and 3).**	Assumed Present
Polytelis swainsonii	Superb Parrot (foraging)	V	V	Yes	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Nest in small colonies, often with more than one nest in a single tree. Breed between September and January. May forage up to 10 km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Can feed on the ground on grass seeds. One Rough-barked Apple tree present on subject site. Two records within 10 km.**	Assumed Present
Rostratula australis	Australian Painted Snipe	E	E	No	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 amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Marginal habitat – no large waterbodies/wetlands present; although several ephemeral streams and small farm dams occur within the site. The grassland may flood when inundated by rainfall.**	Assumed Present

Sminthopsis macroura	Stripe-faced Dunnart	V	No	Throughout much of inland central and northern Australia, extending into central and northern NSW, western Queensland, Northern Territory, South Australia and Western Australia. They are rare on the NSW Central West Slopes and North West Slopes with the most easterly records of recent times located around Dubbo, Coonabarabran, Warialda and Ashford. Native dry grasslands and low dry shrublands, often along drainage lines where food and shelter resources tend to be better. They shelter in cracks in the soil, in grass tussocks or under rocks and logs. Co-occupies areas with the more common Fat-tailed Dunnart, but prefers relatively ungrazed habitats with greater diversity and healthier understorey vegetation. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Can inhabit native grasslands and shrublands.**	Assumed Present
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	No	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. Can occur in treed and treeless habitats.**	Assumed Present

Species Credit Species

Scientific Name	Common Name	NSW status	Comm. Status	Records within 10km	Assessment	Species presence
Ardeotis australis	Australian Bustard	E		No	In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. Breeding now only occurs in the north-west region of NSW. Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams. Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover; roosts on ground among shrubs and long grasses or under trees. Forages on insects, young birds, lizards, mice, leaves, seeds and fruit. Dispersive, with irregular widespread movements over long distances; movements are thought to be in response to habitat and climatic conditions; known to converge on areas with high mice numbers and in recently burnt areas. **Assumed Present - The subject site is within the predicted distribution of the species, an associated vegetation community (PCT 49) is present within the subject site. Occurs north-west of the Newell Highway and therefore meets geographic criteria.**	Assumed Present
Burhinus grallarius	Bush Stone-curlew	E		No	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer. **The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present within the subject site. Absent – zone 1 and 2 due to no timber/fallen logs. Assumed present – zone 3 due to sparse occurrence of fallen logs/standing dead timber.**	Absent – zone 1 and 2. Assumed Present – zone 3
Digitaria porrecta	Finger Panic Grass	E		No	Finger Panic Grass occurs in NSW and Queensland. In NSW it is found on the North West Slopes and Plains, from near Moree south to Tambar Springs and from Tamworth to Coonabarabran. It largely occurs on private land. n NSW, the most frequently recorded associated tree species are *Eucalyptus albens* and *Acacia pendula*. Common associated grasses and forbs in NSW sites include *Austrostipa aristiglumis*, *Enteropogon acicularis*, *Cyperus bifax*, *Hibiscus trionum* and *Neptunia gracilis*. Flowering season is summer or late summer from mid-January to late February, with seeds maturing and falling from the plant soon after. Native grassland, woodlands or open forest with a grassy understorey, on richer soils. Often found along roadsides and travelling stock routes where there is light grazing and	Assumed Present

				occasional fire. *Digitaria porrecta* is a perennial tussock-forming grass that can vegetatively reproduce. Fire, livestock grazing and trampling, and physical disturbance of habitat by road and farm machinery are types of disturbances known to occur in *Digitaria porrecta* sites. Field observations indicate that the grass does continue to persist in such habitats but the effect of the disturbances on the long term capability of the species to maintain a viable population is unknown. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. The species can occur in disturbed areas (livestock grazing, trampling, fire and physical disturbance).**	
Haliaeetus leucogaster	White-bellied Sea-eagle (Breeding)	V	No	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. **Absent – No living or dead mature trees within suitable vegetation within 1 km of a river, lakes, large dams or creeks, wetlands and coastlines.**	Absent
Hieraaetus morphnoides	Little Eagle (breeding)	V	No	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. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion. **Foraging habitat present. Absent – zone 1, as there are no mature trees present for the species to nest in. Assumed Present – zone 2 and 3 as there are sparse to scattered mature trees.**	Absent – zone 1. Assumed Present – zone 2 and 3
Lophochroa leadbeateri	Major Mitchell's Cockatoo	V	No	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. Normally found in pairs or	Absent

	(breeding)				small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres. **Absent – No living or dead hollow-bearing trees within the subject site.**	
Polytelis swainsonii	Superb Parrot (breeding)	V	V	Yes	The Superb Parrot is found throughout eastern inland NSW. The species' inhabits Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. **Breeding** 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. 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. It is estimated that there are less than 5000 breeding pairs left in the wild. Foraging May forage up to 10 km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain. **Absent – No living or dead hollow-bearing trees within the subject site. No associated breeding trees i.e., *E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexa* present.**	Absent
Swainsona murrayana	Slender Darling Pea	V		No	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. The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated. *Swainsona* species contain a poisoning principle, swainsonine, which affects the nervous system and is toxic to stock. **Assumed Present - The subject site is within the known distribution of the species, an associated vegetation community (PCT 49) is present and the species has no geographic limitations / habitat constraints. The species can inhabit native grasslands on floodplains that have been intermittently grazed or cultivated. The species may**	

				require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated.
Swainsona sericea	Silky Swainson-pea	V	No	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines Callitris spp. Habitat on plains unknown. Regenerates from seed after fire. **Assumed Present - The subject site is within the predicted distribution of the species, an associated vegetation community (PCT 49) is present within the subject site and the species has no geographic limitations / habitat constraints.**

Appendix E: EPBC Act Habitat Assessment

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance. The EPBC Act policy *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DoE, 2013) forms the basis of determining if impact to protected matters is significant.

A Protected Matters Search identified six Endangered Ecological Communities, 21 threatened species and 9 migratory species as potentially occurring within 10 km of the subject site.

The following tables give an overview of the assessments of these threatened entities and shows that the Proposed activity:

1. Is not likely to have a significant impact on a matter of national environmental significance. The matters of national environmental significance are:
    i. World heritage properties.
    ii. National heritage places.
    iii. Wetlands of international importance.
    iv. Threatened species and ecological communities.
    v. Migratory species.
    vi. Commonwealth marine areas.
    vii. The Great Barrier Reef Marine Park. And;
    viii. Nuclear actions (including uranium mines).
    ix. A water resource, in relation to coal seam gas development and large coal mining development.
2. Is not likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).

Notes:

Important Population as determined by the *Environment Protection and Biodiversity Conservation Act 1999*, is one that for a vulnerable species:

a) is likely to be key source populations either for breeding or dispersal
b) is likely to be necessary for maintaining genetic diversity
c) is at or near the limit of the species range.

A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE, 2013).

Wetlands of International Importance			
Name	Proximity	Assessment	Assessment of significance required (Yes/No)
Banrock station wetland complex	800-900km	The proposal is not within close proximity of Banrock Station wetland complex.	No
Riverland	700-800km	The proposal is not within close proximity of the Riverland	No
The coorong, and lakes alexandrina and albert wetland	900-1000km	The proposal is not within close proximity of the Coorong and Lakes Alexandria and Albert Wetland	No

Threatened Ecological Communities			
Name	Status	Habitat Assessment	Assessment of significance (Yes/No)
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South bioregion	E	The community does not occur on the subject site.	No
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	The community does not occur on the subject site.	No
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	CE	The community does not occur on the subject site.	No
Poplar Box Grassy Woodland on alluvial plains	E	The community does not occur on the subject site.	No
Weeping Myall Woodlands	E	The community does not occur on the subject site.	No
White Box-Yellow Box-Blakey's Red Gum Grassy Woodland and Derived Native Grassland	CE	The community does not occur on the subject site.	No

Threated Fauna	CE = Critically Endangered	E= Endangered	V= Vulnerable	
Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
Anthochaera phrygia	Regent Honeyeater	CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding	No

			fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. **Absent - Distribution is patchy across NSW, isolated to main breeding populations which occur south-west of the subject site.**	
Calidris ferruginea	Curlew Sandpiper	CE	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one-year old birds remain in Australia rather than migrating north. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in salt works and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. **Unlikely – Less often recorded inland. The subject site contains several farm dams and two dry watercourses. The subject site only likely to provide habitat for this species sporadically if the watercourses flood.**	No
Grantiella picta	Painted Honeyeater	V	The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. **Unlikely - The subject site is within the known distribution of the species; however, associated vegetation communities and habitat (woodlands with trees containing mistletoe) is not present.**	No
Hirundapus caudactus	White-throated Needletail	V	White-throated Needletails are non-breeding migrants, occurring in Australia only between late spring and early autumn, but mostly in summer, when they sometimes form large flocks, appearing as a swirling cloud of birds. Aerial birds however will roost in trees. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts,	Yes

			such as ridges and sand-dunes. They are sometimes recorded above islands well out to sea. **Potential – Potential aerial foraging habitat. The species occurs over most types of habitat.**	
Lathamus discolor	Swift Parrot	CE	The species 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*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora*. Return to some foraging sites on a cyclic basis depending on food availability. **Unlikely - The site is within the species known range; however, associated vegetation communities not present. There are very few mature eucalypts present at the site (one Rough-barked Apple), which likely makes this an unsuitable foraging site for the species. No breeding habitat as the species breeds in Tasmania.**	No
Leipoa ocellata	Malleefowl	V	The stronghold for this species in NSW is the mallee in the south west centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. West of the Darling River a population also occurs in the Scotia mallee including Tarawi NR and Scotia Sanctuary and is part of a larger population north of the Murray River in South Australia. The population in central NSW has been significantly reduced through land clearance and fox predation and now occurs chiefly in Yathong, Nombinnie and Round Hill NRs and surrounding areas, though birds continue to survive in Loughnan NR. Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers. **Absent – Associated vegetation communities not present. Required habitat characteristics not present (dense canopy and dense and diverse shrub and herb layers).**	No
Polytelis swainsonii	Superb Parrot	V	**Assumed Present – foraging. Absent – breeding. See Appendix D**	Yes

Rostratula australis	Australian Painted-snipe, Australian Painted snipe	E	Most records of the Australian Painted Snipe are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. 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 amongst tall vegetation, such as grasses, tussocks or reeds. **Assumed present. See Appendix D.**	Yes
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	V	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies. **Unlikely - Site does not contain associated plant community types or required habitat characteristics (well-timbered areas, caves, crevices, old mines etc.).**	No
Dasyurus maculatus maculatus	Spotted-tail Quoll, Tiger Quoll (SE Mainland population)	E	The range of the Spotted-tailed Quoll has contracted considerably since European settlement. 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. The spotted-tailed Quoll is recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. **Unlikely - The site is within the species known range; however, the site does not contain any associated Plant Communities.**	No
Nyctophilus corbeni	Corben's Long-eared Bat	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 Allocasuarina leuhmanni and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. **Unlikely - The subject site is within the species predicted distribution; however, the site does not contain any associated plant communities.**	No
Phascolarctos cinereus	Koala	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	No

			central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. **Unlikely - The subject site is a partly derived grassland with sparse to scattered trees and few eucalypts (only one Rough-barked Apple). Associated vegetation communities not present.**	
Pteropus poliocephalus	Grey-headed Flying Fox	V	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. **Unlikely - Associated vegetation communities not present on the subject site.**	No
Aprasia parapulchella	Pink-tailed Worm-lizard	V	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites. Feeds on the larvae and eggs of the ants with which it shares its burrows. It is thought that this species lays 2 eggs inside the ant nests during summer; the young first appear in March. **Unlikely – Associated vegetation communities are not present on the subject site.**	No
Delma impar	Striped Legless Lizard	V	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass Themeda australis, spear-grasses Austrostipa spp. and poa tussocks Poa spp., and occasionally wallaby grasses Austrodanthonia spp. Sometimes present in modified grasslands with a significant content of exotic grasses. Sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter. **Absent – Subject site outside species distribution. Associated vegetation communities not present.**	No

Threated Flora	CE = Critically Endangered	E= Endangered	V= Vulnerable	
Species name	Common Name	V	Habitat Assessment	Assessment of Significance required (Yes/No)
Austrostipa wakoolica	-	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. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans*. Flowers from October to December, mainly in response to rain. **Absent – Subject site outside species known distribution in NSW.**	No
Dichanthium setosum	Bluegrass	V	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Flowering time is mostly in summer. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra* aff. *longifolia, Ajuga australis, Calotis hispidula* and *Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea* species. Locally common or found as scattered clumps in broader populations. The extensive distribution and wide environmental tolerances make predictions about suitable habitat difficult. **Unlikely – Associated vegetation communities not present.**	No
Homoranthus darwinioides		V	Rare in the central tablelands and western slopes of NSW, occurring from Putty to the Dubbo district. It is found west of Muswellbrook between Merriwa and Bylong, and north of Muswellbrook to Goonoo SCA. The species has been collected from Lee's Pinch, but not relocated at its original locality north of Mt Coricudgy above the headwaters of Widden Brook. Grows in in various woodland habitats with shrubby understoreys, usually in gravely sandy soils. Landforms the species has been recorded growing on include flat sunny ridge tops with scrubby woodland, sloping ridges, gentle south-facing slopes, and a slight depression on a roadside with loamy sand. Associated species include *Callitris endlicheri, Eucalyptus crebra, E. fibrosa, C. trachyphloia, E. beyeri* subsp. *illaquens, E. dwyeri, E. rossii, Leptospermum divaricatum, Melaleuca uncinata, Calytrix tetragona, Allocasuarina* spp. and *Micromyrtus* spp.	No

			Flowers in spring or from March to December. The species has been cultivated in Sydney from Rylstone cuttings and at Burrendong Arboretum near Wellington. Forms small shrubs or shrublets, often in tangled masses. It has a localised distribution and may be the dominant undershrub at some sites. Its abundance in populations ranges from rare (only one plant at site) to locally very abundant. **Unlikely – Subject site within known distribution. However, associated vegetation communities not present.**	
Prasophyllum sp. Wybong	A leek-orchid	CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. A perennial orchid, appearing as a single leaf over winter and spring. Flowers in spring and dies back to a dormant tuber over summer and autumn. Known to occur in open eucalypt woodland and grassland **Unlikely - Subject site within predicted distribution. Associated vegetation communities not present.**	No
Swainsona murrayana	Slender Darling-pea	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. The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated. *Swainsona* species contain a poisoning principle, swainsonine, which affects the nervous system and is toxic to stock. **Assumed Present. See Appendix D.**	Yes
Tylophora linearis	-	E	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*. Flowers in spring, with flowers recorded in November or May with fruiting probably 2 to 3 months later. **Unlikely - The subject site is within the species known distribution; however, associated vegetation communities are not present. The site does not contain any associated tree species. No twinners were recorded at this site.**	No

Migratory, Wetland and Marine species			
Species Name	Common Name	Habitat Assessment	Assessment of significance required (Yes/No)
Apus pacificus	Fork-tailed Swift	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the Bulloo River and Thurloo Downs. The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. They forage aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water. They often occur in areas of updraughts, especially around cliffs. They are said to search along edges of low-pressure systems, which assist flight. Low-flying Swifts are said to be precursors of unsettled weather, possibly because insect prey fly at a lower altitude when the air is humid and when the air density is low. They sometimes feed aerially among tree-tops in open forest. They probably roost aerially but are occasionally observed to land. They were once recorded roosting in trees, using a bare exposed branch emergent above the foliage. Sometimes they loaf in the air, by allowing strong winds to support them. There have been rare records of loafing elsewhere including Swifts briefly resting on ground and alighting on wire netting of a tennis court. Once, one was seen attempting to land on the wall of a lighthouse. **Potential – Almost exclusively aerial. Mostly occur over dry or open habitats, including treeless grassland and open farmland.**	Yes
Hirundapus caudactus	White-throated Needletail	**Potential – see above.**	Yes
Motacilla flava	Yellow Wagtail	Mostly utilises well-watered open grasslands and the fringes of wetlands. Roosts in mangroves and other dense vegetation. **Unlikely - Known records very far from subject site. No habitat on the subject site (well-watered open grassland, wetlands, mangroves, dense vegetation).**	No
Myiagra cyanoleuca	Satin Flycatcher	In NSW, they are widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests (Birdlife, 2019a). **Unlikely – No habitat within the subject site (e.g., heavily vegetated gullies or eucalypt forests).**	No

Actitis hypoleucos	Common Sandpiper	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. **Absent - There is no habitat (coastal or inland wetlands) on the subject site for this species.**	No
Calidris acuminata	Sharp-tailed Sandpiper	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. 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 salt lakes inland. **Absent - There is no habitat on the subject site for this species.**	No
Calidris ferruginea	Curlew Sandpiper	**Unlikely. See above**	No
Calidris melanotos	Pectoral Sandpiper	In NSW, the Pectoral Sandpiper is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. **Potential - There is no permanent habitat on the subject site for this species. However, the species could occur if/when the grassland is inundated.**	Yes
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Latham's Snipe is a non-breeding migrant to the south east of Australia including Tasmania, passing through the north and New Guinea on passage. Latham's Snipe breed in Japan and on the east Asian mainland. Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture. **Potential – Subject site not in close proximity to a wetland. However, species can use crops and pasture.**	Yes
Ardea alba	Great Egret, White Egret	The Eastern Great Egret has been reported in a wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). The Eastern Great Egret may retreat to permanent wetlands or coastal areas when other wetlands are dry (Department of Environment, 2019b). **Absent - There is no habitat (wetlands) on the subject site for this species.**	No.
Ardea ibis	Cattle Egret	Originally found in Africa, Europe and Asia, the Cattle Egret is now found on nearly every continent, with birds in Australia originating from Asia. In Australia it is most widespread and common in north-eastern Western Australia across the Top End, Northern Territory, and in south-eastern Australia from Bundaberg, Queensland to Port	Yes

		Augusta, South Australia, including Tasmania. The Cattle Egret is found in grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor. Will also forage at garbage dumps and is often seen with cattle and other stock. **Potential – There is potential marginal foraging habitat for the species, which can utilize grasslands and pastures.**	
Chrysococcyx osculans	Black-eared Cuckoo	The Black-eared Cuckoo is found in drier country where species such as mulga and mallee form open woodlands and shrublands. It is often found in vegetation along creek beds. The Black-eared Cuckoo is common across northern Australia. It is migratory, moving into the sub-coastal areas of south-east and south-west Australia for the summer (Birdlife Australia, 2019b). It migrates to eastern Indonesia and southern New Guinea. **Potential – Found across Australian in drier country.**	Yes
Haliaeetus leucogaster	White-bellied Sea-Eagle	**Absent – foraging and breeding. See Appendix D.**	Yes
Lathamus discolor	Swift Parrot	The species 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. **Unlikely. See above.**	No
Merops ornatus	Rainbow Bee-eater	The number of locations that the Rainbow Bee-eater occurs in is unknown, and has not been estimated. The Rainbow Bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation (Higgins 1999). It usually occurs in open, cleared or lightly-timbered areas that are often, but not always, located in close proximity to permanent water. The Rainbow Bee-eater occurs in open woodlands and shrublands, including mallee, and in open forests that are usually dominated by eucalypts. It also occurs in grasslands and, especially in arid or semi-arid areas, in riparian, floodplain or wetland vegetation assemblages. **Potential - Species is potentially present due to generalist habitat requirements. Can occur in grassland and in various cleared or semi-cleared habitats.**	Yes
Motacilla flava	Yellow Wagtail	**Unlikely. See above.**	No
Myia cyanoleuca	Satin flycatcher	**Unlikely. See above.**	No.
Rostratula benghalensis	Painted snipe	**Listed as Endangered as *Rostratula australis*. Assumed present. See above.**	No

Appendix F: Matters of National Environmental Significance

EPBC Listed Critically Endangered and Endangered Species

One Endangered species, the Australian Painted Snipe has the potential to be impacted by the proposal.

Under the EPBC Act, an action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:

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

EPBC listed Vulnerable Species

Three Vulnerable (V) species have the potential to be impacted by the proposal, The White-throated Needletail, Superb Parrot, and Slender Darling-pea.

Under the EPBC Act, an action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:

1. Lead to a long-term decrease in the size of an important population of a species
2. Reduce the area of occupancy of an important population
3. Fragment an existing important population into two or more populations
4. Adversely affect habitat critical to the survival of a species
5. Disrupt the breeding cycle of an important population
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
8. Introduce disease that may cause the species to decline, or
9. Interfere substantially with the recovery of the species.

Each species listed above has been assessed against these guidelines.

Australian Painted Snipe	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	No. The species potentially occurs within the subject site. There are no known breeding sites within the subject site,

	which contains no mapped wetlands but may provide marginal habitat when grasslands/paddocks flood.
Reduce the area of occupancy of the species	Up to 16.18 ha of potential habitat will be removed. This will not reduce the area of occupancy of the species within the local area.
Fragment an existing population into two or more populations	No. Up to 16.18 ha of potential habitat will be removed. However, this will not fragment habitat patches. See Section 5 for additional mitigation measures.
Adversely affect habitat critical to the survival of a species	No. The proposal will not substantially modify or remove critical habitat elements required by this species so that the species is likely to decline. There are two farm dams just outside the subject site and two watercourses, which transect the subject site that will not be modified.
Disrupt the breeding cycle of a population	No. The subject site likely only provides marginal habitat for this species when the grassland/paddocks are inundated. There are no mapped wetlands or major watercourses within or within close proximity to the subject site.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. The proposal will remove up to 16.18 ha of potential marginal habitat. This is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No. There are already high threat weeds within the species' potential habitat. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 5).
Introduce disease that may cause the species to decline, or	No. The proposal does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 5).
Interfere with the recovery of the species.	Conservation actions for the species include protecting known breeding and foraging areas where the species is known or likely to occur. As the species has potential to occur but there is no known or likely population within the subject site (and no records within 10 km), the proposal does not interfere with the recovery of the species.
Conclusion	No significant impact

White-throated Needletail	
Significant Impact Guideline	**Assessment**

Lead to a long-term decrease in the size of an important population of a species	White-throated Needletails are non-breeding migrants to Australia. There are no important populations identified for this species. It is unlikely that individuals within the subject site are part of a key source population either for breeding or dispersal.
Reduce the area of occupancy of an important population	The subject site is not within an important population (see above).
Fragment an existing important population into two or more populations	As above.
Adversely affect habitat critical to the survival of a species	No. White-throated Needletails almost always forage aerially, at heights up to 'cloud level'. The proposal will not substantially modify or remove critical habitat elements required by this species so that the species is likely to decline.
Disrupt the breeding cycle of an important population	See 1 above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. The proposal will remove up to 16.18 ha of potential habitat. There is similar and better quality connected mapped vegetation within the wider study area. Therefore, the proposal will not cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No. There are already high threat weeds within the species' potential habitat. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 5).
Introduce disease that may cause the species to decline, or	No. The proposal does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 5).
Interfere with the recovery of the species.	There are no recovery actions identified under the EPBC Act for this species.
Conclusion	No significant impact

Superb Parrot	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	There are no important populations identified for this species. It is unlikely that individuals within the subject site are part of a key source population either for breeding or dispersal as there are no hollow-bearing trees within the subject site.
Reduce the area of occupancy of	The subject site is not within an important population (see

an important population	above).
Fragment an existing important population into two or more populations	As above.
Adversely affect habitat critical to the survival of a species	Unlikely. The proposal will remove 16.18 ha of potential habitat. There is similar and better quality connected mapped vegetation within the wider study area. Therefore, the proposal will not cause the species to decline.
Disrupt the breeding cycle of an important population	See 1 above. No breeding habitat as there are no hollow-bearing trees and the subject is outside of known breeding areas.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. The proposal will remove up to 16.18 ha of potential habitat. There is similar mapped vegetation within the study area and wider 10 km search area. Therefore, the proposal will not cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No. There are already high threat weeds within the species' potential habitat. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 5).
Introduce disease that may cause the species to decline, or	No. The proposal does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 5).
Interfere with the recovery of the species.	Conservation actions for the species include protecting known breeding season foraging habitat. The subject site is not located within any sites listed for priority management.
Conclusion	No significant impact

Slender Darling-pea assessment of significance.

Slender Darling-pea, *Prasophyllum sp. wybong*	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species.	No. There are no important populations identified for this species. The subject site is unlikely to be an important population, as there are no records of the species within 10 km.
Reduce the area of occupancy of an important population.	No. The subject site is not within an important population (see above). The proposal will remove up to 16.18 ha of potential habitat. This is unlikely to reduce the area of occupancy of the species within the local area as there is approximately 255 ha of similar mapped vegetation within

	the study area and significantly more within a wider 10 km search area.
Fragment an existing important population into two or more populations	As above. The subject site is not within an important population.
Adversely affect habitat critical to the survival of a species	The subject site is not part of any recognised important population and there is no record of the species within 10 km. Therefore, it is unlikely that the subject site would be critical to the survival of the species.
Disrupt the breeding cycle of an important population	Unlikely. The subject is not part of any recognised important population and there is no record of the species within 10 km.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely. The proposal will remove 16.18 ha of potential habitat, however this is unlikely to decrease the availability or quality of the habitat to the extent that the species declines as there is approximately 255 ha of similar mapped vegetation within the study area and significantly more within a wider 10 km search area.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No. There are already weeds within the species' potential habitat. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Introduce disease that may cause the species to decline, or	No. The proposal does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Interfere with the recovery of the species.	The proposal is not part of any recognised important population; however, it does constitute a loss of potential habitat.
Conclusion	No significant impact

EPBC Act listed migratory species

Seven migratory/marine species have the potential to be impacted by proposal, the Fork-tailed Swift, Pectoral Sandpiper, Latham's Snipe, Cattle Egret, Black-eared Cuckoo, White-bellied Sea-Eagle (see above) and Rainbow Bee-eater.

Under the EPBC Act, an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Each species listed above has been assessed against these guidelines

Fork-tailed Swift Assessment of Significance.

Fork-tailed Swift	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Fork-tailed Swift does not breed in Australia. There are no significant threats to the Fork-tailed Swift in Australia. Potential threats include habitat destruction and predation by feral animals. Due to the wide range of the species the potential impacts are thought to be negligible.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	See first point above.
Conclusion	No significant impact

Pectoral Sandpiper	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Pectoral Sandpiper does not breed in Australia and there is no permanent habitat on the subject site for this species (shallow fresh to saline wetlands). The species could occur on the subject site if/when grassland is inundated. However, the proposal will not destroy or isolate an area of important habitat.

Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	See first point above.
Conclusion	No significant impact

Latham's Snipe	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Latham's Snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia. There is no permanent habitat on the subject site for this species (wetland or coastal habitat). The species could occur on the subject site if/when grassland is inundated. However, the proposal will not destroy or isolate an area of important habitat.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	See first point above.
Conclusion	No significant impact

Cattle Egret	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire	The Cattle Egret does not breed near the subject site. The proposal will remove up to 16.18 ha of potential habitat. There

regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	is similar connected mapped vegetation within the study area and wider 10 km search area. Therefore, the proposal will not modify, destroy or isolate an area of important habitat for the species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	See first point above.
Conclusion	No significant impact

Black-eared Cuckoo	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Black-eared Cuckoo is listed as Least Concern by the IUCN and EPBC Act. There is no approved conservation advice, listing advice or recovery plan. The proposal will remove up to 16.18 ha of potential habitat. There is similar connected mapped vegetation within the study area and wider 10 km search area. Therefore, the proposal will not modify, destroy or isolate an area of important habitat for the species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	See first point above.
Conclusion	No significant impact

Rainbow Bee-eater Assessment of Significance.

Rainbow Bee-eater	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The species is not declining and is widespread throughout Australia. The subject site is small in extent and does not form part of an ecologically significant proportion of the population. The only actual, identified threat to the Rainbow Bee-eater is the introduced Cane Toad (*Bufo marinus*). This threat will not increase as a result of the proposed works. Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	Environmental safeguards for the management of biosecurity risks will be implemented (see Section 6.2).
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	See first point above.
Conclusion	No significant impact

Appendix G: Key Threatening Processes

Key Threatening Processes (KTP) predicted as acting on the study area that may be exacerbated by the proposal.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal
Threat	Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala* (Latham, 1802)	KTP	KTP	**NO** The proposal does not include any activities that might exacerbate this threat.	NO IMPACT
Threat	Alteration of habitat following subsidence due to longwall mining	KTP		**NO** The proposal does not include longwall mining.	NO IMPACT
Threat	Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		**NO** Two mapped watercourses cross existing access tracks within the subject site. These tracks will not be widened.	NO IMPACT
Threat	Anthropogenic Climate Change	KTP	KTP	**YES** Some unavoidable emissions that contribute to climate change will occur from construction machinery and ongoing use of the site as a quarry.	NON-SIGNIFICANT IMPACT
Threat	Bushrock removal	KTP		**YES** Bush rocks occur within the subject site and will be removed as part of the quarry proposal.	NON-SIGNIFICANT IMPACT
Threat	Clearing of native vegetation	KTP	KTP	**YES** Up to 16.18 ha of native vegetation will be cleared.	NON-SIGNIFICANT IMPACT
Threat	Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus*	KTP	KTP	**NO** The proposal does not include any activities that might spread feral rabbits.	NO IMPACT
Threat	Competition and habitat degradation by Feral Goats, *Capra hircus*	KTP	KTP	**NO** Feral goats will not be introduced to the site as a result of the proposal	NO IMPACT
Threat	Competition from feral honey bees, *Apis mellifera*	KTP		**NO** The proposal does not include any activities that might introduce feral honey bees.	NO IMPACT
Threat	Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		**NO** The proposal does not include any activities that would exasperate this threat.	NO IMPACT
Threat	Herbivory and environmental degradation caused by feral deer	KTP		**NO** The proposal does not include any activities that would exasperate this threat.	NO IMPACT

Threat	High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		**NO** Fire frequency will not increase due to activities undertaken as part of the proposal.	NO IMPACT
Threat	Importation of Red Fire Ants *Solenopsis invicta*	KTP	KTP	**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Infection by *Psittacine Circoviral* (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Introduction of the Large Earth Bumblebee *Bombus terrestris*	KTP		**NO** The proposal does not include any activities that might introduce the Large Earth Bumblebee	NO IMPACT
Threat	Invasion and establishment of exotic vines and scramblers	KTP		**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Invasion and establishment of the Cane Toad (*Bufo marinus*)	KTP	KTP	**NO** The proposal does not include any activities that might introduce this species.	NO IMPACT
Threat	Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*	KTP		**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Invasion of native plant communities by exotic perennial grasses	KTP		**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* into NSW	KTP		**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL

Threat	Invasion, establishment and spread of Lantana	KTP		**POTENTIAL** Machinery used on site can potentially act as a transport for biosecurity risks	POTENTIAL
Threat	Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	**NO** The proposal does not include any activities that might cause garden plants to escape.	NO IMPACT
Threat	Loss of Hollow-bearing Trees	KTP		**NO** No hollow-bearing trees within the subject site.	NO IMPACT
Threat	Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		**NO** No sites present.	NO IMPACT
Threat	Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	KTP		**NO** Ease of access for Feral Dogs will not be increased by the proposal.	NO IMPACT
Threat	Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)	KTP		**NO** The proposal does not include any activities that would exacerbate this threat.	NO IMPACT
Threat	Predation by the European Red Fox (*Vulpes vulpes)*	KTP	KTP	**NO** Ease of access for foxes will not be increased by the proposal.	NO IMPACT
Threat	Predation by the Feral Cat *Felis catus*	KTP	KTP	**NO** Ease of access for cats will not be increased by the proposal.	NO IMPACT
Threat	Predation, habitat degradation, competition and disease transmission by Feral Pigs	KTP	KTP	**NO** Ease of access for pigs will not be increased by the proposal.	NO IMPACT
Threat	Removal of dead wood and dead trees	KTP		**YES** Some dead wood and trees are likely to be removed.	NON-SIGNIFICANT IMAPCT

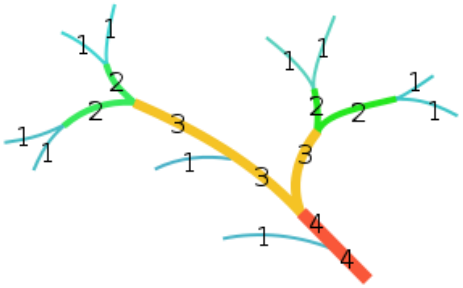
Appendix H: Terms and abbreviations

Terms and abbreviations used in this report

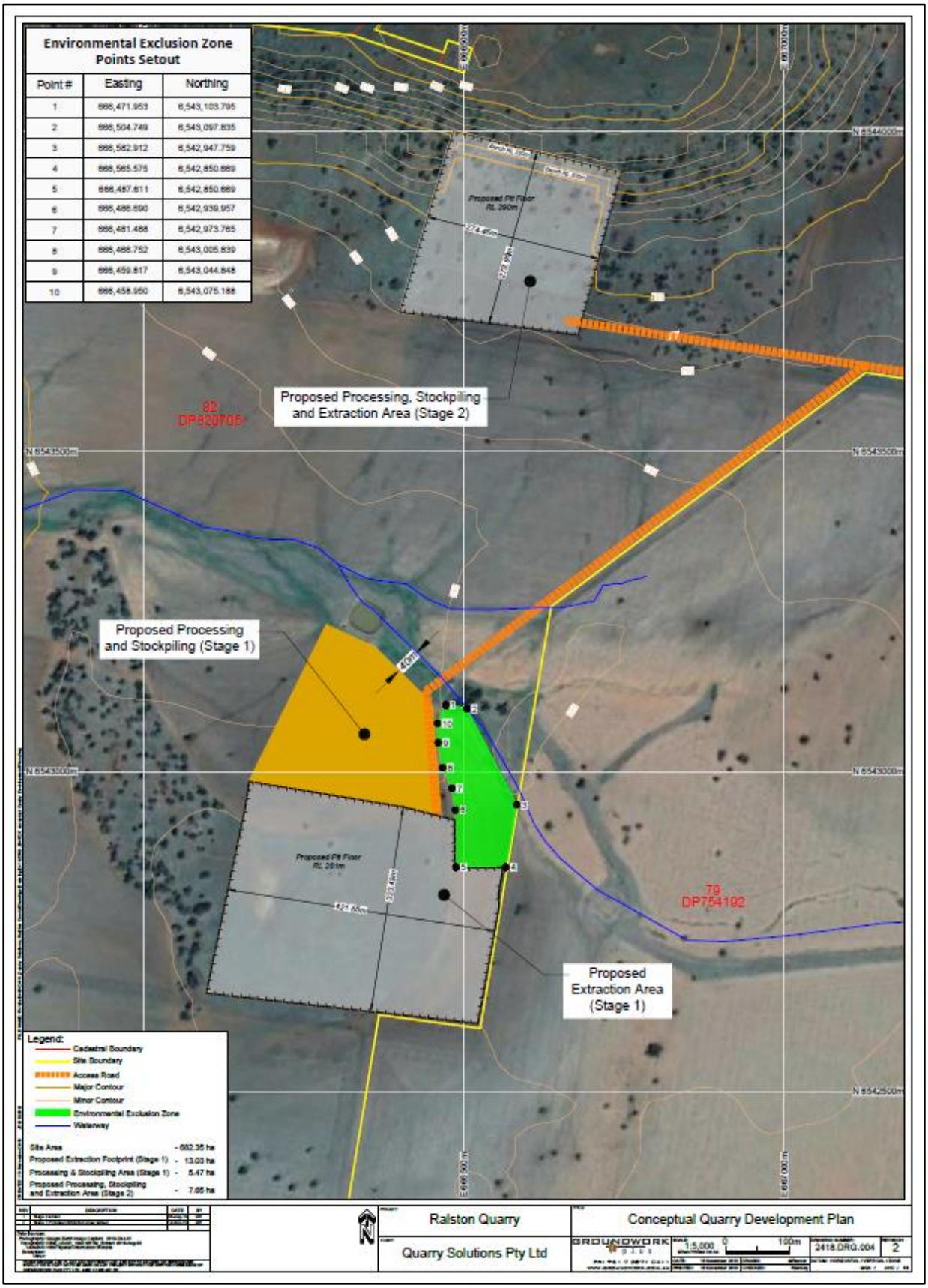
Abbreviation	Terminology	Description
BC Act	*Biodiversity Conservation Act 2016* (NSW)	The purpose of this Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. This Act contains schedules relating to the listing of threatened species, populations and communities in NSW. It also outlines the framework regulating development impact assessments in relation to biodiversity.
	Biosecurity Act 2015 (NSW)	The broad objectives for biosecurity in NSW are to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants by • Preventing their entry into NSW • Quickly finding, containing and eradicating any new entries • Effectively minimising the impacts of those pests, diseases, weeds and contaminants that cannot be eradicated through robust management arrangements. The *Biosecurity Act 2015* provides a statutory framework to help achieve these objectives.
CAMBA	China-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with China entered into in 1986. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
	Cumulative impacts	Impacts, when considered together, lead to a stronger impact than any impact in isolation.
	Direct impacts	Directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.
DoEE	Australian Government Department of Environment and Energy	The Department of the Environment designs and implements the Australian Government's policies and programmes to protect and conserve the environment, water and heritage and promote climate action.
DP	Deposited Plan	A plan of land deposited in Land and Property Information (part of the Land Management Authority) and used for legal identification purposes. They most commonly depict a subdivision of a parcel of land.
EEC	Endangered Ecological Community	An ecological community identified by relevant legislation likely to become extinct or is in immediate danger of extinction.
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW).	Provides the legislative framework for land use planning and development assessment in NSW.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).	Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
FM Act	*Fisheries Management Act 1994* (NSW)	The objects of this Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. This Act protects aquatic habitats and species which are not protected under the BC Act.
IBRA	Interim Biogeographic Regionalisation of Australia	The Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation of Australia developed by the Australian Government's Department of the Environment. Each region is a land area made up of a group of interacting ecosystems repeated in similar form across the landscape.

	Indirect impacts	Occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development.
JAMBA	Japan-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with Japan entered into in 1974. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
KTP	Key Threatening Process	A key threatening process is defined as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. A requirement of their listing on the TSC Act is that the process adversely affects two or more threatened species, populations or ecological communities, or may cause species, populations or ecological communities not threatened to become threatened.
	Local population (species)	A local population of a threatened plant species comprises those individuals occurring in a defined area or a cluster of individuals extend into habitat adjoining and contiguous with the study area where the individuals could reasonably be expected to cross-pollinate. A local population of fauna species comprises those individuals known or likely to occur in in a defined area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area. The local population of migratory or nomadic fauna species comprises those individuals likely to occur in the study area from time to time.
	Local occurrence (EEC)	The ecological community present within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of the ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.
	Low condition (vegetation)	Vegetation in low condition means: a) woody native vegetation with native over-storey percent foliage cover less than 50% of the lower value of the over-storey percent foliage cover benchmark for that vegetation type, and where either: – less than 50% of ground cover vegetation is indigenous species, or – greater than 90% of ground cover vegetation is cleared OR b) native grassland, wetland or herbfield where either: – less than 50% of ground cover vegetation is indigenous species, or – more than 90% of ground cover vegetation is cleared If native vegetation is not in low condition, it is in moderate to good condition. The percentages for the ground cover calculations must be made in a season when the proportion of native ground cover vegetation compared to non-native ground cover vegetation in the area is likely to be at its maximum. NOTE: Clearing the habitat of threatened species, populations or communities for the purposes of reducing its condition prior to assessment under the methodology may be a breach of environmental legislation, including sections 118A and 118D of the *National Parks and Wildlife Act 1974* (NPW Act), the *Native Vegetation Act 2003* (NV Act) and/or the *Environmental Planning and Assessment Act 1979* (EP&A Act).
MNES	Matters of national environmental significance	Refers to the seven matters of national environmental significance outlined under the EPBC Act.
NPW Act	*National Parks and Wildlife Act 1974* (NSW)	The objects of this Act are as follows: • The conservation of nature, including, but not limited to, the conservation of: • habitat, ecosystems and ecosystem processes, and

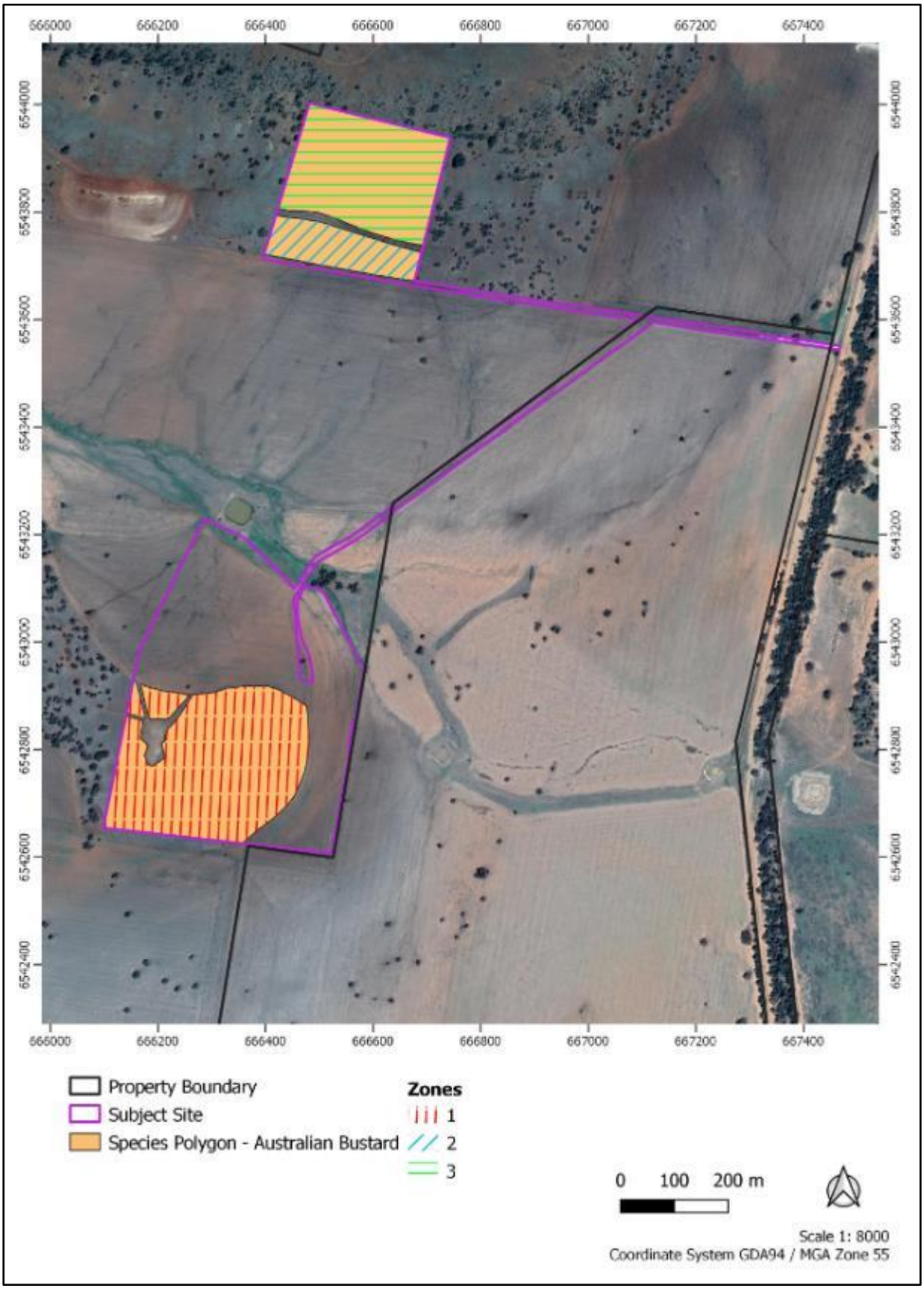
		• biological diversity at the community, species and genetic levels, and • landforms of significance, including geological features and processes, and • landscapes and natural features of significance including wilderness and wild rivers, The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to: • places, objects and features of significance to Aboriginal people, and • places of social value to the people of New South Wales, and • places of historic, architectural or scientific significance, • Fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation, • Providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation. The objects of this Act are to be achieved by applying the principles of ecologically sustainable development.
OEH	Office of Environment and Heritage	The Office of Environment and Heritage (OEH) is a separate agency within the Planning and Environment cluster. OEH was formed on 4 April 2011 and works to protect and conserve the NSW environment, including the natural environment, Aboriginal country, culture and heritage and our built heritage, and manages NSW national parks and reserves.
PoEO Act	*Protection of the Environment Operations Act 1997*	The objects of this Act are as follows: • to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development, • to provide increased opportunities for public involvement and participation in environment protection, • to ensure the community has access to relevant and meaningful information about pollution, • to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms promoting: • pollution prevention and cleaner production, • the reduction to harmless levels of the discharge of substances likely to cause harm to the environment, • the elimination of harmful wastes, • the reduction in the use of materials and the re-use, recovery or recycling of materials, • the making of progressive environmental improvements, including the reduction of pollution at source, • the monitoring and reporting of environmental quality on a regular basis, • to rationalise, simplify and strengthen the regulatory framework for environment protection, • to improve the efficiency of administration of the environment protection legislation, • to assist in the achievement of the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.
RAMSAR	Convention on Wetlands of International Importance	The Ramsar Convention's broad aims are to halt the worldwide loss of wetlands and to conserve, through wise use and management, those remaining. This requires international cooperation, policy making, capacity building and technology transfer.
	Risk of extinction	The likelihood that the local population will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the viability of that population.
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with the Republic of Korea entered into in 2007. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
RF Act	*Rural Fires Act 1997*	The objects of this Act are to provide: • for the prevention, mitigation and suppression of bush and other fires in local government areas (or parts of areas) and other parts of the State constituted as rural fire districts, and

		• for the co-ordination of bush firefighting and bush fire prevention throughout the State, and • for the protection of persons from injury or death, and property from damage, arising from fires, and • for the protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires, and • for the protection of the environment by requiring certain activities referred to in paragraphs (a)-(c1) to be carried out having regard to the principles of ecologically sustainable development described in section 6 (2) of the *Protection of the Environment Administration Act 1991*.
SEPP 44	State Environmental Planning Policy No.44 – Koala Habitat	This Policy aims to encourage the proper conservation and management of areas of natural vegetation with habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline: • by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and • by encouraging the identification of areas of core koala habitat, and • by encouraging the inclusion of areas of core koala habitat in environment protection zones.
Significant impact		A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity.
SIS	Species Impact Statement	A document included with an Environmental Impact Statement which details a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section. The requirements as to the contents of an SIS for different categories of protected species are given in section 110 of the TSC Act.
Strahler stream order		Strahler stream order and are used to define stream size based on a hierarchy of tributaries. 

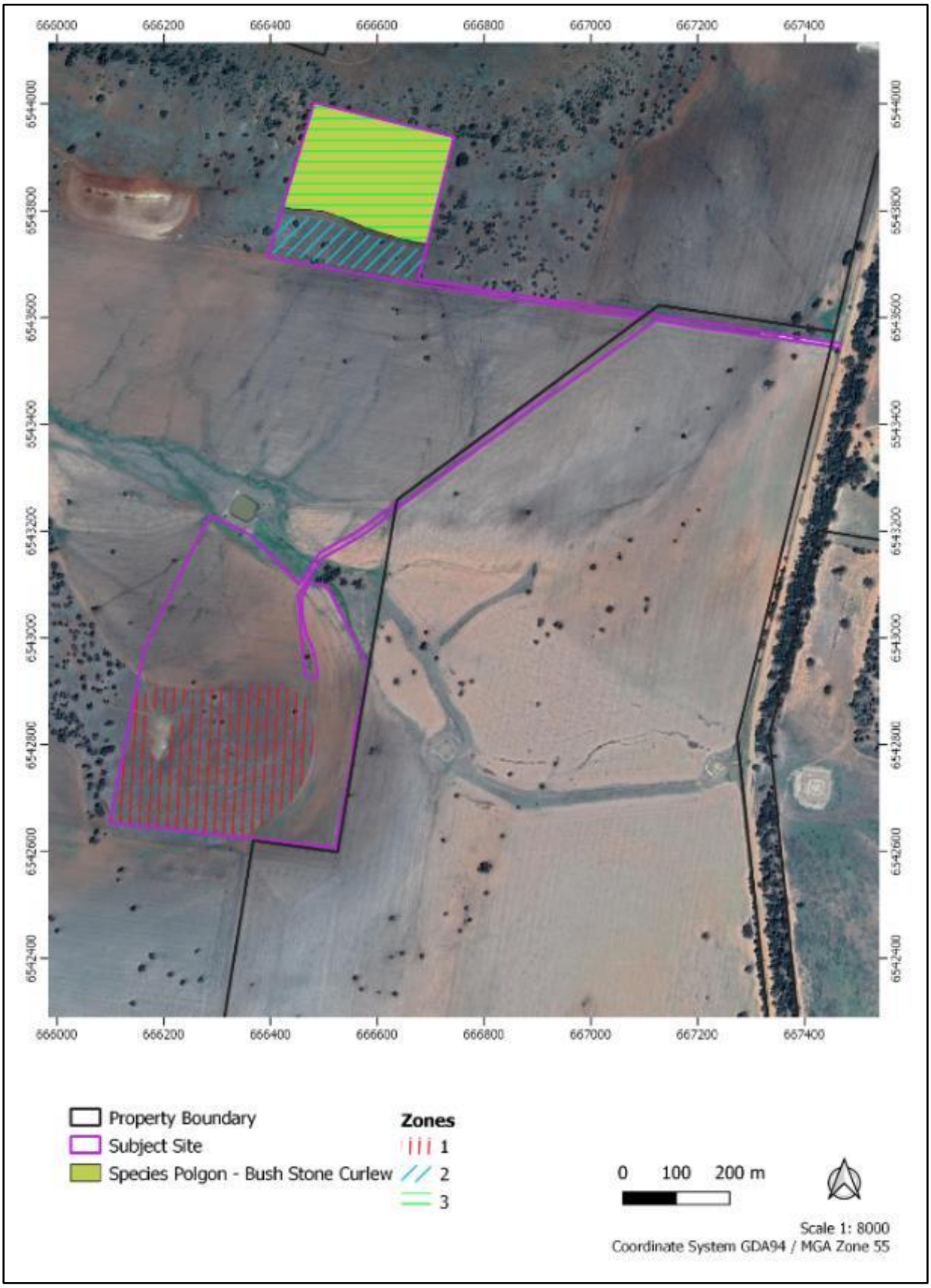
Appendix I: Detailed Site Plan


Environmental Exclusion Zone Points Setout
Point # | Easting | Northing
1 | 666,471.953 | 6,543,103.795
2 | 666,504.749 | 6,543,097.835
3 | 666,582.912 | 6,542,947.759
4 | 666,585.575 | 6,542,850.889
5 | 666,487.811 | 6,542,850.889
6 | 666,486.690 | 6,542,939.957
7 | 666,481.488 | 6,542,973.765
8 | 666,466.752 | 6,543,005.839
9 | 666,459.817 | 6,543,044.848
10 | 666,458.950 | 6,543,075.188
Proposed Processing, Stockpiling and Extraction Area (Stage 2)
Proposed Processing and Stockpiling (Stage 1)
Proposed Extraction Area (Stage 1)
Proposed Pit Floor RL 290m
Proposed Pit Floor RL 281m
82 DP820705
79 DP754192
N 6544000m
N 6543500m
N 6543000m
N 6542500m
E 669 000 m
Legend:
Cadastral Boundary
Site Boundary
Access Road
Major Contour
Minor Contour
Environmental Exclusion Zone
Waterway
Site Area - 662.35 ha
Proposed Extraction Footprint (Stage 1) - 13.03 ha
Processing & Stockpiling Area (Stage 1) - 5.47 ha
Proposed Processing, Stockpiling and Extraction Area (Stage 2) - 7.65 ha
Ralston Quarry
Quarry Solutions Pty Ltd
Conceptual Quarry Development Plan
GROUNDWORK PLUS
1:5,000
0
150m
2418.DRG.004
2

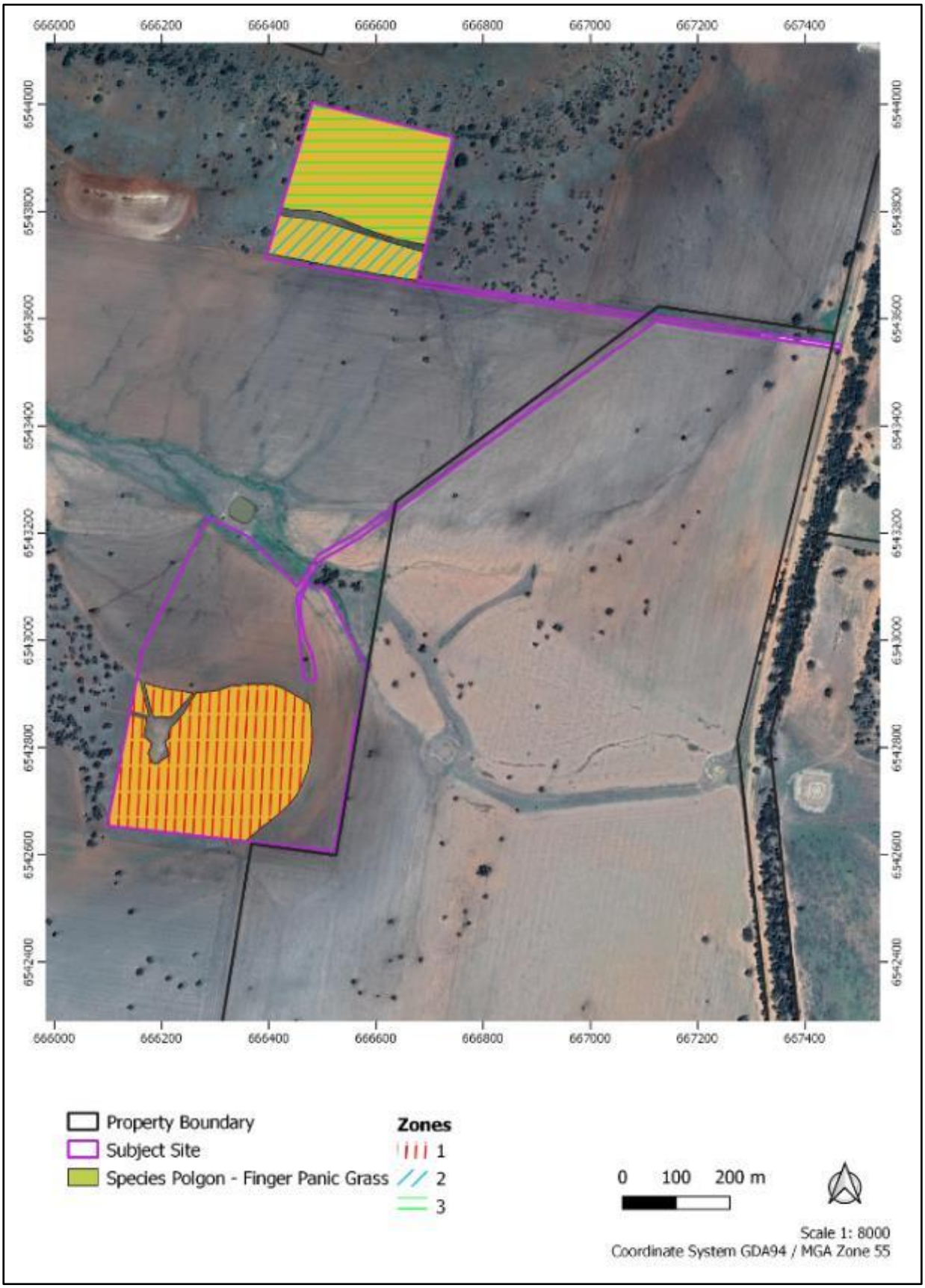
Appendix J: Species Polygons



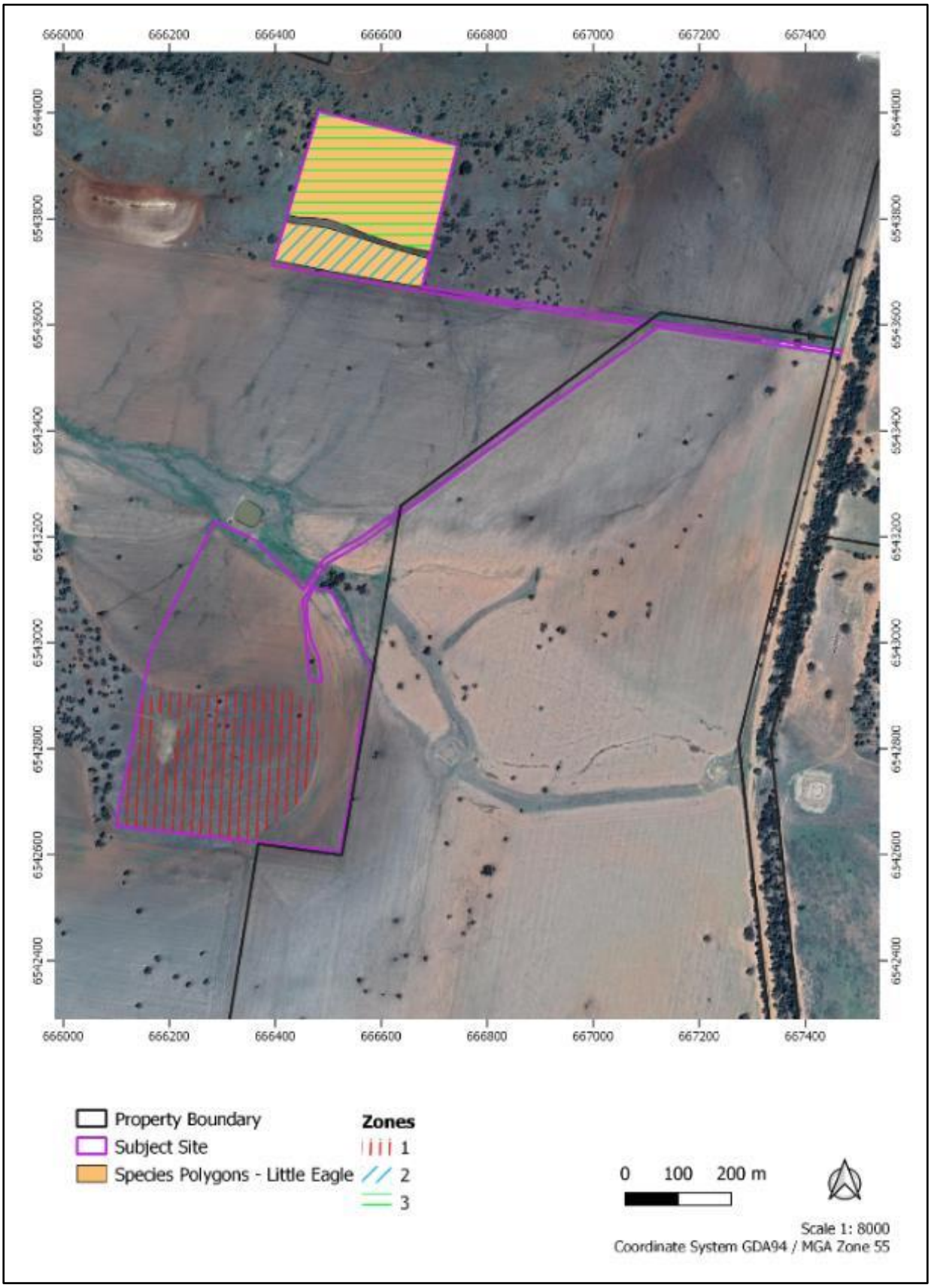
Species polygon – Australian Bustard



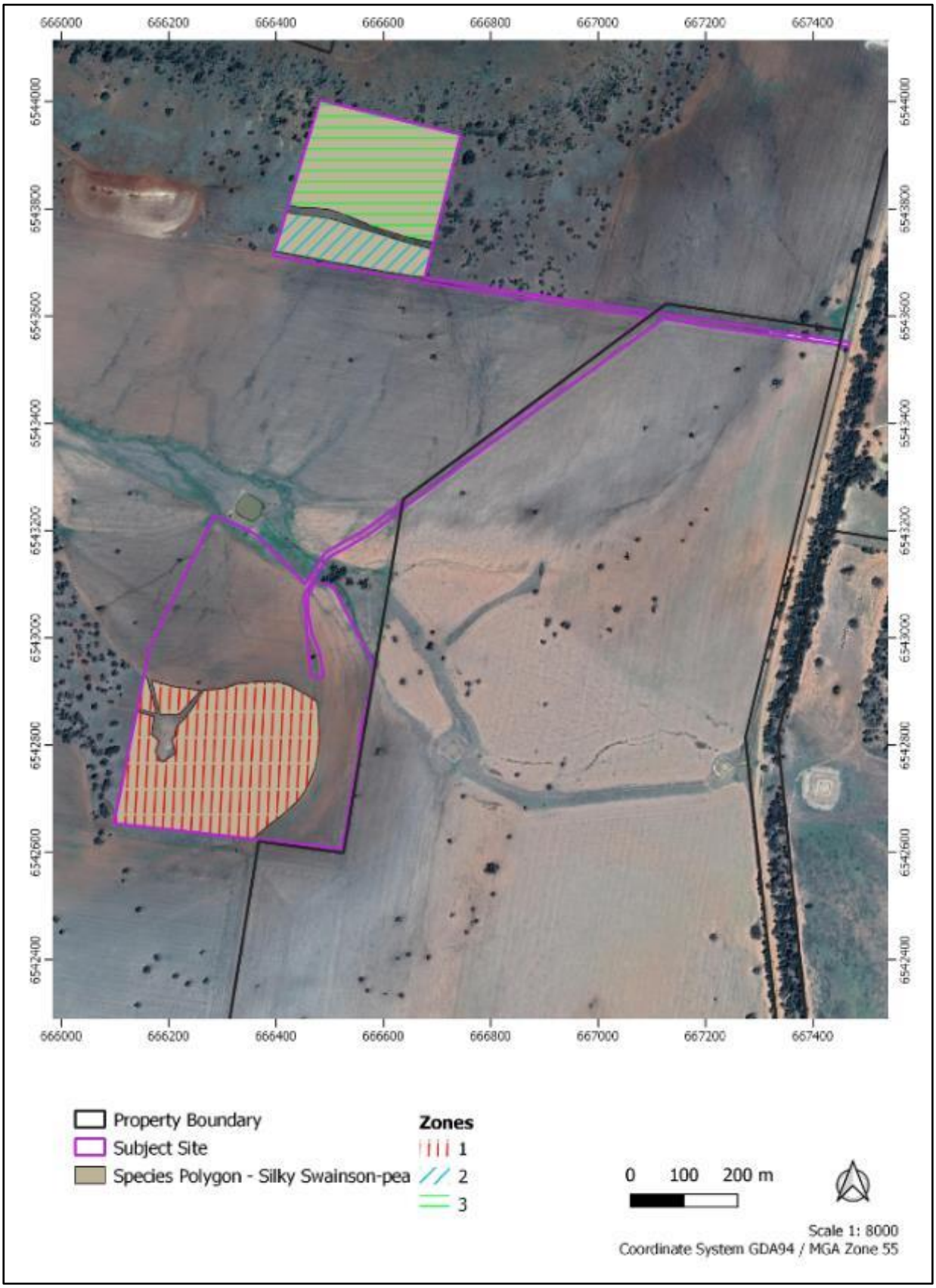
Species polygon – Bush Stone Curlew



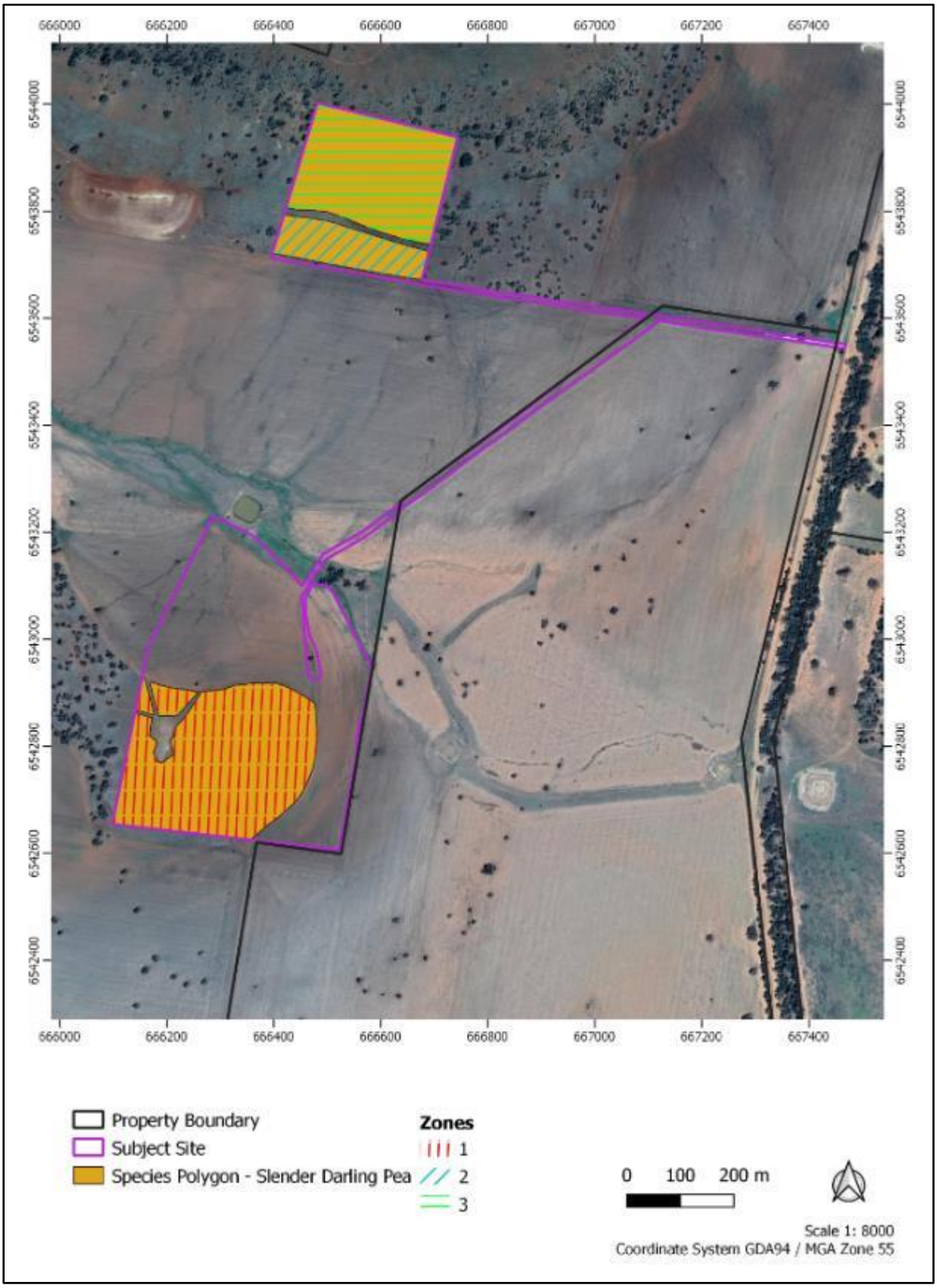
Species polygon – Finger Panic Grass



Species polygon – Little Eagle



Species polygon – Silky Swainson-pea



Species polygon – Slender Darling-pea

Appendix K: Biodiversity Credit Report (Like or Like)

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00018416/BAAS19069/19/00018417	Proposal Name Ralston Quarry	BAM data last updated * 26/11/2019
Assessor Name	Assessor Number	BAM Data version * 22
Proponent Names	Report Created 10/12/2019	BAM Case Status Open
Assessment Revision 1	Assessment Type Part 4 Developments (General)	Date Finalised To be finalised

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

Potential Serious and Irreversible Impacts

Nil

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Like for like)

Predicted Threatened Species Not On Site

Name
Anseranas semipalmata / Magpie Goose
Haliaeetus leucogaster / White-bellied Sea-Eagle

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	16.2	0.00

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	HBT	IBRA region
Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands - ≥ 50% - < 70% cleared group (including Tier 6 or higher).	No	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Species Credit Summary

Species	Area	Credits
Ardeotis australis / Australian Bustard	16.2	50.00
Burhinus grallarius / Bush Stone-curlew	5.6	29.00
Digitaria porrecta / Finger Panic Grass	16.2	50.00
Hieraaetus morphnoides / Little Eagle	7.5	29.00
Swainsona murrayana / Slender Darling Pea	16.2	50.00
Swainsona sericea / Silky Swainson-pea	16.2	50.00

Ardeotis australis/ Australian Bustard	49_Moderate1	**Like-for-like credit retirement options**

Spp	IBRA region
Ardeotis australis/Australian Bustard	Any in NSW

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

Ardeotis australis/ Australian Bustard	49_Moderate2	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Ardeotis australis/Australian Bustard	Any in NSW
	49_Poor	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Ardeotis australis/Australian Bustard	Any in NSW
Burhinus grallarius/ Bush Stone-curlew	49_Moderate2	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Burhinus grallarius/Bush Stone-curlew	Any in NSW
Digitaria porrecta/ Finger Panic Grass	49_Moderate1	**Like-for-like credit retirement options**	
		Spp	IBRA region

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

		Digitaria porrecta/Finger Panic Grass	Any in NSW
	49_Moderate2	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Digitaria porrecta/Finger Panic Grass	Any in NSW
	49_Poor	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Digitaria porrecta/Finger Panic Grass	Any in NSW
Hieraaetus morphnoides/ Little Eagle	49_Moderate1	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hieraaetus morphnoides/Little Eagle	Any in NSW

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

Hieraaetus morphnoides/ Little Eagle	49_Moderate1	
	49_Moderate2	**Like-for-like credit retirement options**
		Spp: IBRA region
		Hieraaetus morphnoides/Little Eagle: Any in NSW
Swainsona murrayana/ Slender Darling Pea	49_Moderate1	**Like-for-like credit retirement options**
		Spp: IBRA region
		Swainsona murrayana/Slender Darling Pea: Any in NSW
	49_Moderate2	**Like-for-like credit retirement options**
		Spp: IBRA region
		Swainsona murrayana/Slender Darling Pea: Any in NSW
	49_Poor	**Like-for-like credit retirement options**

Assessment Id: 00018416/BAAS19069/19/00018417

Proposal Name: Ralston Quarry

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

		Spp	IBRA region
		Swainsona murrayana/Slender Darling Pea	Any in NSW
Swainsona sericea/ Silky Swainson-pea	49_Moderate1	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Swainsona sericea/Silky Swainson-pea	Any in NSW
	49_Moderate2	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Swainsona sericea/Silky Swainson-pea	Any in NSW
	49_Poor	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Swainsona sericea/Silky Swainson-pea	Any in NSW

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

Swainsona sericea/ Silky Swainson-pea	49_Poor	