1154 GUNNEDAH ROAD, WESTDALE

Biodiversity Development Assessment Report

For:

PSA Consulting (Australia)

February 2019

Final

cumberland ecology

PO Box 2474
Carlingford Court 2118

Report No. 18055RP1

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
0	25/01/2019	HG/JL/KW	Draft
1	19/02/2019	HG	Final

Approved by: Dr David Robertson

Position: Director

Signed: David Robertson

Date: *19 February, 2019*

Table of Contents

Table of Contents *(Cont'd)*

Table of Contents *(Cont'd)*

Table of Contents *(Cont'd)*

List of Appendices

List of Tables

List of Tables

List of Figures

List of Photographs

Glossary of Terms

AOBV	Area of Outstanding Biodiversity Value
Assessment area	Area of land within a 1500 m buffer around the outer boundary of the subject land
BAAS	Biodiversity Assessor Accreditation System
Baiada	Baiada Poultry Pty Limited
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Calculator
BAR	Biodiversity Assessment Report
BC Act	*Biodiversity Conservation Act 2016*
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
Box Gum Woodland	White Box – Yellow Box – Blakely's Red Gum Woodland
DA	Development Application
development site	The land directly impacted by the proposed development (see **Figure 1.2**)
EEC	Endangered Ecological Community
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GDEs	Groundwater Dependent Ecosystems
GIS	Geographic Information System
GPS	Global Positioning System
ha	Hectares
IBRA	Interim Biogeographic Regionalisation for Australia
km	kilometres
LGA	Local Government Area

NSW	New South Wales
MNES	Matters of National Environmental Significance
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
the Project	Baiada Poultry Processing Plant Development
SAII	Serious and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
subject land	The area subject to the proposed action (**Figure 1.1)**
TEC	Threatened Ecological Community

Executive Summary

S1 Introduction

Cumberland Ecology was commissioned by PSA Consulting Australia Pty Ltd (PSA Consulting) on behalf of Baiada Poultry Pty Ltd (Baiada) to prepare a Biodiversity Development Assessment Report (BDAR) for the new Poultry Processing Plant Project located at 1154 Gunnedah Rd, Westdale NSW (the 'Project'). The Project involves construction of a new poultry processing plant plus ancillary developments, a new access road, and installation of waste water treatment facility.

This BDAR will form part of the required documentation to support an application for State Significant Development Consent under Part 4 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). Secretary's Environmental Assessment Requirements (SEARs) for the project were issued by the NSW Department of Planning and Environment (DP&E), which specified the requirement for a BDAR to be prepared in accordance with the Biodiversity Assessment Method (BAM).

The purpose of this BDAR is to document the findings of an assessment undertaken for the Project in accordance with Stage 1 (Biodiversity Assessment) and Stage 2 (Impact Assessment) of the BAM.

S2 Background

The Project is located on a property known as 'Oakburn' situated at 1154 Gunnedah Rd, Westdale NSW. It is approximately 7.5km north-west of the Tamworth Central Business District and lies within the Tamworth Regional Local Government Area.

Oakburn is located on Lot 100 DP 1097471, covering an area of approximately 57.6 hectares (ha) and the proposed access track will cover a portion of the south-eastern adjacent properties comprising Lots 101 and 102 DP 1097471.

The Development Application for the subject site will seek development consent for the following key elements:

- A new poultry processing plant with the capacity to process up to 3 million birds per week;
- Complete flexibility to operate up to 24hrs / 7 days;
- Increase in production at the existing rendering plant from 120 tonnes to 240 tonnes of finished product material per day;

- A new site access road connection to Armstrong Street / Goddard lane which will be used for all staff and heavy vehicles as opposed to the existing access to the Oxley Highway; and

- Waste Water Treatment via a new CAL / SBR / pond system.

S3 Landscape Features

As the project is being assessed as a site-based project, the assessment area comprises the area of land within a 1,500 m buffer around the outer boundary of the subject land. A summary of the landscape features identified within the assessment area are detailed below:

- Native vegetation covers 7.15% of the assessment area;

- Category 1, Category 2, and Category 3 streams and a small local wetland have been identified within the subject land and/or assessment area, which includes the Peel River Tributary that is considered to be a Category 1 stream that is within the development footprint;

- There is some very limited habitat connectivity between the subject land and surrounding areas, including planted vegetation associated with Boltons Creek;

- No karsts, caves, crevices cliffs or areas of geological significance were identified within the assessment area; and

- No Areas of Outstanding Biodiversity Value were identified within the assessment area.

S4 Native Vegetation

The subject land has been subject to detailed surveys by Cumberland Ecology for the purpose of this BDAR. Vegetation surveys included vegetation mapping, identification of Plant Community Types (PCTs), completion of 13 BAM plots, targeted threatened flora searches, targeted threatened fauna surveys, as well as assessment of vegetation patches against the Final Determinations for various Threatened Ecological Communities (TECs).

Native vegetation occupies approximately 4.8% of the subject land, and includes a single plant community type in two broad condition states that align to PCT 599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion. The remaining land within the subject land comprises exotic dominated pasture, garden beds and cleared land.

It is important to note that of the two broad condition states (vegetation zones) of PCT 599 occurring within the subject land, one consists of planted immature natives with the other occurring as scattered remnant and regrowth areas. This planted vegetation zone is not considered to comprise a naturally occurring vegetation community and technically does not conform to a PCT. Nonetheless, for the purpose of this BDAR, this vegetation community has

been assigned to what is considered to be the best-fit PCT based on the dominant planted natives.

The remnant and regrowth portion of PCT 599 has been assessed as conforming to the Threatened Ecological Community White Box Yellow Box Blakely's Red Gum Woodland (Box Gum Woodland) listed under the BC Act. This vegetation does not conform to the EPBC listing of White Box Yellow Box Blakely's Red Gum grassy woodland and derived native grassland due to the either the lack of mature trees within the patch size, the patch size not having a predominantly native understorey, or where it does have one it lacks the requisite 12 native non-grass understorey species and is <2 ha in size (DEH 2006).

S5 Threatened Species

The BAM Calculator generates a list of species credit species requiring assessment utilising a number of variables. The predicted ecosystem credit species for the two vegetation zones within the subject land produced a list of 10 ecosystem credit species, 13 species credit species and seven joint ecosystem/species credit species. No ecosystem credit species were removed from further assessment. Of the 13 species credit species, three were removed from further assessment. Surveys were undertaken for all remaining species credit species. None of these species were recorded within the subject land, and none are considered likely to occur.

S6 Prescribed Impacts

The project is considered to potentially result in the following prescribed impacts:

- Impacts on the habitat of a threatened species which comprises human made structures;
- Impacts on the habitat of a threatened species which comprises non-native vegetation;
- Impacts on the connectivity of habitat that facilitates the movement of threatened species;
- Impacts on movement of threatened species that maintains their lifecycle; and
- Impacts of vehicle strike.

S7 Avoid and Minimise Impacts

A number of measures to avoid and minimise impacts of the development have been applied during the design process of the final development layout. These include avoidance of portions of the native vegetation were feasible, limiting impacts to the Peel River Tributary and ensuring the development site is outside the 30 m applied to Boltons Creek. In order to conserve these areas and the biodiversity they support, the proposed development has been designed to avoid impacts to these areas as much as possible.

Although some areas of Box Gum Woodland TEC will be removed as part of the proposed development, the vegetation is in low condition and has little connectivity to the larger tract of the community across Gunnedah Road. Nevertheless, a patch adjacent to the existing site entrance with the highest number of mature trees and the most diverse native understorey will be retained, along with portions of the other scattered patches that occur throughout the subject land.

Alignment of the proposed access road has been designed to minimise direct impacts to the Category 1 stream to the east of the subject land, by placement of the crossing closest to the stream end point.

S8 Impact Assessment

S8.1 Direct Impacts

Approximately 0.83 ha of the 1.41 ha of Box Gum Woodland TEC and approximately 0.51 ha of the 1.45 ha of planted natives will be removed under the proposed development. The remaining ~0.58 ha and ~0.94 ha, respectively, will be retained within the subject land. The remainder of the vegetation to be removed consists of exotic dominated pasture and gardens beds that do not constitute a recognised ecological community.

Two large *Eucalyptus melliodora* hollow-bearing trees that each contains hollows ranging from small to large in size, one stick nest and the habitat associated with the native vegetation will be directly impacted under the proposed development. Four hollow-bearing trees and over half the native vegetation within the subject land will be conserved. Overall, the removal of these habitat features are considered to have only minor implications for fauna species due to the highly modified and degraded ecological context they are within and the high mobility of the species likely to utilise these habitats.

S8.2 Indirect Impacts

Indirect impacts associated with the project are detailed within the report body and include:

- Inadvertent impacts on adjacent habitat or vegetation;
- Reduced viability of adjacent habitat due to noise, dust or light spill; and
- Inadvertent impacts to hydrological processes.

While no groundwater dependent ecosystems are mapped within the subject land, it is recognised that riparian along Boltons Creek and the Peel River Tributary could have some root access to alluvial groundwater.

S8.3 Mitigation Measures

The following measures will be undertaken to mitigate impacts to native vegetation and habitat during and prior to construction:

Construction measures, to limit the impact of construction:

- Timing of construction works;
- Delineation of clearing areas;
- Pre-clearance surveys;
- Sedimentation control measures; and
- Weed management.

Vehicle Strike is the only uncertain impact likely to be relevant to the Project. Management of vehicle strike will be through implementation of signage, speed limits and lighting along the access road.

S8.4 Serious and Irreversible Impacts

One Serious and Irreversible Impact (SAII) entity, the Box Gum Woodland TEC, will be impacted under the proposed development. The proposed removal of approximately 0.83 ha of Box Gum Woodland TEC that occurs within the development site as a number of scattered and small isolated patches is unlikely to have any impact on the long-term survival of the TEC. The area surrounding the vegetation comprises vast areas of agricultural or industrial land use and the occurrence of these small, isolated and degraded patches is unlikely to contribute to these in any measureable way.

The removal of ~0.83 ha of Box Gum Woodland TEC will not increase the isolation of any important areas of the TEC however it is expected to marginally increase the fragmentation. The TEC is currently lacking in substantial connectivity to other areas of the EEC and removal of the areas within the development site would contribute little, if any, to the persistence of the larger tract of the TEC along Boltons Creek and across Gunnedah to the south. The impacts to Box Gum Woodland TEC, which is a SAII entity, are not considered to be significant.

S8.5 Offset Liability

As the project includes the removal of some areas of native vegetation, offsets are required in the form of ecosystem credits. This assessment indicated that the removal of the native vegetation within the subject land requires a total of 20 ecosystem credits for PCT 599. A suite of other PCTs could be utilised to offset this PCT under the offset rules.

S9 Conclusion

With the implementation of the proposed mitigation measures and the offsetting measures, it is considered that the impacts of this project on biodiversity, in particular on Box Gum Woodland will be minimal and can be appropriately managed.

cumberland ecology

Chapter 1

Introduction

Cumberland Ecology was commissioned by PSA Consulting Australia Pty Ltd (PSA Consulting) on behalf of Baiada Poultry Pty Ltd (Baiada) to prepare a Biodiversity Development Assessment Report (BDAR) for the new Poultry Processing Plant Project located at 1154 Gunnedah Rd, Westdale NSW (the 'Project'). The Project involves construction of a new poultry processing plant plus ancillary developments, a new access road, and installation of waste water treatment facility. This BDAR will form part of the required documentation to support an application for State Significant Development (SSD) Consent under Part 4 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.1 Requirement for BDAR

Section 7.9 of the NSW *Biodiversity Conservation Act 2016* (BC Act), requires all for SSD application to be accompanied by a BDAR unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values. The BDAR must be undertaken in accordance with the Biodiversity Assessment Method (BAM).

Secretary's Environmental Assessment Requirements (SEARs) were issued for the Project on 2 July 2018 which specified the requirement for a BDAR. The provisions of the SEARs that are relevant to this BDAR are reproduced below.

- *Biodiversity – including:*
  - *accurate predictions of any vegetation clearing on site or for any road upgrades*
  - *an assessment of the proposal in accordance with the Biodiversity Assessment Method (BAM) including the potential impacts on any threatened species,*
  - *populations, endangered ecological communities or their habitats and groundwater dependent ecosystems*
  - *details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies*

- *a detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts.*

1.2 Purpose

The purpose of this BDAR is to document the findings of an assessment undertaken for the Project in accordance with Stage 1 (Biodiversity Assessment) and Stage 2 (Impact Assessment) of the BAM. Specifically, the objectives of this BDAR are to:

- Identify the landscape features and site context (native vegetation cover) within the subject land and assessment area;
- Assess native vegetation extent, plant community types (PCTs), threatened ecological communities (TECs) and vegetation integrity (site condition) within the subject land;
- Assess habitat suitability for threatened species that can be predicted by habitat surrogates (ecosystem credits) and for threatened species that cannot be predicted by habitat surrogates (species credit species);
- Identify potential prescribed biodiversity impacts on threatened species;
- Describe measures to avoid and minimise impacts on biodiversity values and prescribed biodiversity impacts during project planning;
- Describe impacts to biodiversity values and prescribed biodiversity impacts and the measures to mitigate and manage such impacts;
- Identify the thresholds for the assessment and offsetting of impacts, including:
  - Impact assessment of potential entities of serious and irreversible impacts (SAII);
  - Impacts for which an offset is required;
  - Impacts for which no further assessment is required;
- Describe the application of the no net loss standard, including the calculation of the offset requirement.

1.3 Project Description

1.3.1 Location

The Project is located on a property known as 'Oakburn' situated at 1154 Gunnedah Rd, Westdale, NSW. It is approximately 7.5km north-west of the Tamworth Central Business District and lies within the Tamworth Regional Local Government Area (LGA).

Oakburn is located on Lot 100 DP 1097471, covering an area of approximately 57.6 hectares (ha) and the proposed access road will cover a portion of the south-eastern adjacent properties comprising Lots 101 and 102 DP 1097471. It is generally bounded by Gunnedah Road to the south west, Bolton Creek to the north west, rural pasture land to the north east and industrial developments and a Peel River tributary to the south east. The development will be a secondary production facility, and include a building envelope for the construction of the new poultry processing plant, installation of waste water treatment ponds and construction of a new access road to meet the existing Armstrong Street in the industrial development area.

A site map and location map have been prepared in accordance with the BAM and are presented in **Figure 1.1** and **Figure 1.2**, respectively.

1.3.2 Project Overview

The proposed development is identified under Item 22 Livestock Processing Industries within Schedule 3 of the *Environmental Planning and Assessment Regulation 2000* and accordingly is identified as Designated Development, requiring preparation of an Environmental Impact Statement. Due to the capital investment associated with the project the development is considered to be State Significant and will be assessed by the NSW Minister of Planning as the Consent Authority.

The Project involves the construction and operation of a new processing plant that will provide the capacity to process up to 3 million birds per week at the Oakburn property. The existing rendering plant located on the site is also proposed to increase current production levels from 120 tonnes of finished product per day to 240 tonnes per day.

The development of an integrated processing poultry processing plant was originally approved in February 1998 by the NSW Department of Urban Affairs and Planning (now the NSW Department of Planning and Environment). This approval (and subsequent modifications) allow for the development of an integrated poultry processing plant with a maximum capacity of 1 million birds per week. To date, only Stage 1 (Rendering Plant) has been constructed with the balance of the development still to be completed. In response to the projected growth in demand for poultry products, Baiada is now proceeding with a new application for a poultry processing plant with a production capacity of 3 million birds per week.

The SSD application for the subject land will seek development consent for the following key elements:

- A new poultry processing plant with the capacity to process up to 3 million birds per week;
- Complete flexibility to operate up to 24hrs / 7 days;
- Increase in production at the existing rendering plant from 120 to 240 tonnes of finished product material per day;

- A new site access road connection to Armstrong Street / Goddard lane which will be used for all staff and heavy vehicles as opposed to the existing access to the Oxley Highway; and

- Waste Water Treatment via a new CAL / SBR / pond system.

1.3.3 Identification of the Development Site Footprint

The layout of the Project is shown in **Figure 1.3**. The development site footprint comprises the area of land directly impacted by the Project including the Oakburn Processing Plant, car park, Oakburn Processing Plant Waste Water Treatment Plant and access road, as well as a 10 m buffer surrounding the proposed developments that will account for any encroachment of construction activities into the adjacent land. Therefore, with the 10m buffer in place, the operational and construction footprint for the Project will be the same and will be referred to hereafter as the development site. The area of the Oakburn property occupying the whole of Lot 100 DP 1097471 and the portions of Lots 101 and 102 DP 1097471 to be utilised for the construction of the access road (including 10m buffers either side) will hereafter collectively be referred to as subject land. A rendering waste water treatment plant to be located in the northern portion of the subject land has been approved separately under DA 2018-0443 and will be included within the subject land, however it will be categorised as cleared land within this BDAR and is not within the development site.

1.3.4 General Description of the Development Site

i. Historical and Present Land Use

Historically, the Oakburn property has been cleared of native vegetation and was used for agricultural purposes including grazing of cattle until it was purchased by Baiada in 1999. Baiada demolished the existing residential dwelling, excluded grazing cattle from most areas, and built a first Oakburn Rendering Plant within the property. The rendering plant burnt down in 2013 and was replaced by the larger Oakburn Rendering Plant that is presently operational and represents Stage 1 of the existing 1998 development approval. Two areas consisting of rows of native trees were planted in April 2011 by Baiada, utilising local species in landscaping of the property.

Oakburn currently exists as a predominantly treeless property with the exception of a few scattered paddock trees, four small patches of native trees, and two areas of immature planted natives. For the most part, the site is comprised of grasslands that are dominated by exotic pasture grasses with some native grasses interspersed throughout. Areas of grassland towards the Gunnedah Road boundary undergo routine slashing. Landscaped areas of predominantly exotic garden species are situated within the rendering plant compound and as fruit trees planted to border the existing access road to Gunnedah Rd.

Lots 101 and 102 DP 1097471, that the access road will traverse, have also been cleared and are currently utilised for grazing purposes, though portions of these lots to the south are used as a cemetery and crematorium.

ii. Topography and Soils

The topography and soils of Westdale are characterised by undulating to rolling slopes of sedimentary and metamorphic rocks interspersed with minor interbedded volcanics. The soils tend towards shallow and stony on ridges, red-brown texturecontrast soils on most slopes, with harsh yellow gully-forming soils in the lower slopes (Mitchell 2002).

iii. Hydrology

The subject land lies within the Namoi Catchment which is based around the Namoi River, one of the Murray-Darling Basin's major NSW sub-catchments (NSW Office of Water 2011). The hydrology of the subject land and surrounds has been heavily modified as a result of historical land use.

Boltons Creek is 3rd order mapped waterway that lies outside the north western boundary of the subject land and is crossed by Gunnedah Road via a bridge adjacent to the southern-most corner. A small swamp/wetlands area occurs as part of Boltons Creek towards the northern corner of the subject land that contains vegetation and reeds representative of swamp/wetlands area (*Typha orientalis*); however no visible standing water was present throughout most of the wetlands area at the time of survey. While this represents only a small swamp/wetland area that has limited potential to sustain some wetland species, it is recognised as having significant wildlife habitat value based on its inclusion on the Office of Environment and Heritage's (OEH's) Biodiversity Values Map.

Within Lots 101 and 102 DP 1097471 an unnamed tributary of the Peel River that is a first order mapped waterway occurs, which will be traversed by the access road under the proposed development. No running water was present in this waterway during the time of survey, and it terminates within the boundary of Lot 101 DP 1097471 just south of the subject land. This is likely to be an ephemeral stream that accumulates water in its depressions and has marginal flows throughout periods of heavy rainfall. This waterway has been heavily modified through the clearing of vegetation and the agricultural use of the land, with mostly exotic grasses occupying the stream bed and edges. This waterway is not recognised as having a significant wildlife habitat function based on its exclusion from the Biodiversity Values Map.

iv. Vegetation

The vegetation of Tamworth and the surrounding rural landscapes have been heavily modified since the first European settlement in NSW. Most of the pre-existing vegetation was historically cleared. The majority of cleared areas have been planted with pasture grasses to support agricultural grazing, and few areas have been allowed to regenerate due to ongoing land use activities. Native grasses do still occur throughout the region, and may intergrade with the exotic pasture grasses where unrestricted.

To the south western corner across Gunnedah Road, and in conjunction with Boltons Creek, a patch of White Box – Yellow Box – Blakely's Red Gum Woodland (Box Gum Woodland) extends along the western boundary of the airport and continues southwards for approximately 6 km. There are also planted natives comprising canopy species characteristic

of Box Gum Woodland outside the boundary of the subject land adjacent to Boltons Creek. These immature planted natives have been placed in rows either side of the creek and wetland area and have connectivity with the remnant patch across Gunnedah Road to the south. There is no connectivity to existing patches beyond the additional plantings to the north.

1.4 Information Sources

1.4.1 Databases

A number of databases were utilised during the preparation of this BDAR, including:

- OEH BioNet Atlas;
- OEH Threatened Biodiversity Data Collection;
- OEH BioNet Vegetation Classification database;
- Commonwealth Department of the Environment and Energy (DoEE) Species Profile and Threat Database;
- DoEE Protected Matters Search Tool (PMST); and
- DoEE Directory of Important Wetlands in Australia.

1.4.2 Literature

This BDAR has utilised the results and/or spatial data from the following documents:

- OEH Hunter Native Vegetation Mapping - Hunter Greater Version 4 3855 (2012); and
- Namoi CMA GDE Mapping (SKM 2010).

1.4.3 Aerial Photography

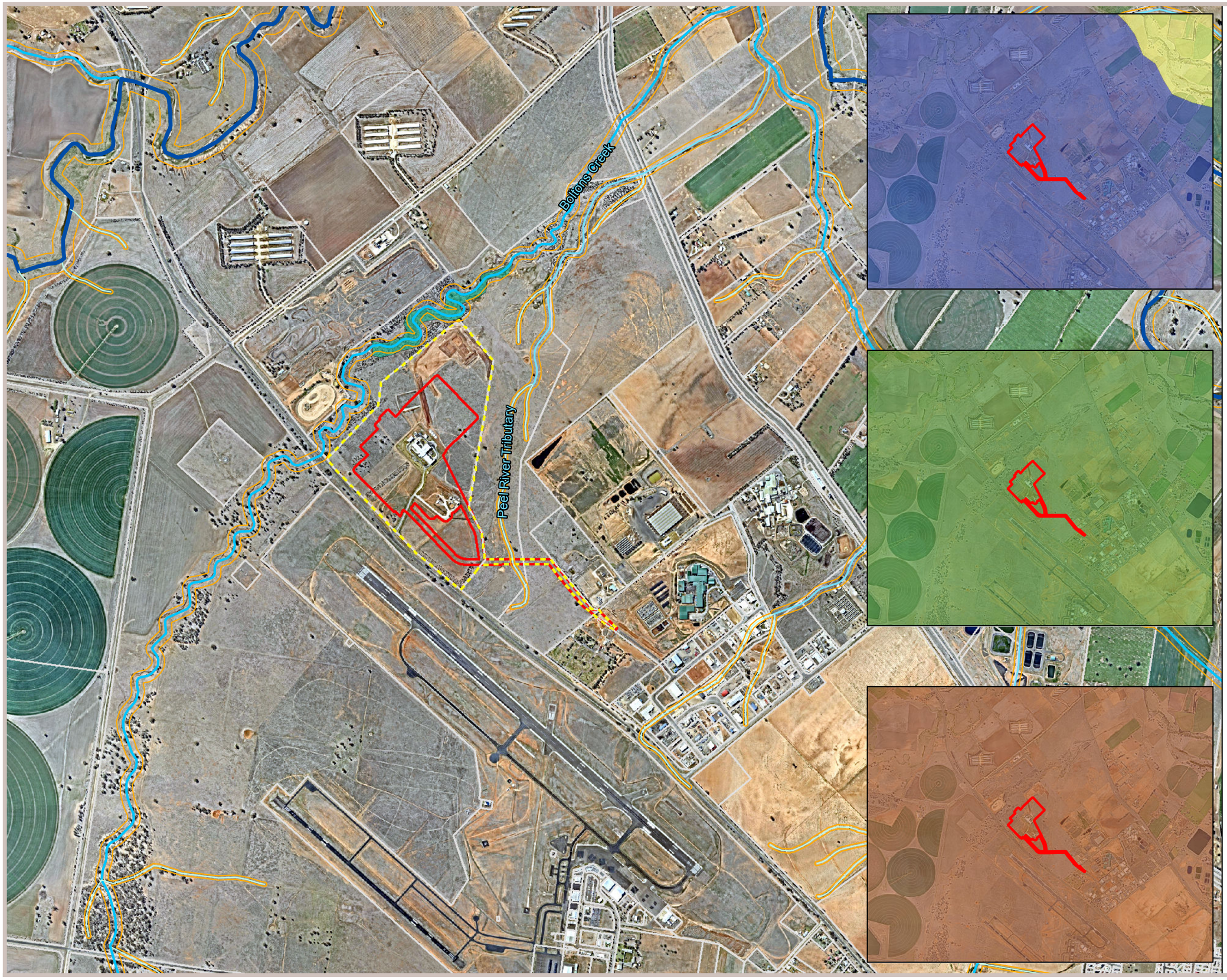
The aerial imagery utilised in this BDAR is sourced from Nearmap and is dated 16 September 2018.

1.5 Authorship and Personnel

This document has been authorised by Dr David Robertson (BAM Accredited Assessor No: BAAS17027). This document, and associated filed surveys and Geographic Information Systems (GIS) mapping, was prepared with the assistance of additional personnel as outlined in **Table 1.1**. Notwithstanding the assistance of the additional personnel, the assessment presented within this document is Dr Robertson's.

Table 1.1 Personnel

Name	Tasks	Relevant Qualifications / Training	BAM Accredited Assessor No.
Dr David Robertson	Document review	Doctor of Philosophy. Ecology, University of Melbourne, 1986 Bachelor of Science (Honours) in Ecology, University of Melbourne, 1980 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS17027
Katrina Wolf	Document review	Bachelor of Science (Environmental). The University of Sydney, 2007 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS18010
Dr Gitanjali Katrak	Document review	Doctor of Philosophy, Intertidal Wetland Ecology. Flinders University, 2011 Bachelor of Science (Honours) in Biological Sciences. La Trobe University, 2002 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS17064
Dr Rohan Mellick	Field surveys	Doctor of Philosophy, Evolutionary Ecology. The University of Adelaide, 2012 Bachelor of Applied Science (Honours) in Natural Resource Management, Southern Cross University, 2000. BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS18075
Heather Gosper	Field surveys, document preparation, credit calculations	Bachelor of Environmental Science and Management. The University of Newcastle, 2013 BAM Accredited Assessor Training. Muddy Boots, 2017	-
Michael Davis	GIS mapping, credit calculations	Bachelor of Biodiversity and Conservation. Macquarie University, 2016 BAM Accredited Assessor Training. Muddy Boots, 2017	-
Jesse Luscombe	GIS mapping, credit calculations	Bachelor of Marine Science. Macquarie University, 2013 Certificate III in Conservation and Land Management. TAFE NSW, 2016	-



Legend

- Development Site
- Subject Land
- Cadastre
- Local Wetlands
- Riparian Buffers

Watercourses

- 1st Order stream
- 2nd Order stream
- 3rd Order stream
- 6th Order or above

Mitchell Landscapes

- Peel Channels and
- Tamworth - Keepit Slopes and Plains

IBRA Bioregions

- Nandewar

IBRA Subregion

- Peel

Image Source:
Image © NearMap 2018
Dated: 16/9/2018

Data Source:
State Environmental Planning Policy (Coastal Management) 2018
© Department of Finances, Sercives and Innovation 2017

DECCW (2008). Landscapes (Mitchell) of NSW - Version 3.

DSEWPaC (2012). Interim Biogeographic Regionalisation for Australia (IBRA) - Version 7.

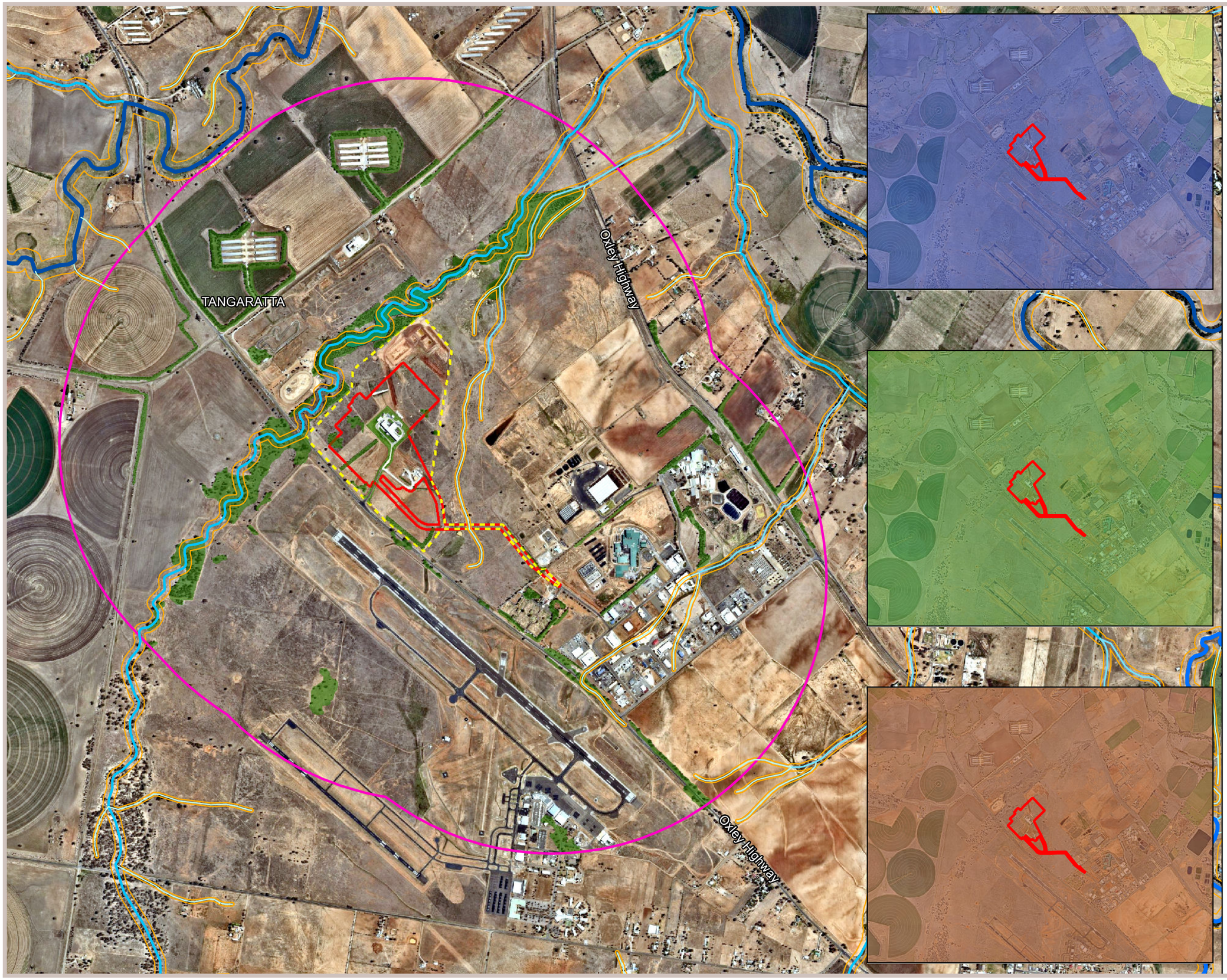
Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 150 300 450 600 m

I:\...\18055\Figures\RP1\20190123\Figure 1.1. Site Map

Figure 1.1. Site Map



Legend

- Development Site
- Subject Land
- Assessment Area
- Local Wetlands
- Native Vegetation Extent
- Riparian Buffers

Watercourses

- 1st Order stream
- 2nd Order stream
- 3rd Order stream
- 4th Order stream
- 5th Order stream
- 6th Order or above

Mitchell Landscapes

- Peel Channels and
- Tamworth - Keepit Slopes and Plains

IBRA Bioregions

- Nandewar

IBRA Subregion

- Peel

Image Source:
Image © NearMap 2018
Dated: 16/9/2018

Data Source:
State Environmental Planning Policy (Coastal Management) 2018
© Department of Finances, Sercives and Innovation 2017

DECCW (2008). Landscapes (Mitchell) of NSW - Version 3.

DSEWPaC (2012). Interim Biogeographic Regionalisation for Australia (IBRA) - Version 7.

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 200 400 600 800 m

I:\...\17145\Figures\RP1\20190123\Figure 1.2. Location Map

Figure 1.2. Location Map

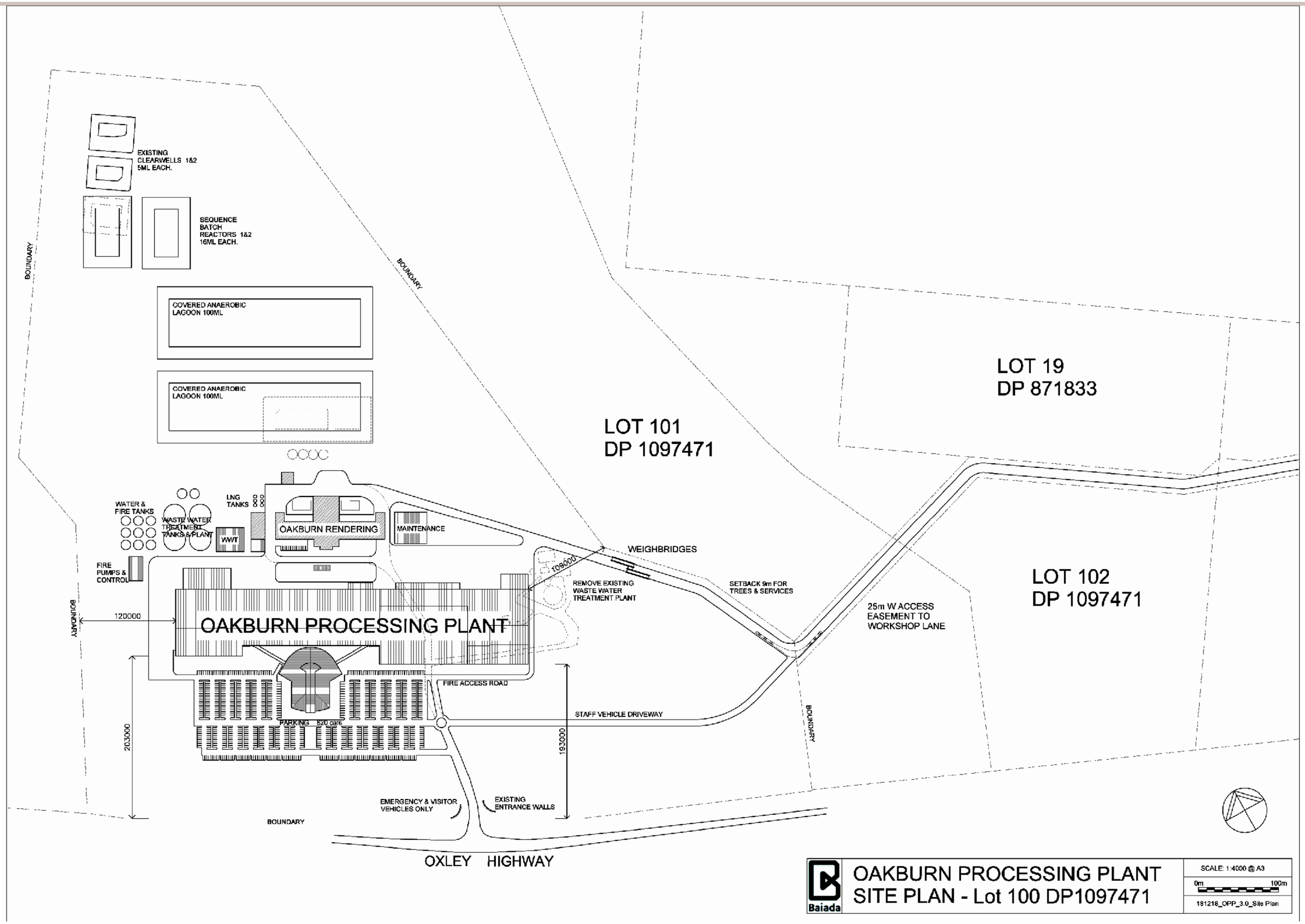


Figure 1.3. Layout of the Project

Image Source: Baiada 2019

Chapter 2

Landscape Features

2.1 Site Context

2.1.1 Assessment Area

As the Project is being assessed as a non-linear project, the assessment area comprises the area of land within a 1500 m buffer around the outer boundary of the subject land. The location of the assessment area is shown in **Figure 1.2**.

2.1.2 Native Vegetation Cover

The native vegetation cover was determined through the use of GIS. To map native vegetation cover within the subject land and assessment area, this assessment utilised the detailed vegetation mapping prepared by Cumberland Ecology in conjunction with broad scale mapping by the OEH Hunter Native Vegetation Mapping (2012). The native vegetation cover within the assessment area is shown in **Figure 1.2**. It occupies approximately 92.37 ha, which represents 7.15% of the assessment area. Therefore the native vegetation cover value is assigned to the cover class of 0–10%.

2.2 Landscape Features

Landscape features identified within the subject land and assessment area are outlined below. The extent of these features within the subject land is shown in **Figure 1.1** and the extent within the assessment area is shown in **Figure 1.2**.

2.2.1 IBRA Bioregions and IBRA Subregions

The subject land and assessment area occurs within the Nandewar Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and within the Peel IBRA Subregion.

2.2.2 Rivers, Streams and Estuaries

The subject land and assessment area occurs within the Namoi catchment. Notable surface drainage systems include the Peel River and Lake Keepit. A Category 1 stream has been identified within the subject land, with Category 2 and a Category 3 stream (Boltons Creek) within the assessment area.

A buffer of 10m and 30m either side of the waterways applies to Category 1 and Category 3 streams, respectively, in accordance with Appendix 3 of the BAM.

2.2.3 Important and Local Wetlands

No important wetlands listed in the Directory of Important Wetlands in Australia are present in the subject land or assessment area.

The closest important wetland based on the Directory of Important Wetlands in Australia is Lake Goran, located approximately 61km to the south west of the subject land.

There is a small area (<5 ha) identified as swamp/wetland outside the north-western boundary of the subject land associated with Boltons Creek based on vegetation mapping of the Nandewar IBRA region by the NSW Department of Environment and Conservation (DEC) (2004). The wetland is unnamed though it is classified as a Category 3 stream and contains vegetation indicative of riparian areas such as *Typha orientalis*. While the small swamp/wetland was predominantly dry and lacking in visible standing water when surveyed, it is identified as having some conservation significance due to being mapped on the Biodiversity Values Map.

2.2.4 Habitat Connectivity

The subject land is located in a highly agricultural and industrial environment, and is surrounded by grazing properties, Tamworth Airport, an industrial estate, and Gunnedah Road. There is some connectivity between the planted and remnant Box Gum Woodland that occurs within the riparian area of Boltons Creek outside the western boundary on the subject land, however continuation of this patch does not occur beyond the planted natives to the north, and this linear patch does not have significant habitat connectivity to the vegetation on site. The patch has some limited connectivity in the form of native grass species to grasses within the subject land.

2.2.5 Karsts, Caves, Crevices, Cliffs and Areas of Geological Significance

No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the assessment area.

2.2.6 Areas of Outstanding Biodiversity Value

No Areas of Outstanding Biodiversity Value (AOBV) have been mapped within the assessment area. An area of riparian habitat associated with Boltons Creek is mapped on the Biodiversity Values map. This area is not within the subject land or Oakburn property boundary.

2.2.7 Additional Features Required by SEARs

The SEARs for the Project issued on 2 July 2018 provides the following additional requirements that are not within the general scope of the BAM to be addressed in this BDAR:

- Potential impacts on Groundwater Dependent Ecosystems (GDEs); and
- Details of weed management during construction and operation in accordance with existing state, regional or local weed management plans or strategies.

2.2.8 Mitchell Landscapes

The Mitchell Landscape that occurs in the subject land and surrounds is “Tamworth – Keepit Slopes and Plains”.

2.2.9 Soil Hazard Features

Not required to be identified or mapped for SSDs.

Chapter 3

Methodology

3.1 Review of Existing Data

Existing information on biodiversity values within the assessment area were reviewed, which includes:

- Survey data that is held in the Flora Survey (BioNet) including:
  - OEH Threatened Biodiversity Data Collection.
- Existing vegetation mapping, being:
  - OEH Hunter Native Vegetation Mapping - Hunter Greater Version 4 (2012); and
  - Nandewar VIS mapping by the DEC (2004),

This existing information was considered and included, where appropriate, into survey design, vegetation mapping and reporting.

3.2 Flora Survey

3.2.1 Vegetation Mapping

Vegetation mapping of the subject land was undertaken by random meander searches throughout each patch of vegetation, noting key characteristics of areas in similar broad condition states such as similar tree cover, shrub cover, ground cover, weediness or combinations of these.

3.2.2 Vegetation Integrity Assessment

Vegetation integrity assessments following the BAM. Surveys included establishment of a 20 x 50 m plot within which the following data was collected:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 10 m x 40 m plot;

- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 10 m x 40m plot;
- Cover of 'High Threat Exotic' weed species;
- Assessment of function attributes within a 10 m x 100 m plot, including:
  - Count of number of large trees;
  - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
  - Regeneration based on the presence of living trees with steams <5 cm DBH;
  - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 20 m x 50 m plot; and
- Number of trees with hollows that are visible from the ground within the 20 m x 50 m plot.

A total of 13 plots were undertaken within the subject land, and their location is shown in **Figure 3.1**. Of these 13 plots, a total of five were undertaken within the native vegetation within the subject land and utilised further within this assessment. **Table 3.1** summarises the plot requirements based on vegetation zones. The minimum number of plots has been completed for both vegetation zones.

Table 3.1 Plot survey requirements

Vegetation Zone	PCT	Condition*	Area (ha)	Minimum Number of Plots Required	Number of Plots Completed
1	599	Low Condition	1.41	1	4
2	599	Planted	1.45	1	1

3.2.3 Threatened Flora Species Survey

Targeted threatened flora surveys were undertaken for species credit species that have the potential to occur within the subject land as determined by the BAM Calculator. All targeted surveys were conducted using parallel field traverses in accordance with the NSW Guide to Surveying Threatened Plants (OEH 2016). Targeted threatened flora surveys were undertaken by Rohan Mellick and Heather Gosper between the 17 December 2018 and 19 December 2018, for the following species:

- *Acacia atrox* (Myall Creek Wattle);

- *Dichanthium setosum* (Bluegrass);
- *Digitaria porrecta* (Finger Panic Grass);
- *Euphrasia arguta*;
- *Homopholis belsonii* (Belson's Panic);
- *Picris evae* (Hawkweed);
- *Thesium australe* (Austral Toadflax); and
- *Tylophora linearis*.

3.2.4 Flora Survey Effort

Table 3.3 below shows the flora survey effort, including dates, staff members and weather conditions.

Survey Detail	Date	Effort	Personnel	Weather Conditions
Vegetation Mapping	18 and 19 July 2018	12 person hours	Rohan Mellick, Heather Gosper	Clear skies, light to moderate breeze, temperature range: 15-22°C
BAM Plots	19 and 20 July 2018	13 x BAM Plots	Rohan Mellick, Heather Gosper	Clear skies, light to moderate breeze, temperature range: 3-22°C
Threatened Flora Searches	18 – 20 July 2018	Throughout 18 – 20 July 2018 surveys	Rohan Mellick, Heather Gosper	Cloudy, light to moderate breeze, temperature range: 6-17°C
Targeted Threatened Flora Surveys	17 - 19 December 2018	9 person hours	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C

3.3 Fauna Survey

3.3.1 Threatened Fauna Species Survey

The following threatened fauna species were included in targeted surveys during the field work:

- *Adelotus brevis* - endangered population (Tusked Frog population in the Nandewar and New England Tableland Bioregions);

- *Anthochaera phrygia* (Regent Honeyeater);
- *Calyptorhynchus lathami* (Glossy Black-cockatoo);
- *Haliaeetus leucogaster* (White-bellied Sea-eagle);
- *Lathamus discolor* (Swift Parrot);
- *Litoria booroolongensis* (Booroolong Frog);
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat);
- *Petaurus norfolcensis* (Squirrel Glider);
- *Phascogale tapoatafa* (Brush-tailed Phascogale);
- *Phascolarctos cinereus* (Koala);
- *Pteropus poliocephalus* (Grey-headed Flying-fox);
- *Uvidicolus sphyrurus* (Border Thick-tailed Gecko).

Under Section 6.4.1.13 of the BAM, species credit species can be excluded from further assessment, and thereby targeted surveys, if it is determined that none of the species-specific habitat constraints are present within the subject land (see ***Section 5.3***). Of these species the Regent Honeyeater, Swift Parrot and Glossy Black-cockatoo were excluded from requiring further assessment based on either the lack of/degradation of habitat constraints within the subject land, or the subject land not occurring within the mapped area for the species as advised by OEH.

Nevertheless, it was determined prudent the species be the subject of targeted surveys regardless as additional surveys were required for the species credit species requiring further assessment and the opportunity was available for undertaking these surveys despite them not being strictly required.

A number of other species credit fauna species had the potential to be excluded from further assessment based on the lack of/degradation of their habitat constraints, however due to the alignment of the survey period for these species within the timeframe for the additional surveys, they were not removed from consideration and were surveyed accordingly as a precautionary measure.

3.3.2 Fauna Survey Methods

Detailed survey methods are described below.

i. Habitat Assessment

Habitat assessments were carried out throughout the entirety of the subject site between 18 July 2018 and 20 July 2018. This survey identified any potential habitat features such as

significant rocky outcrops, bush rock, fallen logs, culverts, water bodies, decorticating bark, nests and hollow-bearing trees. Additional habitat assessments were carried out between 17 December 2018 and 19 December 2018 to target nests for the White-bellied Sea-eagle and breeding camps for the Grey-headed Flying-fox.

ii. Amphibian Surveys

Call playback was undertaken using a recording of the Booroolong Frog and Tusked Frog calls and involved playing the call for five minutes, listening for five minutes, and then searching the surrounding habitat for five minutes. This was conducted for each species at two locations; along Boltons Creek and along the Peel River Tributary within the subject land. These surveys took place over two consecutive nights on the 17 December 2018 and 18 December 2018. The region had recently experienced heavy rainfall in the previous weeks and conditions were ideal for amphibian survey.

This survey targeted: Booroolong Frog and Tusked Frog.

iii. Nocturnal Survey

Nocturnal spotlighting was undertaken via area searches along pre-determined transects throughout the subject land using high power hand-held torches, focussing on treed areas and areas associated with habitat features. Call playback was undertaken using a recording of the Squirrel Glider and Koala calls and involved playing the call for five minutes, listening for five minutes, and then searching the surrounding habitat for five minutes. Five transects were surveyed for between 40 person minutes and 60 person minutes each. Surveys occurred over two consecutive nights on 17 December 2018 and 18 December 2018 and were carried out by Rohan Mellick and Heather Gosper. Observations of all nocturnal birds, mammals, amphibians and reptiles were recorded.

This survey targeted: Squirrel Glider, Koala, Grey-headed Flying-fox, Brush-tailed Phascogale, and Border Thick-tailed Gecko.

iv. Stag/Hollow watches

Hollow/Stag-watching were undertaken by observing potential roost hollows for 30 minutes prior to sunset and 30 minutes following sunset. Watches were conducted at one of the two large *Eucalyptus melliodora* hollow-bearing trees within the development site each night between 17 December 2018 and 18 December 2018.

This survey targeted: Squirrel Glider, Brush-tailed Phascogale, and Glossy Black-Cockatoo.

v. Bird Surveys

Bird Surveys were undertaken using the area search method that involves walking within a 2 ha area and recording all avian species observed. These were conducted at six sites within the subject land for a minimum of 20 minutes per site. All surveys occurred between 17 December 2018 and 18 December 2018. A visual observation of all trees within the site was completed throughout the survey period and any nests present recorded.

This survey targeted: Swift Parrot, Regent Honeyeater, Glossy Black-Cockatoo, and White-bellied Sea-Eagle.

vi. Microchiropteran Bat Surveys

One ANABAT unit and one Songmeter unit were placed in proximity to areas of the most suitable microbat habitat and were left on-site for two consecutive nights between the 17 December 2018 and 18 December 2018 to record microbat activity. The units were relocated after the first night to a new site, resulting in four separate locations being surveyed for one night each and were collected on the morning of the 19 December 2018. The calls were analysed and species identified by Greg Ford of Balance Environmental.

This survey targeted the Eastern Bentwing-bat.

vii. Diurnal Active Searches

Diurnal Active Searches were conducted on 18 December 2018 and 19 December 2018 at a total of four locations within the subject the land. The surveys were situated to capture areas of suitable habitat that included treed vegetation, decorticating bark and fallen timber. Each site was surveyed by gently looking under loose bark on trees, under rock, through timber pile or fallen logs, and checking other areas where fauna are likely to be located. This method was employed carefully to ensure no detrimental impacts occurred to any fauna or their habitat.

This survey targeted: Border Thick-tailed Gecko, Booroolong Frog, and Tusked Frog.

viii. Koala SAT Search

Surveys for Koala populations known as the Spot Assessment Technique (SAT) were conducted throughout the site where possible. Survey locations were chosen based on patches of vegetation within the site that contained Koala food trees. Once a central food tree is established, a maximum of two-person minutes was spent searching for faecal pellets (scats) within a one metre radius of the base of the central tree and 29 surrounding trees. Tree trunks were searched for scratch marks, and the canopy was observed for any koalas present. In cases where 30 trees were not present only those available within a 25m radius of the central tree were surveyed. These surveys were completed at four sites throughout the subject land between 18 December 2018 and 19 December 2018.

ix. Motion Sensor Cameras

Four motion sensor cameras were deployed on 17 December 2018 throughout the subject land. The cameras were angled towards hollows in trees or towards the bases of treed vegetation as these areas were determined the most likely suitable habitats on site for fauna species. The cameras were operational for the duration of the surveys and were collected on the morning of the 19 December 2018.

3.3.3 Fauna Survey Effort

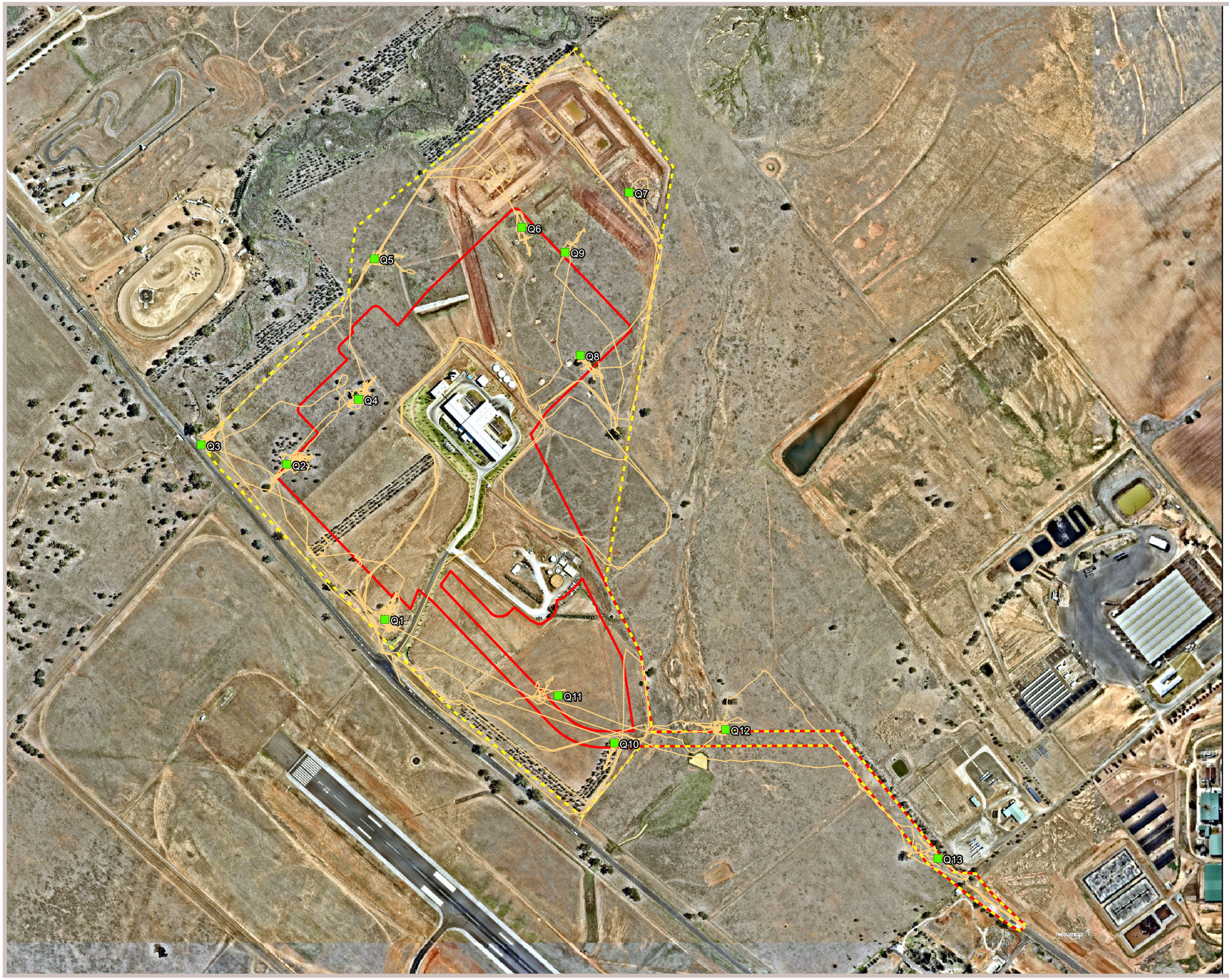
All surveys are undertaken during periods specified in the Threatened Biodiversity Data Collection (OEH 2018a) for each species and according to survey guidelines. **Table 3.4** below shows the fauna survey effort, including dates, staff members and weather conditions.

Table 3.2 Fauna survey effort

Survey Method	Date	Effort	Personnel	Weather Conditions	Notes
Habitat assessment	18-20 July 2018	Throughout survey period (approx. 30 person hours)	Rohan Mellick, Heather Gosper	Clear skies, light to moderate winds, temperature range:3-22°C	
Incidental observations	18-20 July 2018	Throughout survey period (approx. 30 person hours)	Rohan Mellick, Heather Gosper	Clear skies, light to moderate winds, temperature range: 3-22°C	
Habitat assessment	17 – 19 December 2018	Throughout survey period (approx. 37 person hours)	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	
Incidental observations	17 – 19 December 2018	Throughout survey period (approx. 37 person hours)	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	
Amphibian survey	17 & 18 December 2018	4 person hours	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	Heavy rain in preceding weeks, ideal conditions
Nocturnal survey	17 & 18 December 2018	4 person hours	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	
Stag/hollow watch	17 & 18 December 2018	4 person hours	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	
Bird survey	18 & 19 December	6 person hours	Rohan Mellick,	Clear skies, light breeze, temperature	

Table 3.2 Fauna survey effort

Survey Method	Date	Effort	Personnel	Weather Conditions	Notes
	2018		Heather Gosper	range: 18.4 – 36.3°C	
Microchiropteran-ran bat survey	17 -19 December 2018	2 x units recording 12hrs per night each over 2 nights (48 hours recorded)	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	
Diurnal active searches	18 & 19 December 2018	4 x sites for 0.5hrs each (4 person hours)	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	
SAT survey	18 & 19 December 2018	4 x sites for 0.5hrs each (4 person hours)	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	
Motion sensor cameras	17 -19 December 2018	4 x units recording throughout surveys (156 hours recorded)	Rohan Mellick, Heather Gosper	Clear skies, light breeze, temperature range: 18.4 – 36.3°C	



Legend

Development Site

Subject Land

Flora Survey Locations

Targeted Threatened Flora Survey

BAM Plot Locations

Image Source:
Image © NearMap 2018
Dated: 16/9/2018

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 50 100 150 200 m

I:\...\17145\Figures\RP1\20190111\Figure 3.1. Flora survey locations

Figure 3.1. Flora survey locations

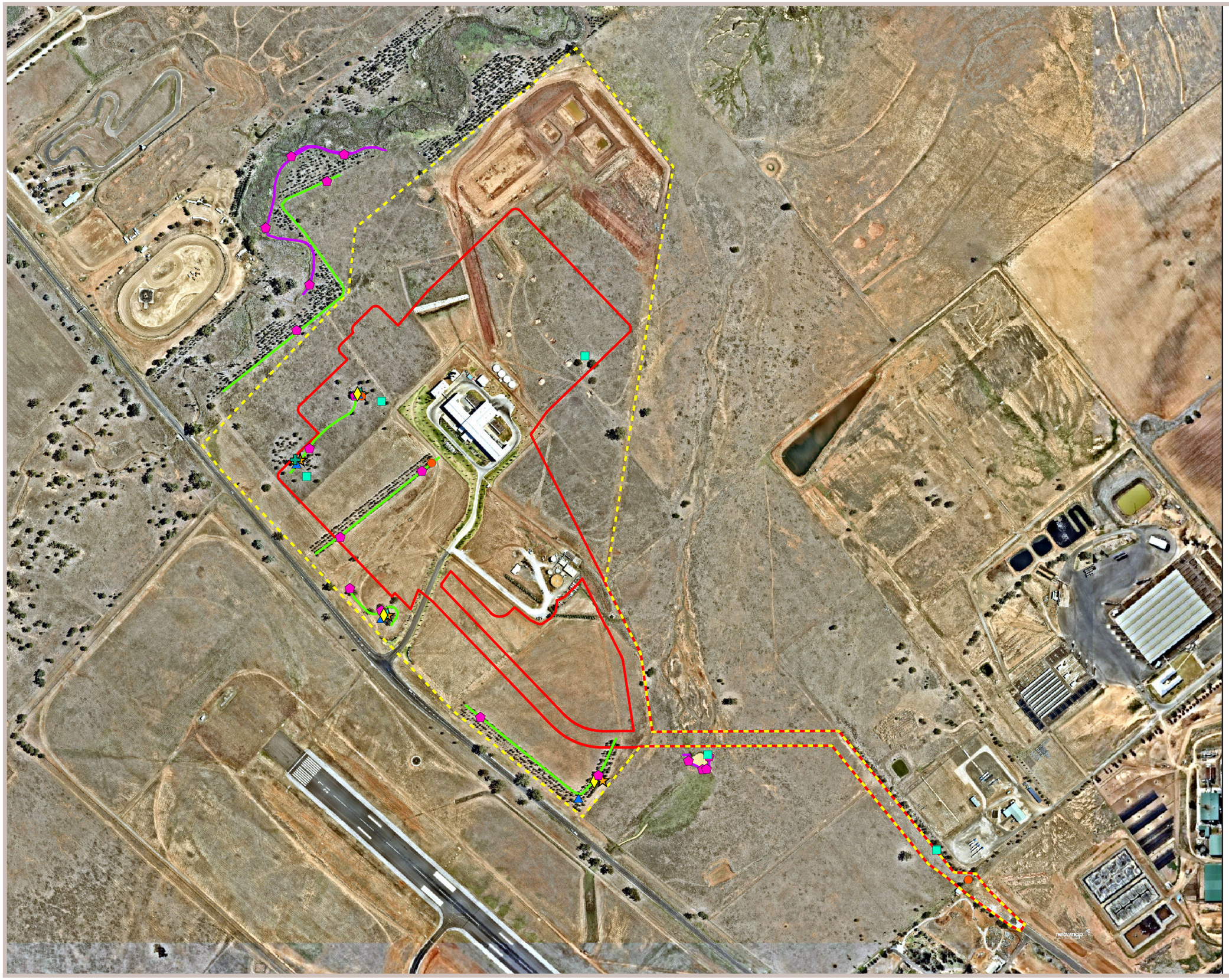


Figure 3.2. Fauna survey locations

Chapter 4

Native Vegetation

4.1 Native Vegetation Extent

The subject land has been subject to detailed surveys by Cumberland Ecology for the purpose of this BDAR. The native vegetation extent within the subject land was determined through aerial photograph interpretation and field surveys. The native vegetation extent within the subject land is shown in **Figure 4.1**. It occupies approximately 2.86 ha, which represents ~4.80% of the subject land. The native vegetation extent within the subject land includes a single native vegetation community in two broad condition states.

The remaining land within the subject land comprises cleared land that includes roads, the rendering plant, infrastructure; and the area to the north of the subject land that is subject to the separate DA and was cleared after the initial surveys in July 2018. The remainder of the subject land consists of garden beds, cleared areas and exotic dominated pasture grasses. In accordance with Section 5.1.1.5 of the BAM, the areas of cleared land, garden beds and pasture grasses do not require further assessment, unless they provide habitat for species credit species.

4.2 Plant Community Types

4.2.1 Introduction

Identification of the PCTs occurring within the subject land was guided by the results of the Cumberland Ecology surveys. The data collected during surveys of the subject land was analysed in conjunction with a review of the PCTs held within the BioNet Vegetation Classification Database. Consideration was given to the following:

- Occurrence within the Peel IBRA subregion;
- Vegetation formation;
- Alignment with TECs;
- Landscape position; and
- Upper, mid and ground strata species.

The analysis determined that the native vegetation within the subject land aligned with the following PCT.

- PCT 599: Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion.

The distribution of this PCT within the subject land is shown in **Figure 4.2**. Detailed descriptions of this PCT and the justification for PCT selection is provided in the sections below.

4.2.2 Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

Vegetation Formation: Grassy Woodlands

Vegetation Class: Western Slopes Grassy Woodland

Area: ~2.86 ha

Percent Cleared Value: 80%

TEC Status: Part Endangered Ecological Community (EEC) / Part non-EEC

i. General Description

This community occurs in two broad condition states within the subject land, as scattered degraded remnant patches (see **Photograph 4.1**) and as rows of planted natives (see **Photograph 4.2**). The remnant and planted patches occupy ~1.41 ha and 1.45 ha of the subject land, respectively.

Five degraded remnant occurrences are present within the subject land. Two occurrences consist of scattered paddock trees, comprising a canopy of a single individual mature *Eucalyptus melliodora* (Yellow Box). One occurrence to the north of the existing rendering plant is based around three mature *Brachychiton populnea* (Kurrajong), another occurrence comprises a sole *Eucalyptus melliodora* and a final occurrence is adjacent to the Oxley Highway access and is made up of 17 mature *Eucalyptus blakelyi* (Blakely's Red Gum).

Across these occurrences, where present the midstorey consists of regrowth *Eucalyptus melliodora* and *Eucalyptus blakelyi* (Blakely's Red Gum). The ground cover generally contains a mix of native and exotic species; where the natives are represented by species such as *Aristida behriana* (Bunch Wiregrass), *Eragrostis brownii* (Brown's Lovegrass), *Dichelachne micrantha* (Shorthair Plumegrass), *Aristida ramosa* (Purple Wiregrass), *Rytidosperma caespitosum* (Ringed Wallaby Grass) and *Austrostipa scabra* (Speargrass). The exotic component of this community includes *Lycium ferocissimum* (African Boxthorn), *Avena sativa* (Oats), *Verbena bonariensis* (Purpletop), *Plantago lanceolata* (Lamb's Tongue), *Centaurea solstitialis* (St Barnaby's Thistle) and *Sida rhombifolia* (Paddy's Lucerne).

Three areas of rows of planted natives occur to the south and east of the existing rendering plant. These trees were planted by Baiada in April 2011 and consist of some species representative of PCT 599, and some additional natives, set out in four rows of evenly spaced individual plants. The species include the species representative of the community

such as *Eucalyptus blakelyi* and *Eucalyptus melliodora, Eucalyptus amplifolia* (Cabbage Gum), *Allocasuarina verticillata* (Drooping Sheoak) and the additional native *Callistemon viminalis* (Weeping Bottlebrush). The ground cover is characterised by the natives *Aristida ramosa*, V*ittadinia cuneata* (A Fuzzweed), *Rytidosperma caespitosum* and *Aristida behriana*. The exotic groundcovers include *Sida rhombifolia*, *Marrubium vulgare* (White Horehound), *Carthamus lanatus* (Saffron Thistle) and *Lolium perenne* (Perennial Ryegrass).

Photograph 4.1 Remnant Blakely's Red Gum - Yellow Box grassy tall woodland within the subject land

Photograph 4.2 Planted Blakely's Red Gum - Yellow Box grassy tall woodland within the subject land

ii. Justification of PCT Selection

PCTs were initially filtered using BioNet Vegetation Classification System for IBRA Region and for the key canopy species *Eucalyptus blakelyi* and *Eucalyptus melliodora*. The resulting list was narrowed down based on landform and geology. PCT 599 was determined to be the best fit based on the PCT Classification Confidence Level and the number of key indicator species present based on the BAM plot surveys undertaken.

4.3 Threatened Ecological Communities

The PCT identified within the subject land has been assessed as being partially associated with a TEC. Remnant PCT 599 is considered to conform to the White Box – Yellow Box – Blakely's Red Gum Woodland (Box Gum Woodland) TEC under the BC Act. A discussion of the alignment of PCT 599 with the TEC is provided below.

The Box Gum Woodland TEC occupies 1.41 ha of the subject land. The distribution of this TEC within the subject land is shown in **Figure 4.3**.

4.3.1 Remnant PCT 599 – TEC

The five patches of remnant and regrowth Blakely's Red Gum - Yellow Box grassy tall woodland within the subject land are considered to conform to the TEC White Box – Yellow Box – Blakely's Red Gum Woodland listed under the BC Act due to their alignment with the listing for the TEC in the final determination (NSW Scientific Committee 2002). The PCT is

considered to conform to the TEC based on it representing the vegetation community that would historically have occupied the subject land, and that degraded scattered paddock trees, or even areas lacking any trees, still conform to the BC Act listing of the community. A total of 1.41 ha of this TEC occurs within the subject land.

This PCT does not conform to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listing of Box Gum Woodland due to the either the lack of mature trees within the patch, the patch size not having a predominantly native understorey, or where it does have one it lacks the requisite 12 native non-grass understorey species and is <2 ha in size (DEH 2006).

4.3.2 Planted PCT 599 – Non TEC

These planted natives are composed of a mix of representative and non-representative species that while being native, are not an example of a naturally occurring PCT. The *Eucalyptus blakelyi* and *Eucalyptus melliodora* are dominant tree species for the PCT; with additional species *Eucalyptus amplifolia, Allocasuarina verticillata* present. *Callistemon viminalis* also occurs within the plantings. In the absence of formal guidance on how planted vegetation is assessed under BAM, this assessment has assigned the vegetation to the best-fit PCT. Therefore, although the patch of planted natives has been aligned to the PCT based on this being the most likely community to have historically occupied the site, it is not considered to align with the Box Gum Woodland TEC listed under the BC Act.

The planted natives do not conform to the EPBC Act listing of Box-Gum Woodland due to the understorey lacking the requisite 12 native non-grass understorey species and is <2 ha in patch size (DEH 2006).

4.4 Vegetation Integrity Assessment

The native vegetation identified within the subject land was assigned to a vegetation zone based on PCTs and broad condition state. Patch sizes were subsequently assigned for each vegetation zone. The extent of vegetation zones and patch size classes within the subject land are shown in **Figure 4.4**.

Each vegetation zone was assessed using survey plots/transects (see ***Section 3.2***) to determine the vegetation integrity score. Plot/transects utilised within the BAM Calculator to determine the vegetation integrity score is provided in **Appendix A**. A flora species list for the subject land is provided in **Appendix B**. Field data sheets and electronic copies of raw data are provided separately to this document.

Vegetation zones, patch sizes and vegetation integrity scores for the development site are summarised in **Table 4.4**.

Table 4.1 Vegetation zones

Vegetation Zone	PCT #	PCT Name	Condition Name	Development site area (ha)	Subject land area (ha)	Patch Size Class	Vegetation Integrity Score
1	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Remnant	0.83	1.41	<5 ha, 25-100 ha	31.5
2	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Planted	0.51	1.45	<5 ha, 25-100 ha	28.0

4.5 Groundwater Dependent Ecosystems

SEARs for the Project require that an assessment of potential impacts to groundwater dependent ecosystems (GDEs) be provided within the biodiversity assessment of the Project. Upon review of the GDE Atlas (Bureau of Meteorology 2018) mapping, no GDEs are located within the subject land or within 2km.

While no obvious GDEs were observed to occur within the subject land, it is recognised that riparian vegetation along Boltons Creek and the Peel River Tributary could have some root access to alluvial groundwater. This riparian vegetation is not considered to be completely dependent on groundwater, with the water balance for this vegetation likely comprising rainfall, surface water and water stored in the soil.

Figure 4.1. Native vegetation extent

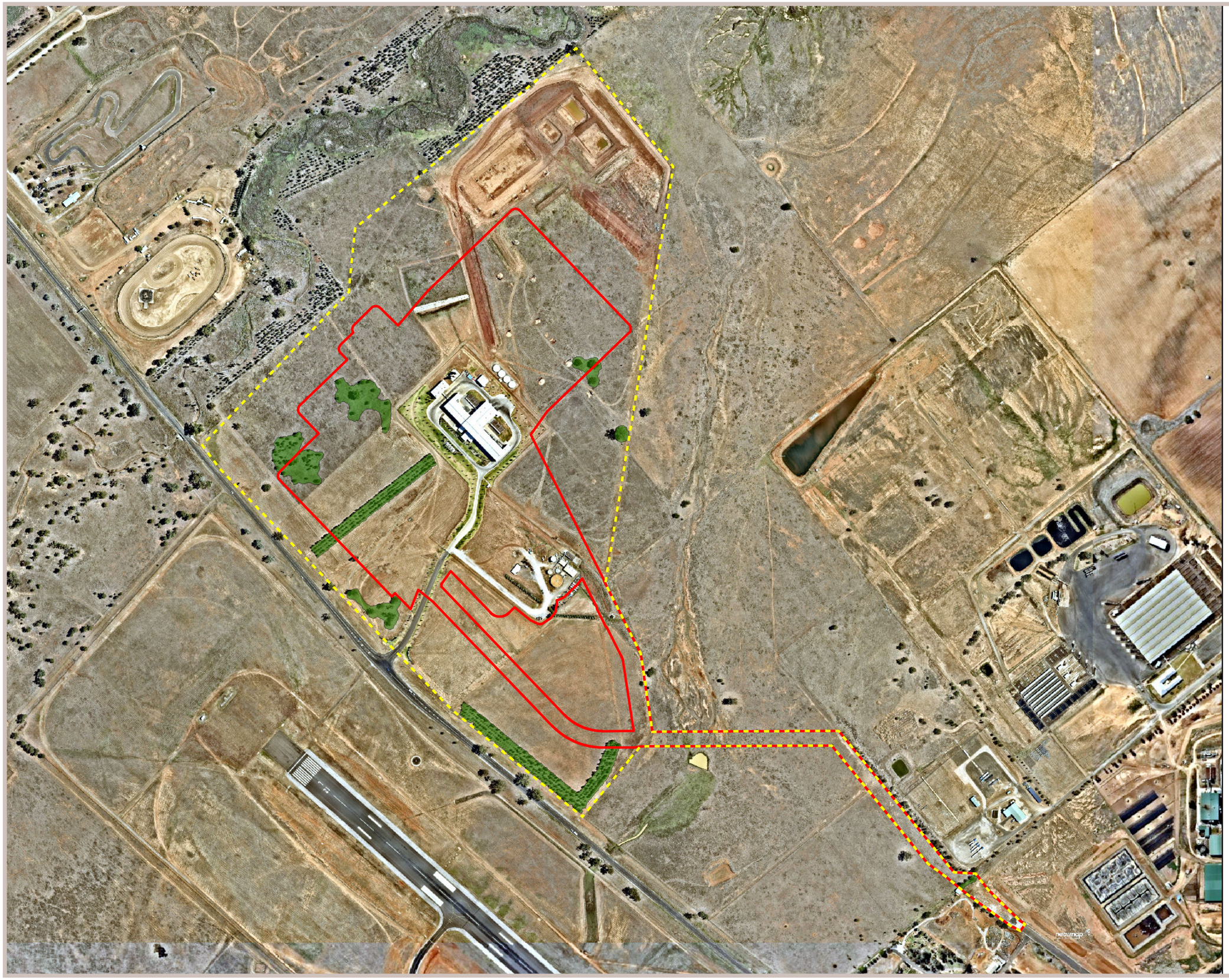


Figure 4.2. Plant community types

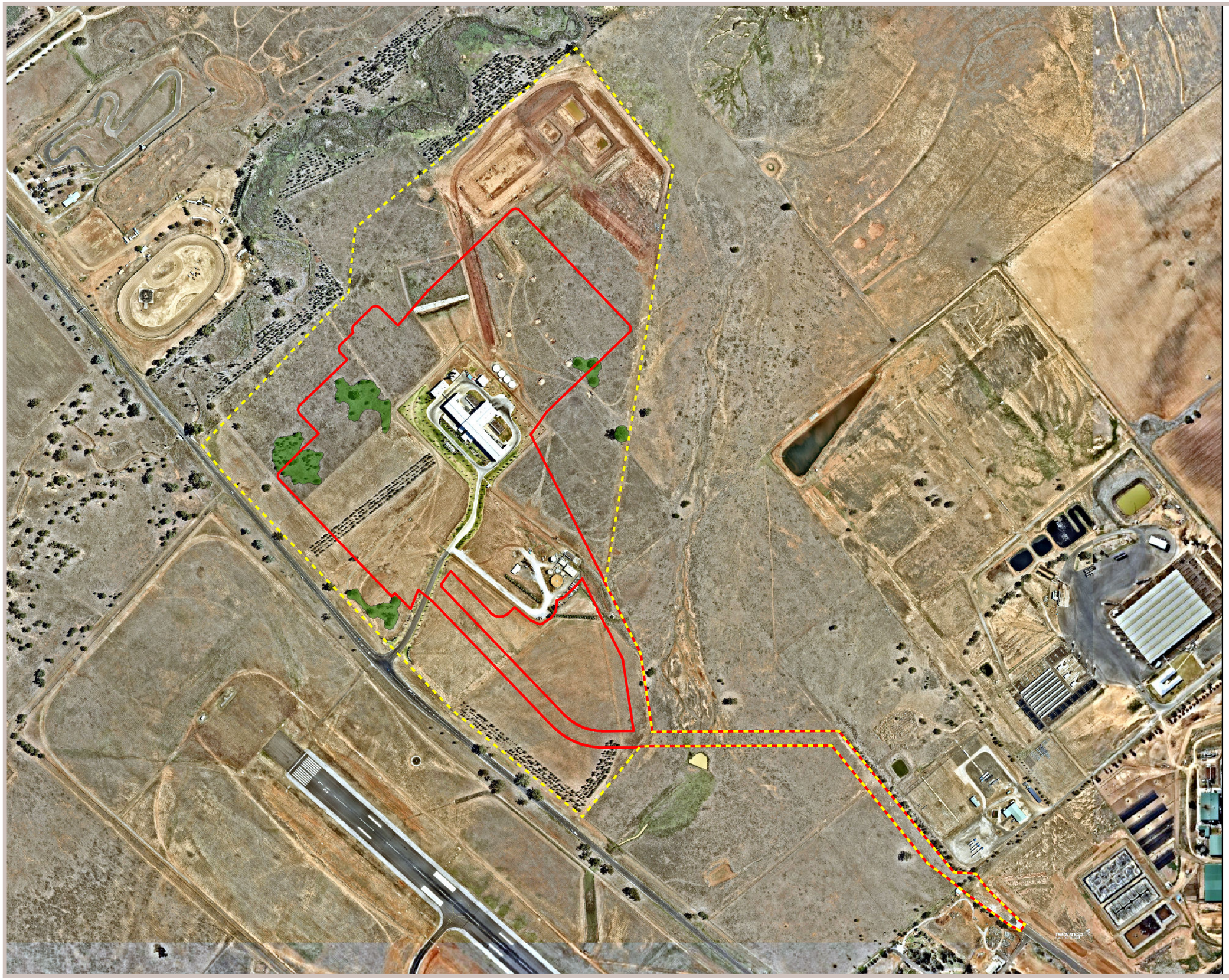


Figure 4.3. Threatened ecological communities

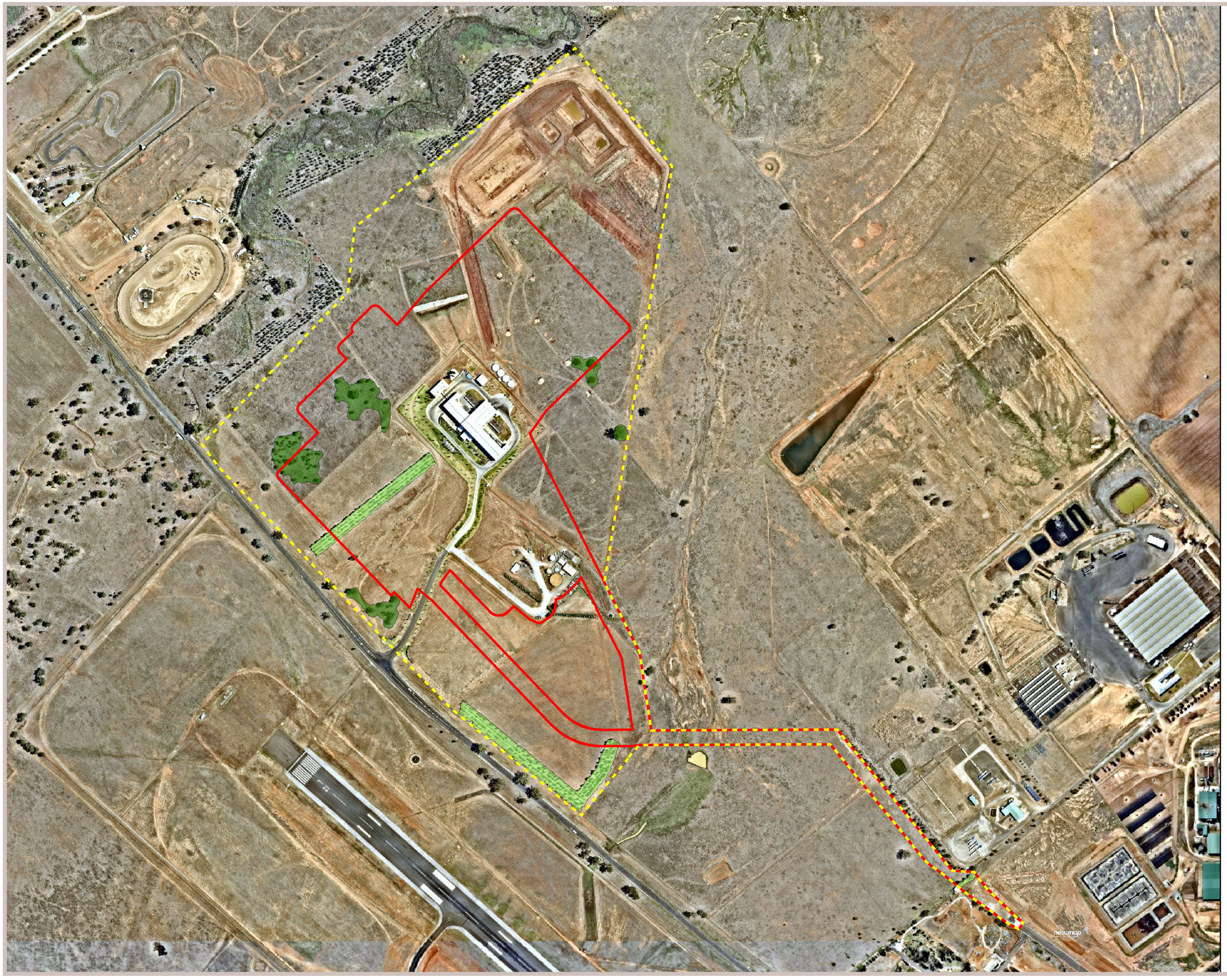


Figure 4.4. Vegetation zones

Chapter 5

Threatened Species

5.1 Threatened Species for Assessment

The BAM Calculator generates a list of threatened species requiring assessment utilising a number of variables. The following criteria have been utilised to predict the threatened species requiring further assessment:

- IBRA subregion: Peel;
- Geographic constraints:
  - Category 1 tributary of the Peel River within the subject land;
  - Category 3 Boltons Creek within the assessment area; and
  - Local wetland associated with Boltons Creek within the assessment area.
- Associated PCTs: 599;
- Percent native vegetation cover in the assessment area: 7.15%;
- Patch size: PCT 599: <5ha and 25-100ha; and
- Credit type: Ecosystem and/or species.

Based on the above variables, the BAM Calculator generated a list of 10 ecosystem credit species, 13 species credit species and seven joint ecosystem/species credit species.

5.2 Ecosystem Credit Species

Table 5.1 lists the predicted ecosystem credit species for the vegetation zones within the subject land. None of these species have been removed from consideration.

Table 5.1 Predicted ecosystem credit species

Scientific Name	Common Name	PCT #599 TEC	PCT # Non-TEC
Artamus cyanopterus	Dusky Woodswallow	X	X

Table 5.1 Predicted ecosystem credit species

Scientific Name	Common Name	PCT #599 TEC	PCT # Non-TEC
cyanopterus			
Chthonicola sagittata	Speckled Warbler	X	X
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	X	X
Dasyurus maculatus	Spotted-tailed Quoll	X	X
Glossopsitta pusilla	Little Lorikeet	X	X
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	X	X
Petroica boodang	Scarlet Robin	X	X
Petroica phoenicea	Flame Robin	X	X
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	X	X
Stagonopleura guttata	Diamond Firetail	X	X

5.3 Species Credit Species

5.3.1 Assessment of Habitat Constraints and Microhabitats

Table 5.2 lists the species credit species predicted by the BAM Calculator and details whether the species have been further assessed based on the presence or absence of habitat constraints within the subject land. Under Section 6.4.1.13 of the BAM, further species credit species can be excluded from further assessment if an assessment of habitat constraints and microhabitats determines that the habitat within the subject land is substantially degraded such that the species credit species is unlikely to occur.

Detailed habitat assessments of the site were undertaken as described in ***Section 3.3.3***. The habitat assessments focussed on habitat features relevant to species credit species predicted to occur. This included determining the presence/absence of the habitat constraints identified for the predicted threatened species and the condition of these habitat constraints and other microhabitats.

The Regent Honeyeater and Swift Parrot have been excluded from further assessment subsequent to confirmation from OEH that no important habitat occurs within the subject land for either species. Breeding habitat for both species is limited to specific areas that are not associated with, or in the vicinity of, the subject land, therefore since the species credit species component for both species is associated with breeding habitat only, both the Regent Honeyeater and Swift Parrot were excluded from further assessment.

The initial habitat assessment survey completed in July 2018 focussed on determining if habitat for any potential species credit species (or relevant breeding component for dual credit species) was substantially degraded such that the species is unlikely to utilise the subject land or specific vegetation zone in accordance with the requirements of Step 3 (a) of Section 6.4 of the BAM. Based on the results of the survey the Glossy Black-cockatoo was excluded from requiring further assessment as the habitat for this species is considered substantially degraded. The subject land is predominantly cleared open grassland with small scattered occurrences of remnant or immature planted natives, while Glossy Black-cockatoos favour woodlands, forests, timbered watercourses, or rugged and rocky inland areas that have not been cleared (OEH 2018c). Furthermore, the subject land does not contain any feed trees for the species such as casuarinas, and there are no records of this species held by the OEH BioNet Atlas within 10km of the subject land. Accordingly, the Glossy Black-cockatoo has been excluded from further assessment based on the habitat within the subject land being degraded such that would be unsuitable to support the breeding of this species.

A number of other species credit fauna species had the potential to be excluded from further assessment based on the lack of/degradation of their habitat constraints, however due to the alignment of the survey period for these species within the timeframe for the additional surveys; they were not removed from consideration and were surveyed accordingly as a precautionary measure.

Table 5.2 Species credit species assessment

Species Credit Species	Common Name	Habitat Constraint	Removed from Consideration	Reason for Inclusion or Removal
Flora				
Acacia atrox	Myall Creek Wattle	None	No	Potential suitable habitat present within subject land
Dichanthium setosum	Bluegrass	None	No	Potential suitable habitat present within subject land
Digitaria porrecta	Finger Panic Grass	None	No	Potential suitable habitat present within subject land
Euphrasia arguta		None	No	Potential suitable habitat present within subject land
Homopholis belsonii	Belson's Panic	None	No	Potential suitable habitat present within subject land
Picris evae	Hawkweed	None	No	Potential suitable habitat present within subject land
Thesium australe	Austral Toadflax	None	No	Potential suitable habitat present within subject land
Tylophora linearis		None	No	Potential suitable habitat present within subject land
Fauna				
Adelotus brevis – endangered population	Tusked Frog population in the Nandewar and New England Tableland Bioregions	None	No	Potential suitable habitat present within subject land
Anthochaera phrygia (Breeding)	Regent Honeyeater	Mapped area	Yes	Subject land not within mapped area for the species
Calyptorhynchus lathami (Breeding)	Glossy Black-Cockatoo	Living or dead tree with hollows greater than 15cm diameter and greater than 5m above ground.	Yes	Habitat degraded for this species and lacking required feed trees such as Allocasuarina and Belah. No records of this species within 10km of the subject land.
Haliaeetus leucogaster (Breeding)	White-bellied Sea-Eagle	Living or dead mature trees within	No	Habitat constraint is present within the subject land

Table 5.2 Species credit species assessment

Species Credit Species	Common Name	Habitat Constraint	Removed from Consideration	Reason for Inclusion or Removal
		suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines		
Lathamus discolor (Breeding)	Swift Parrot	Mapped Area	Yes	Subject land not within mapped area for the species
Litoria booroolongensis	Booroolong Frog	None	No	Potential suitable habitat present within subject land
Miniopterus schreibersii oceanensis (Breeding)	Eastern Bentwing-bat	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500	No	Potential suitable habitat present within subject land
Petaurus norfolcensis	Squirrel Glider	None	No	Potential suitable habitat present within subject land
Phascogale tapoatafa	Brush-tailed Phascogale	Hollow-bearing trees	No	Habitat constraint is present within the subject land
Phascolarctos cinereus (Breeding)	Koala	Areas identified via survey as important habitat: Important' habitat is defined by the density of koalas and quality of habitat determined by on-site survey - contact OEH for more information.	No	Survey required as advised by OEH
Pteropus poliocephalus (Breeding)	Grey-headed Flying-fox	Breeding camps	No	Potential suitable habitat present within subject land
Uvidicolus sphyrurus	Border Thick-tailed Gecko	None	No	Potential suitable habitat present within subject land

5.3.2 Candidate Species for Further Assessment

The following species were identified as candidate species credit species for further assessment;

- Flora:
  - *Acacia atrox;*
  - *Dichanthium setosum;*
  - *Digitaria porrecta;*
  - *Euphrasia arguta;*
  - *Homopholis belsonii;*
  - *Picris evae;*
  - *Thesium australe;* and
  - *Tylophora linearis*.
- Fauna:
  - Tusked Frog population in the Nandewar and New England Tableland Bioregions;
  - White-bellied Sea-eagle (breeding);
  - Booroolong Frog;
  - Eastern Bentwing-bat;
  - Squirrel Glider;
  - Brush-tailed Phascogale;
  - Koala (breeding);
  - Grey-headed Flying-fox (breeding); and
  - Border Thick-tailed Gecko.

5.3.3 Presence of Candidate Species

i. Surveys

Targeted surveys for the candidate species credit species for further assessment undertaken within the subject land are summarised in **Table 5.3**. These surveys are detailed further in

Section 3.3.3. Additional targeted surveys were undertaken for the species credit species that required no further assessment throughout the additional survey period due to the opportunity to do so within the additional December period as described in ***Section 3.3.3***.

Table 5.3 Surveys for candidate species credit species

Species Credit Species	Survey Period	Surveys Undertaken
Flora		
Acacia atrox	Year round	Parallel field traverse threatened flora surveys
Dichanthium setosum	Dec-May	Parallel field traverse threatened flora surveys
Digitaria porrecta	Dec-May	Parallel field traverse threatened flora surveys
Euphrasia arguta	Not listed	Parallel field traverse threatened flora surveys
Homopholis belsonii	Dec-Apr	Parallel field traverse threatened flora surveys
Picris evae	Sep-Feb	Parallel field traverse threatened flora surveys
Thesium australe	Nov-Feb	Parallel field traverse threatened flora surveys
Tylophora linearis	Sep-May	Parallel field traverse threatened flora surveys
Fauna		
Tusked Frog population in the Nandewar and New England Tableland Bioregions -	Oct-Feb	Amphibian survey, nocturnal survey, diurnal active searches
White-bellied Sea-eagle	Jul-Dec	Habitat assessment, bird survey
Booroolong Frog	Nov-Dec	Amphibian survey, nocturnal survey, diurnal active searches
Eastern Bentwing-bat	Dec-Feb	Microchiropteran bat survey, nocturnal survey, habitat assessment
Squirrel Glider	Year round	Nocturnal survey, stag/hollow watches, motion sensor cameras
Brush-tailed Phascogale	Year round	Nocturnal survey, stag/hollow watches, motion sensor cameras
Koala	Year round	Nocturnal survey, Koala SAT search, motion sensor cameras
GHFF	Oct-Dec	Nocturnal survey, habitat assessment
Border Thick-tailed Gecko	Nov-Mar	Nocturnal survey, diurnal active searches

ii. Species Occurrence

None of the candidate species credit species were detected within the subject land, nor was any suitable breeding habitat such as nests observed for these species. As these species were not recorded within the subject land, or considered likely to utilise the habitat within the subject land, no further assessment is required for species credit species.

5.4 Prescribed Impacts

Prescribed impacts are outlined within the NSW *Biodiversity Conservation Regulation 2017*. The project is considered to result in a number of prescribed impacts outlined in **Table 5.4**.

Table 5.4 Identification of prescribed impacts on the development site

Feature	Present (Yes/No)	Description of feature characteristics and location	Potential Impact	Threatened Species or community using or dependent on feature	Section of BDAR where impact is addressed
Karst, caves. Crevices, cliffs or other geologically significant feature	No	N/A	Feature not present within site	N/A	N/A
Rocks	No	N/A	Feature not present within site	N/A	N/A
Human-made structure	Yes	Existing waste water processing plants	Demolition of existing waste water treatment plant	Eastern Bentwing-bat (roosting only, not breeding)	6.1.2, 7.2.1, 7.4.1
Non-native vegetation	Yes	Exotic dominated pasture and garden bed vegetation throughout subject land	Reduce extent of potential foraging habitat for species	Grey-headed Flying-fox (foraging)	6.1.2, 7.2.2, 7.4.2
Connectivity of different areas of habitat that facilitates movement across a	Yes	Peel River tributary traversed by proposed access road	Reduce connectivity between habitats and accessibility to	Threatened woodland birds (ecosystem credit species)	6.1.2, 7.2.3, 7.4.3

Table 5.4 Identification of prescribed impacts on the development site

Feature	Present (Yes/No)	Description of feature characteristics and location	Potential Impact	Threatened Species or community using or dependent on feature	Section of BDAR where impact is addressed
species' range			habitat for species		
Movement of threatened species that maintains their lifecycle	Yes	Peel River tributary traversed by proposed access road	Removal of foraging habitat	Threatened woodland birds (ecosystem credit species)	6.1.2, 7.2.4, 7.4.4
Water quality, water bodies and hydrological processes	No	N/A	No prescribed impacts on hydrological processes	N/A	N/A
Hydrological processes - Ground water dependent ecosystems	No	N/A	Feature not present within site	N/A	N/A
Wind turbine strikes	No	N/A	No wind farm proposed on site	N/A	N/A
Vehicle strikes	Yes	Construction of access road for additional vehicles	Additional roads increase vehicle strike	Threatened woodland birds (ecosystem credit species)	6.1.2, 7.2.6, 7.4.6, 7.5
Other	No	N/A	Feature not present within site	N/A	N/A

Chapter 6

Avoid and Minimise Impacts

6.1 Avoid and Minimise Impacts

This section includes demonstration of efforts to avoid and minimise impact on biodiversity values identified within the subject land, which includes assessment of direct and indirect impacts.

6.1.1 Avoid and Minimise Direct Impacts

i. Project Location

The Project has been situated within the Oakburn property to allow the development site to provide for the operational requirements of the site, yet minimise impacts to areas of biodiversity values.

The current development site has been proposed to avoid removal of native vegetation where possible, including avoidance of a patch of Box Gum Woodland TEC located on the western side of the entrance currently accessing the property off Gunnedah Rd (Oxley Highway). This patch contains two hollow-bearing trees, the highest diversity of native groundcover species, and the largest number of mature trees of any occurrence of the TEC within the subject land. The project design also avoids removal of a large hollow-bearing *Eucalyptus melliodora* to the north east of the subject land and allows for partial retention of one regenerating patch to the south west.

Clearing of the other occurrences of the Box Gum Woodland TEC and the planted natives has been minimised where feasible while still allowing for the practical functioning of the proposed development. Areas of both the TEC and planted natives will be conserved throughout the subject land, including retention of approximately 0.58 ha of the 1.41 ha of Box Gum Woodland TEC and approximately 0.94 ha of the 1.45 ha of planted natives.

Alignment of the proposed access road has been designed to minimise direct impacts to the Category 1 stream to the east of the subject land, by placement of the crossing closest to the stream end point.

Furthermore, the proposed development site is outside the 30m buffer applicable to the Category 3 stream Bolton's Creek.

Therefore the proposed development will avoid and minimise direct impacts on clearing of native vegetation and habitat by:

- Locating the project predominantly in areas where there are low to no biodiversity values (such as in the exotic dominated pasture);
- Situating the development site to minimise clearing of native vegetation that is a TEC; and
- Locating the project to reduce impacts to waterways.

ii. Consideration of Alternative Locations

Alternative development layouts were considered throughout the planning stage however these were amended due to the following:

- Proposed development layout placed further south closer to Oxley Highway was amended as this would require removal of larger areas of the TEC and more habitat features; and
- Alternative access road route, amended as this would result in crossing the Category 1 stream further upstream.

Therefore, it is determined the current proposed development envelope has sought to avoid and minimise direct impacts on native vegetation and watercourses within the property, whilst allowing for adequate functionality of the proposed development.

iii. Consideration of Project Design

The project design has been developed to avoid and minimise clearing of native vegetation and habitats by minimising the clearing footprint to include only the operational footprint and the 10m buffer for the constructional footprint. There are no ancillary areas proposed to be cleared that are not directly related to areas to be utilised for buildings and infrastructure. By retaining all works within the one development site, and in areas of the least biodiversity values practical, the Project will avoid and minimise direct impacts to native vegetation and habitats through:

- Reducing the overall clearing footprint of the project; and
- Locating facilities in areas where the native vegetation or threatened species habitat will be least impacted.

The Project will include as a design component the retention of the remaining native vegetation and habitat within the development site.

6.1.2 Avoid and Minimise Prescribed Impacts

Measures to avoid and minimise prescribed impacts identified in ***Section 5.4*** are outlined below.

i. Human Made Structures

The existing waste water treatment plant will be demolished as part of the proposed development which could potentially provide roosting habitat for the threatened Eastern Bentwing-bat (see **Photograph 6.1**). This species breeds in specialist maternity caves (OEH 2018b) therefore this prescribed impact does not relate to breeding habitat and applies only to the ecosystem credit component for the species.

Given the limited area of land on which the development site occurs, as well as the design requirements for creating a functioning processing plant, impacts to these structures are not able to be avoided as part of the proposed development.

Nevertheless, the human made structures planned to be demolished and removed are not considered to be dependent on for survival for the Eastern Bentwing-bat. Searches of the subject land failed to detect any bats roosting. Furthermore, targeted surveys for microbats failed to detect the species utilising the subject site in any capacity and it is therefore unlikely the species is reliant on these structures or that they are using the site as anything other than occasional foraging and roosting habitat.

Photograph 6.1 Existing waste water treatment plant

ii. Non-native Vegetation

The development design has been focused on avoiding areas of native vegetation, and locating the development site predominantly within areas of exotic vegetation. As a result, the majority of areas to be cleared are non-native vegetation including the exotic dominated

pasture and garden beds **(Photograph 6.2),** which has the potential to reduce the foraging habitat for the Grey-headed Flying-fox.

However, this non-native vegetation is considered highly marginal foraging habitat for this species and is unlikely to be relied upon as a substantial foraging area. Nevertheless, approximately half of the non-native vegetation will be retained and additional landscaping will occur around the new development which will minimise the impact (if any) of the potential loss of foraging habitat for the Grey-headed Flying-fox.

Photograph 6.2 Non-native grassland vegetation within the subject land

iii. Connectivity

The development has been designed to avoid impacts to native vegetation; hence the development will only remove a relatively small area of native vegetation/habitat within the subject land. The vegetation to be removed consists of low condition isolated fragments surrounded by exotic dominated pasture. The proposed removal of these small isolated areas of vegetation and marginal habitat would very minimally add to fragmentation further than current conditions, as there is currently very limited connectivity due to numerous existing hostile gaps throughout the subject land. Threatened woodland birds may occasionally utilise this area for movement throughout the landscape and between areas of habitat, however none are likely to rely on the highly fragmented, small areas of habitat available within the development site.

iv. Movement of Threatened Species

Small areas of native vegetation and two hollow-bearing trees will be removed that may act as part of threatened woodland bird movements; however it is considered unlikely that any

birds would be solely reliant or regularly utilising the highly degraded and exposed habitat within the subject land. Vehicle Strikes

The construction of the access road to service the additional trucks and vehicles that will be accessing the site will increase the risk of fauna vehicle strike. This has been minimised by restricting the additional vehicles and construction to an area primarily devoid of native vegetation that could act as habitat for threatened species. Accordingly, the chance of vehicle strike to species, particularly threatened woodland bird species, is substantially reduced by avoidance of areas most likely to facilitate the movements and foraging of these species.

cumberland ecology

Chapter 7

Impact Assessment

7.1 Assessment of Impacts to Native Vegetation and Habitat

7.1.1 Direct Impacts

The primary and direct impact resulting from the proposed development is the loss of vegetation and associated habitat within the subject land.

i. Impacts on Vegetation Communities

One native vegetation community, PCT 599, will be impacted under the proposed development. Within this PCT three patches of remnant vegetation and three patches of planted vegetation will be removed, or partially removed. All other native vegetation within the subject land will be retained.

The remainder of the vegetation to be removed within the development site consists of exotic dominated pasture and garden beds that do not constitute a recognised ecological community.

Table 7.1 identifies the areas of vegetation to be removed and retained within the subject land.

Table.7.1 Areas of vegetation to be removed and retained within the subject land

PCT	TEC status	Approximate Area (ha)		
		Current Extent	Removed Extent	Retained
Native Vegetation				
599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	TEC	1.41	0.83	0.58
599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Non-TEC	1.45	0.51	0.94

Table.7.1 Areas of vegetation to be removed and retained within the subject land

PCT	TEC status	Approximate Area (ha)		
		Current Extent	Removed Extent	Retained
Other				
Exotic dominated pasture		43.03	20.06	22.97
Garden beds		2.49	2.20	0.29
Cleared		11.18	4.64	6.54
Total		**59.56**	**28.24**	**31.32**

ii. Loss of Specific Habitat Features

The majority of the habitat, albeit degraded habitat, for native fauna in the subject land is in the areas of native vegetation. Overall, more than half of the native vegetation on site and the majority of the habitat features will be retained under the proposed development.

Nevertheless, the proposed development will result in the loss of some existing habitat in the form of two large hollow-bearing trees and other regrowth/immature native trees that provide marginal roosting and foraging habitat for the a variety of predominantly avian species.

The two large *Eucalyptus melliodora* hollow-bearing trees that each contains hollows ranging from small to large in size are remnant paddock trees, as are the two Kurrajongs to be removed in the area to the north of the existing processing plant. In *one Eucalyptus melliodora* hollow to be removed Eastern Rosellas (*Platycercus eximius*) were observed nesting, and a medium-sized stick nest was present in the upper branches of another.

The remainder of the trees that surround the TEC areas comprise regrowth natives that appear to have regenerated since grazing was excluded from Oakburn subsequent to Baiada purchasing the property. This regrowth, along with the planted native vegetation, provides some limited roosting and foraging habitat for birds and arboreal fauna, such as in the form of flowering trees.

Overall, the removal of these habitat features are considered to have only minor implications for fauna species due to the highly modified and degraded ecological context they are within and the high mobility of the species likely to utilise these habitats.

7.1.2 Change in Vegetation Integrity Score

The changes in vegetation integrity scores as a result of clearing are documented for each vegetation zone in **Table 7.2** below.

Table 7.2 Change in vegetation integrity score

Zone	PCT	Approximate Area (ha)	Current Vegetation Integrity Score	Future Vegetation Integrity Score	Change in Vegetation Integrity Zone
1	599_Remnant	0.83	31.5	0	-31.5
2	599_Planted	0.51	28.0	0	-28.0

.

7.1.3 Indirect Impacts

The following indirect impacts to native vegetation and habitat may occur as a result of the Project:

- Inadvertent impacts on adjacent habitat or vegetation;
- Reduced viability of adjacent habitat due to noise, dust or light spill; and
- Inadvertent impacts to hydrological processes.

i. Inadvertent Impacts on Adjacent Habitat or Vegetation

a. Nature and Extent

The vegetation within the subject land that will be removed occurs in very small isolated patches that are surrounded by disturbed land. Removal of the small areas of native vegetation and construction activities associated with the new development are unlikely to inadvertently impact on the adjacent habitat beyond potential minor loss of connectivity that could act as “stepping stone” habitat. The vegetation to the west which occurs along Boltons Creek is primarily immature native plantings similar to those within the subject land, and these would have little reliance, if any, on the isolated patches of native vegetation within the subject land. The connectivity between these plantings alongside Boltons Creek and the area of remnant Box Gum Woodland that occurs south of Gunnedah Road alongside the Tamworth Airport would be maintained and is in no way expected to be indirectly impacted by the removal of the small areas of low condition vegetation within the subject land. The remainder of the adjacent habitat surrounding the subject land is agricultural land that does not support any large tracts of native vegetation that may be impacted by the proposed development.

b. Duration

Any impact on adjacent habitat or vegetation is likely to be long term.

c. Likely Affected Threatened Entities

There is a potential for the following threatened entities to be affected:

- Box Gum Woodland TEC; and
- Threatened woodland birds (ecosystem credit species).

d. Consequences

The construction of the Project will result in removal of approximately 1.34 ha of native vegetation that has some, albeit very minor, connectivity to adjacent vegetation and habitats that could be used by threatened species as they traverse throughout the landscape. However, this vegetation is in low condition and is scattered such that is unlikely to be solely relied upon by any threatened species, or contribute substantially to genetic flow between adjacent areas of Box Gum Woodland TEC. Therefore the consequences of the Project on adjacent habitat or vegetation is expected to be nil or minimal.

ii. Reduced Viability of Adjacent Habitat Due to Noise, Dust or Light Spill

a. Nature and Extent

The Project will involve construction and operation of the new poultry processing plant 24 hrs a day and will therefore increase the noise, dust and light due above current levels due to the additional traffic, infrastructure and operating hours. However, most of the adjacent habitat consists of agricultural land that is covered by exotic dominated pasture grasses that are unlikely to be impacted by these changes. Similarly, the planted native vegetation adjacent to Boltons Creek and the western side of the subject land is an artificial immature community that is unlikely to experience reduced viability due to the increase in noise, dust or light. Due to the vegetation forming a barrier to the wetlands area associated with Boltons Creek, and the Project design that situates the new poultry processing plant towards Gunnedah Rd and away from the wetlands, it is not considered that noise, dust, or light levels are likely to significantly increase in this area.

b. Duration

Increases in noise, dust and light are expected to last in the long-term for the duration of the operational activities of the Project.

c. Likely Affected Threatened Entities

There is a potential for the Box Gum Woodland TEC to be affected.

d. Consequences

The potential increase in noise, dust and light from the proposed development is unlikely to significantly impact the Box Gum Woodland TEC adjacent habitat. The area of vegetation is already subject to the significant levels of noise, dust and light from the traffic of Gunnedah Rd, the operation of the Tamworth Airport, and the surrounding agricultural and industrial infrastructure. The minor increase in light, noise and dust from the Project is unlikely to be such that it would reduce the viability of the adjacent habitats surrounding the subject land.

iii. Inadvertent impacts to hydrological processes

a. Nature and Extent

The location and design of the development site have been modified so that it avoids the most ecologically significant watercourse and wetlands in proximity to the subject land and the majority of the secondary watercourse present within the subject land.

Nevertheless, the road design for the access road will cross the watercourse within approximately 150m from the mapped end of this ephemeral stream, which may inadvertently alter the hydrological regime in the subject land close to the end of the existing Peel River Tributary. Any indirect impacts to hydrological processes are expected to result in only minimal disturbance which will not impact on any other watercourses or hydrological processes. There is also minor potential for sedimentation in Boltons Creek to occur as a result of the construction phase of the Project.

Sediment control and reduction measures in accordance with Managing Storm Water: Soils and Construction – Volume 1, 4th Edition "The Blue Book" (2004) will also be employed to minimise impacts on water quality in the Peel River Tributary and Boltons Creek. Additionally, the development site has been located outside the 30 m buffer applied to Boltons Creek and will thereby avoid impacts to the most ecologically significant watercourse in the vicinity of the subject land.

b. Duration

Impacts to hydrological processes are expected to last in the long-term for the Peel Creek Tributary, while being restricted to the short-term for Boltons Creek.

c. Likely Affected Threatened Entities

There is a potential for the Box Gum Woodland TEC to be affected.

d. Consequences

The potential increase in noise, dust and light from the proposed development is unlikely to significantly impact the Box Gum Woodland TEC adjacent habitat. The area of vegetation is already subject to the significant levels of noise, dust and light from the traffic of Gunnedah Rd, the operation of the Tamworth Airport, and the surrounding agricultural and industrial infrastructure. The minor increase in light, noise and dust from the Project is unlikely to be such that it would reduce the viability of the adjacent habitats surrounding the subject land.

7.1.4 Groundwater Dependent Ecosystems

a. Nature and Extent

While no obvious GDEs were observed to occur within the subject land, there is potential for riparian vegetation adjacent to the subject land associated with Boltons Creek and the Peel River Tributary to have root access to alluvial groundwater. This riparian vegetation is not considered to be completely dependent on groundwater, with the water balance for this vegetation likely comprising rainfall, surface water and water stored in the soil. The Project does not include the extraction of groundwater. Areas comprising GDE vegetation are unlikely to be significantly impacted by the Project.

b. Duration

Impacts to GDEs are expected to be long-term.

c. Likely Affected Threatened Entities

There is a potential for the Box Gum Woodland TEC to be affected.

d. Consequences

The potential indirect impacts to GDEs are unlikely to be significant. The vegetation within the subject land and adjacent areas may have some access to alluvial groundwater, however are unlikely to rely on it as a sole water source. The proposed development is not expected to exacerbate any impacts on GDEs as it does not include the extraction of groundwater.

7.2 Assessment of Prescribed Impacts

The following prescribed impacts are potentially relevant to the proposal:

- The impacts of development on the habitat of threatened species or ecological communities associated with human made structures;
- Impacts of development on the threatened species that utilise the non-native vegetation within the subject land;
- Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range;
- Impacts of the development on movement of threatened species that maintains their life cycle;
- Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities; and

- Impacts of development on threatened species that may occur as a result of vehicle strike.

These are discussed in detail in subsequent sections.

7.2.1 Human Made Structures

As part of the development a small number of human-made structures, which could potentially provide roosting habitat for the threatened Eastern Bentwing-bat, are planned to be demolished. These structures include buildings and infrastructure associated with the existing waste water treatment plant.

Given the limited area of land on which the development site occurs, as well as the design requirements for creating a functioning processing plant, impacts to these structures are not able to be avoided as part of the development.

Nevertheless, the human made structures to be removed for the proposed development are not considered to form significant roosting habitat for this species and therefore are not considered to be dependent on for survival for the Eastern Bentwing-bat.

Searches of the subject land failed to detect any bats roosting and targeted surveys did not detect the species utilising the site in any form.

7.2.2 Non-native Vegetation

The development design has been focused on avoiding areas of native vegetation, and locating the development site predominantly within areas of exotic vegetation. As a result, the majority of areas to be cleared are non-native vegetation including the exotic dominated pasture and gardens, which has the potential to reduce the foraging habitat for the Grey-headed Flying-fox.

However, this non-native vegetation is considered highly marginal foraging habitat for this species and is unlikely to be relied upon as a substantial foraging area. Nevertheless, approximately half of the non-native vegetation will be retained and additional landscaping will occur around the new development which will minimise the impact (if any) of the potential loss of foraging habitat for the Grey-headed Flying-fox.

7.2.3 Connectivity of Different Areas of Habitat that Facilitates Movement Across a Species Range

The development has been designed to avoid impacts to native vegetation to the highest extent possible; hence the development will only remove a relatively small area of native vegetation/habitat within the subject land. The vegetation to be removed consists of low condition isolated fragments surrounded by existing agricultural and industrial development. The proposed removal of these small isolated areas of vegetation and marginal habitat would very minimally add to fragmentation further than current conditions, as there is currently very limited connectivity due to numerous existing hostile gaps throughout the subject land. While the minor connectivity may provide for the occasional “stepping stone” for

threatened species movement throughout the landscape for threatened woodland birds; it is unlikely these degraded and highly fragmented areas would be relied upon by any threatened species to facilitate movements between habitats throughout their range.

7.2.4 Movement of Threatened Species that Maintains their Lifecycle

The project design has aimed to reduce the development footprint where feasible and the current layout will allow for the retention of the over half the area of both native and non-native vegetation, including the majority of the hollow-bearing trees within the subject land that may be utilised by threatened woodland birds. These retained areas will provide for any movement of threatened species required to maintain their lifecycle, however it is considered unlikely that any species would be regularly utilising the exposed and degraded habitats within the subject land as part of their lifecycle movements.

7.2.5 Vehicle Strike

The construction of the access road to service the additional trucks and vehicles that will be accessing the site will increase the risk of fauna vehicle strike. This has been minimised by restricting the additional vehicles and construction of the access road to an area primarily devoid of native vegetation that could act as habitat for threatened species. Accordingly, the chance of vehicle strike to species, particularly threatened woodland bird species, is substantially reduced by avoidance of areas most likely to facilitate the movements and foraging of these species.

7.3 Mitigation Measures for Impacts to Native Vegetation and Habitat

A range of mitigation measures have been developed for this project to mitigate the impacts that are unable to be avoided using the measures outlined previously. These include a range of measures to be undertaken before and during construction to limit the impact of construction, enhance the retained vegetation and measures to manage weed control.

These measures are discussed in more detail below.

7.3.1 Construction Mitigation Measures

i. Timing of Construction Works

In order to minimise impacts to amphibians, bulk earthworks within the vicinity of the Peel River Tributary will either be:

- Undertaken during the winter months when movement of amphibian species is not occurring; or
- Undertaken during periods of no ephemeral pooling of water in the tributary; or
- Undertaken after a pre-clearance inspection by a qualified ecologist determines no amphibian presence at that time.

In order to minimise impacts to threatened fauna species that may utilise the hollow-bearing trees within the development site, removal of these will either be:

- Undertaken after a pre-clearance inspection by a qualified ecologist determines no hollow-dwelling species breeding presence at that time; or
- If breeding hollow-dwelling species are located, removal will be once the ecologist determines the breeding period for that species has ended and all juveniles have moved on.

ii. Delineation of Clearing Areas

Areas that require clearance will be flagged and clearly delineated by temporary fencing to ensure that no areas intended for conservation will be inadvertently cleared during the construction process. No machinery will be parked on areas beyond the temporary fencing and no access will be allowed during construction. Ancillary facilities such as stockpile sites, site compounds and construction zones will not be located beyond the limits of clearing.

iii. Pre-clearance Surveys

In order to avoid impacts to fauna species during construction, pre-clearance surveys will be conducted in all areas that are required to be cleared. Pre-clearing surveys will be undertaken ahead of clearing, to limit fauna injury and mortality and to identify habitat features to be relocated. Pre-clearance surveys will be conducted by suitably qualified ecologists and all fauna found during these surveys will be encouraged to move on or relocated by the ecologists in areas of similar habitat nearby that will not be impacted.

Pre-clearing protocols will include:

- Preparation of an inventory of trees and hollows to be removed and relocated, prior to clearing;
- Checking trees for the presence of bird nests and arboreal mammals, such as possums, gliders and bats, prior to felling;
- Animals found to be occupying trees and habitat will be safely removed before the clearing of trees and relocated into nearby woodlands; and
- Boulders and large logs will be placed in nearby areas of retained vegetation to allow their continued use as fauna habitat.

iv. Sedimentation Control Measures

One of the potential impacts of the project is increased sedimentation of waterways and wetlands as a result of soil disturbance during construction. In order to prevent this impact, the Environmental Impact Statement (EIS) for the Project includes details of erosion, sediment and stormwater and leachate control during construction as required by the SEARs. These measures will be undertaken in accordance with “The Blue Book” (Landcom 2004).

v. Weed Management

In order to minimise the spread of weeds throughout the subject land, and spread of weeds present in the subject land to areas outside of it, appropriate weed control activities will be undertaken in accordance with all state, regional and local weed management plans. The SEARs for the Project require 'details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies'. The following section has been prepared to address this requirement.

The subject land lies within the North West Local Land Services Area and is subject to the North West Regional Strategic Weed Management Plan 2017 - 2022 (LLS: North West 2017) and management of Weeds of National Significance (WoNS).

The *Biosecurity Act 2015* and regulations provide specific legal requirements for state level priority weeds and high risk activities, as provided in the Appendices of the North West Regional Strategic Weed Management Plan.

The objectives of the management plan (2017) are:

- Prevention: preventing the entry of new risks into NSW;
- Eradication: quickly finding, identifying and eradicating threats where possible;
- Containment: quickly finding, identifying and containing threats; and
- Minimisation: effectively minimising the impacts of those pests, diseases and weeds that cannot be eradicated.

In order to comply with the objectives of the North West Regional Strategic Weed Management Plan, it is recommended the following measures be implemented as part of a management plan for the subject land.

a. Prevention

Appropriate site hygiene measures will be implemented to prevent entry of new weeds to the area.

b. Eradication

Initial weed management will be carried out over the development site according to best-practice methods under the direction of a suitably qualified bush regenerator. The targeted species will be those listed under Appendices 1 and 2 of the North West Regional Strategic Weed Management Plan. Initial weed treatment will include eliminating woody species and targeting large dominant infestations of exotic herbs. This may be achieved via a combination of manual weed removal and herbicide use.

Best-practice bush regeneration should undertake measures to avoid adverse impacts to retained vegetation within the development site, including not over clearing (remove only

targeted species), employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance, and replacement of disturbed mulch/leaf-litter.

It is noted that due to the agricultural history of the subject land and surrounds, removal of all exotic grasses will not be feasible and weed management will focus on non-grass species.

c. Containment

Follow-up monitoring and maintenance should be undertaken in areas of the development site that have received past primary weeding treatments in the following months, to contain any re-emergence of weed species.

d. Minimisation

Minimisation of weed species that cannot be effectively controlled on the site, such as exotic grasses, will be prevented from further spread through construction and operational phase site hygiene procedures.

7.4 Mitigation Measures for Prescribed Impacts

7.4.1 Human Made Structures

A small number of human-made structures are planned to be demolished within the subject land that form the existing waste water treatment plant. Although the human made structures proposed to be removed are not considered to form significant roosting habitat or be dependent on for survival for the Eastern Bentwing-bat, or any other threatened species, they could still potentially be used occasionally for roosting habitat for the species as well as other non-threatened microchiropteran bat species.

In order to mitigate or avoid impacts to fauna species, and the Eastern Bentwing-bat in particular, during demolition of the mentioned structures, pre-clearance checks will be conducted of all human made structures proposed to be demolished prior to construction. Pre-clearance surveys will be conducted by suitably qualified ecologists and all fauna found during these surveys will be encouraged to move on or relocated by the ecologists in areas of similar habitat nearby that will not be impacted.

7.4.2 Non-native Vegetation

Although non-native vegetation that may occasionally be utilised by the Grey-headed Flying-fox for foraging will be removed as part of the development, over half the non-native vegetation will be retained and additional areas that comprise a mix of native and non-native species will be planted in accordance with the landscaping plan. The plantings provided under the landscape plan are likely to result in maintenance or improvement of the biodiversity values of the non-native vegetation currently occupying the development site.

7.4.3 Connectivity of Different Areas of Habitat that Facilitates Movement Across a Species' Range

As previously stated in ***Section 7.2.3***, the vegetation to be removed already consists of isolated fragments surrounded by agricultural and industrial development. The proposed removal of this small area of vegetation and marginal habitat would very minimally add to fragmentation further than current conditions, as there is currently very limited connectivity due to numerous existing hostile gaps throughout the subject land.

The design of the Project provides for landscaped vegetation throughout the development site, which can be used as "stepping stones" for fauna species to move through the landscape. The final design layout of the development provides a range of trees, shrubs, and ground-cover vegetation where there are currently vast open spaces occupied by predominantly exotic pasture grasses. The size of the hostile gaps is reduced where possible by the introduction of landscaped vegetation. The "stepping stone" habitat will provide improved fauna habitat and movement corridors for the species that may utilise the subject land and adjacent habitats, including threatened woodland birds.

7.4.4 Movement of Threatened Species that Maintains their Lifecycle

As previously mentioned in ***Section 7.3.1***, a number of construction measures are proposed to mitigate any potential impacts to threatened species that may occasionally utilise the development site for foraging. These measures are focused around the timing of the construction works and pre-clearance surveys.

To minimise the impacts upon native threatened woodland birds utilising hollows for breeding or tree limbs for nesting, vegetation pre-clearance is required for all vegetation to be removed and clearing should not occur during the breeding period for any species found to be utilising the habitats within the development site.

7.4.5 Vehicle Strike

As discussed in ***Section 7.2.5***, the design of the access road has been situated so as to avoid areas of the treed vegetation that are most likely to be inhabited by fauna species susceptible to vehicle strike.

Accordingly, the chance of vehicle strike to species, particularly threatened woodland bird species, is substantially reduced by avoidance of areas most likely to facilitate the movements and foraging of these species.

A quantitative traffic impact assessment has been prepared for the project in accordance with relevant Council, Ausroads and Roads and Maritime Services guidelines and is included in the EIS material.

7.5 Adaptive Management of Uncertain Impacts

Vehicle strike is the only uncertain impact likely to be relevant to the Project. Management of vehicle strike will be through implementation of:

- Signage: appropriate signage notifying vehicles of potential fauna presence should be installed along the access road;
- Speed limits: Speed limits will be introduced to restrict the speed of vehicles travelling along the access road; and
- Lighting: Low wattage lighting, and minimal / well-spaced street lights should be considered. The use of lights with flat glass aeroscreen rather than reflector glass covers may be an option to reduce glare, thus reducing impact on nocturnal fauna. The location of street lights is subject to the final road design plans.

7.6 Assessment Thresholds

Unavoidable impacts of the project have been considered and a determination made of the assessment thresholds. The following sections outline the assessment thresholds and their relevance to the project.

7.6.1 Impacts to Potential Serious and Irreversible Impact Entities

i. Identification of the Serious and Irreversible Impact Entity

One SAII entity, Box Gum Woodland TEC, will be impacted by the Project (**Figure 7.1**. Approximately 0.83 ha of Box Gum Woodland will be directly impacted in the form of removal as a result of the Project, with approximately 0.58 ha retained within the subject land. The Box Gum Woodland TEC is part of a single vegetation zone that is categorised as being in low condition based on the vegetation integrity score of 31.5 for the vegetation zone and will require offsetting due to the vegetation integrity score being ≥17.

ii. Actions and measures taken to avoid direct and indirect impacts on the potential SAII entity

The measures taken to avoid impacts to the SAII entity, as described in ***Section 6.1.1*** and ***Section 7.3*** include avoidance measures through consideration of the project location, possible alternative locations, project design, and mitigation measures such as construction activities mitigation and weed management.

iii. Extent to which the impact exceeds the threshold

The proposed development will result in the removal of approximately 0.83 ha of low condition Box Gum Woodland TEC. There is currently no defined threshold for this SAII entity.

iv. Extent and overall condition of the potential TEC within an area of 1000 ha, and 10,000 ha surrounding the proposed development

Within an area of 1,000 ha surrounding the subject land approximately 12.88 ha of Box Gum Woodland is mapped as occurring, which is equal to ~1.29%. This was derived using the OEH Hunter Native Vegetation Mapping (2012) for the Nandewar IBRA bioregion clipped to

include the 1,000 ha within a radius surrounding the subject land. This area is represented by the larger tract of Box Gum Woodland TEC across Gunnedah Road and continuing south alongside the Tamworth Airport. The condition of this TEC is expected to be in a higher condition than the vegetation within the subject land based on the larger tract size and connectivity of the area. Given the small patches of TEC within the subject land did not exist on available mapping, it can be assumed the areas of the TEC that have been mapped throughout the region are likely to be generally in better condition than that of the vegetation within the subject land.

Within an area of 10,000 ha surrounding the subject land approximately 193.53 ha of Box Gum Woodland has been mapped, equal to ~1.94% of the area. This was derived using the OEH Hunter Native Vegetation Mapping (2012) for the Nandewar IBRA bioregion clipped to include the 10,000 ha within a radius surrounding the subject land. The condition of this TEC within this area is expected to be variable, though it is likely to be generally in better condition than the vegetation within the subject land as described above.

v. An estimate of the extent and overall condition of the potential TEC remaining in the IBRA subregion before and after the impact of the proposed development.

Approximately 297,848 ha of Box Gum Woodland TEC is mapped as occurring within the Peel subregion according to OEH Hunter Native Vegetation Mapping.

None of this area will be diminished by the proposed development as the area identified within the subject land as conforming to the TEC was not included within this mapping. Regardless, ~0.83 ha of Box Gum Woodland will be removed.

The condition of the TEC remaining within the Nandewar region and Peel subregion is unknown. This community is known to have suffered a very severe decline in geographic distribution and reduction in its integrity across most of its geographic range (Threatened Species Scientific Committee 2006). It is likely that due to the community being situated largely on fertile, arable land in prime agricultural areas (DECCW (NSW) 2010), that the remaining extent within the region and subregion is in a variable condition and would include areas that have undergone historical clearing and fragmentation. Areas comprising higher quality habitat may exist within Mount Kaputar National Park, Wallabadah National Park and Gibraltar Nature Reserve, where this community is known to occur.

vi. An estimate of the TEC that is in the reserve system within the IBRA region and the IBRA subregion

Approximately 11,506 ha of Box Gum Woodland is in the reserve system in the Nandewar bioregion and 8,125 ha is within the reserve system in the Peel subregion based on OEH Hunter Native Vegetation Mapping (2012). This mapping was clipped to the Nandewar IBRA bioregion and Peel subregion, respectively, then further clipped to include only those areas within the NSW National Parks and Wildlife Service Estate Data Version 4 (2016).

vii. The development, clearing or biodiversity certification proposal's impact on:

a. abiotic factors critical to the long-term survival of the CEEC or EEC. For example, how much the impact will lead to a reduction of groundwater levels or substantial alteration of surface water patterns

The proposed removal of approximately 0.83 ha of low condition Box Gum Woodland TEC that occurs within the development site as a number of scattered and small isolated patches is unlikely to have any impact on abiotic factors critical to the long-term survival of the TEC.

The subject land is largely dry and the main vegetation within it is dry-land woodland and grassland, which are not dependent on streams or groundwater for their existence. For this reason, there is considered to be very limited potential for impacts from alteration to groundwater levels and hydrological regimes to impact this community. Extensive areas of this community occur at locations where groundwater and streams are unlikely to be accessed by species within this community. The Box Gum Woodland within the subject land is not considered to comprise a GDE.

b. characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants

Within the development site, a substantial change will occur to the composition of the community, as it will be entirely removed. Indirect impacts, such as altered microclimates, weed invasion and soil erosion are not anticipated to have a significant impact on characteristic and functionally important species.

Box Gum Woodland has previously been substantially cleared and or modified within the subject land. Although invasive flora species are known to occur within this community, there is the potential for an increase of such species if left unmitigated due to changing land uses and management. The Project will not result in the regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species that harm or inhibit the growth of plant species in Box Gum Woodland TEC.

c. the quality and integrity of an occurrence of the CEEC or EEC through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the CEEC or EEC.

The quality and integrity of the remaining areas TEC is unlikely to be significantly impacted due to a lack of substantial connectivity and the already degraded condition of the TEC within the development site.

viii. direct or indirect fragmentation and isolation of an important area of the CEEC or EEC. .

The removal of ~0.83 ha of Box Gum Woodland TEC will not increase the isolation of any important areas of the TEC however it is expected to marginally increase the fragmentation. The TEC is currently lacking in substantial connectivity to other areas of the TEC and removal of the areas within the development site would contribute little, if any, to the persistence of the larger tract of the TEC along Boltons Creek and across Gunnedah Road to the south.

Although the Project will increase the amount of overall fragmentation, it will not result in the isolation of areas of habitat for this community

ix. the measures proposed to contribute to the recovery of the CEEC or EEC in the IBRA subregion.

Biodiversity offsets as determined by the BAM Calculator are proposed to be purchased within the IBRA subregion or surrounding subregions that will contribute to the recovery of Box Gum Woodland in the surrounding landscape.

Therefore, it is considered the removal of ~0.83 of Box Gum Woodland would not represent a SAII to the persistence of the TEC within the region.

7.6.2 Impacts that Require an Offset

i. Native Vegetation

In accordance with the BAM, an offset is required for all impacts of development on PCTs that are associated with:

- A vegetation zone that has a vegetation integrity score ≥15 where the PCT is representative of an EEC or CEEC, or;
- A vegetation zone that has a vegetation integrity score of ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community; or
- A vegetation zone that has vegetation integrity score of ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

The PCTs and vegetation zones requiring offsets, and the number of ecosystem credits required, are documented in **Table 7.3**, whilst these areas are mapped in **Figure 7.2**.

Although vegetation zone 2 is not associated with a TEC, it was selected as 'TEC' in the BAM Calculator as the same PCT within an assessment cannot have multiple TEC statuses selected. The biodiversity risk weighting for PCT 599 is the same irrespective of the TEC status due to the percent cleared value. Therefore alignment of vegetation zone 2 to the TEC does not impact the number of credits generated. As such, both vegetation zones have been included in the one BAM Calculator assessment and assessed as TECs.

Table 7.3 Ecosystem credit liability

Zone	PCT	TEC	Area (ha)	Credits
1	599_Remnant	White Box Yellow Box Blakely's Red Gum Woodland	0.83	13
2	599_Planted	Not a TEC	0.51	7

ii. Threatened Species

No species credit species have been assessed as impacted within the development site and therefore no offset is required.

7.6.3 Impacts that do not Require an Offset

All areas identified in **Figure 7.3** as 'Cleared' or 'Exotic dominated pasture' and 'Garden beds' occur within the development site however do not require an offset. Areas within the subject land that do not require assessment are shown in **Figure 7.4**.

7.7 Summary of Offset Credits Required

The credit requirement for the project is summarised in **Table 7.4**, whilst the 'like for like' offsetting options for the ecosystem credits are provided in **Table 7.5**. A credit report from the BAM calculator has been included in **Appendix D**.

PCT	TEC	Credits
599 – Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	TEC	20

Table 7.4 Like for like options for PCTs

Original PCT to be offset	Any PCT with the below TEC	Containing HBT	In the below IBRA subregions
599	White Box Yellow Box Blakely's Red Gum Woodland (including PCT's 2, 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280,	Yes	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau.

Table 7.4 Like for like options for PCTs

Original PCT to be offset	Any PCT with the below TEC	Containing HBT	In the below IBRA subregions
	281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 506, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1601, 1606, 1608, 1611, 1691, 1693, 1695, 1698)		or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.

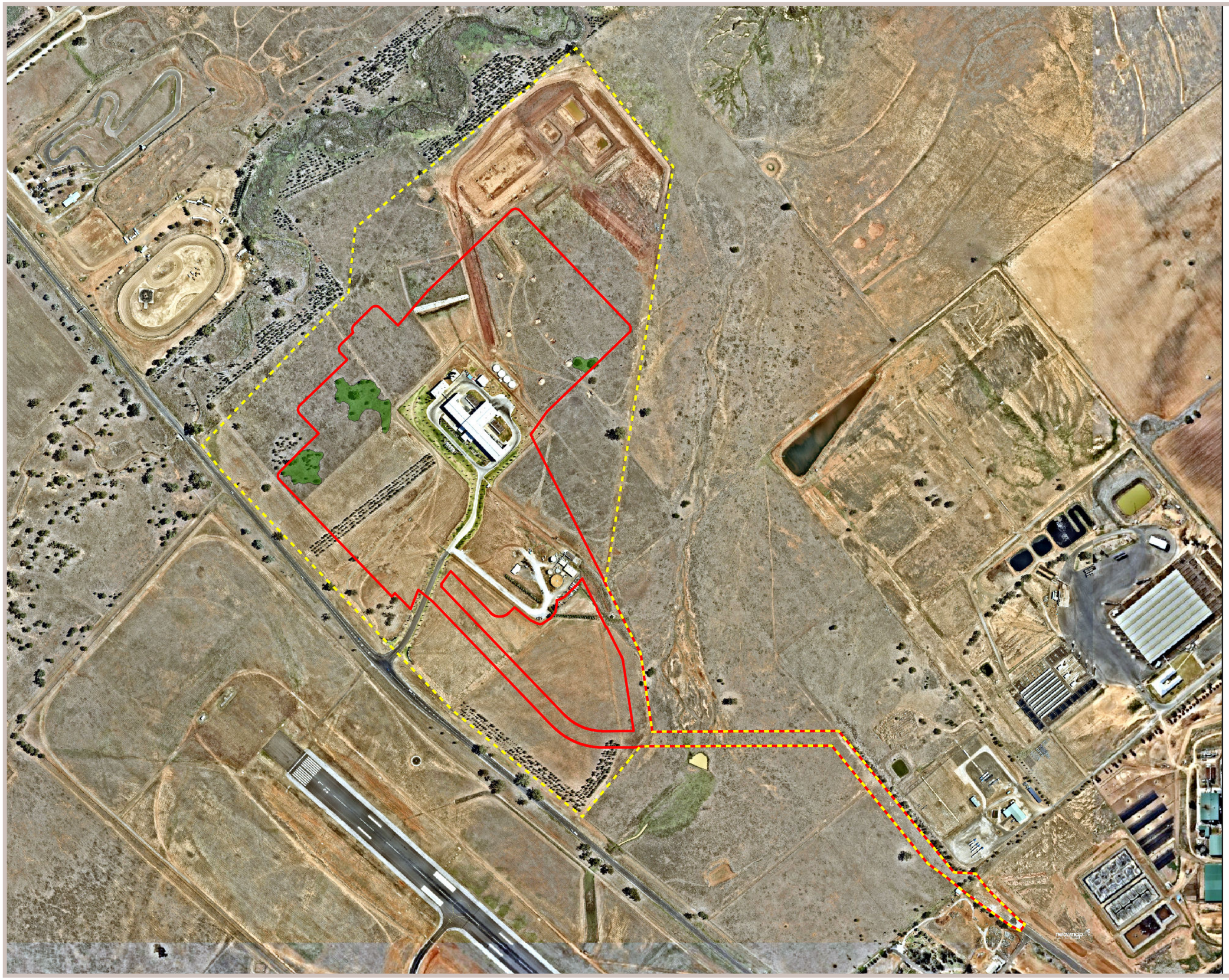


Figure 7.1. Location of serious and irreversible impacts

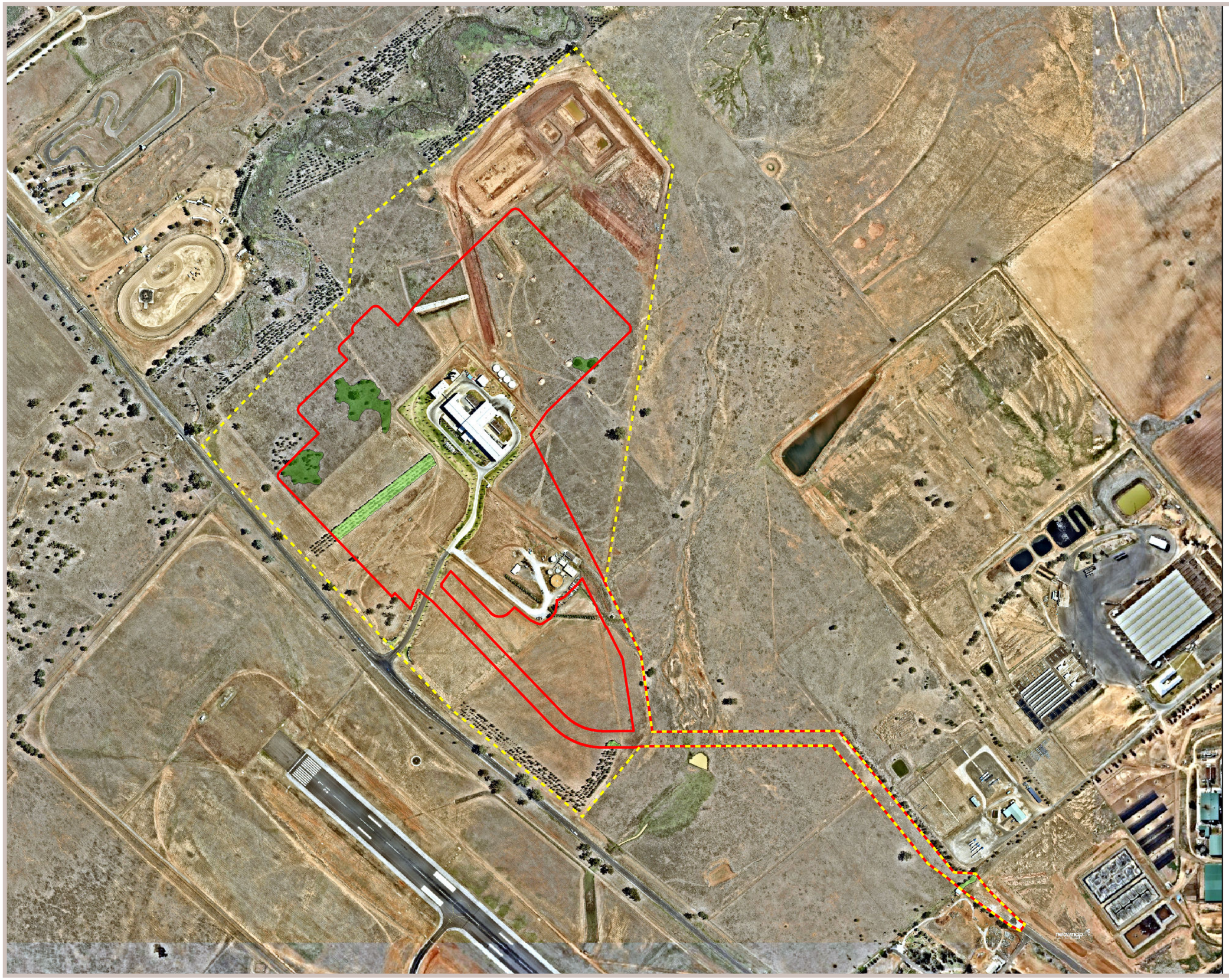


Figure 7.2. Location of impacts that require an offset

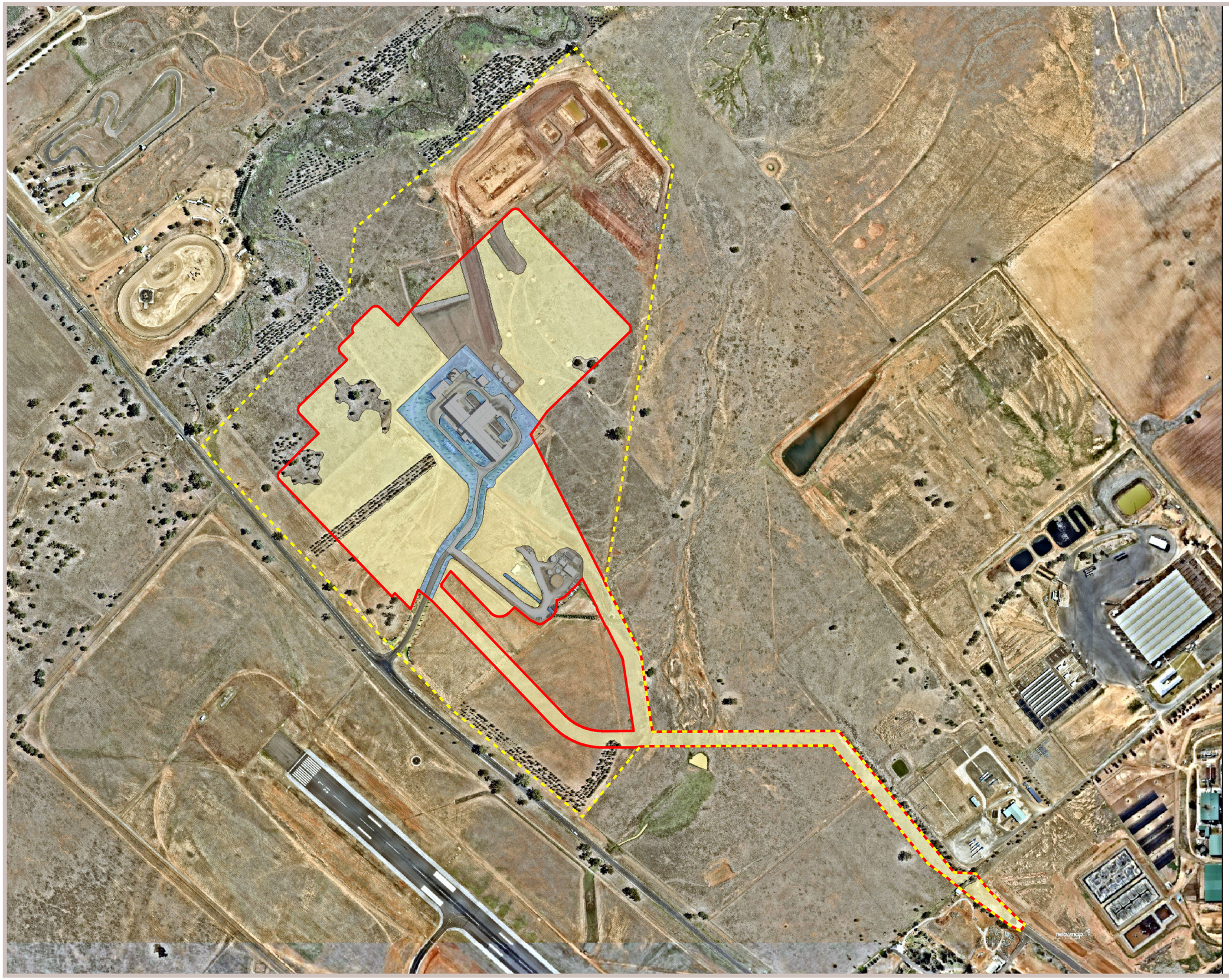


Figure 7.3. Location of impacts that do not require an offset

Figure 7.4. Location of areas not requiring assessment

cumberland ecology

Chapter 8

Conclusion

The Project involves the construction and operation of new poultry processing plant within the development site. An assessment was undertaken to examine the impacts of the Project on the biodiversity values of the subject land. This BDAR has been prepared to document the findings of an ecological investigation undertaken within the subject land in accordance with the BAM.

The biodiversity values of the subject land are limited, due the site history of heavy modification and agricultural activities. Only one native vegetation community, Box Gum Woodland, occurs as scattered isolated patches that align to the BC Act listing of the TEC and as patches of planted natives that are non-TEC. The remaining areas include garden beds, exotic dominated pasture and cleared areas. The subject land contains six hollow-bearing trees and a Category 1 watercourse, Additional habitat values are represented by the non-native vegetation and human-made structures. There is some, albeit minor, connectivity between the Box Gum Woodland vegetation within the subject land and a larger tract of Box Gum Woodland that is associated with Boltons Creek outside the subject land.

Measures to avoid and minimise impacts to the biodiversity values of the subject land have been implemented and included consideration of the project location, design and possible alternative locations.

Nevertheless, the Project will result in the removal of ~0.83 ha of Box Gum Woodland TEC and ~0.51 ha of planted native vegetation. Two hollow-bearing trees, one stick nest and areas of non-native vegetation will also be removed. Potential indirect impacts of the Project include inadvertent impacts on hydrological processes and adjacent habitat, and prescribed impacts such as demolition of human-made structures and impacts on habitat connectivity and species movements have been considered. The impacts to Box Gum Woodland TEC, which is a SAII entity, are not considered to be significant.

A suite of mitigation measures have been proposed to minimise the direct, indirect and prescribed impacts of the Project, such as construction mitigation measures, weed management and pre-clearance surveys.

As the Project includes the removal of areas of native vegetation, offsets are required in the form of ecosystem credits. This assessment indicated that the removal of the native vegetation within the subject land requires a total of 20 ecosystem credits, comprising PCT 599. With the implementation of the proposed mitigation measures and the offsetting described previously, it is considered that the impacts of this project on biodiversity, in particular on Box Gum Woodland, will be minimal and can be appropriately managed.

References

Bureau of Meteorology. 2018. Atlas of Groundwater Dependent Ecosystems. Bureau of Meteorology.

DEC (NSW). 2004. Nandewar Biodiversity Surrogates: Vegetation. Department of Environment and Conservation (NSW), Coffs Harbour, NSW.

DECCW (NSW). 2010. Draft National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland. NSW DECCW, Sydney.

DEH. 2006. EPBC Act Policy Statement 3.5 - White Box - Yellow Box - Blakely's Red Gum grassy woodland and derived grasslands. Department of Environment and Heritage, Canberra, ACT.

Landcom. 2004. Managing Urban Stormwater: Soils and Construction ("Blue Book"), Fourth Edition, NSW Government, Parramatta.

LLS: North West, editor. 2017. North West Regional Strategic Weed Management Plan 2017 - 2022. Local Land Services NSW.

Mitchell, P. 2002. Descriptions for NSW (Mitchell) Landscapes. Department of Environment and Climate Change NSW, Sydney.

NPWS. 2016. National Parks and Wildlife Service Estate Data.

NSW Office of Water. 2011. Water Resources and Management Overview: Namoi Catchment. NSW Office of Water, Sydney.

NSW Scientific Committee. 2002. White box yellow box Blakely's red gum woodland - endangered ecological community listing. Department of Environment and Conservation (NSW), Hurstville.

OEH. 2012. Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855. NSW Office of Environment and Heritage, Sydney.

OEH. 2016. NSW Guide to Surveying Threatened Plants. Office of Environment and Heritage,, Sydney.

OEH. 2018a. BioNet Atlas. Office of Environment and Heritage.

OEH. 2018b. Eastern Bentwing-bat - profile. Office of Environment and Heritage, Hurstville.

OEH. 2018c. Glossy Black Cockatoo - profile. NSW Office of the Environment and Heritage, Hurstville.

SKM. 2010. Mapping Groundwater Dependent Ecosystems in the Namoi Catchment. Application of Sebal Remotely Sensed Evapotranspiration Measurement. Sinclair Knight Mertz.

Threatened Species Scientific Committee. 2006. Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Department of Environment and Heritage, Canberra.

Appendix A

Plot/transect data

Table A.1 Plot/transect data

Plot	Vegetation Zone	PCT	Composition						Structure						Large Trees	Hollow Trees	Litter Cover	Length of Fallen Logs	Tree Stem (5-10)	Tree Stem (10-20)	Tree Stem (20-30)	Tree Stem (30-50)	Tree Stem (50-80)	Tree Regeneration	High Threat Exotic
			Tree	Shrub	Grass	Forb	Fern	Other	Tree	Shrub	Grass	Forb	Fern	Other											
1	**1**	**599**	**1**	**1**	**7**	**6**	**1**	**1**	**5.0**	**0.2**	**7.0**	**3.4**	**0.2**	**0.3**	**1**	**2**	**73.0**	**0.0**	**0**	**1**	**1**	**1**	**1**	**0**	**0.0**
2	**1**	**599**	**2**	**3**	**5**	**0**	**0**	**0**	**23.0**	**1.2**	**4.5**	**0.0**	**0.0**	**0.0**	**1**	**1**	**84.0**	**43.0**	**1**	**1**	**0**	**0**	**0**	**1**	**2.5**
3			0	0	1	1	0	0	0.0	0.0	2.0	0.2	0.0	0.0	0	0	77.0	0.0	1	0	0	0	0	1	5.5
4	**1**	**599**	**1**	**0**	**4**	**0**	**0**	**0**	**15.0**	**0.0**	**3.0**	**0.0**	**0.0**	**0.0**	**1**	**1**	**87.0**	**22.0**	**1**	**0**	**1**	**0**	**0**	**0**	**8.5**
5			0	1	4	1	0	0	0.0	0.5	3.2	0.2	0.0	0.0	0	0	75.0	0.0	0	0	0	0	0	0	1.5
6			0	0	4	2	0	0	0.0	0.0	44.0	1.2	0.0	0.0	0	0	88.0	0.0	0	0	0	0	0	0	0.0
7			0	0	4	0	0	0	0.0	0.0	50.7	0.0	0.0	0.0	0	0	49.0	0.0	0	0	0	0	0	0	1.0
8	**1**	**599**	**1**	**1**	**3**	**0**	**0**	**0**	**25.0**	**0.3**	**16.2**	**0.0**	**0.0**	**0.0**	**2**	**0**	**96.0**	**34.0**	**0**	**0**	**0**	**0**	**1**	**0**	**2.5**
9			0	0	2	3	0	0	0.0	0.0	2.5	0.9	0.0	0.0	0	0	88.0	0.0	0	0	0	0	0	0	11.5
10	**2**	**599**	**5**	**0**	**3**	**4**	**0**	**1**	**12.0**	**0.0**	**1.5**	**2.5**	**0.0**	**0.2**	**0**	**0**	**64.0**	**0.0**	**1**	**1**	**1**	**0**	**0**	**1**	**0.5**
11			0	0	3	2	1	1	0.0	0.0	13.0	5.0	0.2	0.5	0	0	60.0	0.0	0	0	0	0	0	0	1.0
12			0	1	4	2	0	0	0.0	0.3	2.8	0.8	0.0	0.0	0	0	72.0	0.0	0	0	0	0	0	0	0.7
13			0	0	4	0	0	0	0.0	0.0	10.9	0.0	0.0	0.0	0	0	83.0	0.0	0	0	0	0	0	0	4.0

Appendix B

Flora Species List

Table B.1 Flora species list

Family	Exotic	Scientific Name	Common Name
Amygdalaceae	*	*Prunus spp.*	
Apiaceae	*	*Foeniculum vulgare*	Fennel
Asteraceae	*	*Bidens pilosa*	Cobbler's Pegs
Asteraceae		*Calotis cuneata*	Mountain Burr-Daisy
Asteraceae		*Calotis lappulacea*	Yellow Burr-daisy
Asteraceae	*	*Carthamus lanatus*	Saffron Thistle
Asteraceae	*	*Centaurea solstitialis*	St Barnabys Thistle
Asteraceae	*	*Chondrilla juncea*	Skeleton Weed
Asteraceae	*	*Cichorium intybus*	Chicory
Asteraceae	*	*Cirsium vulgare*	Spear Thistle
Asteraceae		*Cotula australis*	Common Cotula
Asteraceae	*	*Gamochaeta calviceps*	Cudweed
Asteraceae	*	*Gazania linearis*	
Asteraceae	*	*Hypochaeris radicata*	Catsear
Asteraceae	*	*Senecio madagascariensis*	Fireweed
Asteraceae	*	*Tragopogon porrifolius subsp. porrifolius*	Salsify
Asteraceae		*Vittadinia cuneata*	A Fuzzweed
Asteraceae		*Vittadinia cuneata*	A Fuzzweed
Asteraceae		*Vittadinia muelleri*	A Fuzzweed
Brassicaceae	*	*Capsella bursa-pastoris*	Shepherd's Purse
Brassicaceae	*	*Lepidium africanum*	Common Peppercress
Brassicaceae	*	*Lepidium bonariense*	Argentine Peppercress
Campanulaceae		*Wahlenbergia gracilenta*	Annual Bluebell
Caryophyllaceae	*	*Paronychia brasiliana*	Chilean Whitlow Wort
Casuarinaceae		*Allocasuarina verticillata*	Drooping Sheoak
Chenopodiaceae		*Einadia trigonos*	Fishweed
Chenopodiaceae		*Maireana microphylla*	Small-leaf Bluebush
Convolvulaceae	*	*Convolvulus arvensis*	Field Bindweed
Convolvulaceae		*Convolvulus erubescens*	Pink Bindweed
Convolvulaceae		*Dichondra repens*	Kidney Weed
Cupressaceae	*	*Juniperus spp.*	Juniper
Cyperaceae		*Cyperus gracilis*	Slender Flat-sedge
Dilleniaceae		*Hibbertia obtusifolia*	Hoary Guinea Flower

Table B.1 Flora species list

Family	Exotic	Scientific Name	Common Name
Fabaceae (Faboideae)		*Desmodium varians*	Slender Tick-trefoil
Fabaceae (Faboideae)	*	*Medicago polymorpha*	Burr Medic
Fabaceae (Faboideae)	*	*Medicago sativa*	Lucerne
Fabaceae (Mimosoideae)		*Acacia saliciformis*	
Geraniaceae		*Geranium solanderi*	Native Geranium
Geraniaceae	*	*Geranium spp.*	
Juncaceae		*Juncus usitatus*	
Lamiaceae	*	*Marrubium vulgare*	White Horehound
Lamiaceae		*Westringia fruticosa*	Coastal Rosemary
Lomandraceae		*Lomandra multiflora subsp. multiflora*	Many-flowered Mat-rush
Lomandraceae		*Lomandra spp.*	Mat-rush
Malvaceae		*Brachychiton populneus*	Kurrajong
Malvaceae	*	*Malva parviflora*	Small-flowered Mallow
Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne
Myrtaceae		*Angophora floribunda*	Rough-barked Apple
Myrtaceae		*Callistemon viminalis*	Weeping Bottlebrush
Myrtaceae		*Eucalyptus amplifolia*	Cabbage Gum
Myrtaceae		*Eucalyptus blakelyi*	Blakely's Red Gum
Myrtaceae		*Eucalyptus melliodora*	Yellow Box
Nandinaceae	*	*Nandina domestica*	Japanese Sacred Bamboo
Pittosporaceae		*Bursaria spinosa*	Native Blackthorn
Plantaginaceae	*	*Plantago lanceolata*	Lamb's Tongues
Poaceae	*	*Andropogon virginicus*	Whisky Grass
Poaceae		*Aristida behriana*	Bunch Wiregrass
Poaceae		*Aristida ramosa*	Purple Wiregrass
Poaceae		*Austrostipa scabra*	Speargrass
Poaceae		*Austrostipa verticillata*	Slender Bamboo Grass
Poaceae	*	*Avena sativa*	Oats
Poaceae	*	*Axonopus fissifolius*	Narrow-leafed Carpet Grass
Poaceae	*	*Briza maxima*	Quaking Grass
Poaceae	*	*Briza minor*	Shivery Grass
Poaceae	*	*Cenchrus clandestinus*	Kikuyu Grass
Poaceae	*	*Chloris virgata*	Feathertop Rhodes Grass

Table B.1 Flora species list

Family	Exotic	Scientific Name	Common Name
Poaceae		*Cynodon dactylon*	Common Couch
Poaceae		*Dichanthium sericeum*	Queensland Bluegrass
Poaceae		*Dichelachne micrantha*	Shorthair Plumegrass
Poaceae		*Eragrostis brownii*	Brown's Lovegrass
Poaceae	*	*Lolium perenne*	Perennial Ryegrass
Poaceae	*	*Paspalum dilatatum*	Paspalum
Poaceae	*	*Phalaris aquatica*	Phalaris
Poaceae	*	*Poa annua*	Winter Grass
Poaceae		*Rytidosperma caespitosum*	Ringed Wallaby Grass
Poaceae		*Rytidosperma sp.*	
Poaceae		*Sporobolus creber*	Slender Rat's Tail Grass
Poaceae		*Themeda triandra*	
Poaceae	*	*Vulpia spp.*	Rat's-tail Fescue
Polygonaceae		*Rumex brownii*	Swamp Dock
Proteaceae		*Grevillea speciosa*	Red Spider Flower
Pteridaceae		*Cheilanthes sieberi*	Rock Fern
Rosaceae	*	*Rosa spp.*	
Rutaceae	*	*Coleonema spp.*	
Rutaceae		*Geijera parviflora*	Wilga
Scrophulariaceae	*	*Verbascum virgatum*	Twiggy Mullein
Solanaceae	*	*Lycium ferocissimum*	African Boxthorn
Verbenaceae	*	*Verbena bonariensis*	Purpletop
Violaceae	*	*Viola spp.*	
Xanthorrhoeaceae		*Xanthorrhoea spp.*	

Appendix C

Fauna Species List

Table C.1 Fauna species list

Scientific Name	Common Name	Exotic
Amphibia		
Limnodynastes fletcheri	Barking Frog	
Litoria caerulea	Green Tree Frog	
Litoria latopalmata	Broad-palmed Frog	
Litoria peronii	Peron's Tree Frog	
Litoria rubella	Red Tree Frog	
Aves		
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	
Acanthiza nana	Yellow Thornbill	
Anas gracilis	Grey Teal	
Cacatua sanguinea	Little Corella	
Chalcites osculans	Black-eared Cuckoo	
Cincloramphus mathewsi	Rufous Songlark	
Coracina novaehollandiae	Black-faced Cuckoo-shrike	
Corvus coronoides	Australian Raven	
Coturnix ypsilophora	Brown Quail	
Cracticus nigrogularis	Pied Butcherbird	
Cracticus tibicen	Australian Magpie	
Dacelo novaeguineae	Laughing Kookaburra	
Elanus axillaris	Black-shouldered Kite	
Eolophus roseicapillus	Galah	
Grallina cyanoleuca	Magpie-lark	
Haliastur sphenurus	Whistling Kite	
Lichenostomus penicillatus	White-plumed Honeyeater	
Malurus cyaneus	Superb Fairy-wren	
Manorina melanocephala	Noisy Miner	
Milvus migrans	Black Kite	
Mirafra javanica	Horsfield's Bushlark	
Nycticorax caledonicus	Nankeen Night-Heron	
Nymphicus hollandicus	Cockatiel	
Ocyphaps lophotes	Crested Pigeon	
Pardalotus striatus	Striated Pardalote	
Petrochelidon ariel	Fairy Martin	

Table C.1 Fauna species list

Scientific Name	Common Name	Exotic
Platycercus eximius	Eastern Rosella	
Psephotus haematonotus	Red-rumped Parrot	
Rhipidura leucophrys	Willie Wagtail	
Scythrops novaehollandiae	Channel-billed Cuckoo	
Smicrornis brevirostris	Weebill	
Streptopelia chinensis	Spotted Dove	*
Sturnus tristis	Common Myna	*
Sturnus vulgaris	Common Starling	*
Taeniopygia guttata	Zebra Finch	
Vanellus miles	Masked Lapwing	
Mammalia		
Austronomus australis	White-striped Freetail-bat	
Bos taurus	Cow	*
Chalinolobus gouldii	Gould's Wattled Bat	
Lepus capensis	Brown Hare	*
Macropus giganteus	Eastern Grey Kangaroo	
Macropus rufogriseus	Red-necked Wallaby	
Macropus rufus	Red Kangaroo	
Mormopterus planiceps	Southern Freetail-bat	
Mormopterus ridei	Eastern Free-tailed bat	
Oryctolagus cuniculus	European Rabbit	*
Scotorepens balstoni	Inland Broad-nosed Bat	
Sus scrofa	Pig	*
Vulpes vulpes	Red Fox	*
Reptilia		
Pseudonaja textilis	Eastern Brown Snake	

Appendix D

Credit Report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00012526/BAAS17027/19/00012527	Baiada	04/01/2019
Assessor Name	**Report Created**	**BAM Data version ***
David Robertson	29/01/2019	6
Assessor Number	* 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.	
BAAS17027		

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Candidate SAII	Ecosystem credits
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion								
1	599_Planted	28.0	0.5	0.25	High Sensitivity to Potential Gain	2.00	TRUE	7
2	599_Remnant	31.5	0.8	0.25	High Sensitivity to Potential Gain	2.00	TRUE	13
							Subtotal	**20**
							Total	**20**

BAM Credit Summary Report

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Candidate SAII	Species credits