
Valley of the Winds
Renewable Energy from ACEN
Appendix 6
Ammended biodiversity development assessment report
RAMBOLL
ACEN Australia

Valley of the Winds Wind Farm
Biodiversity Development Assessment Report

ACEN Australia



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Executive Summary

Eco Logical Australia Pty Ltd (ELA) was commissioned ACEN Australia (ACEN) to prepare a Biodiversity Development Assessment Report (BDAR) under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Biodiversity Assessment Method (BAM) for the development of the Valley of the Winds Windfarm (the project), near Coolah, NSW.

This report has been prepared to meet the requirements of the Biodiversity Assessment Method (BAM) established under Section 6.7 of the NSW BC Act. The accredited BAM assessor who prepared the assessment is Alex Pursche (BAAS17019).

The project was also referred to the Commonwealth Department of Agriculture, Water and the Environment for potential impacts to matters of national environmental significance protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

On 13 July 2020, a delegate of the Federal Minister for the Department of Agriculture, Water and the Environment determined that the project was a controlled action under section 75 of the EPBC Act and therefore requires assessment and approval under the EPBC Act. The assessment of environmental impacts for the project is being undertaken under the *Amended Bilateral Agreement* between the Australian Department of Agriculture, Water and the Environment and the New South Wales Department of Planning, Industry and Environment.

The detailed project design is currently in preparation and this BDAR has been applied by assessing a development site within which all direct impacts (both construction and operation) would be expected to occur based on the current wind farm layout.

ACEN has designed the development site by taking steps to avoid, minimise and mitigate impacts to biodiversity values. An original larger investigation area was surveyed in 2019, and the site selected and refined over several iterations to avoid the areas of highest biodiversity value. This report presents a refined footprint to that proposed in the Environment Impact Statement (EIS) in 2022.

The Central-West Orana Transmission Line (CWO-REZ Transmission Line) runs north-west from the existing 500kV network near Merriwa, passing south of Dunedoo before connecting to the existing network east of Wellington. As a Candidate Foundation Generator (CFG) for the CWO-REZ, the project would connect directly to the proposed CWO-REZ transmission line, which will allow for the project's output to be transmitted across the National Energy Market (NEM). ACEN has undertaken extensive consultation with EnergyCo regarding the proposed and how the project would connect to that infrastructure. It is confirmed that the overhead transmission line running south from the Girragulang Road, and Leadville clusters will no longer form part of this project. This infrastructure will be assessed as part of the CWO REZ transmission line extension project that will be developed separately by EnergyCo. The removal of electrical connectivity to the CWO REZ Transmission line has reduced the development site of this Project by 12%.

ACEN has also removed 17 turbines from the EIS wind farm layout to reduce amenity impacts for nearby dwellings and biodiversity impacts. This refinement follows extensive consultation with the NSW Department of Planning and Environment (DPE) as well as the Biodiversity Conservation and Science

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Directorate (BCS) regarding the extent of potential impact on threatened ecological communities and other native vegetation and the project's ability to demonstrate the principles of 'avoid and minimise' regarding impacts to biodiversity. In addition to the removal of turbines, ACEN has refined the internal layout of the wind farm, to propose a narrower construction corridor, which steers around areas of higher biodiversity value (where possible).

The development site has been reduced by 51% from 1,318 ha to 695 ha. This reduction has come as a result of the removal of 17 turbines (11% reduction in turbines) and associated infrastructure, including revised access tracks and hardstands, and removal of the electrical connectivity to the CWO REZ transmission line.

The development site, which includes both construction and operational footprints covers approximately 695 ha and is primarily used for sheep and cattle grazing and cropping. The majority of native vegetation is modified by both historical and ongoing farming practices and is generally restricted to isolated paddock trees or small patches of paddock trees with a modified understorey. Paddock areas, represent over 71% of the development site. Significant areas of the development site no longer comprise native plant communities due to historical agricultural activities including cropping and pasture improvement. Some areas of native vegetation across the region have been subject to an intense fire in 2017, which has permanently modified the structure and function of vegetation across the development site.

Eight Plant Community Types (PCTs) were recorded in the study area totalling 12,185 ha including:

- 84 River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
- 267 White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
- 281 Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
- 461 Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion
- 478 Red Ironbark - Black Cypress Pine - stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong - Mendooran region, southern Brigalow Belt South Bioregion
- 479 Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
- 483 Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
- 616 Grey Myrtle - Rusty Fig dry rainforest in sandstone gorges of the upper Hunter Valley, mainly Sydney Basin Bioregion

PCT 267 that occur within the development site have been assessed to meet the threshold for Inland Grey Box Endangered Ecological Community (EEC) under both the BC Act and EPBC Act.

PCT 281 and 483 can conform to White Box - Yellow Box - Blakely's Red Gum Grassy Woodland, a Critically Endangered Ecological Community (CEEC) listed under the BC Act and EPBC Act. All of PCT 281

within the development site has been conservatively assessed to meet the CEEC threshold under the BC Act. PCT 483 in good, moderate, and low condition has been assessed to meet the CEEC threshold under the BC Act. Areas of PCT483 in poor condition (previously identified as Category 1 Land) are not considered to meet the description of the BC Act CEEC as these areas are not '*dominated by perennial tussock grasses interspersed with a diverse range of forb species'* (Section 4.2; NSW TSSC, 2020).

Within the development site 35.32 ha was assessed as meeting the condition thresholds for the CEEC listed under the EPBC Act.

Flora and fauna habitats across the development site are generally significantly degraded, typical of a highly modified farming landscape. Assessment and survey of potential threatened species habitats recorded 16 threatened fauna species and one flora species within or adjacent to the development site:

- Barking Owl
- Black Falcon
- Black-chinned Honeyeater
- Dusky Woodswallow
- Grey-crowned Babbler
- Little Lorikeet
- Masked Owl
- Powerful Owl
- Speckled Warbler
- Spotted Harrier
- Varied Sittella
- White-throated Needletail
- Large Bentwing-bat
- Large-eared Pied Bat
- Squirrel Glider
- Yellow-bellied Sheathtail-bat
- *Dichanthium setosum*

Where appropriate, species polygons have been calculated for those candidate species identified as known to the study area.

The extent of impacts in this report likely overestimate the actual impacts of the project. The development footprint includes a significant buffer to allow for temporary construction impacts as well as detailed civil design for cut and fill associated with the projects internal road network. The proposed development corridor allows for considerable micro siting within it's bounds, and through a detailed design process, we can expect the total project impact area to be reduced by more than 25%. Flexibility within the development corridor will allow the project to significantly reduce any Serious and Irreversible Impacts. Similarly, the construction of connecting transmission lines between wind farm clusters will not remove native grasslands in which the development spans (other than for installation of poles). As such the impacts quantified in this report should be considered in the context of the final developments true impacts.

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An assessment of the impacts of the project on matters of national environmental significance (MNES) within the development site was undertaken to fulfil the requirements of the Commonwealth Minister for the Environment under referral 2020/8668. Following revision of the project impacts, Assessments of Significance were completed for all MNES known or likely to be impacted. Assessments concluded that the only MNES likely to be impacted was the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland due to the removal of 35.32 ha of this CEEC, and this impact is not considered significant.

Similarly, an assessment of the impacts to aquatic habitats have been undertaken in accordance with the NSW *Fisheries Management Act 1994* (FM Act). Whilst the development site includes numerous 1st and 2nd order streams, they are all ephemeral and present little habitat for aquatic threatened species. One waterway within the study area (Coolaburragundy River) has been identified as potential Key Fish Habitat for threated species. This waterway will need to be crossed by electrical infrastructure as part of connecting the project together. Impacts to this waterway are likely to be negligible, and no impacts are proposed within the riparian corridor of the aquatic habitats.

An assessment of the potential for Serious and Irreversible Impacts (SAII) resulting from the project was undertaken. This included review of potential SAII for Large-eared Pied Bat, Large Bentwing-bat, and Box Gum Woodland. The project has avoided all areas of potential cliff line and cave habitat, as well as avoiding buffers around these features. The project will not lead to the extinction of these two cave-dwelling bats. Similarly, the assessment of impacts to Box Gum Woodland, identified that the majority of the development impacts areas that are in low condition, and that the removal of 119 ha of woodland and 158 ha of derived grassland would constitute a reduction in the CEEC in NSW by 0.01%. The remaining 1,800,000 ha of the CEEC in NSW would be unaffected by the Project.

Based on the findings of this assessment, the potential impacts requiring offsets are detailed in Table 1 and Table 2 below. These calculations include both options for access to the Girragulang Road cluster. Should only one of these accessways be constructed, then the credit liability would be reduced. Separate BAMC calculations have been conducted for each access option.

Table 1 Ecosystem credits required

PCT Number	PCT Name	BC Act	EPBC Act	Maximum area impacted	Credits required
84	River Oak – Rough-barked Apple – red gum – box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Not listed	Not listed	1.14	12
267	White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	EEC	EEC	4.48	77
281	Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	CEEC	CEEC (portions thereof)	16.38	601
479	Narrow-leaved Ironbark- Black Cypress Pine – stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not listed	Not listed	24.69	414

PCT Number	PCT Name	BC Act	EPBC Act	Maximum area impacted	Credits required
483	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	CEEC (portions thereof)	CEEC (portions thereof)	593.01	5,374

Table 2 Species credits required

Species	Common Name	Number of individuals / Habitat (ha) in development site	Credits required
Dichanthium setosum	Bluegrass	Species identified outside the development site. No impacts to this species will occur.	0 – no individuals or habitats impacted
Chalinolobus dwyeri	Large-eared Pied Bat	0.0 ha of potential breeding habitat 3.85 ha of foraging habitats	189 for foraging habitats. No breeding habitat impacted.
Tyto novahollandiae	Masked Owl	6.85 ha of buffer around hollow-bearing trees	217
Ninox connivens	Barking Owl	130.38 ha	2,426
Ninox strenua	Powerful owl	6.85 ha of buffer around hollow-bearing trees	217
Petaurus norfolcensis	Squirrel Glider	14.01 ha	446
Hoplocephalus bitorquatus	Pale-headed Snake	1.1 ha	15 credits

This BDAR has been prepared in accordance with the BAM. The development site has been designed to avoid and minimise impacts and is predominately located in areas of low or no biodiversity value. The residual impact of the proposed development requires 6,352 ecosystem credits and 3,510 species credits.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMCC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BCD	Biodiversity Conservation and Science Division of DPE
BDAR	Biodiversity Development Assessment Report
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically Endangered Ecological Community
DAFF	Department of Agriculture, Fisheries and Forestry
DCCEEW	Department of Climate Change, Energy, Environment and Water
DNG	Derived Native Grassland
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
LLS	Local Land Service
NSW	New South Wales
NOW	NSW Office of Water
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SSI	State Significant Infrastructure
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW *Water Management Act 2000*

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Terminology

The following terminology has been used throughout this report for the purposes of describing the impacts of the Project in the context of a biodiversity assessment in accordance with the NSW Biodiversity Assessment Method (DPIE, 2020).

Terminology	Description
Construction footprint	Includes all areas of land impacted by the construction of the wind turbines and supporting infrastructure, including construction compounds, laydown areas, batching plants and construction access tracks.
Development site	Includes all areas of the construction and operational footprint.
Direct impacts	Impacts that are assessed by the BAM and result from the clearing of vegetation for development. These impacts directly affect habitat and individuals (DPIE, 2020).
Indirect impacts	Impacts that occur when the Project affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. transporting weeds or pathogens, dumping rubbish). This includes impacts from activities related to the construction or operational phase of the Project and prescribed impacts (DPIE, 2020).
Operational footprint	Includes all areas of land containing all wind farm elements, including underground reticulation, turbine locations, substations, transmission line and accessways.
Prescribed impacts	Are those that may affect biodiversity values in addition to, or instead of, impacts from clearing vegetation. These may include, but are not limited to, impacts to movement of threatened species that maintains their life cycle, or impacts of wind turbine strikes on protected animals.
The Project	The construction and operation of the Valley of the Winds Wind Farm, including all elements encompassed within the development area.
SEARs	Secretary's Environmental Assessment Requirements
Study area	a 500m buffer area from the project centreline

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1. Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Alex Pursche, an Accredited Person (BAAS17021) to apply the Biodiversity Assessment Method (BAM) under the NSW *Biodiversity Conservation Act 2016* (BC Act).

All credit calculations have been undertaken using the BAM Calculator (BAMC) version in case number 21959. Separate BAMC calculations have been undertaken to delineate the credit requirements of the project for each subregion, as well as for the six stages of the wind farm elements as follows:

- Workers camp – Pilliga subregion: 40555
- GR Access via Moorfield Rd – Pilliga subregion: 21962
- GR Access via Moorfield Rd – Kerrabee subregion 40556
- GR Alternative Access – Pilliga subregion: 40557
- GR Alternative Access – Pilliga subregion: 40560
- GR Cluster – Pilliga subregion: 40564
- GR Cluster – Liverpool Range subregion: 39289
- LV Cluster – Inland Slopes subregion: 21960
- LV Cluster – Inland Slopes subregion: 21961
- MH Cluster – Pilliga subregion: 40568
- MH Cluster – Liverpool Range subregion: 40567

The study area spans three bioregions: Brigalow Belt South – Liverpool Range and Pilliga subregions, NSW South Western Slopes – Inland slopes subregion, and Sydney Basin – Kerrabee subregion. The confluence of these three bioregions occurs north of the Leadville Cluster (Figure 2). The majority of the study area occurs in Brigalow Belt South IBRA region, which typifies the vegetation and species generally identified during this study. A very small portion of the project is located in the Talbragar Valley IBRA subregion. This area has been amalgamated into all calculations for the Pilliga subregion.

As the project spans multiple IBRA regions, a separate calculation has been undertaken in the BAMCC for each IBRA subregion. As such the identification of predicted (ecosystem) species and candidate (species credit) species has been prepared for each calculation. The assessment of habitats, species distribution, and geographic limitations for candidate species has been undertaken separately for each IBRA region. Similarly, species associations and habitat mapping for each IBRA region has been assigned to only those PCT's the species is predicted to occur in.

For ease of readability, this assessment has been drafted as a single BDAR, with data presented on common figures for each IBRA subregion.

As the project is generally narrow and extends across the landscape, it has been assessed as a linear development with a study area of 500m buffer from the project centreline.

Due to the scale of the project, figures presented in this report are shown at the scale of each wind farm cluster (approximately 80,000:1). To show compliance with survey guidelines as well as survey details, detailed maps are provided (for each project stage) as an appendix to this report.

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1.1. Introduction

Eco Logical Australia Pty Ltd (ELA) were engaged by ACEN Australia (ACEN) to undertake a biodiversity assessment for the Valley of the Winds Wind Farm (the Project), suitable for inclusion in the Environmental Impact Statement (EIS).

The Project is located within the Warrumbungle Shire Council Local Government Area (LGA) between the towns of Coolah and Leadville in central west of NSW (Figure 2).

The Project proposes to construct and operate 131 turbines. The wind turbines will be broadly located in three areas known as the Mount Hope, Girragulang Road and Leadville clusters. A map of the wind farm layout is shown on Figure 1.

The Project will supply approximately 800 megawatts (MW) of electricity into the National Electricity Market (NEM).

The Project meets the threshold for State Significant Development (SSD) under State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). As the Project is declared to be an SSD under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) and must be assessed via an EIS, the consent authority for the Project is NSW Department of Planning and Environment (DPE). Due to potential for significant impacts to Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the Project has been declared a 'Controlled Action' and will also require consent from the Commonwealth Minister for the Environment.

As a SSD, the impacts to biodiversity must be assessed using the Biodiversity Assessment Method (BAM) (DPIE, 2020), which is a repeatable method for assessing biodiversity impacts. The BAM is a mandated methodology under the BC Act. Under the BAM, impacts to biodiversity are quantified through two credit types:

- Ecosystem credits – which includes impacts to vegetation (and some predicted threatened fauna species that are easily predicted by vegetation surrogates).
- Species credits – which includes all threatened flora, amphibians, invertebrates, reptiles, and some avian and mammal species.

The number of ecosystem credits and species credits required by a development is directly related to the condition and extent of vegetation (and habitats) impacted and is measured using the Biodiversity Assessment Method Credit Calculator (BAMC). The BAMC utilises vegetation integrity collected in the field, as well as native vegetation extent data within the study area, to estimate the number of ecosystem credits that will be required. The BAMC also provides a list of candidate threatened species that must be considered during the biodiversity assessment.

This report includes two base maps, the Location Map (Figure 5) and the Site Map (Figure 6).

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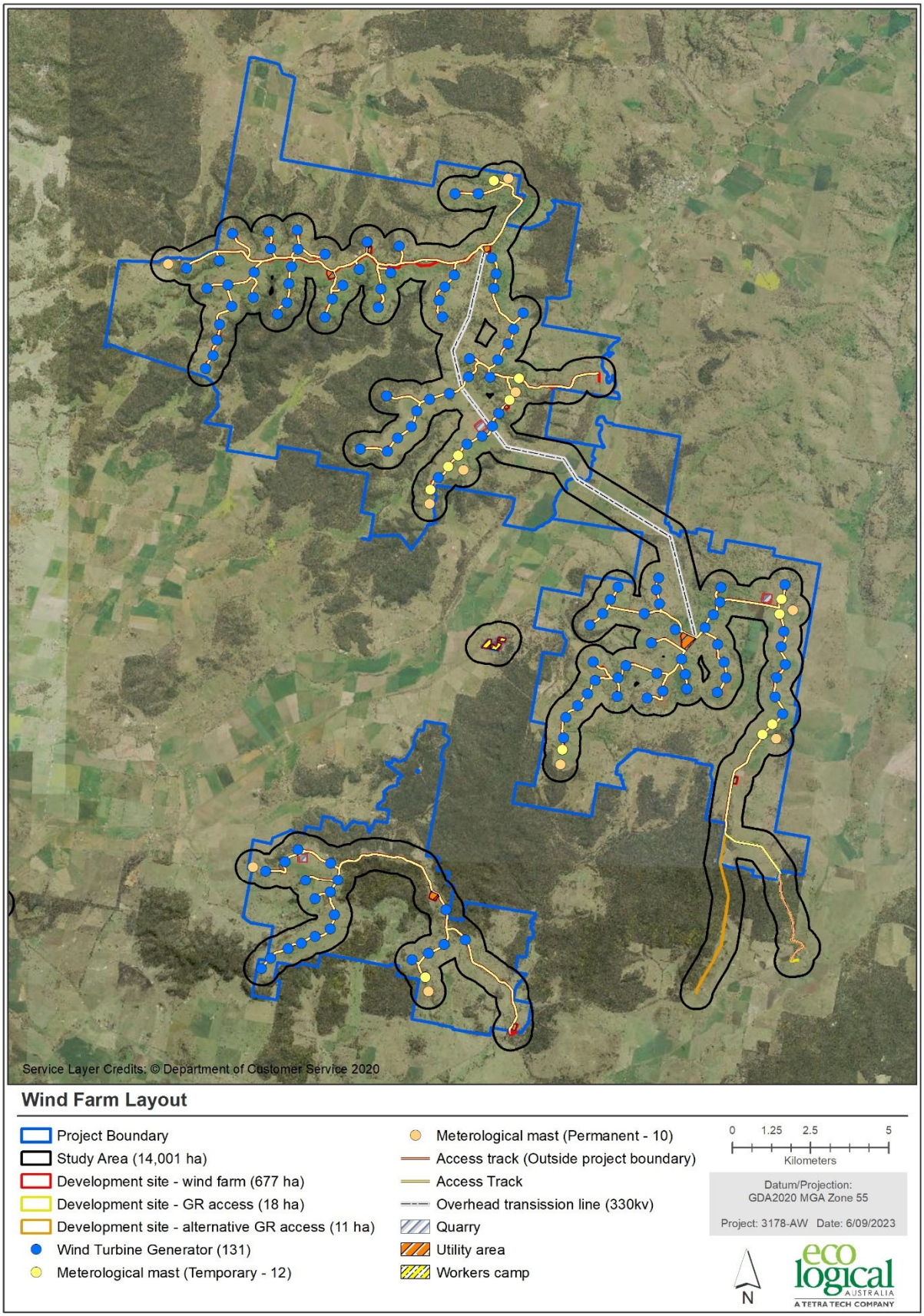


Figure 1 Wind farm layout

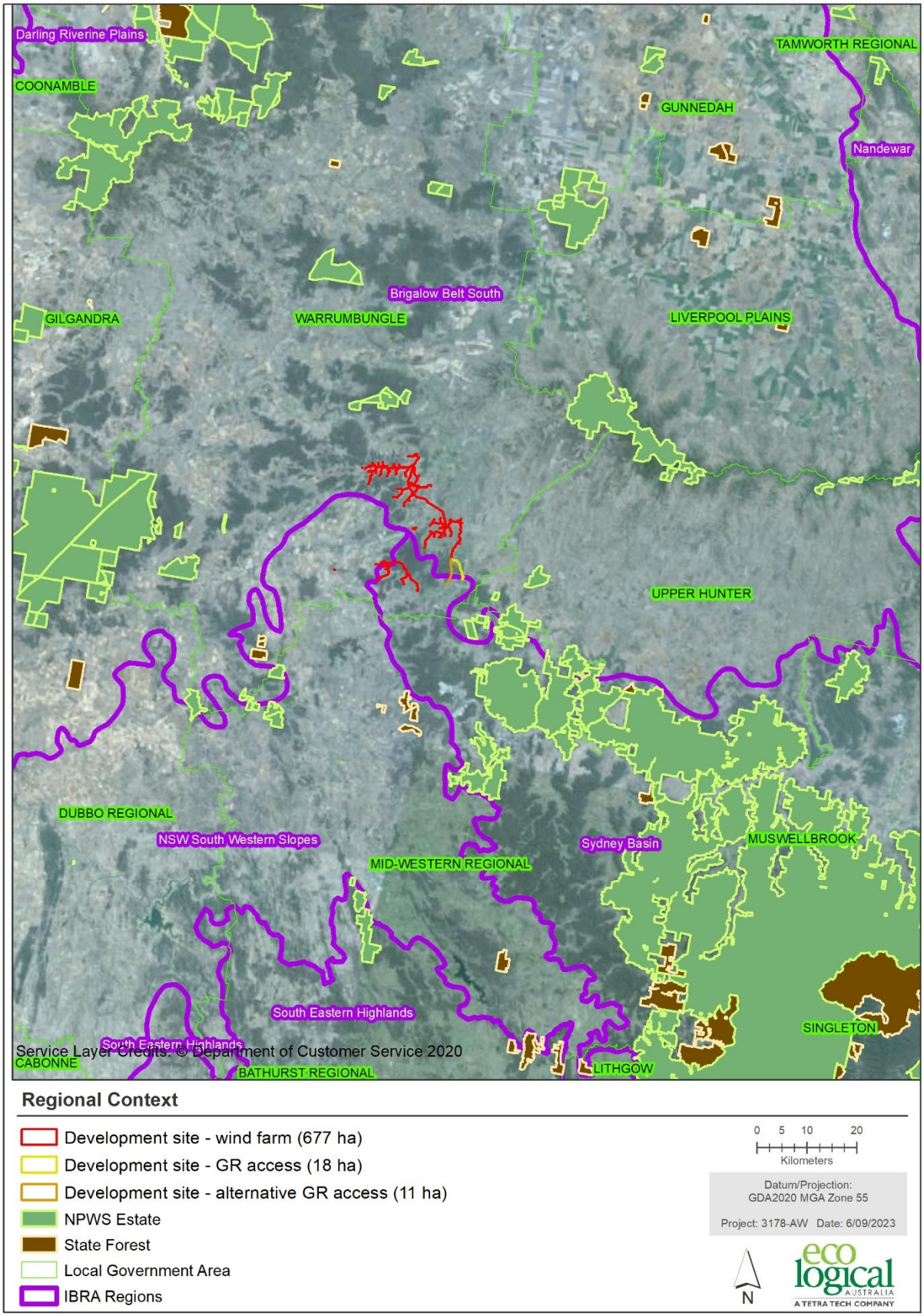


Figure 2 Regional context

1.2. General description of the development site

The proposed Valley of the Winds Wind Farm is nested between the towns of Coolah, Leadville and Uarbry within the Warrumbungle Shire Council Local Government Area (LGA) (Figure 2).

The Black Stump Way runs from Coolah to Leadville and passes through the centre of the Project, with the Mount Hope cluster to the north and the Leadville and Girragulang Road clusters to the south. Moorefield Road branches off the Black Stump Way and provides access to the southern end of the Girragulang Road cluster. The Golden Highway runs along the southern extent of the Project and provides major access points to the southern end of the Leadville cluster and to the proposed transmission line west of Uarbry. Access to the northern extent of the Project and to the Mount Hope cluster is via Mount Hope Road. Besides the major access ways, the majority of the site is accessed via private landholder farm tracks.

There are three land zonings across the study area, including RU5 within the villages of Uarbry & Leadville, SP2 within the Golden Highway road easement, and RU1 for all other remaining areas of the study area. Land tenure within the study area is almost entirely held in private ownership, with the exception of Council road easements. Within the study area there are no areas of the NPWS estate.

The average annual temperate in Dunedoo (the nearest Bureau of Meteorology weather station) is a minimum of 9.7°C and maximum of 24.0°C (BoM 2021). On average the area receives 613 mm of rainfall per year (BoM 2021).

In February and March of 2017 much of the remnant vegetation in the project development area was impacted by the Sir Ivan bushfire. The vegetation in the Girragulang Road and Leadville clusters, as well as the transmission line route, was severely impacted and experienced high severity crown fires. Six years later much of this vegetation is still significantly damaged. These areas may take up to 50 years to recover from this fire event.

1.3. Brief description of the proposal

The project consists of a maximum of 131 wind turbines and supporting infrastructure. The project would supply approximately 800 megawatts (MW) of electricity into the National Electricity Market (NEM).

The wind farm would be located between the townships of Coolah and Leadville. The project would be entirely within the Warrumbungle Shire Council Local Government Area (LGA).

The project would involve the construction, operation and decommissioning of three clusters of wind turbines, that would be connected electrically. These are:

- Mount Hope cluster – 65 turbines
- Girragulang Road cluster – 45 turbines
- Leadville cluster – 21 turbines.

The project includes the following key components:

- Up to 1310 wind turbines with a maximum tip height of 250 metres and a hardstand area at the base of each turbine

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- electrical infrastructure, including:
    - substations in each cluster and a step-up facility at the Girragulang road central substation
    - up to 330 kilovolt overhead transmission line connecting the 2 substations in the Mount Hope cluster
    - overhead transmission lines (up to 330 kilovolt) dispatching electricity from Mount Hope cluster to Girragulang Road cluster
    - other electrical infrastructure as required including a potential battery energy storage system (BESS)
- other permanent on-site ancillary infrastructure:
    - operation and maintenance facilities
    - meteorological masts (up to ten)
- access track network:
    - access and egress points to each cluster from public roads including intersection and road upgrades
    - access tracks and associated infrastructure within each cluster on private property
- temporary construction-phase ancillary facilities:
    - potential construction workforce accommodation site
    - construction compounds
    - laydown areas
    - concrete batching plants
    - quarry sites for construction material (rock for access tracks and hardstands).

At the end of its practical life, the wind farm would be decommissioned, and the site returned to its pre-existing land use in consultation with the affected landholders.

The project is proposed to be developed in five stages and includes two access options for entry into the Girragulang Road cluster. The project is therefore separated for all calculations into the following seven areas:

- Golden Highway/Black Stump Way intersection upgrade
- Girragulang Road access via Moorfield Road (public road upgrade)
- Girragulang Road (Alternative access)
- Girragulang Road cluster
- Leadville cluster
- Mount Hope cluster
- Mount Hope Road (public road upgrade)

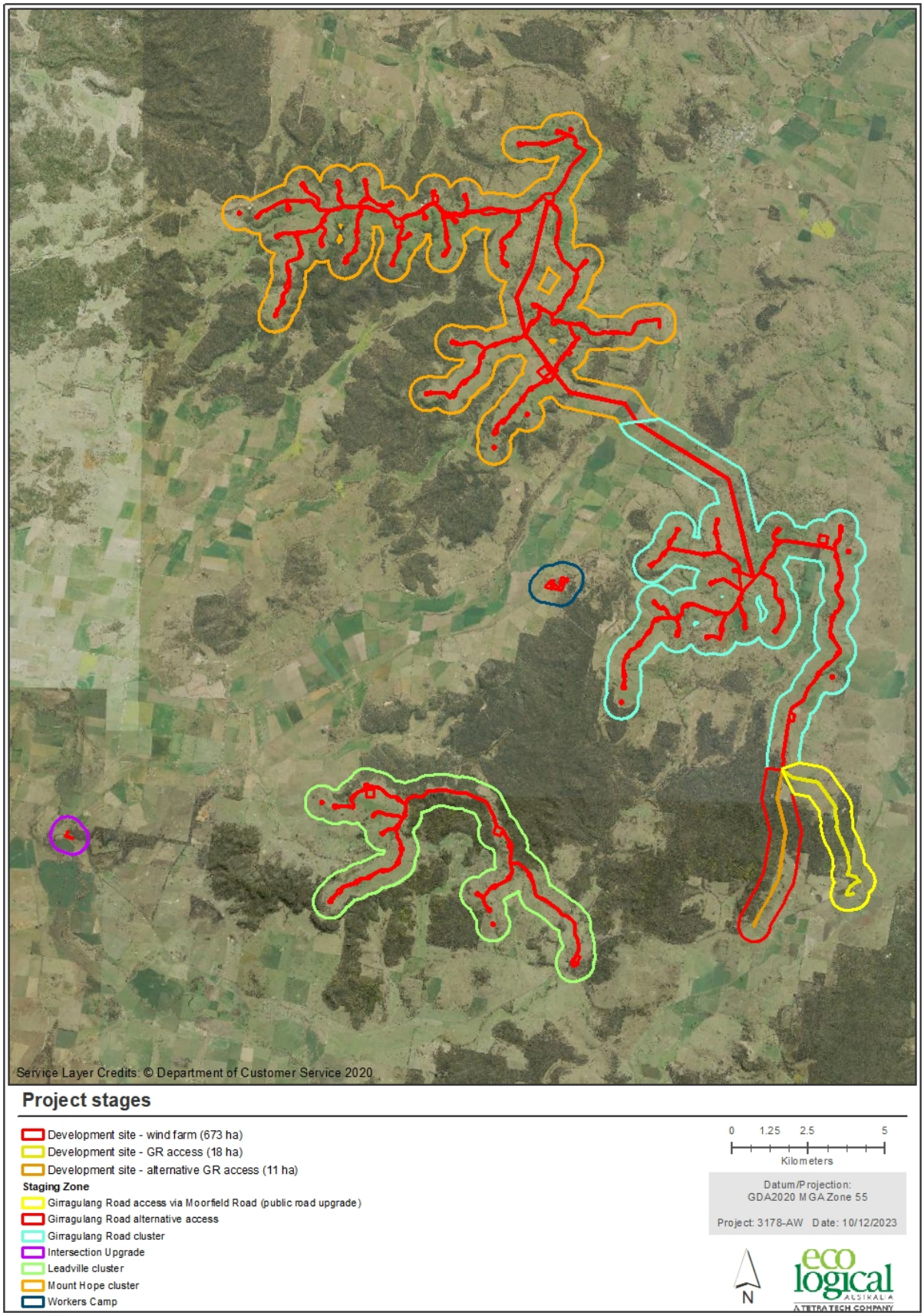


Figure 3 Project Stages

1.4. Development site footprint

The development site footprint includes both the construction and operational footprints required to construct and operate the wind farm.

The development site, including the construction and operational footprints, are presented in Figure 4.

1.5. Sources of information used

The following data sources were reviewed as part of this report:

- BioNet Vegetation Classification
- Bionet Atlas Database (accessed December 2021)
- BioNet Threatened Biodiversity Data Collection
- PlantNET (The NSW Plant Information Network System). Royal Botanic Gardens and Domain Trust, Sydney (PlantNET 2021)
- Atlas of Living Australia (ALA 2021)
- Australian Virtual Herbarium (AVH 2020)

Additional sources of information accessed for this assessment are presented in Appendix A.

1.6. Response to Submissions

This report aims to satisfy queries raised by both members of the public as well as Agency advice received from the BCS in response to the original BDAR during the public exhibition of the EIS from 23 May 2022 to 20 June 2022.

A table detailing how this report has addressed comments received by the BCS is provided in Appendix B.

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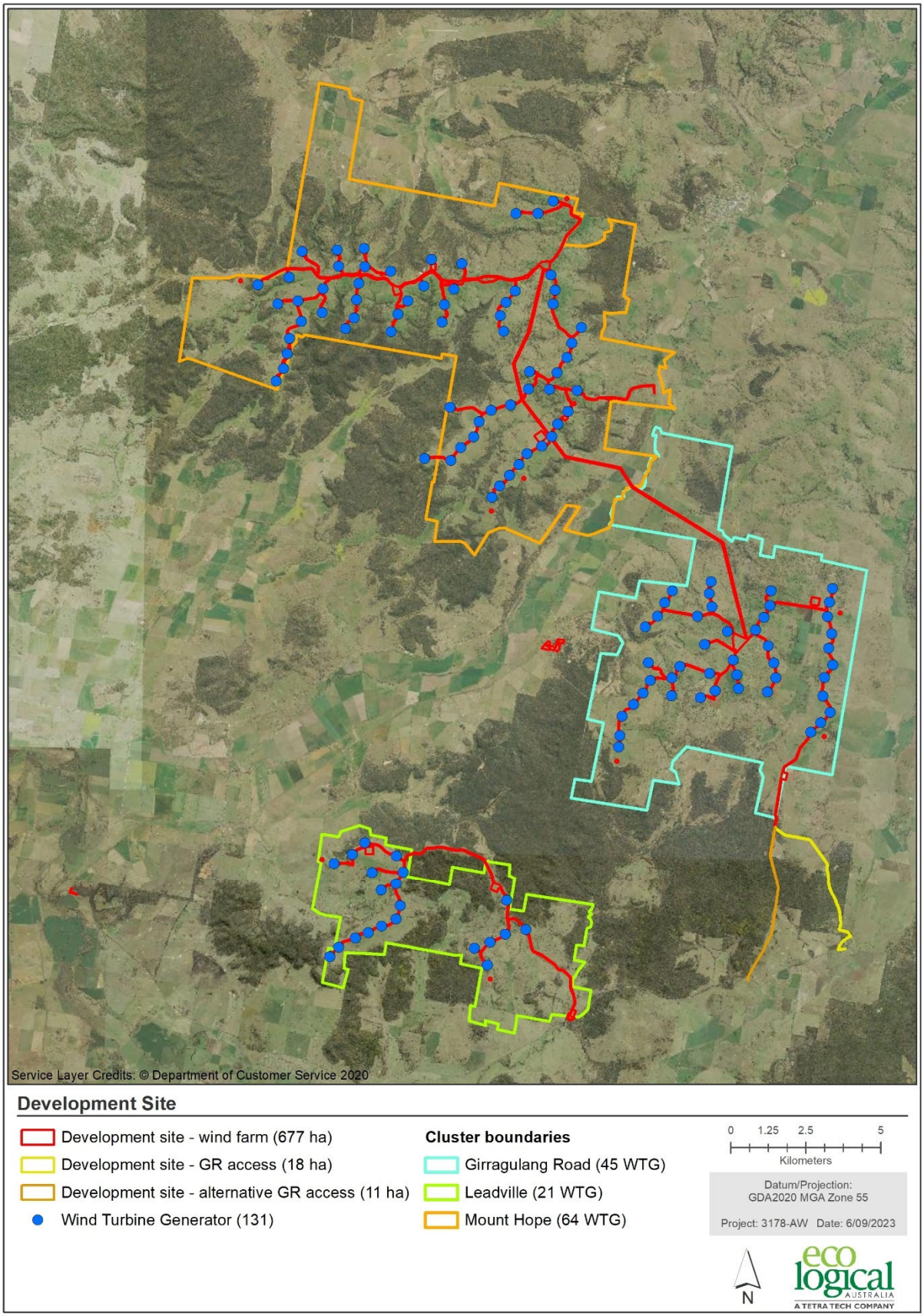


Figure 4 Development site

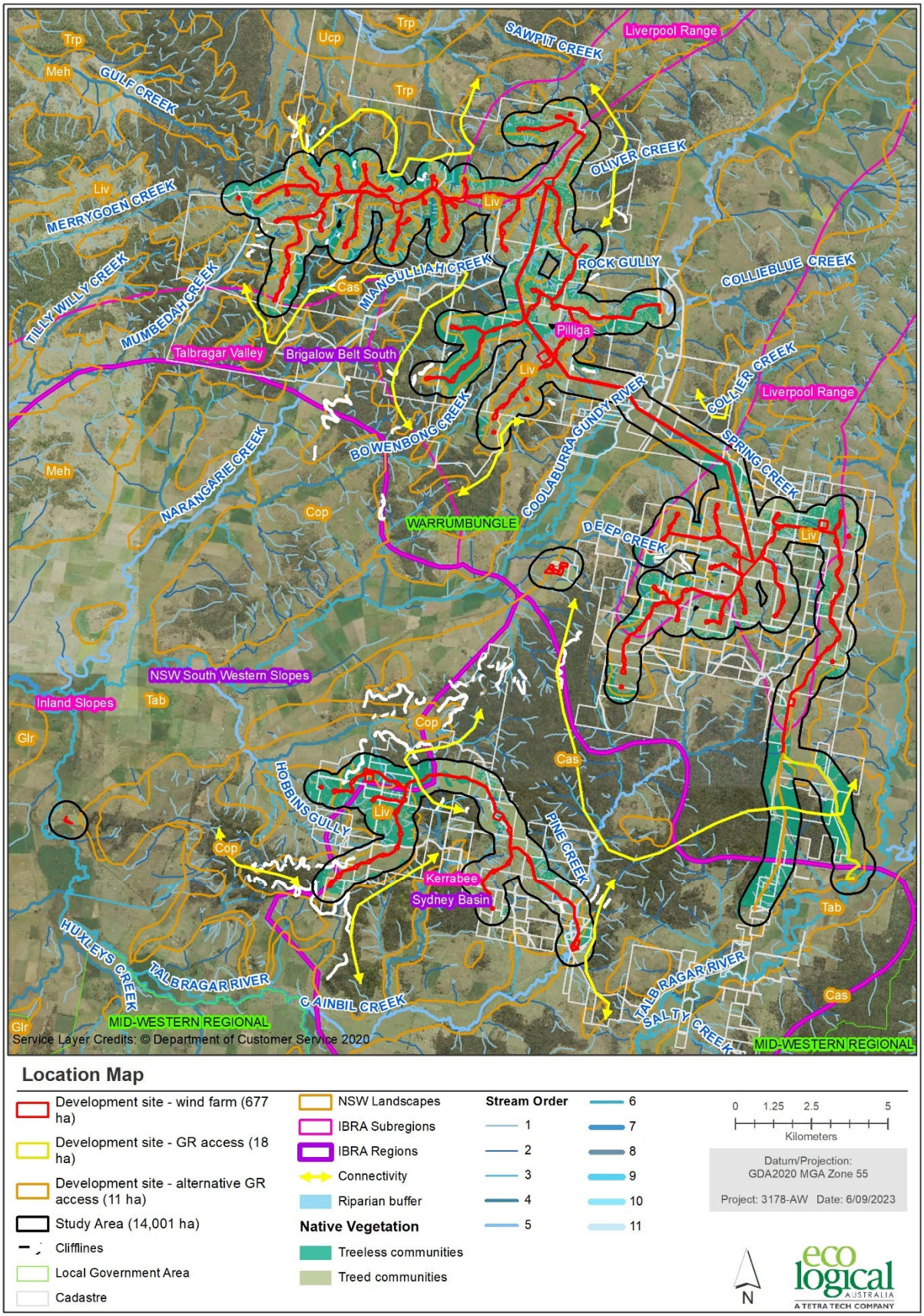


Figure 5: Location Map

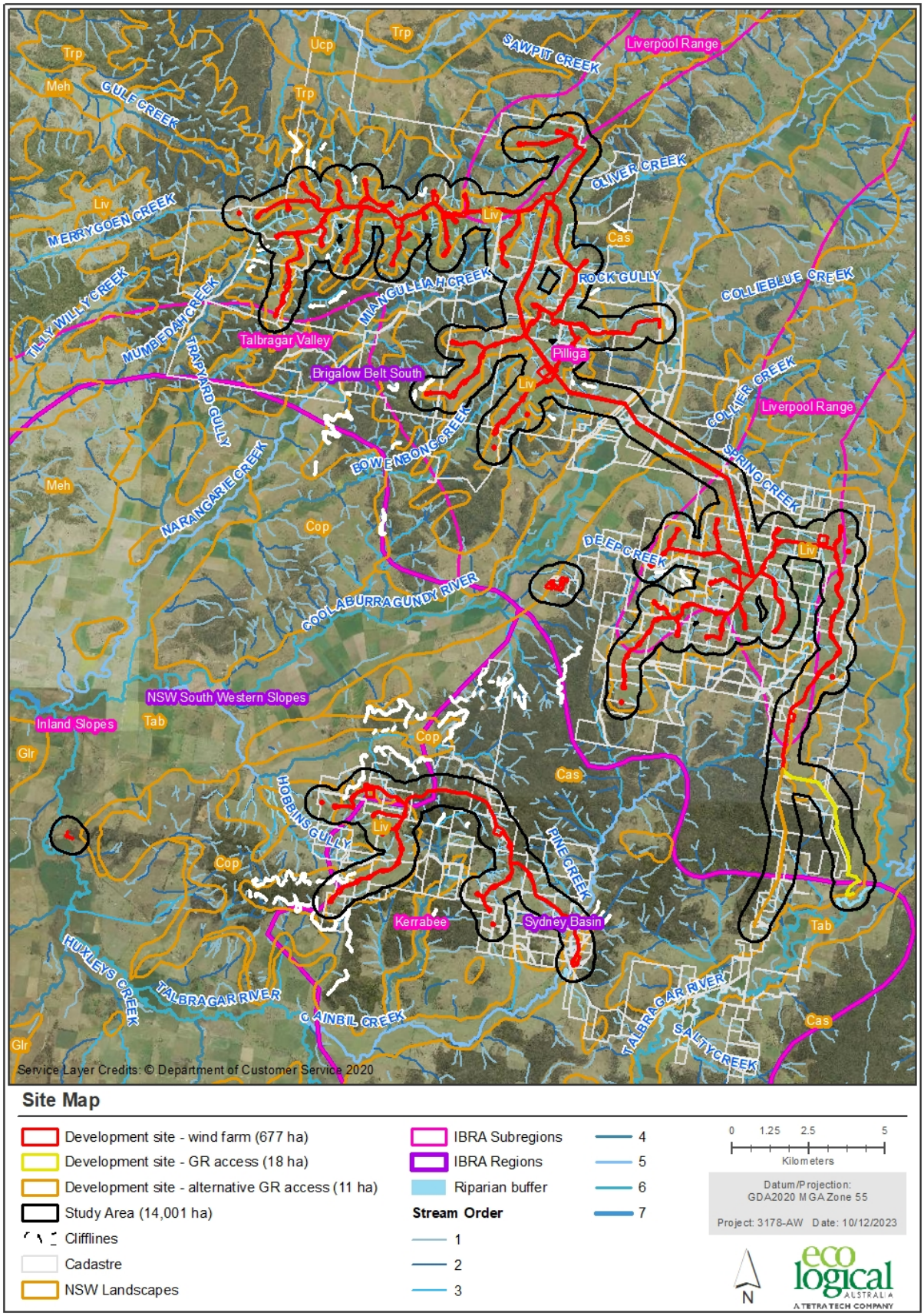


Figure 6: Site Map

1.7. Legislative context

Legislation relevant to the development site is outlined in Table 3.

Table 3: Legislative context

Name	Relevance to the project	Report Section
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999	Matters of National Environmental Significance (MNES) have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is likely to have a significant impact on MNES.	MNES are addressed in Chapter 11
State		
Environmental Planning and Assessment Act 1979	The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. The proposed development is State Significant Development and is to be assessed under Part 4.1 of the EP&A Act. Secretary's Environmental Assessment Requirements have been issued and require assessment of: • biodiversity values and the likely biodiversity impacts of the development including impacts associated with transport route road upgrades in accordance with the Biodiversity Conservation Act 2016 (NSW), including a detailed description of the proposed regime for minimising, managing and reporting on the biodiversity impacts of the development over time, and a strategy to offset any residual impacts of the development in accordance with the Biodiversity Conservation Act 2016 (NSW); • the likely impacts on koalas and their habitat in accordance with the requirements of State Environmental Planning Policy No. 44 – Koala Habitat Protection; and • assess the impact of the project on birds and bats from blade strikes, low air pressure zones at the blade tips (barotrauma), and alteration to movement patterns resulting from the turbines and considering cumulative effects of other wind farms in the vicinity.	Biodiversity values are assessed in Section 1-4. Impacts area assessed in Sections 5-6.
Biodiversity Conservation Act 2016	The proposed development requires submission of a Biodiversity Development Assessment Report.	This report is a BDAR prepared in accordance with the BAM (2020).
Local Land Services Amendment Act 2016	The LLS Act applies to this assessment, with respect to the development of the Native Vegetation Regulatory Map.	
Planning Instruments		
Warrumbungle Local Environment Plan (LEP) 2013	The project is a State Significant Development and will comply with EP&A Act and relevant State Environmental Planning Policies. The proposed development will aim to comply with LEP requirements and objectives in consultation with Warrumbungle Shire Council. Clause 6.3(2) of the LEP relates to mapped areas of Terrestrial Biodiversity. The development has been designed to avoid, minimise and mitigate impacts to mapped areas of Biodiversity.	

2. Landscape features

The site context for this assessment has been selected using the linear-based method and therefore the study area is a 500 m buffer around the impact centreline and wind turbine points.

The landscape features considered for this assessment are presented in Table 4, Figure 5 and Figure 6.

Table 4: Landscape features

Landscape feature	Development site	Study Area (500m buffer)	Data source
IBRA Region(s)	• Brigalow Belt South (BBS) • Sydney Basin (SB) • NSW South Western Slopes (SWS)	• BBS • SB • SWS	Interim Biogeographic Regionalisation for Australia, Version 7
IBRA subregion(s)	• Liverpool Range • Pilliga • Kerrabee • Inland Slopes	• Liverpool Range • Pilliga • Kerrabee • Inland Slopes • Talbragar Valley	Interim Biogeographic Regionalisation for Australia, Version 7
Rivers and streams	There are numerous first and second order streams across the Project development area. Major waterways identified in the database review include: • Coolabaragundy River		NSW LPI Waterway mapping
Estuaries and wetlands	The assessment area does not contain any mapped wetlands.		NSW directory of important wetlands
Connectivity of different areas of habitat	Areas of connectivity are mapped on the Location map		Aerial imagery
Geological features of significance and soil hazard features	None present		Aerial imagery
Areas of Outstanding Biodiversity Value	The assessment area does not contain any Areas of Outstanding Biodiversity Value.		Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2020)
NSW (Mitchell) Landscapes	• Liverpool Range Valleys and Footslopes • Cape Hills Granite • Cassilis Slopes • Coolah Tops • Gulgong Ranges • Merrygoen Hills and Slopes • Upper Castlereagh Alluvial Plains • Trinkey Plateau • Talbragar – Upper Macquarie Terrace Sand		NSW (Mitchell) Landscapes - version 3.1 (DPIE 2016)

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Landscape feature	Development site	Study Area (500m buffer)	Data source
Additional features required to be assessed	No additional landscape features identified		Project SEARs
Percent (%) native vegetation extent	There are no differences between the mapped vegetation extent and the aerial imagery. The development footprint is approximately 695 ha and contains approximately 640 ha of native vegetation, including areas identified as exotic dominated grasslands. Pilliga subregion: The assessment area is approximately 8,114 ha and contains approximately 4668 ha of native vegetation (58%). Kerrabee subregion: The assessment area is approximately 2,210 ha and contains approximately 1,505 ha of native vegetation (68%). Inland slopes subregion: The assessment area is approximately 578 ha and contains approximately 487 ha of native vegetation (84%). Liverpool Range subregion: The assessment area is approximately 2,962 ha and contains approximately 1,435 ha of native vegetation (48%).		Calculated using aerial imagery and ArcGIS software

2.1. Fire history

A significant portion of the development site was devastated by the Sir Ivan Fire in February 2017 which was started by a lightning strike near Leadville, NSW. The fire burned from west to east, and then turned north burning over 55,000 ha, and destroying 35 homes, more than 2,000 stock, and over 5,700km of fencing. The greatest intensity of the fire was within the forested area between the towns of Leadville and Uarbry, where the heat of the fire has resulted in near total loss of biodiversity. The extent of the Sir Ivan Fire is shown on Figure 7.

The intensity of the fire has led to a near total loss of living canopy within forested areas, which now contains a dense mid-storey of *Acacia sp.*, sparse sandy ground layer containing *Lomandra longifola* and other species tolerant of high shading and highly draining soils. The canopy consists of stags that are completely exposed to sunlight, and cease to function as a typical upper stratum in a forest community.

The severity of the fire, in a relatively low rainfall area, followed by a severe drought has created an alternate ecosystem, with little post fire recovery (now 6 years ago) as shown Photograph 1 and Photograph 2.

Grassy woodlands more intensively grazed, were not burned with the same intensity as forested areas, most likely due to a reduced fuel load on the ground and less capacity for flames to spread through the canopy. These open woodland areas that were subject to the Sir Ivan Fire, have recovered and are not discernibly different to unburned areas of woodlands (excepting occasional evidence of charring on retained trees).

All other areas of the development site have not been burned in recent times.

Consideration was given to the Guideline for applying the *Biodiversity Assessment Method at severely burnt sites* (DPIE, 2020), to determine if any areas of the development site were also burned in the 2019-2020 summer bushfires. No areas of the development site were identified on this map. Following the flow chart in Figure 8, no areas of the subject land include any of the Burnt Area Classes, and so the BAM is to be applied, rather than applying any of the burn severity rules. To consider the suitability of existing benchmark data for burned areas, a review against Table 1 of the *Biodiversity Assessment Method at severely burnt sites* (DPIE, 2020) was undertaken (Table 5). The review found that site data collected within burned areas is comparable to unburned areas. No further review of benchmark data has been undertaken.

Table 5 Review of severely burned sites

Feature	Descriptive characteristics for severely burnt vegetation	Vegetation characteristics within the development site
Species richness	The range of species present before the fire are burnt and/or cannot be identified. Dominant species cannot be easily identified until regeneration occurs.	Regeneration has occurred and species are able to be identified. Up to 29 species identified in burned plots. Not severely burned.
Growth form: trees	Canopy trees are killed and/or canopy is consumed or largely consumed with most leaf material charred/scorched. Epicormic growth, if present, is not well developed (<1m long).	Epicormic growth and regeneration is well developed. Tree richness in burned sites comparable to unburned sites

Feature	Descriptive characteristics for severely burnt vegetation	Vegetation characteristics within the development site
Growth form: shrubs, forbs, ferns, and other	All understorey plants are consumed or largely consumed (some charred). Re-growth, if present, is immature (very few species have attained full height).	Understorey plants are identifiable, and regeneration is well developed.
Growth form: grasses and grass-like	Ground cover is consumed, or largely consumed. Evidence of ground scorch is present. Re-growth, if present, consists predominately of new resprouting growth (native vegetation).	Composition and cover of grasses is slightly lower in burned areas, but species are readily identifiable. No scorched earth present.
Logs	Logs (if expected to have been previously on site) are absent or largely consumed.	Fallen logs are present in all burned areas.
Litter cover	Pre-fire surface litter (if expected) is consumed. Soil organic layer is consumed or largely consumed. New leaf may be occurring where the canopy was burnt but not scorched	Litter is present and is comparable to unburned areas.
Ash	White ash deposition and charred organic matter is present to several centimetres depth	No white ash present. Charred organic matter is present on trees but sparse on ground.



Photograph 1 Burned ironbark forest near Uarbry, NSW



Photograph 2 Burned ironbark forest within investigation area

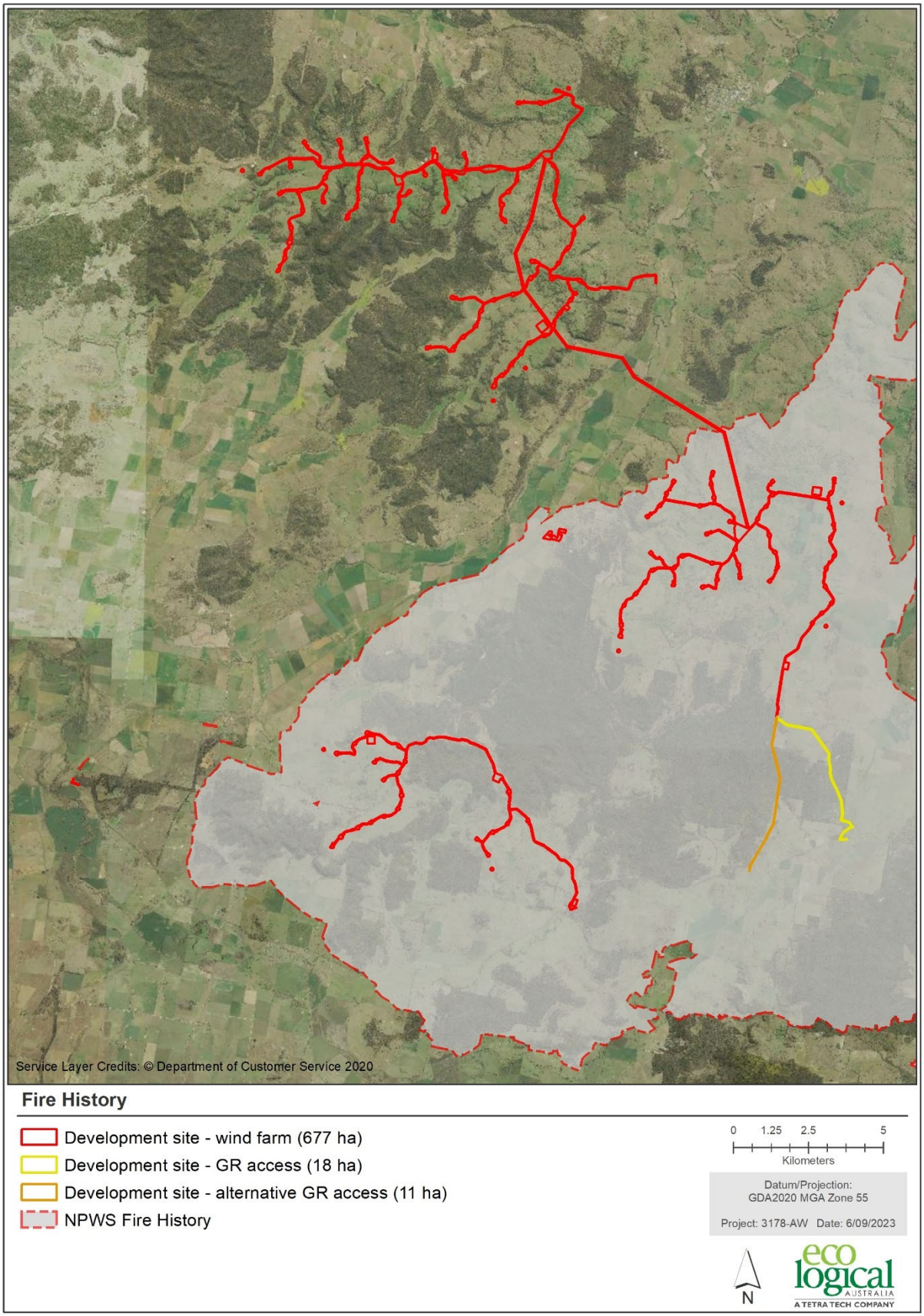


Figure 7 Fire history

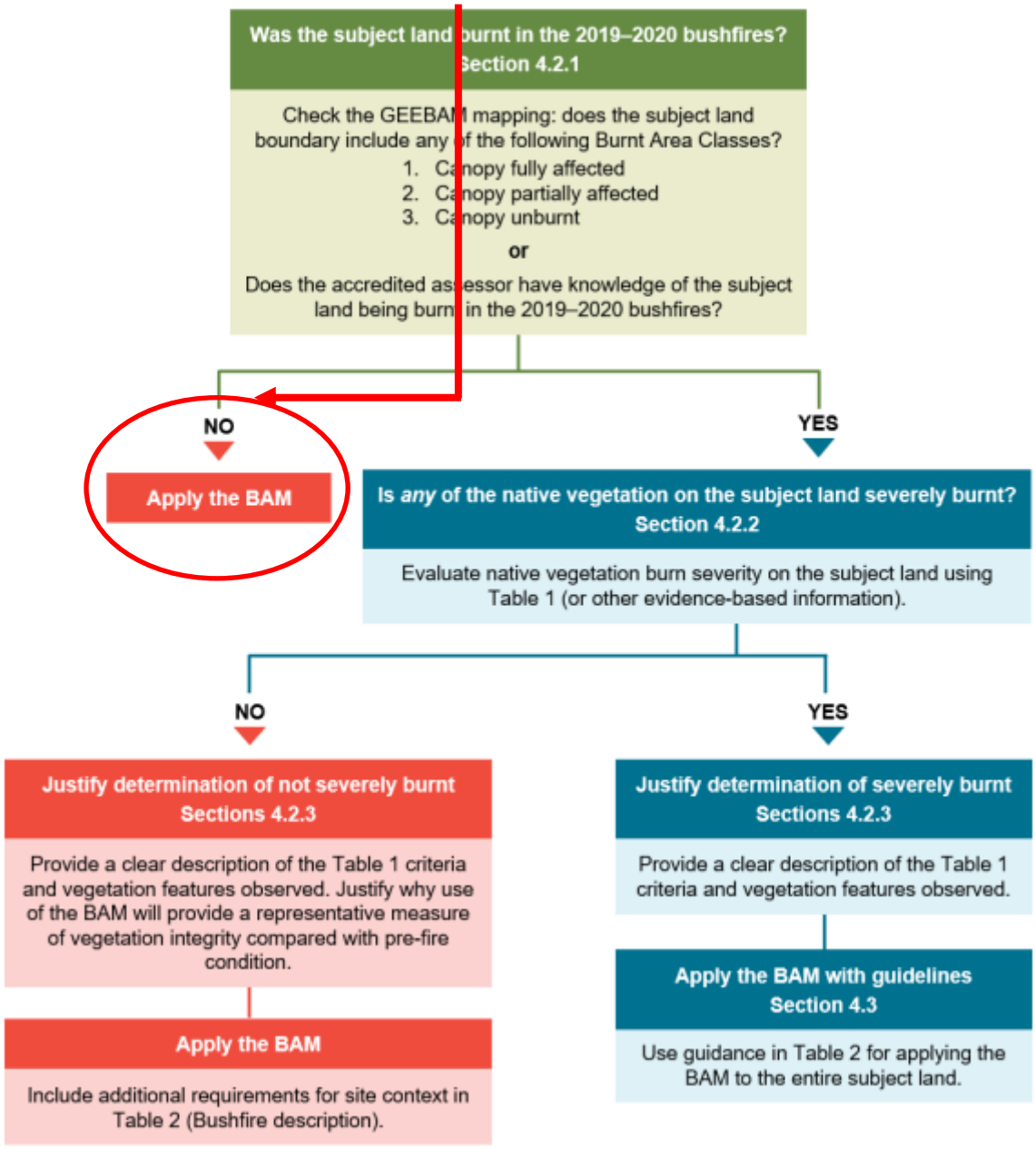


Figure 8 Determine whether native vegetation on a subject land is severely burnt and requires application of the Guideline to the Biodiversity Assessment Method assessment.

2.2. Landuse history

The region has been subject to agriculture since settlement in the mid 1800's. Historic aerial imagery (from 1955 till present; Photograph 3 to Photograph 12), shows that the cleared areas of the study area have been cleared for over 50 years, and that also the paddock trees observed in the present day predate this clearing event. Historic imagery also reveals that existing areas of vegetation on steep sandstone slopes, are not regenerated from previous events and are potentially pre-European remnant patches of forest.

More recent chromatic aerial imagery from 1994 – 1999 reveals some of the extent of pasture improvement, with large portions of the landscape a vibrant green from superphosphate usage. This bright colour is also likely to be a result of pasture improvement from under sowing of common pasture species such as *Phlaris aquatica*, *Lolium perenne,* and *Hoardeum vulgare* which are prevalent groundcovers throughout the majority of the study area.

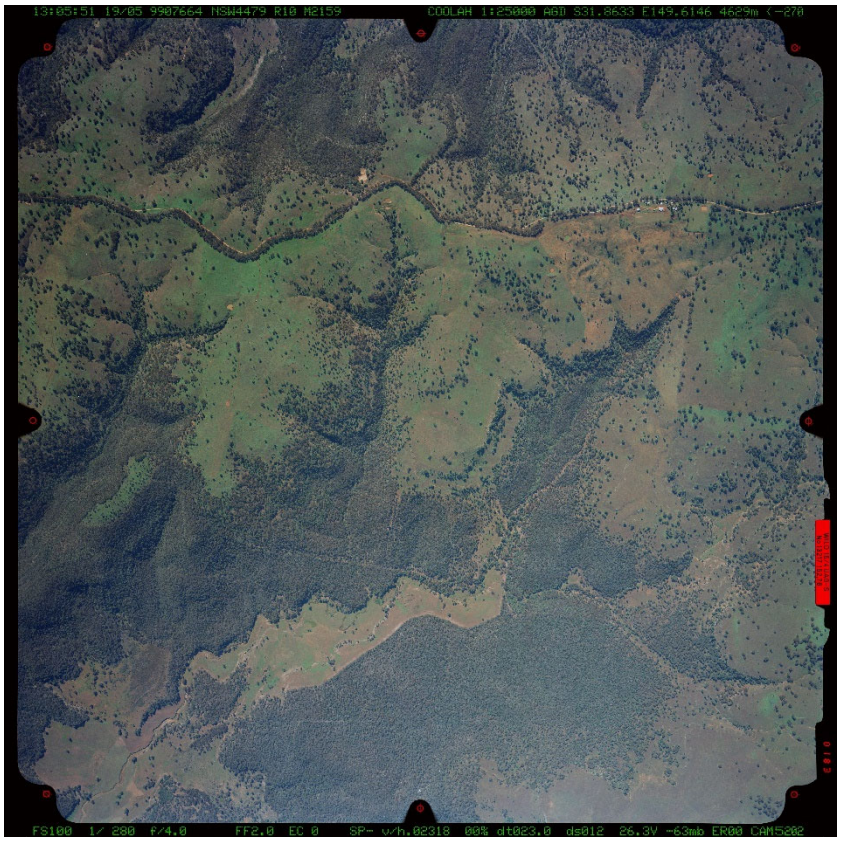
The study area consists almost entirely of moderate to high intensity agricultural use. The majority of landholders operate agricultural enterprises as their primary income, and as such all accessible areas of land are continuously used for cropping, grazing, or pasture improvement. The most commonly undertaken agricultural pursuit is cattle farming.

The intensity of agricultural usage of the landscape is further substantiated by the Landuse 2017 spatial dataset by NSW Department of Planning, Industry and Environment (DPIE). This dataset is produced following the *Native vegetation regulatory map method statement* (DPIE, 2017), which describes the input datasets, spatial interrogation, and methodology of ALUM classification for the purposes of defining the native vegetation regulatory map. Across the study area, fourteen landuse categories are identified, of which 87% are linked to agricultural activity, 11% residual native vegetation, and the remaining 2% residential and infrastructure related land uses.

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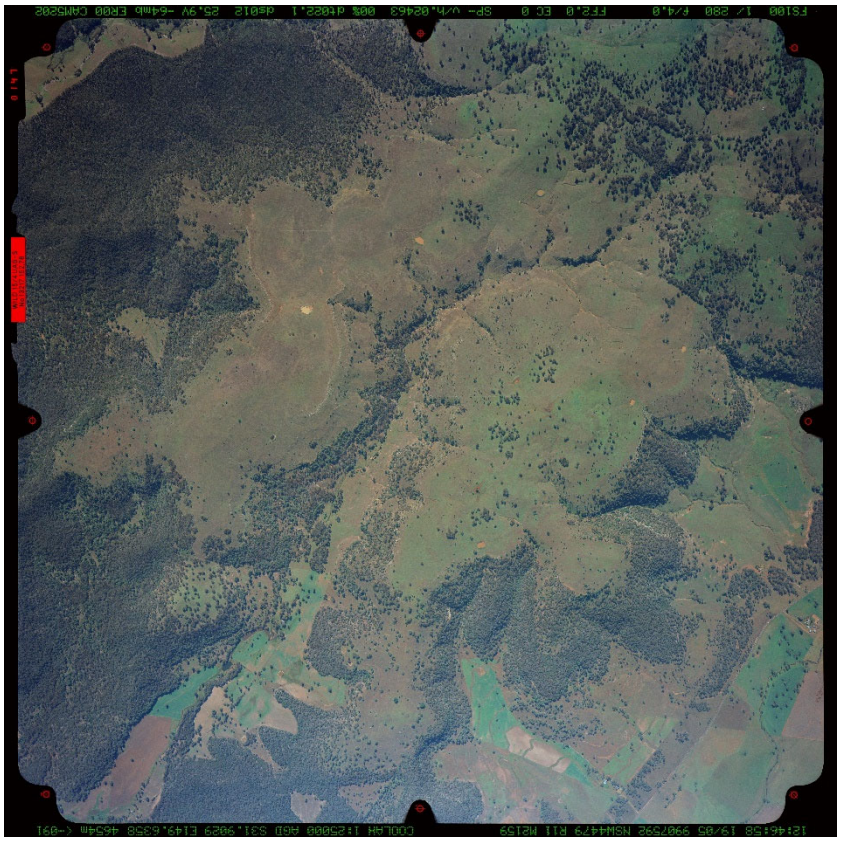
Photograph 3 Historic imagery at Northern area of Mount Hope cluster (1955; NSW LPI)



Photograph 4 Historic imagery at Northern area of Mount Hope cluster (1999; NSW LPI)



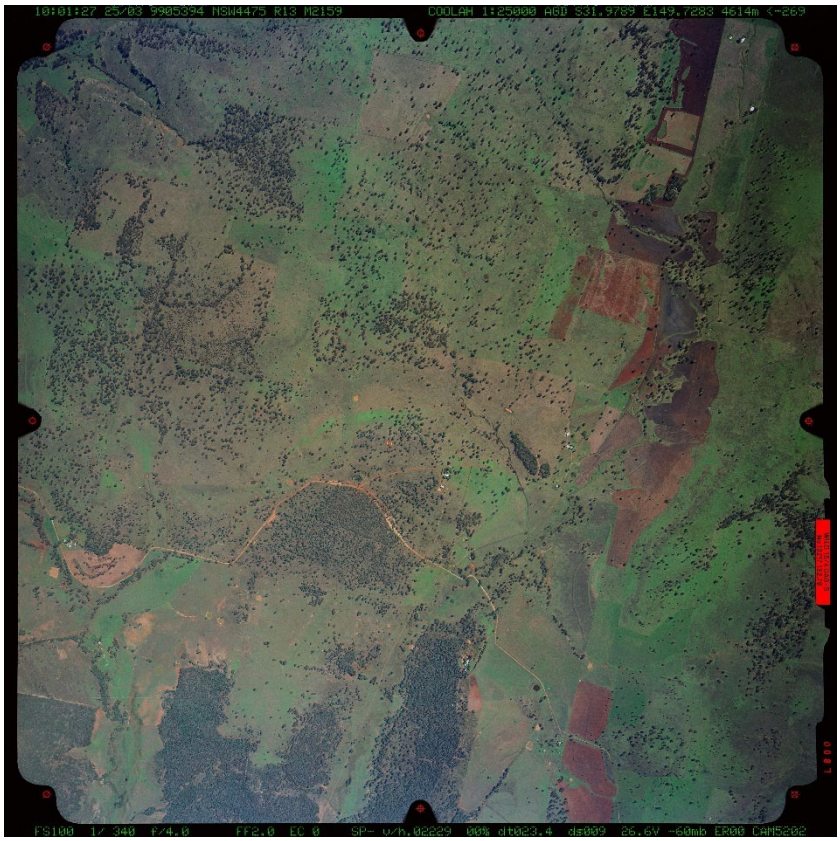
Photograph 5 Historic imagery at southern area of Mount Hope cluster (1955; NSW LPI)



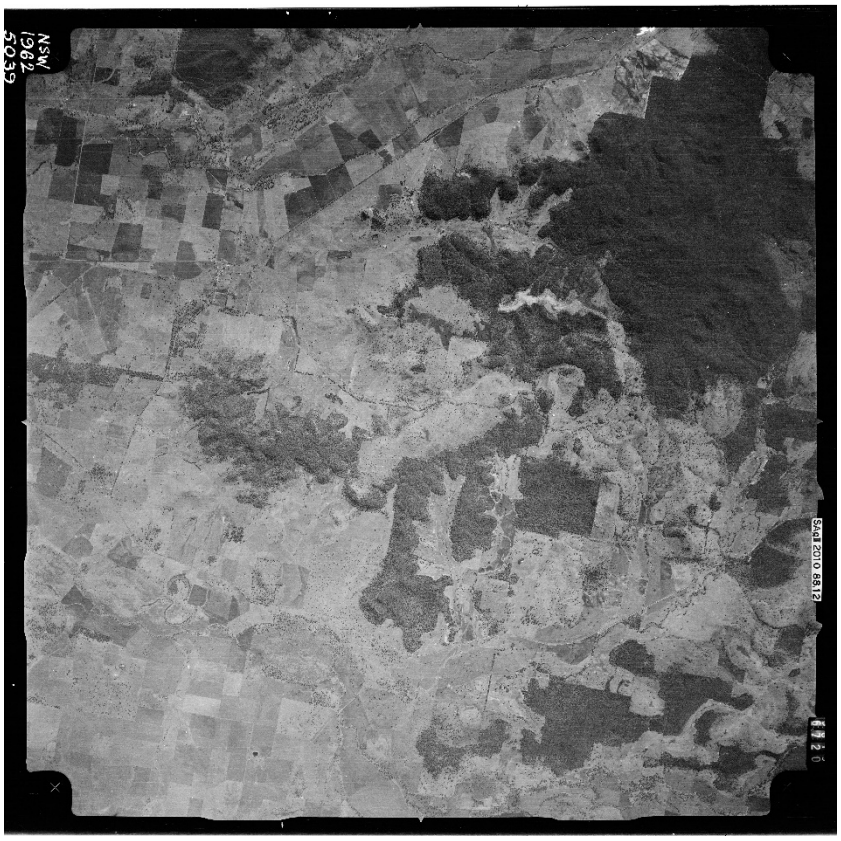
Photograph 6 Historic imagery at southern area of Mount Hope cluster (1999; NSW LPI)



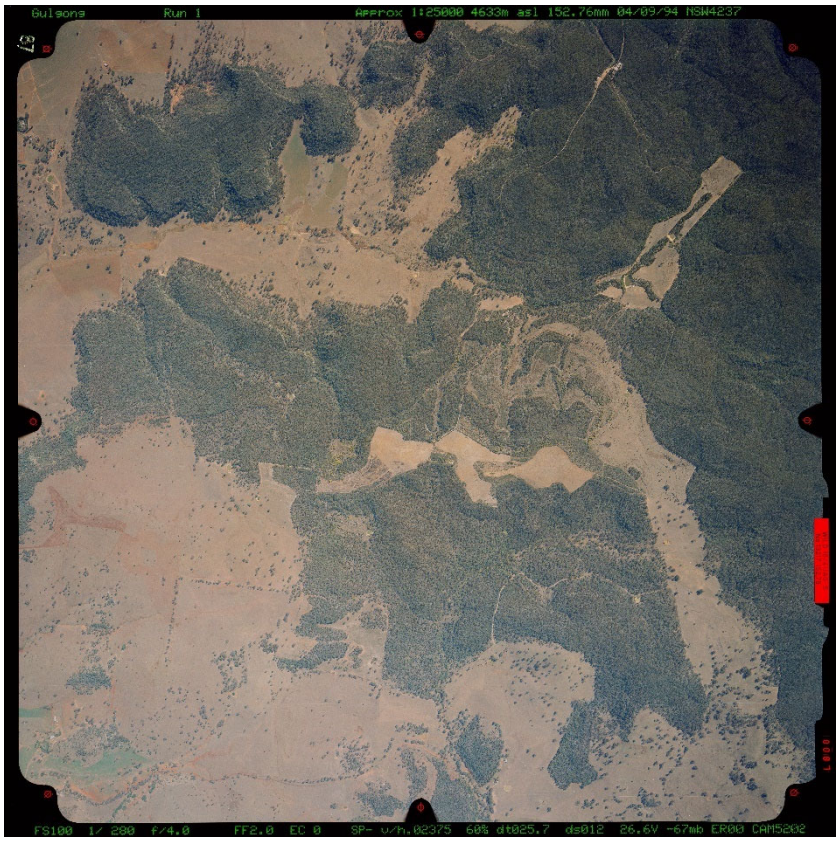
Photograph 7 Historic imagery from Girragulang Road cluster (1970; NSW LPI)



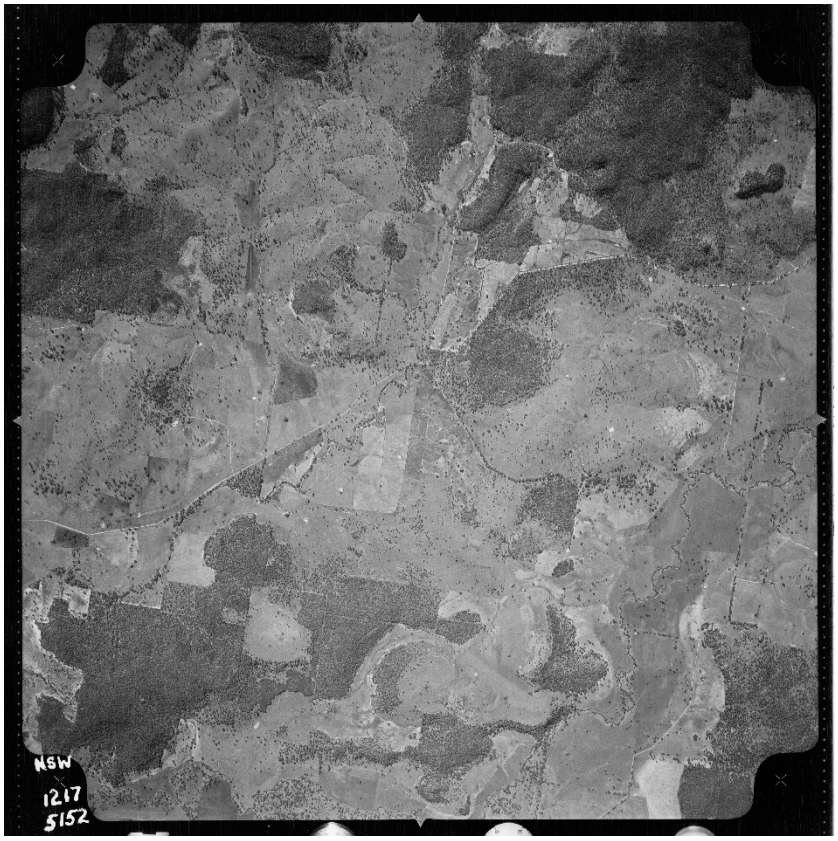
Photograph 8 Historic imagery from Girragulang Road cluster (1999; NSW LPI)



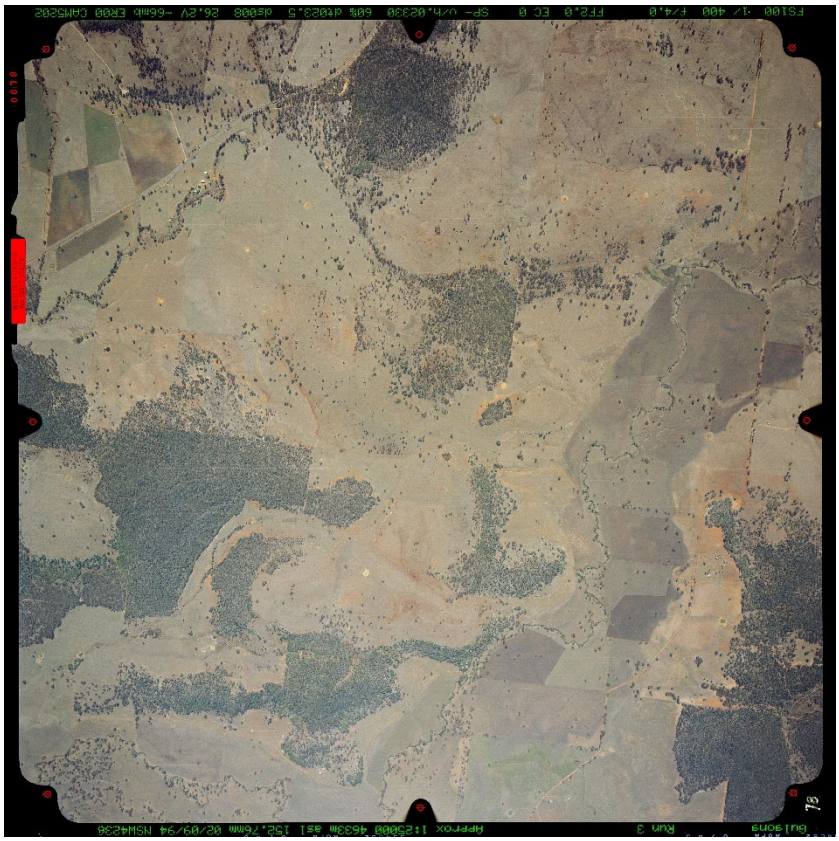
Photograph 9 Historic imagery from Leadville cluster (1971; NSW LPI)



Photograph 10 Historic imagery from Leadville cluster (1994; NSW LPI)



Photograph 11 Historic imagery from southern transmission line (1964; NSW LPI)



Photograph 12 Historic imagery from southern transmission line (1994; NSW LPI)

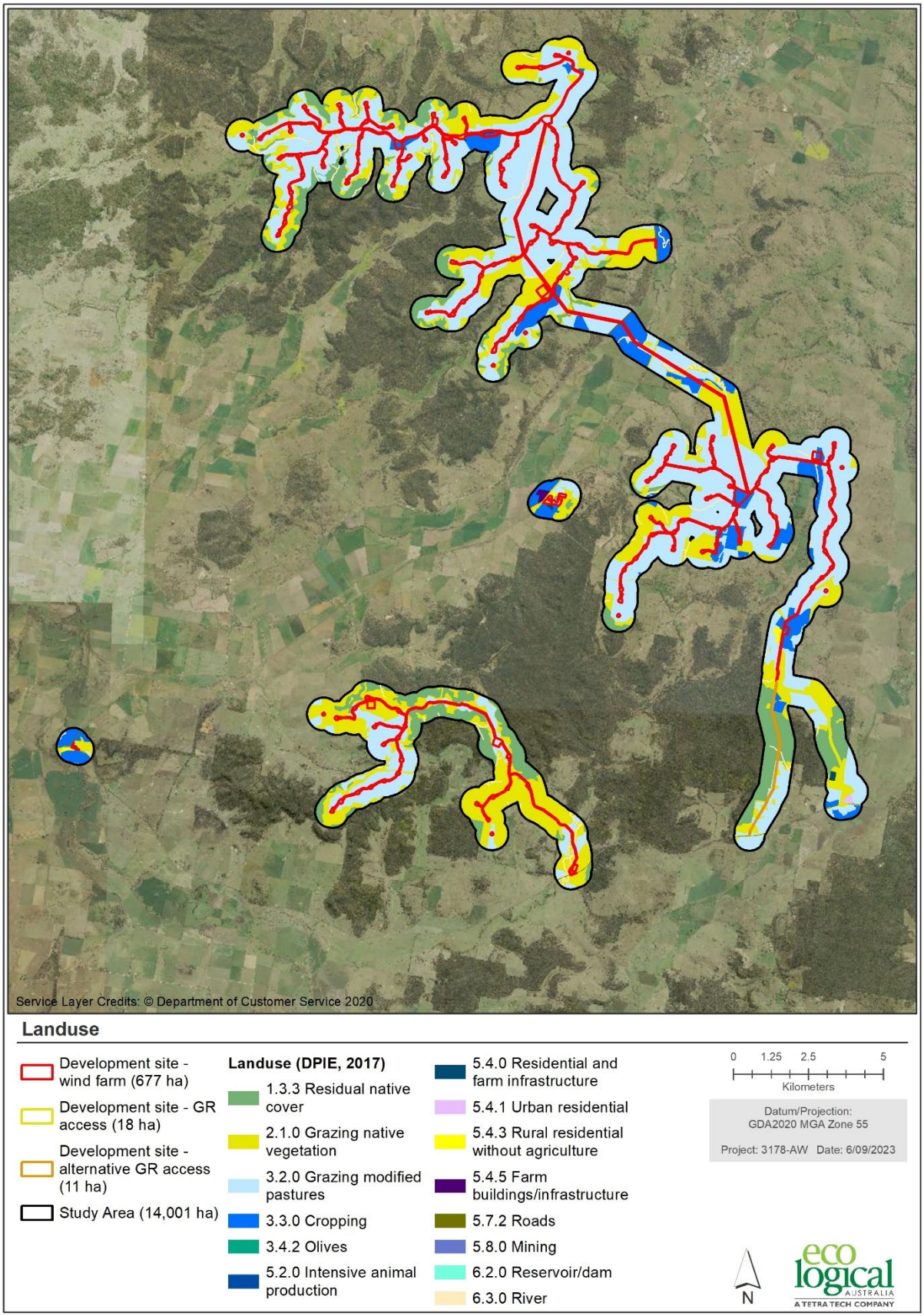


Figure 9 Landuse mapping

2.3. Native vegetation regulatory map assessment

Under the LLS Act, all land in NSW is categorised into three broad types:

- **Category 1 – Exempt land**, where clearing of vegetation is unregulated (s60H LLS Act)
- **Category 2 – Regulated land**, where a biodiversity assessment is required for any activity requiring clearing of native vegetation. Category 2 land can be Vulnerable regulated land, Sensitive regulated land, or Vulnerable and sensitive regulated land (s60I LLS Act)
- **Excluded land** – where the LLS Act (and the two land categories described above) does not apply (s60A LLS Act).

The BAM does not assess biodiversity values for native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the LLS Act), other than the additional biodiversity impacts under clause 6.1 of the NSW *Biodiversity Regulation 2017* (BC Regulation). Category 1, Category 2, and Excluded land should be shown on the Native Vegetation Regulatory map (NVR map). An interim map is currently published on https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap. However, the location of Category 1 – Exempt land is not provided. Significant areas of Category 2 – regulated land are also not shown on this map. As such ELA have developed a mapping approach to provide a completed NVR Map, to be applied to this assessment.

The land category criteria and approach was previously confirmed by the NSW Biodiversity Conservation and Science Division (BCS) in Dubbo. In the review of the BDAR provided previously, the BCS disagreed with the extent of Category 1 – exempt land across the development site. As the criteria for assessing category 1 – exempt land where a CEEC may be present is not defined, it leaves this element of the assessment unable to adequately demonstrate the extent of exempt land present.

A map of the category 1 land has not been revised for this project and has not been used further in this assessment. All areas previously mapped as Category 1 – Exempt Land under the LLS Act have been mapped as 'Poor' condition and a PCT applied and plots collected. Further discussion on the habitat values and vegetation integrity of 'poor' condition PCTs is discussed in Chapter 3.

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3. Native Vegetation

The majority of the study area is located on land that is currently, and historically, used for grazing and agriculture. In these areas the native understorey and midstorey are diminished and often contain significant amounts of non-native vegetation.

Vegetation within the Leadville area is the most poorly degraded within the study area, due to ongoing agricultural practices and a significant uncontrolled fire in 2017, which burnt a large portion of remnant vegetation between the Girragulang Road and Mount Hope clusters. Due to the severity of the fire and drought conditions for a large period following the fire event, the vegetation in this area may take more than 50 years to recover.

There are some patches of better condition native vegetation around the slopes adjacent to the study areas at the Girragulang Road and Mount Hope clusters, as well as in riparian areas in steep gullies north of the study area.

3.1. Geology of the study area

The Liverpool Range is the largest lava field province in NSW. The lava field province is dated between 32 and 40 million years with the lava fields made up from multiple eruption fissures rather than a single volcanic vent (NPWS 2003). These volcanic eruptions flowed over the existing topography, covering the sandstone formed by sediments and river gravels around 150 million years ago (NPWS 2003).

Geology mapping of the region has been undertaken at a 1:250,000 scale by the Department of Mineral Resources (Figure 10; DMR, 2002). The majority of the underlying geology of the study area buffer is mapped as basalt (43%) with sandstone (33%) also making significant contributions. The majority of basalt geology mapping is associated with the Tertiary Liverpool Range Volcanics and the majority of the sandstone geology is associated with the Jurassic Pilliga Sandstone group.

Similarly, Great Soil Group (GSG) mapping also indicates that the majority of the study area includes Chocolate Soils on ridgelines in the north of the study area, and Earthy Sands in the southern portion of the study area. Soils along the Talbragar River are Black Earths (Figure 11). Soil landscapes were also considered across most of the study area primarily as part of the Soil and Land Resources of the Merriwa Plateau 1:100,000 mapping (OEH 2014), as well as the Soil Landscapes of Dubbo 1:250,000 mapping (DPIE 2018). The most widespread soil landscapes within the 500m investigation area are summarized in Table 6. An additional 16 soil landscapes occur within the buffer but make up <4% of the total area.

Tertiary Volcanics basalt-derived soils (Ant Hill) are the predominate soil type in the study area and cover the high elevation plateau of undulating hills from approximately 300 – 800 m ASL. The basalt soils range from shallow lithosols on hills crests, to deeper chocolate soils and brown clays on lower slopes (Photograph 13). Sandstone derived soils (Turill) also make up a high proportion of soil types in the study area, particularly at the southern end (Photograph 14). These soil types are significantly lower in fertility and water holding capacities in comparison to the basalt derived soils. Smaller areas of fertile soils occur on floodplains and alluvial terraces derived from basaltic alluvium (Photograph 15).

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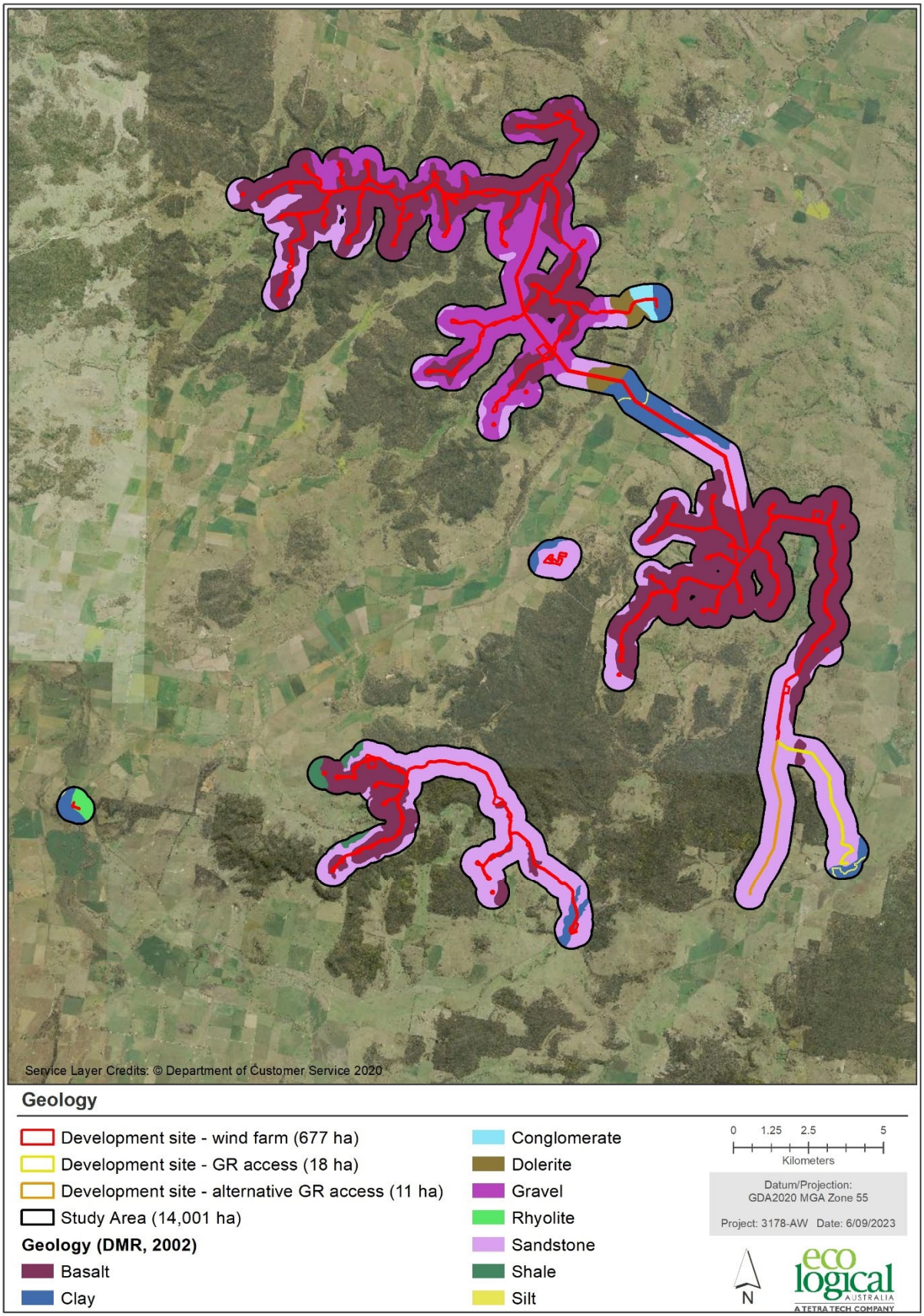


Figure 10 Geology

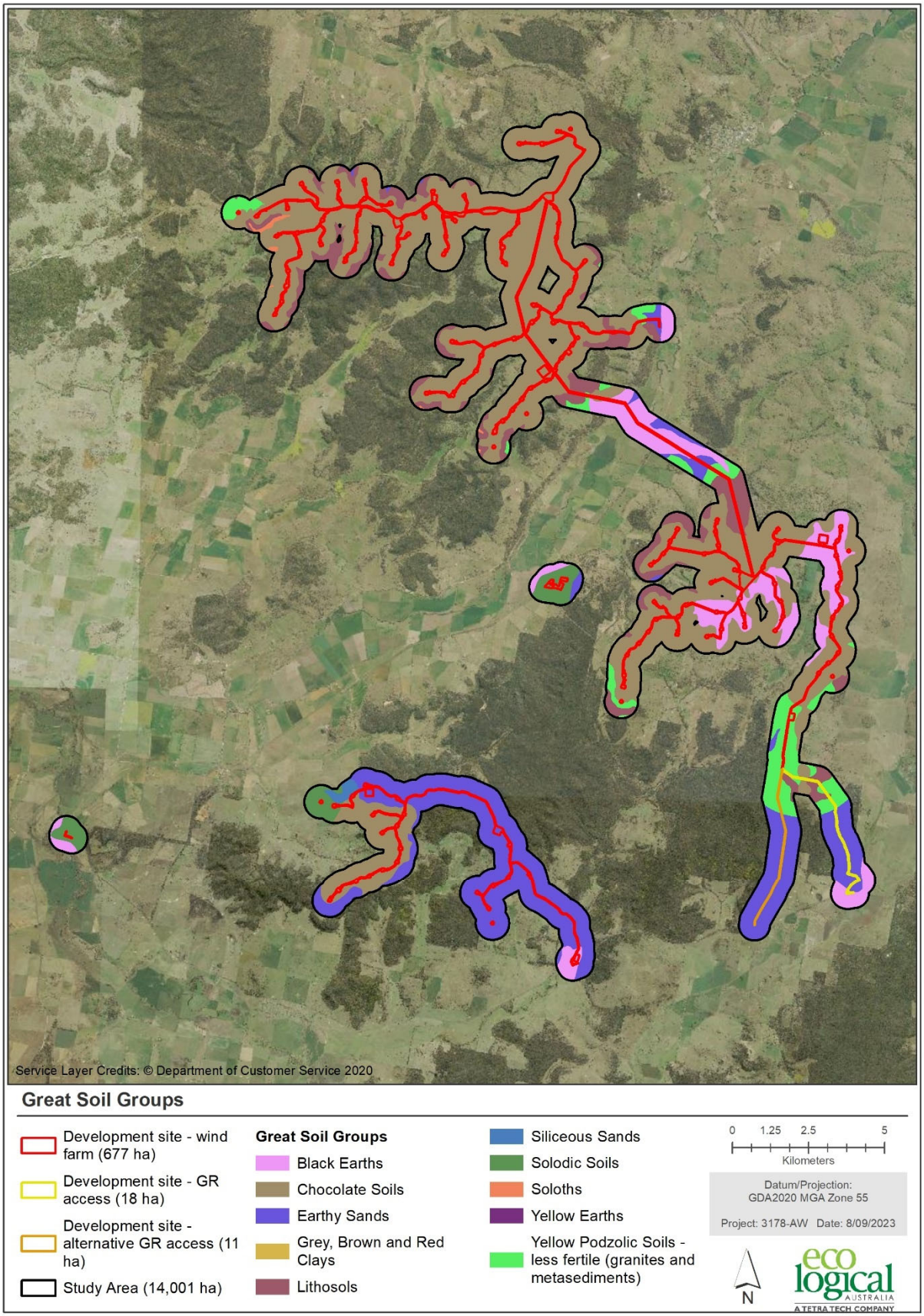


Figure 11 Great soil group mapping



Photograph 13 Chocolate brown soils derived from basalt parent material



Photograph 14 Sandy creek bed with sandy alluvium and sandstone parent material



Photograph 15 Basalt derived alluvial soils on floodplains used for intensive cropping and grazing

Table 6: Soil landscapes mapped in the study area

Source	Name	Description
OEH 2014, DPIE 2018	Ant Hill	Rolling hills with benched side slopes on **Tertiary Basalt** of the Merriwa Plateau occurring mainly in the Hunter Region with some extending into the Central West catchment. Slopes 20 - 32%, local relief 90 - 200 m, elevation 300 - 1160 m. Extensively cleared woodland and open-woodland.
OEH 2014	Ant Hill variant a	Undulating to rolling low hills on **Tertiary basalts** of the Merriwa Plateau. Slopes 5 - 20%, local relief 30 - 100 m, elevation 300 - 800 m. Extensively cleared open-forest and woodland.
DPIE 2018	Turill	Undulating low hills with some sandstone outcrop. **Narrabeen Sandstone**, mudstone, and Jurassic shale and sandstone. Relief to 30 - 90 m; slopes 5 - 20%. Dry sclerophyll woodland dominated by broad leaved ironbark, red ironbark and narrow-leaved ironbark.
OEH 2014	Cranbourne	Level to undulating **Tertiary basalt** plateaux and broad benches of the Merriwa Plateau and southern Liverpool Ranges. Level to gently inclined slopes generally <5%, local relief to 30 m, elevation ranges from 360 - 780 m. Open-forests and woodland mostly cleared for grazing and cropping.
OEH 2014	Summerhill	Undulating rises to rolling rises on **Jurassic sandstone often influenced by Tertiary basalt** flows in the west of the Hunter Region. Slopes 3 - 15% (typically <10%), local relief <30 m, elevation 230 - 570 m. Rock outcrop including ironstones generally <20%. Extensively cleared open-forest and woodland.
OEH 2014	Summerhill variant a	Rolling rises and rolling low hills on **Pilliga Sandstone** beds in the west of the Hunter Region. Slopes 10 - 33%, local relief <30 m, elevation 230 - 570 m. Rock outcrop <20%. Partially cleared open-forests for cattle grazing on native pastures.
OEH 2014	Munmurra	Steep to precipitous hillslopes and gorges of **Jurassic quartz and lithic sandstone**, conglomerate and siltstone of the Pilliga and Purlewaugh Beds in the Central West and Hunter Regions. Slopes 25 - 150% (typically >33%), local relief 30 - 140 m, elevation 260 - 510 m. Uncleared open-forests and shrubby woodland.

3.2. Survey Effort

3.2.1. Areas without survey access

The survey effort presented below includes detailed site inspections and investigations to the entirety of the wind farm clusters.

All areas within the footprint have been surveyed.

3.2.2. Initial site inspections and vegetation validation

The initial site inspections were carried out by ELA Senior Ecologists Martin Sullivan, Alex Pursche and Tom Kelly during three survey periods in 2019 and 2020. Data was collected within the project investigation area, with the primary aim of these initial site surveys being to:

- Collect Rapid Data Points (RDPs) to validate vegetation and assist in developing a Plant Community Type (PCT) map across the wind farm study area.
- Consider the extent of Threatened Ecological Communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) or Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) across the project investigation area.
- Identify habitats for threatened species.
- Validate suitability of regional spatial datasets for use for the project (such as landuse history and cliffline mapping).

The majority of the study area was accessible by existing tracks or paddocks. Approximately 230 RDPs were taken within vegetation patches, as well as locations where changes in vegetation community boundaries occurred.

All field data was collected using mobile devices loaded with ESRI Collector for ArcGIS software and relevant Geographic Information System (GIS) datasets (target plots, aerial imagery, vegetation mapping, drainage, contours etc.) and ESRI Survey123.

Vegetation validation RDPs recorded the dominant canopy, midstorey and groundcover species; structural cover condition; vegetation structure; potential PCT; priority or environmental weed species and cover; threatened species and count; soil texture; fire history; vegetation condition; landform element and pattern; notes; photo number; surveyor; and date were recorded. RDPs are less comprehensive than full floristic vegetation plots, however they allow for rapid identification of PCTs which could then be extrapolated through Aerial Photographic Interpretation (API).

The following vegetation formations were identified across the study area (Figure 12):

- Dry sclerophyll Forests (Shrubby sub-formation)
- Forested Wetlands
- Grassy Woodlands
- Rainforests

In addition, Low Condition Native Grassland, Poor condition, and Exotic/cleared areas were also identified within the study area.

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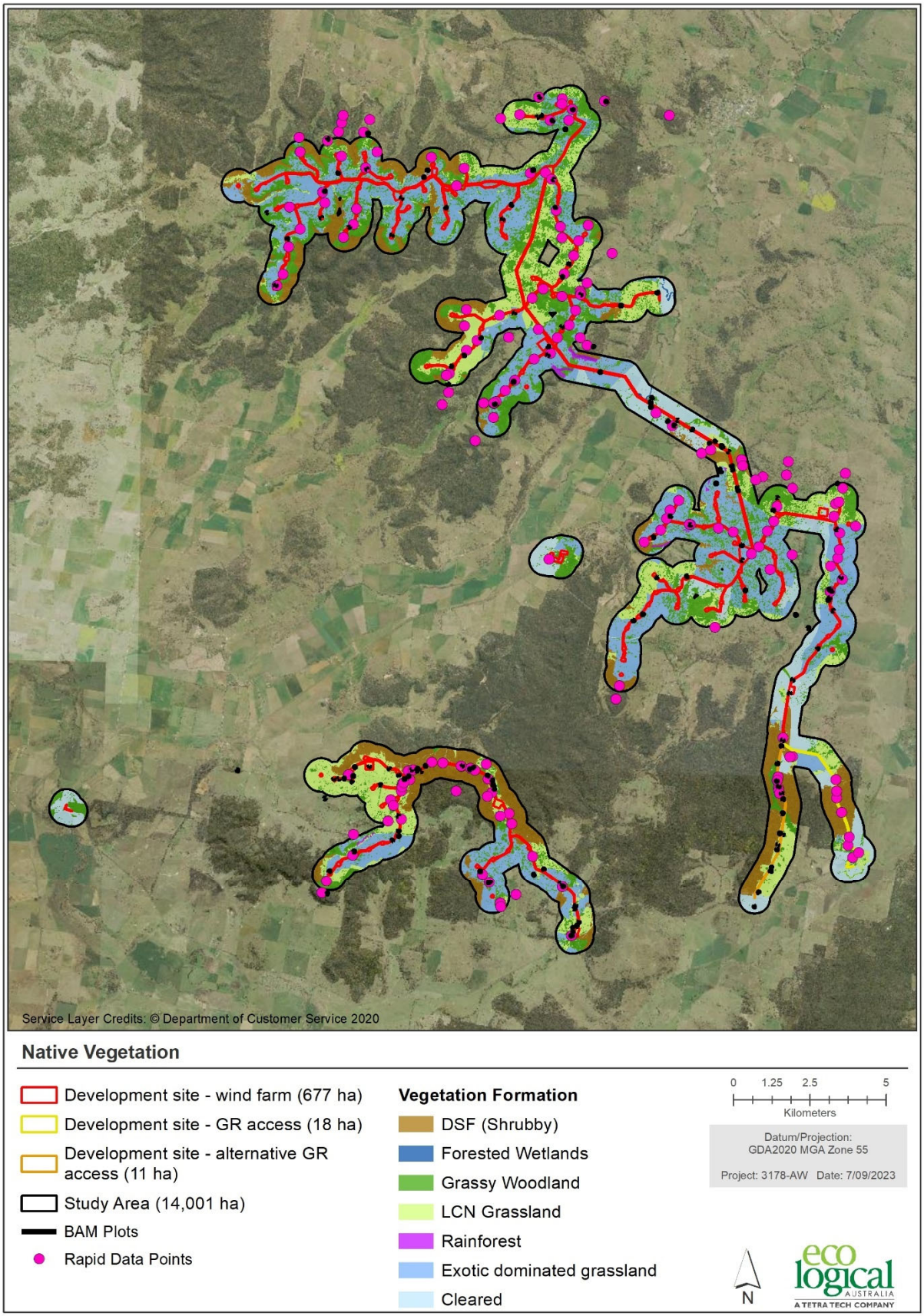


Figure 12 Native vegetation formations

3.2.3. Unmanned Aerial Vehicle survey

An Unmanned Aerial Vehicle (drone) was utilised to enhance the accuracy of Plant Community Type mapping. A DJI Mavic Air was flown by a registered operator in accordance with the Civil Aviation Safety Authority (CASA) standard operating conditions. High resolution photographs were taken across the study area. Aerial photographs allowed for post flight analysis of dominant canopy species, vegetation structure, condition and interpretation of cover of various Plant Community Types (Photograph 16).



Photograph 16 Example of drone aerial image showing transition (left to right) from Narrow-leaved Ironbark - Cypress Pine shrubby open forest to Eucalyptus 'albemol' Grassy Woodland

3.3. Native Vegetation Patterns

The study area is spread across eleven properties, overlapping with three bioregions, five subregions and nine Mitchell Landscapes, reflecting the diversity of the underlying geology and soil properties, geomorphology, and microclimates in the study area. Soil fertility and land use history appear to be the most important factors influencing the distribution of vegetation communities in the study area. The main broad geological components affecting the vegetation are the Tertiary Volcanic basalt flows of the Liverpool Range, and the Jurassic sandstones (DPIE 2005, McRae and Cooper 1985).

Twelve vegetation communities in variable condition states were identified across the study area:

- *Eucalyptus 'albemol'* Grassy Woodland on basalt derived soils (moderate and high condition)
- Derived Native Grassland on basalt and sandstone derived soils (low condition)
- Rusty Fig Rainforest on basalt derived soils in sheltered sites (moderate condition)
- Narrow-leaved Ironbark Open Woodland on sandstone derived soil with basalt influence (moderate condition)
- Inland Grey Box woodland on low sandstone foothills (moderate condition)

- Narrow-leaved Ironbark – Cypress Pine shrubby open forest on sandstone (low, burnt, regenerating and good condition)
- Tumbledown Red Gum on slopes and exposed cliffs (moderate condition)
- Inland Scribbly Gum – Narrow-leaved Stringybark shrubby open forest on sandstone (good condition)
- Yellow Box on black alluvial soils (moderate and good condition)
- River Oak woodland fringing creeks on lower alluvial plains (moderate condition)
- River Red Gum riparian woodland (moderate condition)
- Exotic dominated poor condition grasslands
- Crops

The following sub-sections includes a description and photograph of the best example of each of these vegetation communities present.

3.3.1. *Eucalyptus 'albemol'* grassy woodland on basalt derived soils

The fertile basalt soils across the majority of the study area at higher elevations support stands of grassy box gum woodland, typically dominated by an intergrade of *Eucalyptus albens* (White Box) and *Eucalyptus moluccana* (Grey Box) known as *Eucalyptus 'albemol'* (McRae and Cooper 1985) (Photograph 17). *Eucalyptus 'albemol'* grassy woodland was likely the predominant vegetation type on these basalt soils pre-European settlement. The remaining areas of *Eucalyptus 'albemol'* grassy woodland are limited in comparison to pre-clearing extent. The vast majority of patches are surrounded by grasslands dominated by either exotic or native pasture grasses. Grazing and camping under the trees by sheep and cattle has resulted in the groundcover under the trees often presenting in poorer condition than the surrounding grassland, and is often dominated by *Urtica incisa*, *Silybum marianum*, *Marrubium vulgare* or bare ground.

These areas have been mapped as 'moderate' in condition due to the high proportion of exotic groundcover species and lack of functional habitat attributes such as tree hollows and fallen logs. A small area of this community is mapped as 'good' condition with a lower proportion of exotic species in the ground layer.

The canopy is typically composed of well-spaced *Eucalyptus 'albemol'* and *Brachychiton populneus* (Kurrajong). A high amount of floristic variation occurs in this community due to grazing and clearing history. For example, *Brachychiton populneus* may be the only remaining tree species present in this community. Where a midstorey is present, it is made up of sparse shrubs and the ground layer is typically dominated by grasses and forbs including *Dichanthium sericeum* (Queensland Blue Grass), *Aristida* species (Wiregrass), *Austrostipa aristiglumis* (Plains Grass), *Austrostipa scabra* (Speargrass) and *Bothriochloa macra* (Red Grass). Commonly recorded exotic pasture species also contribute a high amount of cover to the ground layer including *Lolium perenne* (Perennial Ryegrass), *Phalaris aquatica* (Phalaris), *Eleusine indica* (Crowsfoot Grass), *Dactylis glomerata* (Cocksfoot), *Medicago* species and *Trifolium* species.



Photograph 17 Eucalyptus 'albemol' Grassy Woodland

3.3.2. Derived native grassland on basalt and sandstone derived soils

European settlement of the Coolah district began in the mid-1800s, primarily motivated by pastoral pursuits of sheep and cattle grazing and cropping (Hickson 2005; NPWS 2003). The demand for land for these purposes resulted in widespread clearing of native vegetation (NPWS 2003). The majority of grassy box gum woodland, as well as open forest on sandstone derived soils, has since been converted to derived native grasslands.

Derived native grasslands are native grasslands remaining after the removal or dieback of previous woody canopy vegetation, to a point where woody vegetation has less than 10% cover (Benson 1996; Bell 2021). Two separate communities were mapped based on the broad soil types of basalt or sandstone.

A very high amount of spatial and temporal floristic variation in the cover and abundance of native and exotic groundcovers is observed in both communities, likely influenced by rainfall and seasonality (Burrows 2004), as well as grazing intensity and fire history. Some species were consistently recorded between both communities such as *Austrostipa scabra* (Speargrass), while other species appeared to favour soil types. The derived native grasslands are maintained by sheep and cattle grazing, with a variable amount of exotic species favoured by frequent disturbance and nutrient enrichment from livestock, and the addition of superphosphate fertiliser in some areas applied as aerial topdressing (Photograph 18)

Native species commonly recorded in derived native grasslands on basalt soils include *Austrostipa aristiglumis* (Plains Grass), *Austrostipa verticillata* (Slender Bamboo Grass), *Bothriochloa macra* (Red

Grass), *Dichanthium sericeum* (Queensland Blue Grass), *Acaena ovina*, and *Cheilanthes sieberi* subsp. *sieberi.*

Native species commonly recorded in derived native grasslands on sandstone soils include *Cynodon dactylon* (Couch), *Eragrostis brownii* (Brown's Lovegrass), *Sporobolus elongatus* (Slender Rat's Tail Grass), *Dichondra repens* (Kidney Weed) and *Cymbonotus lawsonianus* (Bear's Ear). There were very few/no observations of *Themeda triandra* (Kangaroo Grass) dominated derived native grasslands, which may represent a community of higher conservation significance (Bell 2021). It is thought that Kangaroo Grass and other grazing sensitive species may have once dominated in areas that are now occupied by *Austrostipa aristiglumis* (Lang 2008, Bell 2021).

Exotic species commonly recorded across both derived native grassland communities include *Avena* species (Oats), *Silybum marianum* (Variegated Thistle), *Carthamus lanatus* (Saffron Thistle), *Lolium perenne* (Perennial Ryegrass), *Phalaris aquatica* (Phalaris), *Eleusine indica* (Crowsfoot Grass), *Dactylis glomerata* (Cocksfoot), *Marrubium vulgare* (Horehound), *Trifolium repens* (White Clover), *Medicago* species and *Amaranthus* species. It is likely that some of these species such as *Lolium* species and *Medicago* species have been aerially sown in the past.



Photograph 18 Grassland communities vary according to soil type, grazing management, nutrient input, and microtopography

3.3.3. Rusty Fig Dry Rainforest in sheltered sites on basalt derived soils

On sites sheltered by short steep slopes or rocky outcrops, small, restricted pockets of dry rainforest vegetation occur. Dry rainforest communities are floristically and structurally similar to mesic rainforests, occurring in areas where rainfall is comparatively low and highly seasonal (Curran et al. 2008).

This community is dominated primarily by *Ficus rubiginosa* (Rusty Fig) with less frequent *Angophora floribunda* (Rough-leaved Apple) and *Brachychiton populneus* (Kurrajong) with occasional *Eucalyptus 'albemol'* bordering the community.

The midstorey is generally absent but may include low cover of *Acacia* species or juvenile Kurrajong.

Ground layer species include Calotis lappulacea, Microlaena stipoides var. stipoides, Cheilanthes sieberi subsp. sieberi, Austrostipa scabra subsp. scabra, Cotula australis, Dichondra repens, Sigesbeckia australiensis, Sporobolus creber, Crassula sieberiana, Vittadinia spp., Cymbopogon refractus, Wahlenbergia communis, Arthropodium milleflorum, Desmodium varians, Einadia hastata, Solanum cinereum and Veronica plebeia.

Exotic species are commonly observed in this community, generally where there are higher light levels in gaps or edges of the canopy dripline. Exotic species include *Arctotheca calendula, Anagallis* sp., *Sonchus oleraceus, Lepidium didymum, Solanum nigrum*.

Sheep, cattle and native herbivores graze the understorey, maintaining it in a low-moderate condition.



Photograph 19 Typical structure of Rusty Fig Dry rainforest occurring as isolated trees in sheltered location with simplified mid and ground layers.

3.3.4. Narrow-leaved Ironbark Open Woodland on sandstone derived soil with basalt influence

Open ironbark woodland primarily occurs in a small area at the southern end of the study area (Photograph 20). The community occurs on soils primarily derived from sandstone, with an influence of upslope Tertiary basalt derived soils, creating moderately fertile soils.

These areas contain a canopy composed predominantly of *Eucalyptus crebra* (Narrow-leaved Ironbark), with occasional *Eucalyptus sparsifolia* (Narrow-leaved Stringybark), *Eucalyptus 'albemol'* and *Callitris endlicheri* (Black Cypress Pine). The understorey ranges from grassy in grazed, unburnt areas to shrubby in burnt areas. Grassy areas contain *Cynodon dactylon* (Couch), *Aristida vagans* (Threeawn Speargrass), *Eragrostis brownii* (Brown's Lovegrass), *Panicum* sp., *Sporobolus creber* (Slender Rat's Tail Grass) and *Sporobolus elongatus* (Slender Rat's Tail Grass). Areas with a shrubby understorey contain *Acacia* species (Wattle), *Bursaria spinosa* (Sweet Bursaria), *Cassinia sifton* (Sifton Bush) as well as groundcover species associated with grassier areas and forbs including *Dichondra repens* (Kidney Weed), *Geranium solanderi* var. *solanderi* (Native Geranium), *Hydrocotyle laxiflora* (Stinking Pennywort), *Wahlenbergia communis* (Tufted Bluebell), *Euchiton involucratus* (Star Cudweed), and *Cheilanthes sieberi* subsp. *sieberi* (Poison Rock Fern).



Photograph 20 Narrow-leaved Ironbark Open Woodland

3.3.5. Inland Grey Box woodland on low sandstone foothills

The community is restricted to the southern end of the study area property where it occurs on sandstone derived soils (Photograph 21). It is dominated by *Eucalyptus microcarpa* (Inland Grey Box) with *Eucalyptus* crebra (Narrow-leaved Ironbark) occurring less frequently. A sparse shrub layer is maintained in a moderate condition by heavy sheep grazing and includes *Cassinia sifton* (Sifton Bush) and *Bursaria spinosa* (Sweet Bursaria).

The ground layer includes species typical of a disturbed grassy understorey including *Austrostipa scabra* subsp. *scabra* (Spear Grass), *Calotis cuneifolia* (Purple Burr-daisy), *Eragrostis brownii* (Brown's Lovegrass), *Sporobolus elongatus* (Slender Rat's Tail Grass), *Echinopogon caespitosus* var. *caespitosus (Bushy Hedgehog-grass)*, *Aristida ramosa* (Purple Wiregrass), *Hypochaeris radicata* (Catsear) and *Sorghum halepense* (Johnson Grass).

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Photograph 21 Inland Grey Box woodland

3.3.6. Narrow-leaved Ironbark – Cypress Pine shrubby open forest on sandstone

The sandstone derived soils on undulating slopes are largely unutilised by grazing or cropping and contain intact remnant vegetation, with some areas showing evidence of historic clearing with subsequent regrowth. This dry sclerophyll forest community is highly distinguishable from the upslope woodland communities by the lighter coloured sandy soil, tree canopy composed of *Eucalyptus crebra* (Narrow-leaved Ironbark), *Callitris endlicheri* (Black Cypress Pine), and *Eucalyptus rossii* (Scribbly Gum).

The condition and understorey composition of these communities is variable and highly influenced by fire history. While these communities would have historically been subjected to periodic burning to protect agricultural land and provide fresh regrowth for cattle fodder (McRae and Cooper 1985), a large tract of vegetation was burnt in the high intensity uncontrolled Sir Ivan bushfire in 2017 under catastrophic fire danger conditions between the Girragulang Road and Mount Hope clusters. Prolonged drought conditions following the fire has likely contributed to the poor regrowth consisting mostly of a very dense midstorey dominated by *Acacia* species. Areas supporting a higher diversity midstorey species also contain *Bursaria spinosa* (Blackthorn), *Cassinia sifton* (Sifton Bush), *Allocasuarina* sp., *Dampiera lanceolata*, *Stypandra glauca* (Nodding Blue Lily) and *Calytrix tetragona* (Common Fringe-Myrtle). Canopy trees show very low levels of post-fire epicormic regrowth but have not yet re-established the canopy layer (Photograph 22).

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Photograph 22 Burnt narrow-leaved Ironbark – Cypress Pine shrubby open forest showing shrubby regrowth and low levels of post-fire epicormic regrowth since 2017

3.3.7. Tumbledown Red Gum grassy woodland

A small patch of this community occurs in a small patch within the Leadville cluster (Photograph 23). The soil is rocky and shallow which is characteristic habitat for *Eucalyptus dealbata* (Tumbledown Red Gum). *Eucalyptus dealbata* (Tumbledown Red Gum) is the dominant canopy tree in this community with *Eucalyptus macrorhyncha* (Red Stringybark) also occurring. *Callitris endlicheri* (Black Cypress), *Brachychiton populneus* (Kurrajong) and *Acacia* species make up a very sparse mid layer. The ground layer is heavily grazed by sheep and cattle and includes *Goodenia heterophylla, Calotis lappulacea, Dichondra repens, Wurmbea dioica, Conyza species, Hypochaeris radicata, Petrorhagia dubia, Gonocarpus teucrioides* and *Arctotheca calendula*.



Photograph 23 Tumbledown Red Gum grassy woodland

3.3.8. Inland Scribbly Gum – Narrow-leaved Stringybark shrubby open forest on sandstone

This community occurs in a small area in the south of the study area on brown sandy-clay soil (Photograph 24). The community is dominated by *Eucalyptus rossii* (Inland Scribbly Gum) and *Eucalyptus sparsifolia* (Narrow-leaved Stringybark) with a shrubby understorey consisting of *Cassinia sifton* (Sifton Bush), *Dodonaea viscosa* subsp. *cuneata* (Wedge-Leaf Hop-Bush), *Hovea apiculata*, *Persoonia linearis* (Narrow-leaved Geebung) and *Stypandra glauca* (Nodding Blue Lily). The patch of vegetation has not recently burnt at high intensity, and is not heavily grazed so this community is considered to be in a 'good' condition state.



Photograph 24 Inland Scribby Gum - Narrow-leaved Stringybark shrubby open forest

3.3.9. Yellow Box woodland on black alluvial soils

This community typically occurs on the banks of creeks where there is an accumulation of recently deposited black alluvial and colluvial sediments derived from basalt and sandstone parent materials producing high to moderate soil fertility and high to moderate water holding capabilities (Photograph 25). Small patches of remnant vegetation exist primarily on the creek banks with communities dominated by *Eucalyptus melliodora* (Yellow Box), *Angophora floribunda* (Rough-barked Apple), *Eucalyptus blakelyi* (Blakely's Red Gum). The land use history is a major determinate of vegetation condition and composition in this community, and the shrub layer is typically very sparse with occasional *Acacia* species and *Brachychiton populneus* (Kurrajong). The ground cover is grassy, consisting of *Chloris truncata* (Windmill Grass), *Austrostipa verticillata* (Slender Bamboo Grass), *Microlaena stipoides* (Weeping Grass) and *Austrostipa scabra* (Speargrass), with a high proportion of forbs such as *Einadia hastata* (Berry Saltbush), *Eremophila debilis* (Winter Apple), *Sigesbeckia australiensis*, *Geranium gardneri* (Rough Crane's-bill) and the sedge *Cyperus gracilis* (Slender Flat-sedge).

Exotic species include *Bidens subalternans* (Greater Beggar's Ticks), *Trifolium arvense* (Haresfoot Clover), *Conyza* sp., *Cenchrus clandestinus* (Kikuyu Grass) and *Chenopodium album* (Fat Hen).

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Photograph 25 Yellow Box woodland on rich alluvial soils

3.3.10. River Oak woodland fringing creeks on lower alluvial plains

Occurs as a narrow band of vegetation fringing creeks on lower alluvial plains where there is an accumulation of black alluvial soils (Photograph 26). These sites are occupied by *Casuarina cunninghamii* (River Oak) due to water table conditions, frequent waterlogging of soils, and periodic physical disturbance through flooding (Charmers et al. 2012; Erskine et al. 2013). The community is dominated by *Casuarina cunninghamii* (River Oak) with occasional *Eucalyptus melliodora* (Yellow Box). The shrub layer is very sparse with a high proportion of exotic species in the ground layer, likely due to high disturbance from flood events, pasture improvement, grazing and recruitment from adjacent cropped areas.



Photograph 26 River Oak woodland fringing creeks

3.3.11. River Red Gum riparian woodland

Occurs as a narrow band of vegetation fringing creeks on lower alluvial plains where there is an accumulation of black alluvial soils (Photograph 27). Dominated by *Eucalyptus camaldulensis* (River Red Gum) with occasional juvenile *Casuarina cunninghamii*. *Eucalyptus melliodora* (Yellow Box) may also occur on elevated sites. The shrub layer is very sparse and there is a high proportion of exotic species in the ground layer, likely due to high disturbance from flood events, grazing and recruitment from adjacent cropped areas. The ground layer contains exotics including *Lolium perenne*, *Medicago* sp., *Hydrochaeris radicata*, *Conyza* sp.

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Photograph 27 River Red Gum riparian woodland

3.3.12. Exotic dominated poor condition grasslands

Exotic dominated poor condition grasslands are areas that were previously mapped as Category-1 Land in the BDAR (ELA, 2022) that accompanied the EIS in 2022. These areas are dominated by *Lolium perenne* (Perennial Ryegrass), Hoardeum sp (Barley Grass) and other exotic agricultural fodder species. This vegetation may include native species such as *A. aristiglumis* and *A. verticillata* at low to very low cover. These areas do not contain shrubs and trees, and are typified by a vegetation integrity score <15.

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Photograph 28 Exotic dominated poor condition grasslands

3.3.13. Cropped areas

Cropped areas cover a high proportion of the study area, mostly occupying alluvial flats or basalt plains. These areas undergo various management treatments that may include application of herbicide and superphosphate fertiliser, tillage and ground disturbance, sowing, grazing and harvesting. Very low cover and abundance of native species may occur sporadically in these areas but due to ongoing crop management, are highly unlikely to persist as a functional native plant community. The main crops utilised in the study area include *Avena sativa* (Oats) and *Hordeum vulgare* (Barley).



Photograph 29 Sown crops within Girragulang Road cluster

3.4. Woodland mapping methodology

3.4.1. Background

Agency advice received on the EIS from the Biodiversity, Conservation and Science Directorate (BCS) of DPE included a request to update Plant Community Type (PCT) mapping, in accordance with the '*BCS North West Branch – Woodland Mapping Guidance*' (Woodland Mapping Guidance). It is understood that the Woodland Mapping Guidance is not a DPE endorsed assessment methodology or available to assessors preparing BDARs and was therefore provided as an attachment to the BCS submission on the EIS.

The Woodland Mapping Guidance was requested to be applied to all woodland PCTs, and only applies to those PCTs that are consistent with the *Final Determination for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* (Box Gum Woodland).

Following receipt of the BCS advice, ELA and ACEN have considered the Woodland Mapping Guidance, and met with BCS on 12 September 2022 to discuss the implications of adopting the Woodland Mapping Guidance. It was highlighted that there is currently no publicly available DPE methodology to map PCT's for assessments under the BAM, and that provision of the Woodland Mapping Guidance following submission of the BDAR (and previous interactions between ELA, ACEN, and BCS) would have a substantial change in the ecological outcomes of the project. Furthermore, provision of a mapping

methodology in response to a submitted BDAR is clearly beyond the DPE Assessor Update 36 – item 4 which provides guidance on the application of new or revised survey guidelines:

> *"Where survey has been completed prior to the publication of a survey guide, the Department expects the assessor (or surveyor) to have applied current best-practice in searching for the target species (in accordance with BAM s6.5.1.4). Assessors can use information from other published, peer-reviewed sources to guide survey technique and effort, but this must be clearly documented and justified in the BAR as well as indicating how this differs from our recently published guide."*

As part of this discussion, ELA reviewed existing data available for mapping relevant woodland PCTs, which included PCT Benchmarks and threatened ecological community descriptions, as available in the Box Gum Woodland Final Determination. ELA highlighted that components of the Woodland Mapping Guidance required woodland polygons to be mapped by up to 20 crown widths apart, resulting in a crown cover of 0.2%, which is lower than both the PCT benchmark (17-19%) and the Box Gum Woodland Final Determination (30%). The Woodland Mapping Guidance is therefore prescribing a minimum canopy cover that is significantly different to those lines of evidence described above, devalues those areas of woodland with trees, and significantly increases PCT polygons in areas that are predominately exotic. The Woodland Mapping Guidance makes reference to Tables 6 and 7 of the *Explanatory notes for the Vegetation field handbook, version 2* (Thackway & Hnatiuk, 2009), which whilst a useful tool in assessing vegetative cover, is not referred to in the Final Determination.

Furthermore, previous BDARs submitted to the Dubbo branch of BCS were not required to follow the Woodland Mapping Guidance. This is despite areas of the same ecological communities being incorporated into their project designs, and similar mapping approaches to that prepared by ELA for Valley of the Winds.

ELA proposed an alternative woodland mapping methodology in light of the details described above. The aim of this alternative method is to map grassy woodland appropriately, in line with available information at the time of preparation of the BDAR, to ensure that mapping aligns with the PCT benchmarks, as well as the Final Determination for the relevant threatened ecological communities (TECs).

Section 4.1.1 of the BAM (2020) directs assessors to map native vegetation on the Project site, and this "*…extends to native ground cover and tree canopy cover*". The BAM makes no reference to mapping inter-canopy areas of exotic vegetation in a woodland, as native vegetation. The original vegetation mapping provided by ELA within the Valley of the Winds BDAR is compliant with this directive within the BAM.

Part 4.2 of the Box Gum Woodland Final Determination (NSW Threatened Species Scientific Committee, 2020) describes the TEC as *"…characterised by widely spaced trees with canopies not touching and projected foliage cover generally less than 30%..."*. This is consistent with a crown separation of approximately 0.25 crown widths (Thackway & Hnatiuk, 2009). The Final Determination does not make reference to any other measurement of canopy cover.

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The PCT Benchmarks for PCTs 483 and 281 range from 17-19% projected foliage cover, depending on the IBRA subregion in which they occur. This is consistent with a crown separation of approximately 0.5 crown widths.

Plot data collected within the Project site indicates that the projected foliage cover of PCT 281 and PCT 483 (in vegetation zones that have trees) averages 33% and 12.7% respectively. The higher vegetation cover within PCT 281 is recorded in a remnant patch of vegetation that has likely not been subject to land clearing and naturally has a dense canopy cover. Plot data collected within the Project site is compliant with both the PCT benchmarks, and the Final Determination.

3.4.2. Mapping approach

To ensure vegetation mapping within the Project site is consistent with the Final Determination and PCT Benchmarks, ELA applied the following spatial analysis to all areas of good and moderate condition PCTs 281 and 483:

1. Map canopy cover only. This will be completed using the Landsat woody extent and foliage projective cover (FPC) Ver 2.1 (25m) 2008, available from https://datasets.seed.nsw.gov.au/dataset/landsat-woody-extent-and-foliage-projective-cover-fpc-ver-2-1-25m-20087355d . This layer will be buffered by 2m to smooth out any imperfections, and will be visually checked for accuracy, and may be edited to appropriately align with aerial imagery. This step will ensure canopy mapping is compliant with 4.1.1 of the BAM.

2. The canopy cover layer from 1 (above) will be analysed using the 'Amalgamate' function in ArcMap, to identify those trees that are within a crown separation of 1 tree (a conservative approach, given the Final Determination and PCT Benchmarks indicate a 0.25 to 0.5 crown separation. A crown diameter of 12m will be used for this analysis.

3. All trees that are connected to each other using the function in 2 (above) will be connected by a single polygon, by editing the existing PCT map presented in the BDAR. This will form the woodland vegetation zones 'Moderate' and 'High' quality.

Areas of native vegetation outside of the woodland polygons will be mapped as derived native grassland, using the same nomenclature from the Valley of the Winds BDAR (ELA, 2022). This mapping methodology will comply with both the Final Determination for Box Gum Woodland, as well as the benchmarks for the relevant PCTs present. In areas where trees are separated by spaces larger than those identified above, the mapping will be unchanged.

ELA requested that this alternative methodology be reviewed and endorsed by BCS prior to any further assessment for the Project. This mapping approach was endorsed by BCS and the responding letter is provided in Appendix C.

An example of the woodland mapping spatial analysis for each wind farm cluster is shown in Figure 13 to Figure 15.

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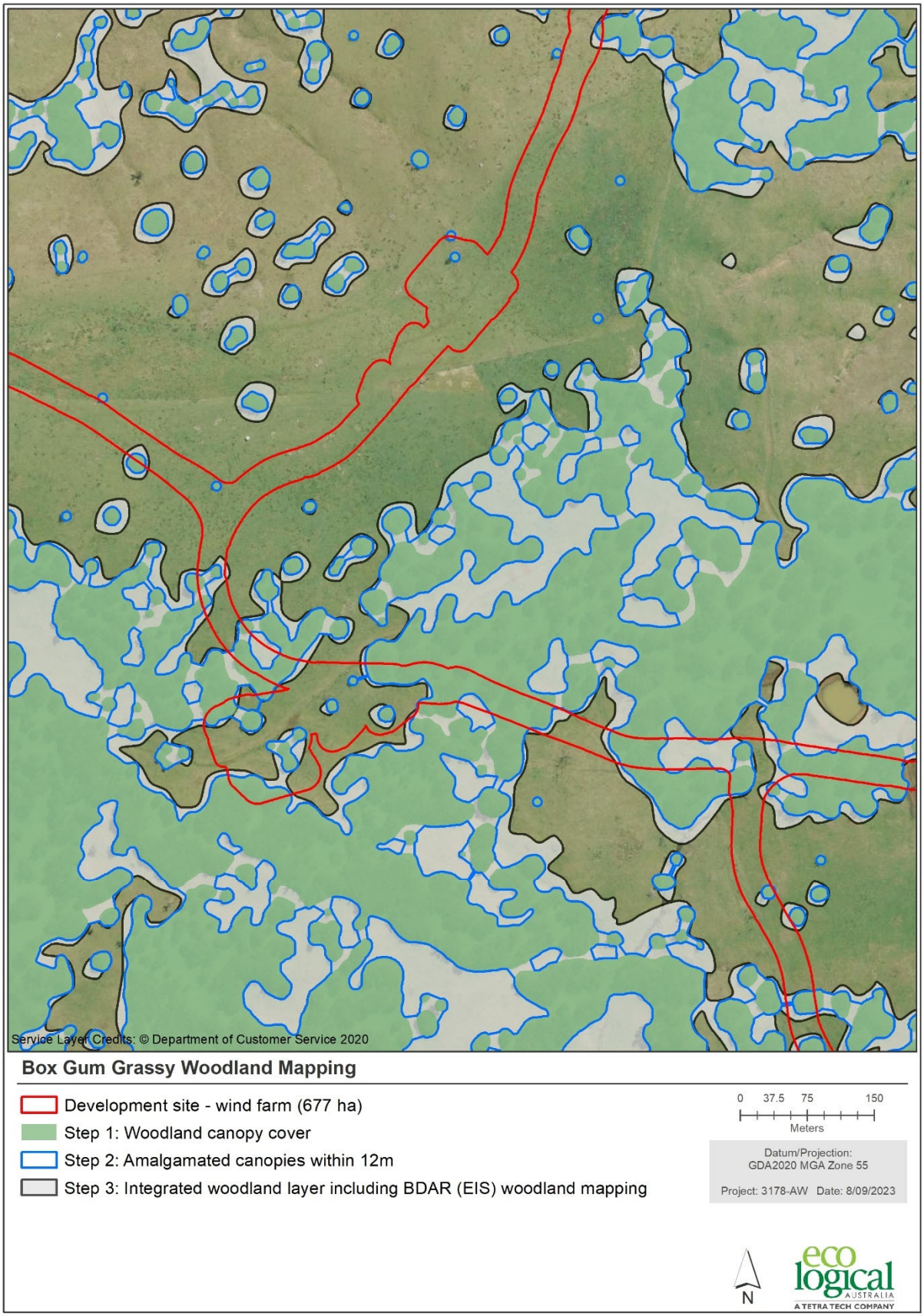


Figure 13 Woodland mapping example from Mount Hope Cluster

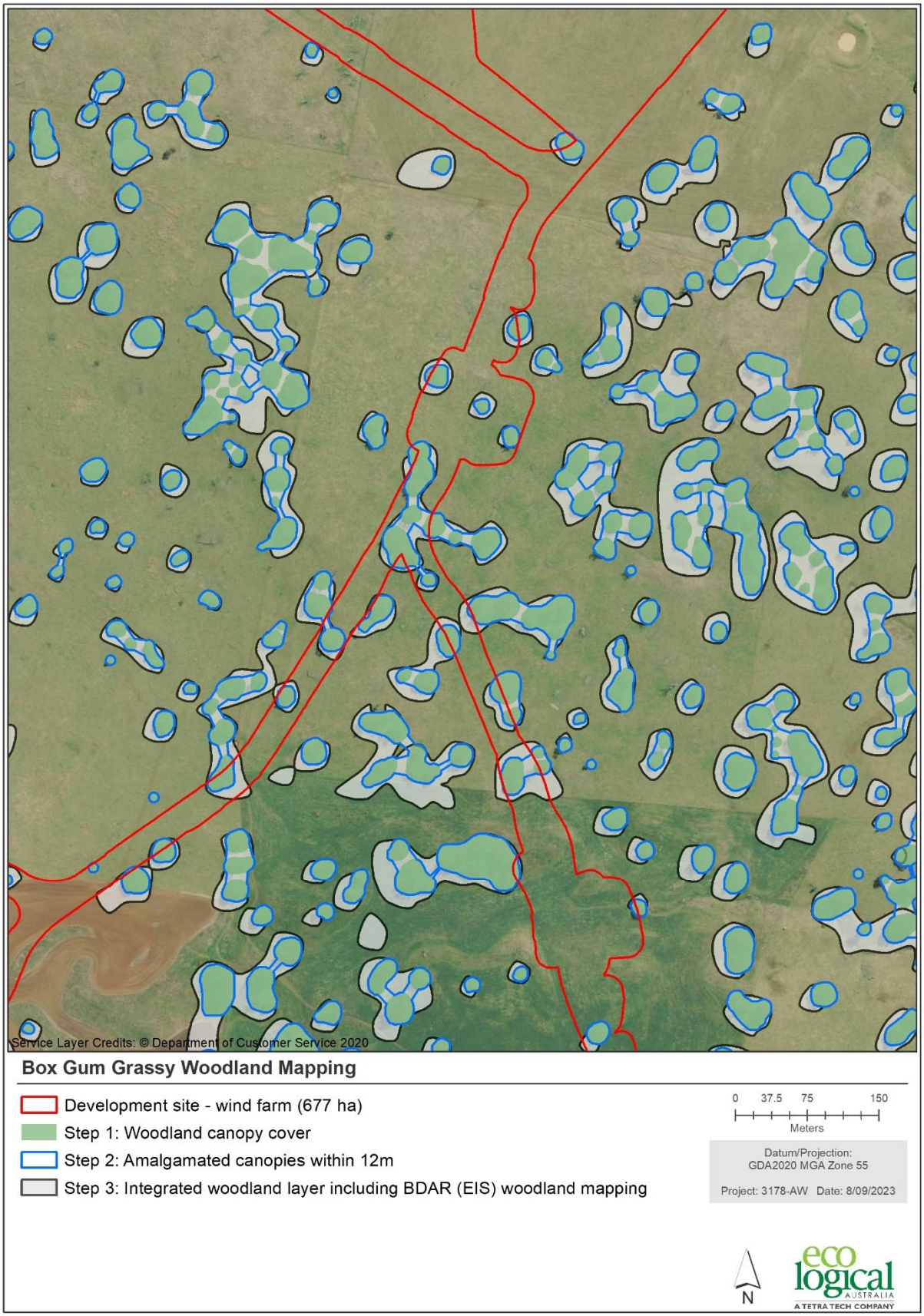


Figure 14 Woodland mapping example from Girragulang Road cluster

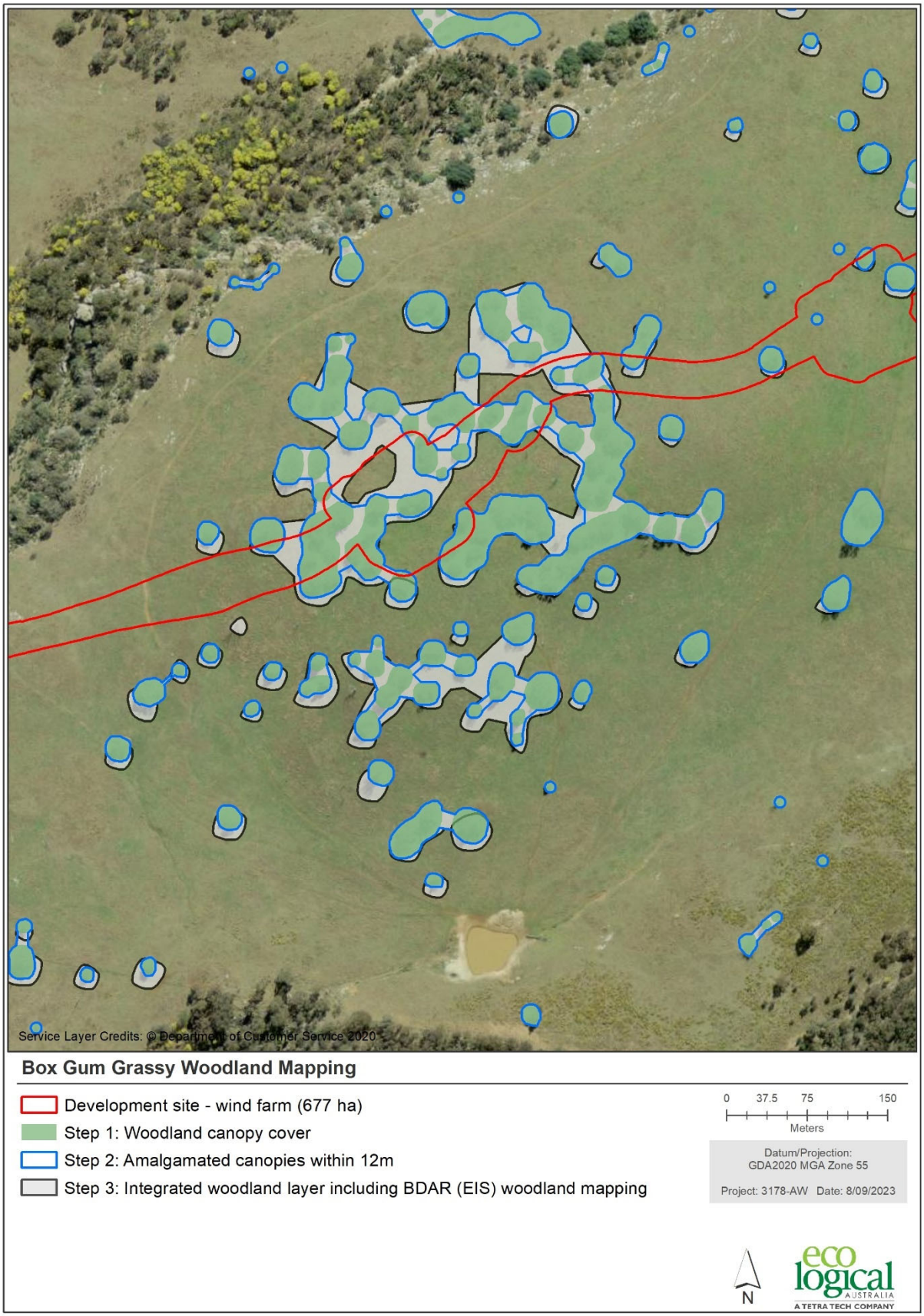


Figure 15 Woodland mapping example from Leadville cluster

3.5. Vegetation Integrity Assessment

Vegetation surveys undertaken within the development site were led by ELA Senior Ecologists and Accredited Assessors Lily Gorrell, Alex Pursche and Dan Watts, with assistance from ELA Ecologists Liam Scanlan and Sophie Montgomery. Initial surveys were undertaken September 2020, April 2021, May 2021, and June 2021 (Table 7). An additional 88 plots have been collected between September 2022 and March 2023 as part of this revised report to demonstrate and further validate the vegetation integrity across the development site.

A total of 152 full-floristic vegetation integrity plots were surveyed to identify Plant Community Types (PCTs) on the development site and to assess the composition, structure and function components of each vegetation zone in accordance with the BAM.

At each survey site, the following information was collected:

- Site ID
- Name of recorder(s)
- Date
- Plot orientation, slope, and aspect
- Easting and northing at either end of the 50 m transect
- Site photographs
- A plot-based 400 m2 full floristic survey
- A plot and transect survey (20 x 50).

Within the 20 m x 20 m quadrat, the following data was collected at each plot-based full floristic survey site:

- Species name: Scientific name and common name
- Stratum (& layer): in which each species occurs
- Cover: an estimate of the appropriate cover measure for each recorded species: from 1-5% and then to the nearest 5%
- Abundance: A relative measure of the number of individuals or shoots of a species within the plot using the following intervals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50, 100, 500, 1000, or specify a number greater than 1000 if required
- Form: (T) Tree; (S) Shrub; (G) Grass and grass like (F) Forb; (E) Fern; (O) other

Within each plot survey, the following information was collected:

- Within a 20 m x 20 m quadrat the number of native species present
- Within a 50 m x 20 m quadrat the number of large trees, tree regeneration, tree stem size class, total length of fallen logs, number of hollow-bearing trees
- Within five 1m x 1m sub-plots litter cover

All field data collected at full-floristic vegetation integrity plots is included in Appendix E and Appendix E.

Table 7: Vegetation Integrity Survey surveyors and timing

Plot	PCT	Surveyor 1	Surveyor 2	Date
1	479	Lily Gorrell	Alex Pursche	20200907
2	483	Lily Gorrell	Alex Pursche	20200907
3	483	Lily Gorrell	Alex Pursche	20200907
4	483	Lily Gorrell	Alex Pursche	20200908
5	483	Lily Gorrell	Alex Pursche	20200908
6	483	Lily Gorrell	Alex Pursche	20200908
7	483	Lily Gorrell	Alex Pursche	20200908
8	479	Lily Gorrell	Alex Pursche	20200908
9	483	Lily Gorrell	Alex Pursche	20200909
10	483	Lily Gorrell	Alex Pursche	20200909
11	483	Lily Gorrell	Alex Pursche	20200909
12	483	Lily Gorrell	Alex Pursche	20200909
13	483	Lily Gorrell	Alex Pursche	20200910
14	483	Lily Gorrell	Alex Pursche	20200910
15	483	Lily Gorrell	Alex Pursche	20200910
16	483	Lily Gorrell	Alex Pursche	20200910
17	483	Lily Gorrell	Alex Pursche	20200910
18	483	Lily Gorrell	Alex Pursche	20200911
19	479	Lily Gorrell	Sophie Montgomery	20210429
20	478	Lily Gorrell	Sophie Montgomery	20210429
21	281	Lily Gorrell	Sophie Montgomery	20210430
22	483	Liam Scanlan	--	20210513
23	483	Dan Watts	Liam Scanlan	20210513
24	84	Liam Scanlan	--	20210514
25	281	Liam Scanlan	--	20210514
26	281	Liam Scanlan	--	20210514
27	483	Dan Watts	Liam Scanlan	20210513
28	483	Dan Watts	--	20210513
29	281	Dan Watts	Liam Scanlan	20210514
30	84	Dan Watts	--	20210514
31	281	Dan Watts	--	20210514
32	281	Dan Watts	--	20210514
33	479	Lily Gorrell	Liam Scanlan	20210628
34	479	Lily Gorrell	Liam Scanlan	20210628
35	479	Lily Gorrell	Liam Scanlan	20210628

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Plot	PCT	Surveyor 1	Surveyor 2	Date
36	479	Lily Gorrell	Liam Scanlan	20210628
37	479	Lily Gorrell	Liam Scanlan	20210629
38	281	Lily Gorrell	Liam Scanlan	20210629
39	281	Lily Gorrell	Liam Scanlan	20210629
40	479	Lily Gorrell	Liam Scanlan	20210629
41	479	Lily Gorrell	Liam Scanlan	20210629
42	267	Lily Gorrell	Liam Scanlan	20210630
43	267	Lily Gorrell	Liam Scanlan	20210630
44	267	Lily Gorrell	Liam Scanlan	20210630
45	281	Lily Gorrell	Liam Scanlan	20210630
46	483	Lily Gorrell	Liam Scanlan	20210630
47	479	Lily Gorrell	Liam Scanlan	20210630
48	478	Lily Gorrell	Liam Scanlan	20210908
49	479	Lily Gorrell	Liam Scanlan	20210909
50	483	Lily Gorrell	Liam Scanlan	20210911
51	267	Lily Gorrell	Liam Scanlan	20210911
52	267	Lily Gorrell	Liam Scanlan	20210911
53	479	Lily Gorrell	Liam Scanlan	20210913
54	479	Lily Gorrell	Liam Scanlan	20210914
55	479	Lily Gorrell	Liam Scanlan	20210914
56	479	Lily Gorrell	Liam Scanlan	20210914
57	479	Lily Gorrell	Liam Scanlan	20210914
58	616	Lily Gorrell	Liam Scanlan	20210914
59	483	Liam Scanlan	Sophie Montgomery	20210914
60	483	Liam Scanlan	Sophie Montgomery	20200923
61	479	Liam Scanlan	Sophie Montgomery	20210925
62	281	Lily Gorrell	--	20200907
63	281	Lily Gorrell	--	20200907
64	281	Lily Gorrell	--	20220201
65	483	Lily Gorrell	Alex Yates	20221101
66	483	Lily Gorrell	Alex Yates	20221101
67	483	Lily Gorrell	Alex Yates	20221101
68	483	Lily Gorrell	Alex Yates	20221101
69	483	Lily Gorrell	Alex Yates	20221102
70	483	Lily Gorrell	Alex Yates	20221102
71	483	Lily Gorrell	Alex Yates	20221102

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Plot	PCT	Surveyor 1	Surveyor 2	Date
72	483	Lily Gorrell	Alex Yates	20221102
73	483	Lily Gorrell	Alex Yates	20221102
74	483	Lily Gorrell	Alex Yates	20221102
75	483	Lily Gorrell	Alex Yates	20221102
76	483	Lily Gorrell	Alex Yates	20221103
77	483	Lily Gorrell	Alex Yates	20221103
78	281	Lily Gorrell	Alex Yates	20221103
79	281	Lily Gorrell	Alex Yates	20221103
80	281	Lily Gorrell	Alex Yates	20221103
81	483	Lily Gorrell	Alex Yates	20221103
82	483	Lily Gorrell	Alex Yates	20221103
83	483	Lily Gorrell	Alex Yates	20221103
84	483	Lily Gorrell	Alex Yates	20221103
85	483	Lily Gorrell	Alex Yates	20221103
86	483	Lily Gorrell	Alex Yates	20221104
87	483	Lily Gorrell	Alex Yates	20221104
88	483	Lily Gorrell	Alex Yates	20221104
89	483	Lily Gorrell	Alex Yates	20221104
90	483	Lily Gorrell	Alex Yates	20221104
91	483	Lily Gorrell	Alex Yates	20230221
92	483	Lily Gorrell	Alex Yates	20230221
93	483	Lily Gorrell	Alex Yates	20230221
94	483	Lily Gorrell	Alex Yates	20230221
95	483	Lily Gorrell	Alex Yates	20230221
96	281	Lily Gorrell	Alex Yates	20230221
97	483	Lily Gorrell	Alex Yates	20230221
98	483	Lily Gorrell	Alex Yates	20230221
99	483	Lily Gorrell	Alex Yates	20230221
100	483	Lily Gorrell	Alex Yates	20230220
101	483	Lily Gorrell	Alex Yates	20230220
102	483	Lily Gorrell	Alex Yates	20230220
103	483	Lily Gorrell	Alex Yates	20230220
104	483	Lily Gorrell	Alex Yates	20230220
105	281	Lily Gorrell	Alex Yates	20230222
106	483	Lily Gorrell	Alex Yates	20230222
107	483	Lily Gorrell	Alex Yates	20230222

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Plot	PCT	Surveyor 1	Surveyor 2	Date
108	483	Lily Gorrell	Alex Yates	20230222
109	483	Lily Gorrell	Alex Yates	20230222
110	483	Lily Gorrell	Alex Yates	20230222
111	483	Lily Gorrell	Alex Yates	20230222
112	281	Lily Gorrell	Alex Yates	20200223
113	281	Lily Gorrell	Alex Yates	20200223
114	483	Lily Gorrell	Alex Yates	20230220
115	483	Lily Gorrell	Alex Yates	20230220
116	483	Lily Gorrell	Alex Yates	20230220
117	483	Lily Gorrell	Alex Yates	20230220
118	483	Lily Gorrell	Alex Yates	20230221
119	483	Liam Scanlan	Kate Taylor	20221212
120	483	Liam Scanlan	Kate Taylor	20221212
121	479	Liam Scanlan	Kate Taylor	20221213
122	483	Liam Scanlan	Kate Taylor	20221213
123	483	Liam Scanlan	Kate Taylor	20221213
124	483	Liam Scanlan	Kate Taylor	20221213
125	483	Liam Scanlan	Kate Taylor	20221214
126	483	Liam Scanlan	Kate Taylor	20221214
127	483	Liam Scanlan	Kate Taylor	20221214
128	483	Liam Scanlan	Kate Taylor	20221214
129	483	Liam Scanlan	Kate Taylor	20221214
130	483	Liam Scanlan	Kate Taylor	20221214
131	483	Liam Scanlan	Jack O'Sullivan	20220913
132	483	Liam Scanlan	Jack O'Sullivan	20220913
133	483	Liam Scanlan	Jack O'Sullivan	20220913
134	483	Liam Scanlan	Jack O'Sullivan	20220913
135	483	Liam Scanlan	Jack O'Sullivan	20220913
136	483	Liam Scanlan	Jack O'Sullivan	20220913
137	483	Liam Scanlan	Jack O'Sullivan	20220913
138	483	Liam Scanlan	Jack O'Sullivan	20220914
139	483	Liam Scanlan	Jack O'Sullivan	20220914
140	483	Liam Scanlan	Jack O'Sullivan	20220914
141	281	Liam Scanlan	Jack O'Sullivan	20220914
142	483	Liam Scanlan	Jack O'Sullivan	20220914
143	483	Liam Scanlan	Jack O'Sullivan	20220915

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Plot	PCT	Surveyor 1	Surveyor 2	Date
144	281	Liam Scanlan	Jack O'Sullivan	20220915
145	483	Liam Scanlan	Jack O'Sullivan	20220915
146	483	Liam Scanlan	Jack O'Sullivan	20220916
147	483	Liam Scanlan	Jack O'Sullivan	20220916
148	483	Liam Scanlan	Jack O'Sullivan	20220916
149	267	Liam Scanlan	Alex Yates	20230505
150	267	Liam Scanlan	Alex Yates	20230505
151	479	Liam Scanlan	Alex Yates	20230505
152	479	Liam Scanlan	Alex Yates	20230505

In response to the review by BCS, ELA have reviewed the distance of all VI Plots to the development site, and have reviewed whether the plots collected are appropriate for use in calculations. The review included consideration by the Accredited assessor as to whether any ecotones or land use differences exist between the plot and the development site. The results of the review are provided in Table 8 below. All plots within suitable PCTs were used in the final calculations.

Table 8 Plot location and distance to development site

Plot	Distance to Development site	Notes
1	0	Within development footprint
2	0	Within development footprint
3	151	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
4	22	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
5	0	Within development footprint
6	57	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
7	0	Within development footprint
8	69	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
9	258	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
10	349	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
11	0	Within development footprint
12	68	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
13	133	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.

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Plot	Distance to Development site	Notes
14	569	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
15	966	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
16	0	Within development footprint
17	245	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
18	40	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
19	48	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
20	35	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
21	5	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
22	0	Within development footprint
23	25	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
24	0	Within development footprint
25	0	Within development footprint
26	153	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
27	49	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
28	58	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
29	174	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
30	38	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
31	0	Within development footprint
32	142	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
33	0	Within development footprint
34	0	Within development footprint
35	11	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
36	0	Within development footprint
37	70	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
38	55	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.

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Plot	Distance to Development site	Notes
39	594	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
40	0	Within development footprint
41	78	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
42	50	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
43	24	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
44	45	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
45	360	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
46	0	Within development footprint
47	109	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
48	44	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
49	20	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
50	0	Within development footprint
51	28	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
52	50	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
53	714	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
54	46	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
55	18	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
56	0	Within development footprint
57	37	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
58	381	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
59	30	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
60	61	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
61	25	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.

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Plot	Distance to Development site	Notes
62	0	Within development footprint
63	0	Within development footprint
64	0	Within development footprint
65	0	Within development footprint
66	1	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
67	0	Within development footprint
68	0	Within development footprint
69	31	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
70	4	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
71	0	Within development footprint
72	0	Within development footprint
73	0	Within development footprint
74	12	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
75	4	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
76	0	Within development footprint
77	0	Within development footprint
78	0	Within development footprint
79	11	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
80	46.5	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
81	0	Within development footprint
82	0	Within development footprint
83	0	Within development footprint
84	0	Within development footprint
85	34	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
86	2	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
87	2	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
88	0	Within development footprint
89	0	Within development footprint
90	452	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.

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Plot	Distance to Development site	Notes
91	0	Within development footprint
92	0	Within development footprint
93	0	Within development footprint
94	0	Within development footprint
95	0	Within development footprint
96	0	Within development footprint
97	0	Within development footprint
98	0	Within development footprint
99	0	Within development footprint
100	0	Within development footprint
101	0	Within development footprint
102	0	Within development footprint
103	0	Within development footprint
104	0	Within development footprint
105	0	Within development footprint
106	0	Within development footprint
107	0	Within development footprint
108	0	Within development footprint
109	0	Within development footprint
110	0	Within development footprint
111	0	Within development footprint
112	0	Within development footprint
113	0	Within development footprint
114	0	Within development footprint
115	0	Within development footprint
116	0	Within development footprint
117	0	Within development footprint
118	0	Within development footprint
119	25.3	Nearby to the development footprint. No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
120	0	Within development footprint
121	0	Within development footprint
122	0	Within development footprint
123	0	Within development footprint
124	0	Within development footprint
125	0	Within development footprint
126	0	Within development footprint

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Plot	Distance to Development site	Notes
127	0	Within development footprint
128	0	Within development footprint
129	0	Within development footprint
130	0	Within development footprint
131	463	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
132	0	Within development footprint
133	0	Within development footprint
134	0	Within development footprint
135	696	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
136	621	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
137	0	Within development footprint
138	0	Within development footprint
139	0	Within development footprint
140	0	Within development footprint
141	0	Within development footprint
142	0	Within development footprint
143	0	Within development footprint
144	328	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
145	166	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
146	0	Within development footprint
147	0	Within development footprint
148	595	No ecotone or substantial change in vegetation characteristics. Suitable for use in assessment.
149	0	Within development footprint
150	0	Within development footprint
151	0	Within development footprint
152	0	Within development footprint

3.6. Plant Community Types present

In order to determine which PCT aligns best to each vegetation pattern, the following process was undertaken.

- Compile a preliminary PCT list via database searches of the Vegetation Information System (VIS) and SEED (Sharing and Enabling Environmental Data)

- Site inspection to collect RDPs, develop PCT shortlist and preliminary vegetation mapping
- Undertake full floristic plots to collect data used in quantitative PCT selection
- Identify additional data sources for PCT selection e.g. soil landscapes mapping
- Quantitatively compare field data to PCT database to find best fit
- Finalise PCT mapping

PCTs identified within the development site are presented in Table 9.

The development site also contains exotic vegetation or crops which does not conform to any native PCT.

In determining the PCT for the development site, various attributes were considered in combination to assign vegetation to the best fit PCT. Attributes included dominant species in each stratum and relative abundance, community composition, soils and landscape position. Reference was made to the PCT descriptions in the BioNet Vegetation Classification and the final scientific determinations for TECs. The best fitting PCT selections are provided in Table 10.

PCT mapping now no longer includes areas that are outside the development site and is shown on Figure 16.

Table 9: Plant Community Types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Percent cleared
84	River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Eastern Riverine Forests	Forested Wetlands	40%
267	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodlands	Grassy Woodlands	65%
281	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Western Slopes Grassy Woodlands	Grassy Woodlands	67%
461	Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion	Western Slopes Grassy Woodlands	Grassy Woodlands	50%
478	Red Ironbark - Black Cypress Pine - stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong - Mendooran region, southern Brigalow Belt South Bioregion	Western Slopes Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	29%
479	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Western Slopes Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	40%
483	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Western Slopes Grassy Woodlands	Grassy Woodlands	90%

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Percent cleared
616	Grey Myrtle - Rusty Fig dry rainforest in sandstone gorges of the upper Hunter Valley	Dry Rainforests	Rainforests	0%

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Table 10: Justification of selected Plant Community Types

Vegetation community	Selected PCT ID	Selected PCT Name	Other options	Justification for PCT selection
River Red Gum Riparian Woodland	42	River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	2, 5, 7, 8, 9, 10, 11, 36, 78, 112, 233, 249, 362	Filtered IBRA regions to Brigalow Belt South, NSW South Western Slopes and Sydney Basin. Filtered Vegetation Class to Inland Riverine Forests. Filtered communities containing Eucalyptus camaldulensis. PCT 42 was chosen for landscape position and simple floristic and structural characteristics.
River Oak woodland fringing creeks on lower alluvial plains	84	River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	36, 78, 85	Filtered IBRA regions to Brigalow Belt South, NSW South Western Slopes and Sydney Basin. Filtered PCTs containing *Casuarina cunninghamii* and *Eucalyptus melliodora*. Filtered vegetation formations to Forested Wetlands. 36 and 78 are characterised by *Eucalyptus camaldulensis* (River Red Gum) which is absent in this community. 84 also contains *Eucalyptus camaldulensis* (River Red Gum), but also contains *Eucalyptus melliodora* and *Angophora floribunda* which likely would have been a component prior to clearing. 85 was excluded as it would be almost exclusively dominated by River Oak.
Derived Native Grassland on sandstone	267	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	--	Occurs adjacent to intact PCT 272 and on the same soils and landscape position. 272 was chosen as the original PCT the derived grassland has developed from. PCT272 has been decommissioned, and so is now replaced with PCT267 in this assessment.
Inland Grey Box woodland on low sandstone foothills	267	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	80, 81	Filtered IBRA regions to Brigalow Belt South, NSW South Western Slopes and Sydney Basin. Filtered to Grassy woodland vegetation formation and Western Slopes Grassy Woodlands. Filtered *Eucalyptus microcarpa* in upper strata and *Cassinia laevis* in mid strata. 80 and 81 are similar but in Floodplain Transition Woodlands vegetation class which does not fit the landscape position that this community is found. 272 is best fit considering vegetation class, vegetation formation, dominant species present.

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Vegetation community	Selected PCT ID	Selected PCT Name	Other options	Justification for PCT selection
				PCT272 has been decommissioned, and so is now replaced with PCT267 in this assessment.
Yellow Box on lower slopes with black alluvial soils	281	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	--	Filtered IBRA regions to Brigalow Belt South, NSW South Western Slopes and Sydney Basin. Filtered PCTs containing Eucalyptus melliodora, Eucalyptus blakelyi and Casuarina cunninghamii.
Tumbledown Red Gum on slopes with shallow rocky soils	461	Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion	--	This community does not occur within the proposed impact footprint and no full floristic plots were undertaken. 461 description states "Mid-high to low open woodland to woodland dominated by Tumbledown Gum (*Eucalyptus dealbata*) often with no other tree species." which is accurate for this community.
Inland Scribbly Gum – Narrow-leaved Stringybark shrubby open forest on sandstone	478	Red Ironbark - Black Cypress Pine - stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong - Mendooran region, southern Brigalow Belt South Bioregion	612, 863, 1666	Filtered IBRA regions to Brigalow Belt South, NSW South Western Slopes and Sydney Basin. Filtered PCTs containing Eucalyptus rossii and Eucalyptus sparsifolia. 612 is a very tall moist shrubland/heathland which does not match this community. 863 contains Grey Gum (Eucalyptus punctata) and Narrow-leaved Stringybark which dos does not match this community. 1666 contains Eucalyptus crebra and Fringe Myrtle which does not match this community. 478 was the best match considering species composition and vegetation structure
Narrow-leaved Ironbark Open Woodland on sandstone derived soil with basalt influence	479	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	--	Filtered IBRA regions to Brigalow Belt South, NSW South Western Slopes and Sydney Basin. Filtered PCT names containing "Narrow-leaved Ironbark" as this community is solely dominated by *Eucalyptus crebra*. Filtered Dry Sclerophyll Forests (Shrubby sub-formation). Removed "Yetman Dry Sclerophyll Forests" vegetation class from search. Filtered PCTs containing *Bursaria spinosa* and *Phyllanthus hirtellus* which are the two most dominant shrubs in this community.
Narrow-leaved Ironbark – Callitris shrubby open forest on sandstone	479	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open	--	Filtered IBRA regions to Brigalow Belt South, NSW South Western Slopes and Sydney Basin. Filtered PCT names containing "Narrow-leaved Ironbark" as this community is solely dominated by

Vegetation community	Selected PCT ID	Selected PCT Name	Other options	Justification for PCT selection
		forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion		*Eucalyptus crebra.* Filtered Dry Sclerophyll Forests (Shrubby sub-formation). Removed "Yetman Dry Sclerophyll Forests" vegetation class from search. Filtered PCTs containing *Bursaria spinosa* and *Phyllanthus hirtellus* which are the two most dominant shrubs in this community.
Eucalyptus 'albemol' Grassy Woodland on basalt derived soils	483	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	484, 617	Searched for PCTs containing *Eucalyptus 'albemol'*. PCT 483, 484 and 617 are the only PCTs *with E. 'albemol'*. Excluding "Western Slopes Grasslands" from the search removes PCT 484. PCT 617 has a shrubby understorey which does not match with this community. PCT 483 is the best fit considering species composition and community structure
Derived Native Grassland on basalt	483	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	484	This community fits PCT 484 (Derived tall spear grass grassland on mainly basalt hills of the Liverpool Plains, Liverpool Range and in the upper Hunter Valley (Merriwa district), however was not used in accordance with BAM 2020 Section 4.2 subset 3 "Assessors must not identify native vegetation as a derived PCT in the BioNet Vegetation Classification. Assessors must identify the original PCT from which the derived PCT has developed." Therefore 483 was chosen as the original PCT the derived grassland has developed from.
Rusty Fig Rainforest on basalt derived soils in sheltered sites	616	Grey Myrtle - Rusty Fig dry rainforest in sandstone gorges of the upper Hunter Valley	547	Filtered PCTs containing *Ficus rubiginosa* and *Angophora floribunda* in the Brigalow Belt South, Sydney Basic and NSW South Western Slopes IBRA regions, with Rainforest vegetation formation. PCT 547 is described as occurring on rocky and scree areas, and 616 is described as occurring in sandstone gorges. 616 is a better fit for landscape position and floristic composition.
Crops	n/a	n/a	n/a	Dominated by exotic species, managed as crop with frequent removal of foliage and ground disturbance, likely broad-scale applications of herbicide, fertiliser and exotic pasture sowing.

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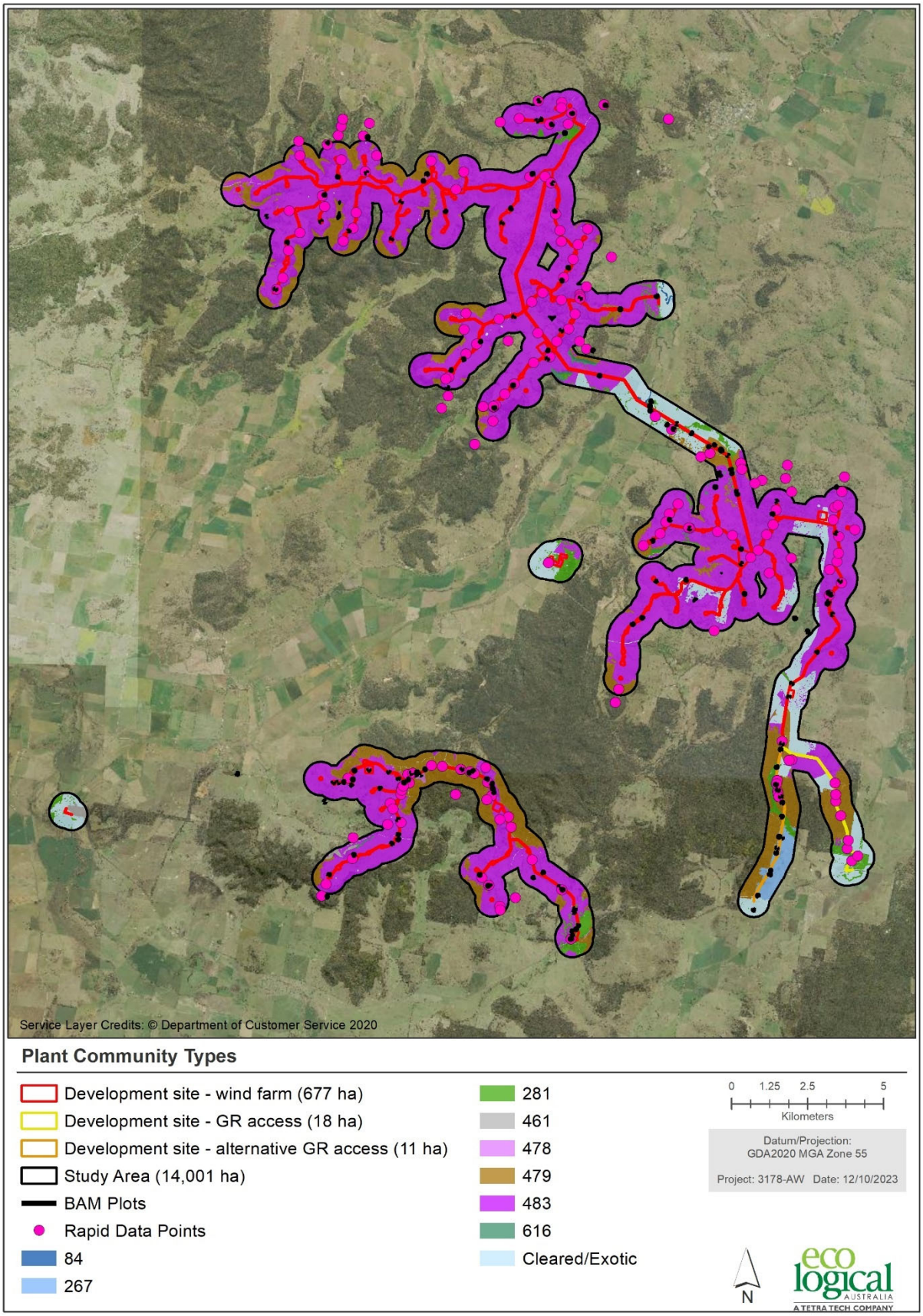


Figure 16 Plant Community Types

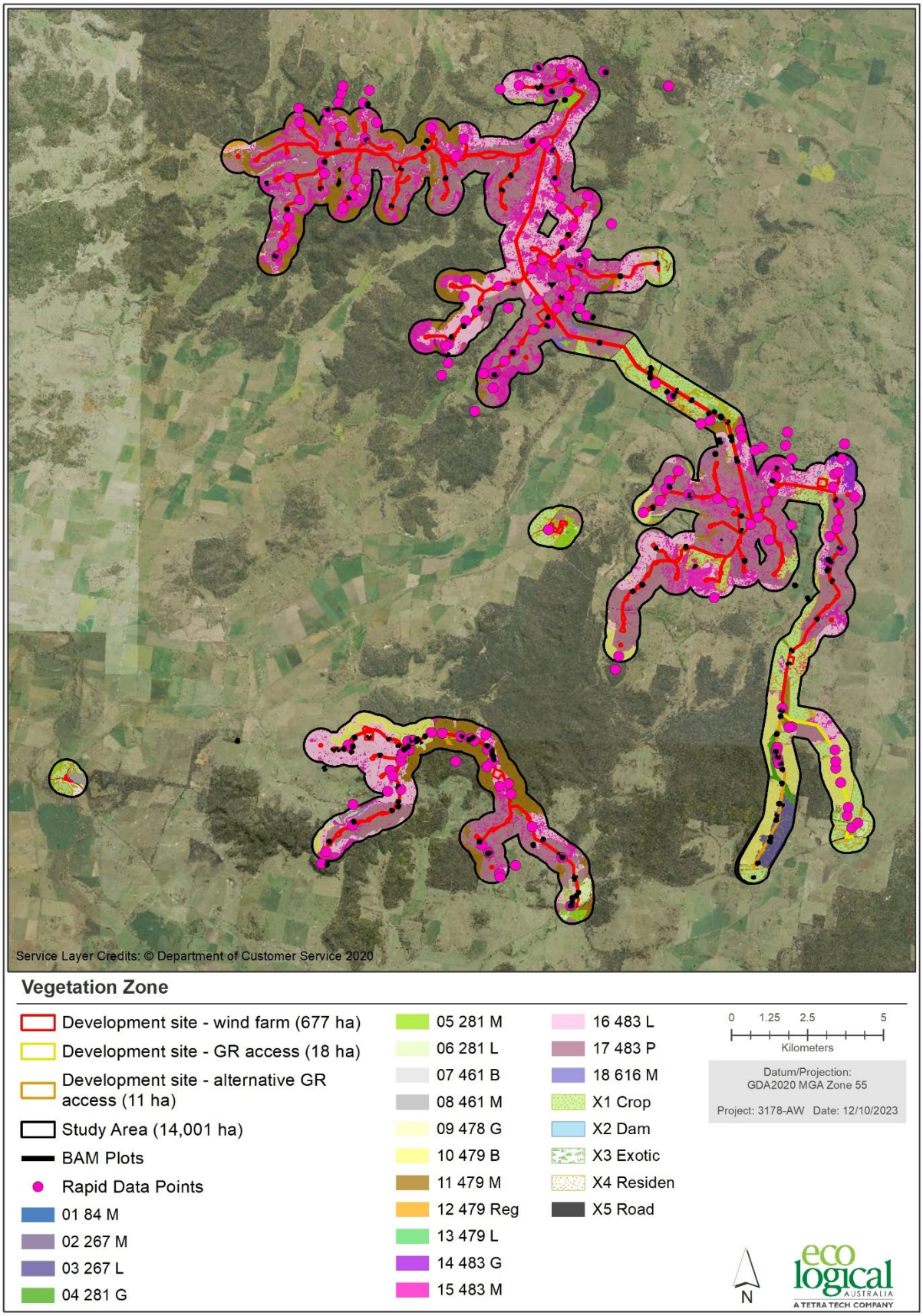


Figure 17 Vegetation zones and VI plot locations

3.7. Threatened ecological communities

Assessment of each PCT was undertaken to determine if any of the vegetation communities present were consistent with Threatened Ecological Communities (TEC's) listed under the BC Act and/or the EPBC Act.

Assessment of the assemblage of species in each vegetation type was considered against potential TECs and their relevant Final Determination (BC Act) or Listing Advice (EPBC Act).

3.7.1. BC Act TECs

To determine a candidate list of potential BC Act TECs, a spatial search was conducted using the species siting search in BioNet and considering any potential TECs that were predicted in the BAM Credit Calculator (BAMCC). Based on this review, 15 candidate TECs were identified as potentially occurring. Of these 15 TEC's, many are associated with the Hunter Valley and coastal areas, which does not include any portion of the study area. As such the following nine TECs were ruled out from the assessment due to geographical limitations of the occurrence of the TEC:

- Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions
- Coolac-Tumut Serpentinite Shrubby Woodland in the NSW South Western Slopes and South Eastern Highlands Bioregions
- Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions
- Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion
- Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions
- Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion
- Pilliga Outwash Ephemeral Wetlands in the Brigalow Belt South Bioregion
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Similarly, a further four TECs have been ruled out of the assessment, as there are no vegetation communities (Section 3.3) within the study area that contains the appropriate assemblage of species:

- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions
- Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions
- Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions

Based on the location and assemblage of species, two potential TECs occur within the study area:

- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (BC Act Inland Grey Box Woodland)

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- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverine Bioregions (BC Act Box Gum Woodland)

3.7.1.1. BC Act Inland Grey Box Woodland TEC

Assessment of the final determination for Inland Grey Box Woodland identified that this TEC occurs in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions only. The final determination identified that similar TECs occur in the Sydney Basin Bioregion – including Box Gum Woodland.

The majority of occurrences of *E. microcarpa* within the study area are within PCT 267, and occur on low lying areas in the southern portion of the study area (particularly along the alternate access route to the Girragulang road cluster), and are mostly located within the Sydney Basin Bioregion. This occurrence is outside of the spatial extent of the TEC identified in the Final Determination. There is a small portion of this TEC identified within the Brigalow Belt South Bioregion, present as scattered paddock trees in PCT267.

As such this TEC has been identified within the study area and the extent is shown on Figure 18.

3.7.1.2. BC Act Box Gum Woodland TEC

Assessment for the final determination for Box Gum Woodland identified that this TEC occurs in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverine Bioregions. As such all regions of the study area are considered for this TEC.

Grassy Woodland PCTs that contain an appropriate assemblage of species for this TEC, that also occur in the study area includes PCT 281 and 483. In this assessment, intergrades between *E. albens* and *E. mollucana* that are prevalent throughout PCT483 are considered to be included within this TEC. PCT281 is a *E. melliodora* dominated grassy woodland, and is also consistent with the Box Gum Woodland TEC. There is no minimum threshold for the condition state of this TEC, and so areas of low condition grassland are also included in this TEC.

Based on the species present within each PCT, all occurrence of PCTs 281 and 483 in good, moderate, and low condition are consistent with Box Gum Woodland.

Where areas of PCT483 have been mapped as Poor condition, these areas do not confirm to the Final Determination for Box Gum Woodland. This vegetation zone (483 Poor) is generally dominated by exotic pasture grasses such as *Lolium perenne*, *Hoardeum* sp, and *Eragrostis curvula*, and is prone to dominating plumes of *Silibum marianum*. This vegetation zone generally has an exotic cover >90%. Native cover within this zone is limited to only hardy natives such as Austrostipa verticillate and Austrostipa aristiglumis at very low cover. Given the persistent rain and favourable conditions experienced since 2021, the lack of recovery confirms the level of degradation in this zone.

PCT483 Poor does not align to the following descriptions provided within the Final Determination:

- Section 4.2: *"The groundcover is dominated by perennial tussock grasses interspersed with a diverse range of forb species with the families Asteraceae and Fabaceae, and the orders Liliales and Asparagales well represented (Prober et al. 2017)."*
- Section 4.7: *"Grassland across its geographical range, particularly following periods of good rainfall. With the removal of canopy trees, access to additional light, nutrients and soil water allows increased abundance of some species over others, such that grassland areas may be dominated by only a few of the characteristic species."*

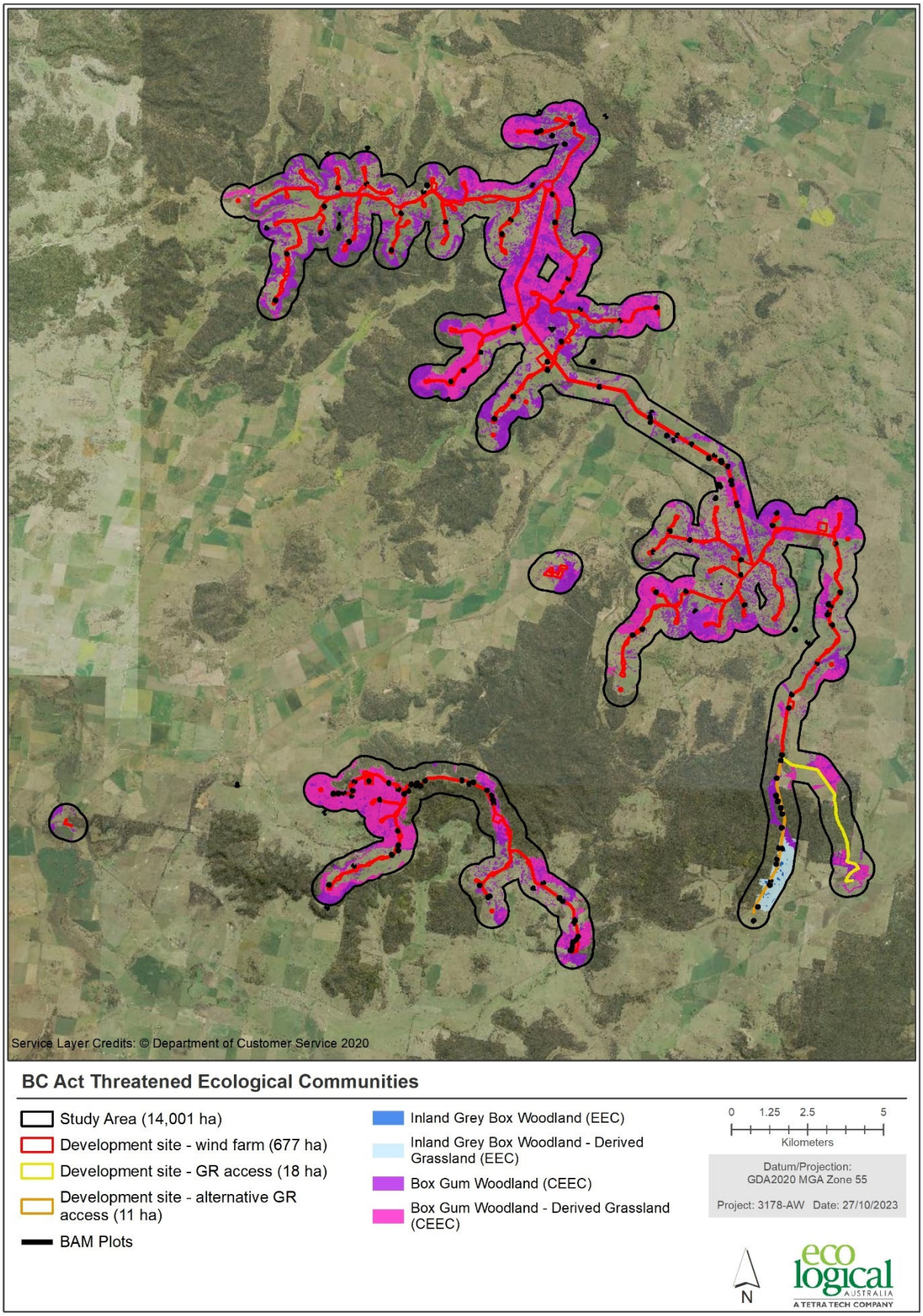


Figure 18 BC Act Threatened Ecological Communities

3.7.2. EPBC Act TECs

To determine a list of candidate TECs under the EPBC Act, assessment of the Listing Criteria was undertaken for two potential TECs within the study area:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (EPBC Act Inland Grey Box Woodland)
- White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands (EPBC Act Box Gum Woodland)

3.7.2.1. EPBC Act Inland Grey Box Woodland TEC

The guide to identifying *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia* (Commonwealth of Australia), identifies that this TEC occurs in the Brigalow Belt South, Darling Riverine Plain, NSW South Western Slopes, Cobar Peneplain and Riverina bioregions within NSW, as identified in the map below (Figure 19).

All areas of PCT267 have been identified as aligning to the Inland Grey Box Woodland EEC under the EPBC Act.



Figure 19 EPBC Act Inland Grey Box Woodland extent (Commonwealth of Australia, 2012)

3.7.2.2. EPBC Act Box Gum Woodland

EPBC Act Box Gum Woodland occurs across wide range of bioregions (Figure 20), of which includes the entire study area.



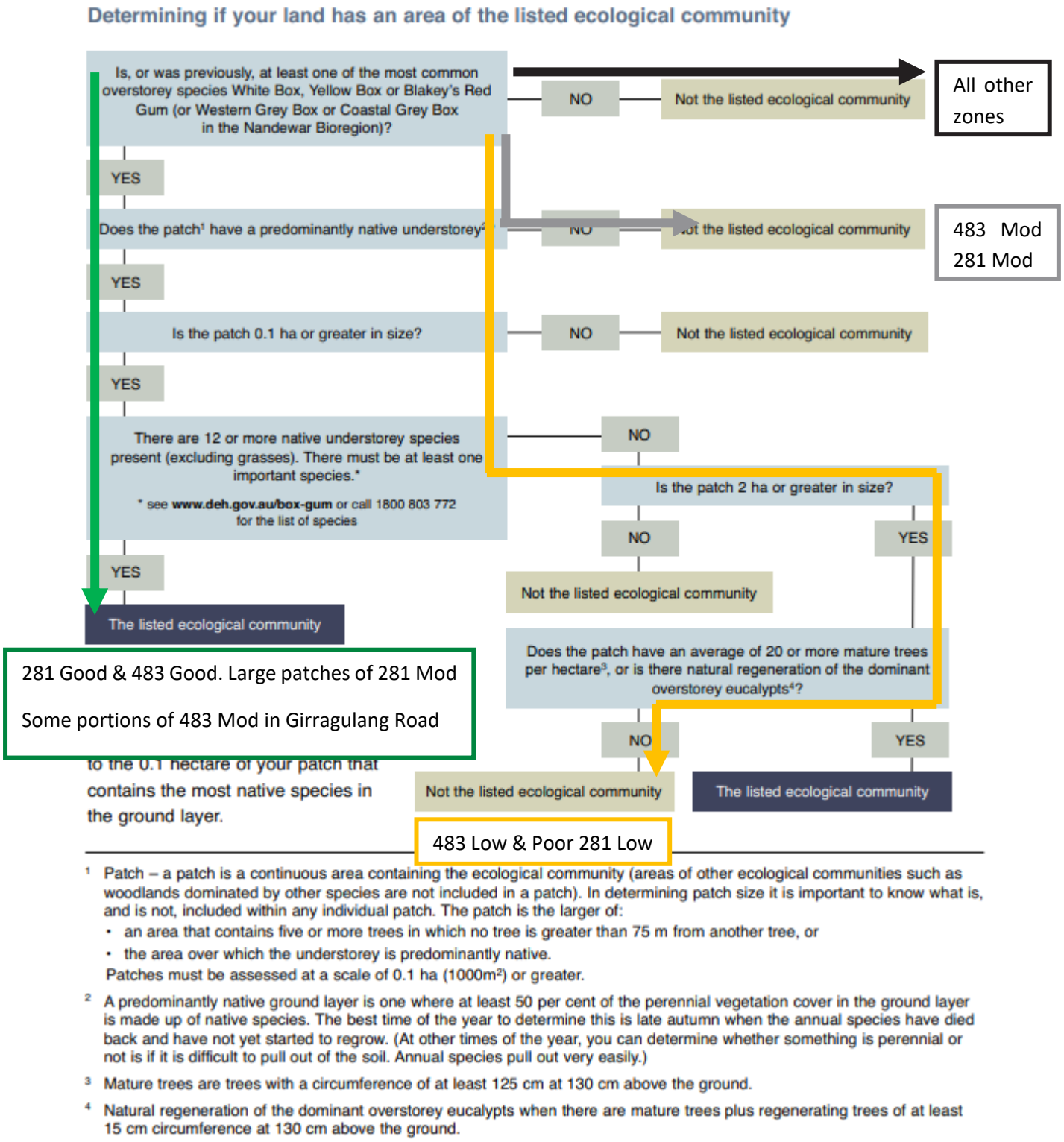
Figure 20 EPBC Act Box Gum Woodland range (Commonwealth of Australia, 2006)

An assessment of the species composition and patch size was undertaken using floristic data collected at BAM Plot locations. The assessment followed the flowchart below (Figure 21), and the findings of all plot assessments is provided in Appendix G. For the assessment of groundcover, the perennial ground layer was calculated as a percentage of living material being perennial and native/exotic. The number of non-grass species was then calculated for those plots that contained a perennial groundcover. The findings of the assessment are detailed in Appendix G.

Of the 152 data plot locations, 11 were identified as containing the listed ecological community. Based on the assessment, all occurrences of 281 (in good condition), 483 (in good condition), larger patches of 281 (in moderate condition), and portions of 483 (in moderate condition) connected to those patches described above, are the EPBC Act CEEC. Where an individual patch was not assessed, but within reasonable proximity to data that confirmed the CEEC, a precautionary approach was taken and the CEEC was mapped.

This methodology was only applied to those patches that intersected the development site.

A total of 43.59 ha of Box Gum Woodland CEEC, listed under the EPBC Act, is present in the development site.



[1] Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:

- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m²) or greater.

[2] A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

[3] Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

[4] Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

Figure 21 EPBC Act Box Gum Woodland decision criteria (Commonwealth of Australia, 2006)

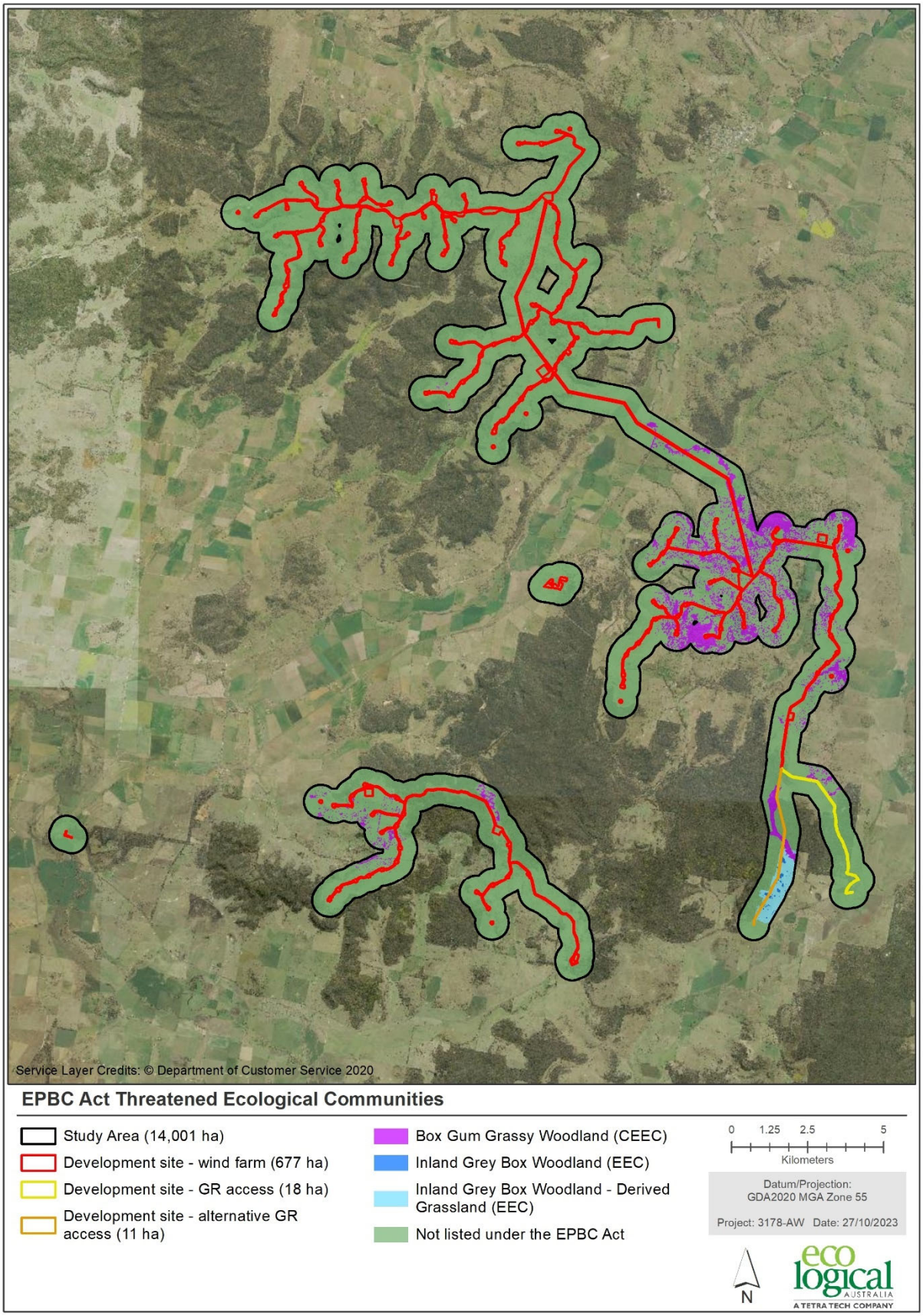


Figure 22 EPBC Act TECs

3.7.3. TEC summary

Based on the assessment of each PCT/Vegetation community, the following TECs have been identified in the study area:

Table 11 TEC summary

PCT Number	PCT Name	BC Act	EPBC Act
42	River Red Gum / River Oak riparian woodland wetland in the Hunter Valley	Not listed	Not listed
84	River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Not listed	Not listed
267	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Inland Grey Box Woodland (EEC)	Inland Grey Box Woodland (EEC)
281	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Box Gum Woodland (CEEC)	Box Gum Woodland (CEEC) - portions thereof
461	Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion	Not listed	Not listed
478	Red Ironbark - Black Cypress Pine - stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong - Mendooran region, southern Brigalow Belt South Bioregion	Not listed	Not listed
479	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not listed	Not listed
483	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Box Gum Woodland (CEEC)	Box Gum Woodland (CEEC) - portions thereof
616	Grey Myrtle - Rusty Fig dry rainforest in sandstone gorges of the upper Hunter Valley, mainly Sydney Basin Bioregion	Not listed	Not listed

3.8. Vegetation integrity assessment

3.8.1. Vegetation zones

A total of 17 vegetation zones were identified on the development site based on the broad condition state of each PCT. A total of 152 vegetation integrity survey plots were collected on the development site consistent with the BAM (Table 12). Vegetation plots have not been replicated across zones within a given IBRA subregion. Where multiple stages of the project occur in a single IBRA subregion, plot data for a single vegetation zones has been duplicated within the IBRA subregion and vegetation zone. Where no data was available for a zone, within a subregion, replacement floristic plots have been assumed at benchmark, subject to further investigation.

Descriptions of vegetation zones are provided in Appendix F and a summary of the area of each vegetation zone impacted is shown in Table 12 below. Details of all floristic and vegetation integrity data are provided in Appendix E and Appendix E.

In this revised report, all areas previously mapped as Category-1 Land are now mapped as PCT483 Poor condition. This vegetation zone has been assessed using the BAM, and VI Plots have been collected at the appropriate frequency. It is noted that the sole purpose of including this as a separate vegetation zone is to demonstrate the degraded nature of this zone and that this zone is not consistent with the Final Determination of Box Gum Woodland.

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Table 12: Vegetation zones and vegetation integrity survey plots collected

Vegetation zone	PCT Name	Condition	IBRA Subregion	IBRA Region	Area ha	Plots required	Number of plots collected	Plots collected
01 84 M	River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Moderate	Pilliga	Brigalow Belt South	1.14	1	2	Plot 24, 30
02 267 M	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Moderate	Pilliga	Brigalow Belt South	0.30	1	1	Plot 51
02 267 M	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Moderate	Kerrabee	Sydney Basin	0.45	1	1	Plot 42
03 267 L	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Low	Pilliga	Brigalow Belt South	1.40	1	2	Plot 149, 150
03 267 L	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Low	Kerrabee	Sydney Basin	2.34	2	3	Plot 34, 44, 52
04 281 G	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Good	Liverpool Range	Brigalow Belt South	0.11	1	1	Plot 141
04 281 G	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Good	Pilliga	Brigalow Belt South	0.55	1	3	Plot 21, 38, 39
05 281 M	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Moderate	Kerrabee	Sydney Basin	2.51	2	5	Plot 78, 79, 80, 112, 113
05 281 M	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Moderate	Liverpool Range	Brigalow Belt South	4.16	2	3	Plot 25, 31, 114
05 281 M	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Moderate	Pilliga	Brigalow Belt South	5.67	3	3	Plot 26, 29, 32
06 281 L	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Low	Pilliga	Brigalow Belt South	0.21	1	0	BM
06 281 L	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Low	Kerrabee	Sydney Basin	3.73	2	4	Plot 45, 62, 63, 64
10 479 B	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Burned	Kerrabee	Sydney Basin	5.14	3	2	Plot 1, 49, BM
10 479 B	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Burned	Inland Slopes	NSW South Western Slopes	0.92	1	0	BM
10 479 B	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Burned	Pilliga	Brigalow Belt South	8.25	3	2	Plot 151, 152, BM
11 479 M	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Moderate	Inland Slopes	NSW South Western Slopes	0.35	1	2	Plot 19, 121

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Vegetation zone	PCT Name	Condition	IBRA Subregion	IBRA Region	Area ha	Plots required	Number of plots collected	Plots collected
11 479 M	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Moderate	Pilliga	Brigalow Belt South	4.03	2	5	Plot 40, 41, 47, 53, 61
12 479 Reg	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Regenerating	Inland Slopes	NSW South Western Slopes	2.20	2	2	Plot 33, 34
12 479 Reg	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Regenerating	Kerrabee	Sydney Basin	3.50	2	2	Plot 25, 36
13 479 L	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Low	Liverpool Range	Brigalow Belt South	1.87	1	1	Plot 56
13 479 L	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Low	Pilliga	Brigalow Belt South	2.32	2	2	Plot 54, 57
14 483 G	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Good	Pilliga	Brigalow Belt South	0.22	1	2	Plot 23, 27
15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	Inland Slopes	NSW South Western Slopes	1.09	1	1	Plot 125
15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	Pilliga	Brigalow Belt South	67.73	5	15	Plot 15, 16, 17, 18, 46, 69, 81, 85, 90, 91, 101, 102, 114, 145, 148
15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	Kerrabee	Sydney Basin	7.97	3	5	Plot 6, 7, 76, 108, 109
15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	Liverpool Range	Brigalow Belt South	29.09	4	9	Plot 10, 11, 12, 13, 14, 99, 137, 143, 147
16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Low	Inland Slopes	NSW South Western Slopes	20.87	4	9	Plot 50, 119, 123, 124, 126, 127, 128, 129, 130
16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Low	Liverpool Range	Brigalow Belt South	24.00	4	6	Plot 71, 75, 95, 97, 98, 146
16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Low	Kerrabee	Sydney Basin	30.22	4	8	Plot 4, 60, 106, 107, 110, 111, 120, 122
16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	Pilliga	Brigalow Belt South	79.90	5	8	Plot 22, 28, 70, 88, 89, 92, 93, 94
17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	Talbragar Valley	Brigalow Belt South	0.47	1	0	Added 0.47 ha to Pilliga subregion
17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	Inland Slopes	NSW South Western Slopes	0.85	1	0	BM
17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	Kerrabee	Sydney Basin	28.67	4	5	Plot 02, 03, 05, 59, 77
17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	Liverpool Range	Brigalow Belt South	90.27	5	10	Plot 09, 72, 73, 74, 132, 135, 136, 138, 139, 140
17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	Pilliga	Brigalow Belt South	208.31	6	19	Plot 65, 66, 67, 68, 82, 83, 84, 85, 87, 100, 103, 104, 115, 116, 117, 118, 133, 134, 142
Sub total native vegetation					**640.79**	**83**	**143**	**Note – 9 plots not required**

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3.8.2. Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. Patch size was assigned to one of four classes (<5 ha, 5-24 ha, 25-100 ha or ≥100 ha). A patch size 101 ha was determined for the development site.

3.8.3. Assessing vegetation integrity

A vegetation integrity assessment using the BAM Calculator (BAMC) was undertaken. The project is to be developed in six stages, and so each stage has been entered into the BAMC separately. Similarly, within a project stage, a separate BAMC has been generated for each IBRA subregion. A total of 11 BAMC child cases are now included in this assessment:

- Workers camp – Pilliga subregion: 40555
- GR Access via Moorfield Rd – Pilliga subregion: 21962
- GR Access via Moorfield Rd – Kerrabee subregion 40556
- GR Alternative Access – Pilliga subregion: 40557
- GR Alternative Access – Pilliga subregion: 40560
- GR Cluster – Pilliga subregion: 40564
- GR Cluster – Liverpool Range subregion: 39289
- LV Cluster – Inland Slopes subregion: 21960
- LV Cluster – Inland Slopes subregion: 21961
- MH Cluster – Pilliga subregion: 40568
- MH Cluster – Liverpool Range subregion: 40567

The areas for each vegetation zone in each calculation are shown on Table 13, and results of the vegetation integrity assessment is provided in Table 14.

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Table 13 Vegetation zone areas by IBRA subregion and project stage

IBRA Subregion	Zone	PCT Name	Condition	Intersection upgrade	Workers Camp	GR Access via Moorfield Road	GR alternative access	GR cluster	LV cluster	MH cluster	Total
Inland Slopes	10 479 B	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Burned	0.00	0.00	0.00	0.00	0.00	0.92	0.00	0.92
Inland Slopes	11 479 M	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Moderate	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.35
Inland Slopes	12 479 Reg	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Regenerating	0.00	0.00	0.00	0.00	0.00	2.20	0.00	2.20
Inland Slopes	15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	0.00	0.00	0.00	0.00	0.00	1.09	0.00	1.09
Inland Slopes	16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Low	0.00	0.00	0.00	0.00	0.00	20.87	0.00	20.87
Inland Slopes	17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.85
Kerrabee	02 267 M	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Moderate	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.45
Kerrabee	03 267 L	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Low	0.00	0.00	0.00	2.34	0.00	0.00	0.00	2.34
Kerrabee	05 281 M	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Moderate	0.00	0.00	1.27	0.00	0.00	1.24	0.00	2.51
Kerrabee	06 281 L	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Low	0.00	0.00	0.03	0.00	0.00	3.70	0.00	3.73
Kerrabee	10 479 B	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Burned	0.00	0.00	0.00	0.75	0.00	4.39	0.00	5.14
Kerrabee	12 479 Reg	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Regenerating	0.00	0.00	0.00	0.00	0.00	3.50	0.00	3.50
Kerrabee	15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	0.00	0.00	0.00	0.00	0.00	7.97	0.00	7.97
Kerrabee	16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Low	0.00	0.00	0.00	0.00	0.00	30.22	0.00	30.22
Kerrabee	17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	0.00	0.00	0.00	0.00	0.00	28.67	0.00	28.67
Liverpool Range	04 281 G	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Good	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.11

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IBRA Subregion	Zone	PCT Name	Condition	Intersection upgrade	Workers Camp	GR Access via Moorfield Road	GR alternative access	GR cluster	LV cluster	MH cluster	Total
Liverpool Range	05 281 M	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Moderate	0.00	0.00	0.00	0.00	3.90	0.00	0.25	4.16
Liverpool Range	13 479 L	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Low	0.00	0.00	0.00	0.00	1.87	0.00	0.00	1.87
Liverpool Range	15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	0.00	0.00	0.00	0.00	21.73	0.00	7.35	29.09
Liverpool Range	16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Low	0.00	0.00	0.00	0.00	18.43	0.00	5.57	24.00
Liverpool Range	17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	0.00	0.00	0.00	0.00	80.64	0.00	9.63	90.27
Pilliga	01 84 M	River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Moderate	0.00	0.00	0.00	0.00	1.04	0.00	0.10	1.14
Pilliga	02 267 M	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Moderate	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.30
Pilliga	03 267 L	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Low	0.00	0.00	0.00	1.40	0.00	0.00	0.00	1.40
Pilliga	04 281 G	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Good	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.55
Pilliga	05 281 M	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Moderate	0.00	0.01	1.53	0.00	1.64	0.00	2.49	5.67
Pilliga	06 281 L	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Low	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.21
Pilliga	10 479 B	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Burned	0.00	0.00	5.09	3.00	0.15	0.00	0.00	8.25
Pilliga	11 479 M	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Moderate	0.00	0.00	0.84	0.44	0.94	0.00	1.80	4.03
Pilliga	13 479 L	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Low	0.00	0.00	0.00	0.00	2.32	0.00	0.00	2.32
Pilliga	14 483 G	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Good	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.22
Pilliga	15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Moderate	0.00	0.00	0.95	0.00	5.01	0.00	61.77	67.73
Pilliga	16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Low	0.00	0.00	2.43	0.12	1.68	0.00	75.67	79.90

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IBRA Subregion	Zone	PCT Name	Condition	Intersection upgrade	Workers Camp	GR Access via Moorfield Road	GR alternative access	GR cluster	LV cluster	MH cluster	Total
Pilliga	17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	0.00	6.87	0.56	0.00	31.17	0.00	169.25	207.85
Talbragar Valley	17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Poor	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.47
Total native vegetation				**0.00**	**6.87**	**12.91**	**9.35**	**170.86**	**105.97**	**334.36**	**640.32**

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Table 14: Vegetation integrity scores

Stage	BAMC Case	Vegetation Zone	Subregion	Composition	Structure	Function	VI Score
Excluded (Workers Camp)	40555	17 483 P	Pilliga	6.8	2.3	13.7	6
GR Access via Moorfield Road (public road upgrade)	21962	05 281 M	Pilliga	71.3	91.1	75.2	78.8
GR Access via Moorfield Road (public road upgrade)	21962	06 281 L	Pilliga	100	100	100	100
GR Access via Moorfield Road (public road upgrade)	21962	10 479 B	Pilliga	88	43.2	44.3	55.2
GR Access via Moorfield Road (public road upgrade)	21962	11 479 M	Pilliga	66.4	46.1	96.7	66.7
GR Access via Moorfield Road (public road upgrade)	21962	15 483 M	Pilliga	23.4	30.1	49.7	32.7
GR Access via Moorfield Road (public road upgrade)	21962	16 483 L	Pilliga	24.6	62.8	15	28.5
GR Access via Moorfield Road (public road upgrade)	21962	17 483 P	Pilliga	5.8	2.1	15	5.7
GR Access via Moorfield Road (public road upgrade)	40556	05 281 M	Kerrabee	15.9	68.1	45.6	36.6
GR Access via Moorfield Road (public road upgrade)	40556	06 281 L	Kerrabee	23.9	57	5.1	19.1
GR alternative access	40557	02 267 M	Pilliga	36.9	46.5	47.1	43.3
GR alternative access	40557	03 267 L	Pilliga	38.9	60.6	23.9	38.3
GR alternative access	40557	04 281 G	Pilliga	85.1	68.1	85.4	79.1
GR alternative access	40557	10 479 B	Pilliga	88	43.2	44.3	55.2
GR alternative access	40557	11 479 M	Pilliga	66.4	46.1	96.7	66.7
GR alternative access	40557	16 483 L	Pilliga	28.9	60.8	14.7	29.6
GR alternative access	40560	02 267 M	Kerrabee	72.8	69	74.2	72
GR alternative access	40560	03 267 L	Kerrabee	16.4	58.9	13.7	23.6
GR alternative access	40560	10 479 B	Kerrabee	70	21.9	35.1	37.7
GR cluster	39289	04 281 G	Liverpool Range	20.5	52.3	51.6	38.1
GR cluster	39289	05 281 M	Liverpool Range	86.7	88.1	40.1	67.4
GR cluster	39289	13 479 L	Liverpool Range	11.4	7.6	6	8

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Stage	BAMC Case	Vegetation Zone	Subregion	Composition	Structure	Function	VI Score
GR cluster	39289	15 483 M	Liverpool Range	28.7	25.8	21.9	25.3
GR cluster	39289	16 483 L	Liverpool Range	26.4	49.7	15	27
GR cluster	39289	17 483 P	Liverpool Range	14.1	8.5	4	7.8
GR cluster	40564	01 84 M	Pilliga	12.1	33.8	49.6	27.3
GR cluster	40564	05 281 M	Pilliga	71.3	91.1	75.2	78.8
GR cluster	40564	10 479 B	Pilliga	88	43.2	44.3	55.2
GR cluster	40564	11 479 M	Pilliga	66.4	46.1	96.7	66.7
GR cluster	40564	13 479 L	Pilliga	24.3	13.1	5.8	12.3
GR cluster	40564	14 483 G	Pilliga	66	91.6	57.4	70.3
GR cluster	40564	15 483 M	Pilliga	27.6	31.4	46.7	34.3
GR cluster	40564	16 483 L	Pilliga	28.9	60.8	14.7	29.6
GR cluster	40564	17 483 P	Pilliga	6.8	2.3	13.7	6
LV cluster	21960	05 281 M	Kerrabee	13.5	68.9	45.6	34.8
LV cluster	21960	06 281 L	Kerrabee	21.5	58.1	5.1	18.5
LV cluster	21960	10 479 B	Kerrabee	64.7	21	35.1	36.2
LV cluster	21960	12 479 Reg	Kerrabee	33.7	18	2.1	10.8
LV cluster	21960	15 483 M	Kerrabee	56.6	77.2	40.1	56
LV cluster	21960	16 483 L	Kerrabee	30.7	57.4	14.8	29.6
LV cluster	21960	17 483 P	Kerrabee	15.4	3.7	8.9	8
LV cluster	21961	10 479 B	Inland Slopes	100	100	100	100
LV cluster	21961	11 479 M	Inland Slopes	91.8	60.2	87.8	78.6
LV cluster	21961	12 479 Reg	Inland Slopes	54.4	26.7	26.8	33.9
LV cluster	21961	15 483 M	Inland Slopes	38.6	60.9	20.1	36.1

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Stage	BAMC Case	Vegetation Zone	Subregion	Composition	Structure	Function	VI Score
LV cluster	21961	16 483 L	Inland Slopes	72.5	65.8	15.3	41.8
LV cluster	21961	17 483 P	Inland Slopes	100	100	100	100
MH cluster	40567	05 281 M	Liverpool Range	86.7	88.1	40.1	67.4
MH cluster	40567	15 483 M	Liverpool Range	28.7	25.8	21.9	25.3
MH cluster	40567	16 483 L	Liverpool Range	26.4	49.7	15	27
MH cluster	40567	17 483 P	Liverpool Range	14.1	8.5	4	7.8
MH cluster	40568	01 84 M	Pilliga	12.1	33.8	49.6	27.3
MH cluster	40568	05 281 M	Pilliga	71.3	91.1	75.2	78.8
MH cluster	40568	11 479 M	Pilliga	66.4	46.1	96.7	66.7
MH cluster	40568	15 483 M	Pilliga	27.6	31.4	46.7	34.3
MH cluster	40568	16 483 L	Pilliga	28.9	60.8	14.7	29.6
MH cluster	40568	17 483 P	Pilliga	6.8	2.3	13.7	6

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3.9. Use of local data and calculation notes

No local data has been used to modify benchmarks in this assessment.

Separate calculations have been provided for each IBRA subregion and each project stage within each subregion.

No modifications to benchmark data were made.

Whereby a vegetation zone was short a BAM plot, benchmark data was used to populate the data.

4. Threatened species

The following threatened species assessment was generally completed prior to submission of the initial BDAR for the project. Assessor update 36 – item 4 describes the application of new or revised survey guidelines:

> *"Where survey has been completed prior to the publication of a survey guide, the Department expects the assessor (or surveyor) to have applied current best-practice in searching for the target species (in accordance with BAM s6.5.1.4). Assessors can use information from other published, peer-reviewed sources to guide survey technique and effort, but this must be clearly documented and justified in the BAR as well as indicating how this differs from our recently published guide."*

As such any guideline published on or after January 2022 may not have been considered in this assessment.

4.1. Ecosystem credit species

Ecosystem credit species predicted to occur within the development site are generated by the BAMC following the input of VI data and the PCTs identified within Chapter 3. No predicted species have been removed from the assessment.

Ecosystem credit species predicted to occur at the development site, their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Appendix H.

4.2. Species credit species

4.2.1. Step 1 Identify threatened species for assessment.

Species credit species that require further assessment on the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Appendix I.

In negotiation with BCS, the following species have been removed from all relevant assessments:

- *Delma impar* is removed, as the geographic constraint 'south of the Great Western Highway occurs across the entire development site; and
- Brush-tailed Phascogale, as the agreed distribution did not apply to the location of the development site.

All other species were carried further to the habitat assessment.

4.2.2. Step 2: Assess the habitat constraints and vagrant species on the subject land

Habitat assessment was undertaken across the study area to determine the types of threatened species habitats that may be present and require assessment. The habitat assessment used multiple sources and lines of evidence drawn from:

- Habitat assessment points across the wind farm

- Hollow-bearing tree survey
- Floristic data (Section 3.4) within each vegetation zone
- Desktop and ground-truthed cliffline mapping
- Important area mapping

Methods and results for each information source are provided below.

4.2.2.1. Habitat assessment

Within the study area, habitat assessment was undertaken within each vegetation zone and identified:

- Vegetation condition (high, medium, or low)
- Vegetation formation
- Evidence of stock disturbance (yes/no)
- Evidence of feral animal disturbance (yes/no)
- Evidence of human disturbance (yes/no)
- Evidence of erosion (yes/no)
- Fire history
- Description of fruit or nectar resources
- Water resource (dam, drainage line, lake, ponding, pool, river, other)

The results of the habitat assessment are summarised below in Table 15.

Table 15 Fauna habitats within each vegetation zone

Vegetation Zone	Condition	Formation	Disturbance					Resources		
			Stock	Feral animal	Humans	Erosion	Fire	Fruit/nectar	Water	Notes
01 84 M	Moderate	Forested Wetlands	Cattle grazing	Feral pigs	Slashed, firewood collection, nutrient enhancement, cropping.	None identified	No evidence of fire	Mistletoe on Casuarina. Shrub layer absent.	No permanent water present	Isolated paddock trees along drainage with exotic understorey. Limited fauna habitats.
02 267 M	Moderate	Grassy Woodlands	Sheep and cattle grazing	Feral pigs	Slashed, firewood collection, nutrient enhancement, cropping.	None identified	Limited evidence of fire from 2017	Flowering *E. macrocarpa*. No shrub layer.	None present	Isolated paddock trees in predominately exotic paddock. Poor fauna habitats.
03 267 L	Low	Poor condition native/exotic grassland	Sheep and cattle grazing	Feral pigs	Slashed, firewood collection, nutrient enhancement, cropping.	None identified	No evidence of fire	None present	Dams in paddocks	Absence of resource and frequent disturbance. Little to no fauna habitat value.
04 281 G	Good	Grassy Woodlands	--	Feral pigs and goats.	Firewood collection	None identified	Limited evidence of fire from 2017	Flowering *E. melliodora* & *A. floribunda*, mistletoe, established shrub layer.	Ponded water along unnamed 2nd order stream	Established canopy and shrub layer with intermittent water present. Highest quality habitat identified within the development site.
05 281 M	Moderate	Grassy Woodlands	Cattle grazing	Feral pigs	Slashed, firewood collection, nutrient enhancement..	None identified	Limited evidence of fire from 2017	Flowering *E. melliodora* & *A. floribunda*	Dams in paddocks	Isolated paddock trees in predominately exotic paddock. Poor fauna habitats.
06 281 L	Low	Poor condition native/exotic grassland	Sheep and cattle grazing	Feral pigs and goats	Slashed, firewood collection, nutrient enhancement, cropping.	None identified	No evidence of fire	None present	Dams in paddocks	Absence of resource and frequent disturbance. Little to no fauna habitat value.
07 461 B	Burnt	Grassy Woodlands	Sheep and cattle grazing	Goats	Firewood collection	None identified	Limited evidence of fire from 2017	Flowering *E. dealbata*	None present	Isolated paddock trees in predominately exotic paddock. Poor fauna habitats.
08 461 M	Moderate	Grassy Woodlands	--	--	Firewood Collection	None identified	None identified	Flowering E. dealbata	None present	Roadside vegetation near rest stop. Limited fauna habitats.
09 478 G	Good	Dry Sclerophyll Forests (Shrubby sub-formation)	--	Feral pigs and goats	Firewood collection	None identified	Limited evidence of fire from 2017	Flowering *E. crebra* & *E. sparsifolia*, established shrub layer.	None present	Established canopy and shrub layer. Moderate fauna habitat.
10 479 B	Burnt	Dry Sclerophyll Forests (Shrubby sub-formation)	--	Feral pigs and goats	Firewood collection	None identified	Extensive damage from fire in 2017	Canopy destroyed, excessively dense Acacia shrub layer	None present	Canopy destroyed and dead, with dense mid-storey. Poor fauna habitat due to acacia monoculture.
11 479 M	Moderate	Dry Sclerophyll Forests (Shrubby sub-formation)	Sheep and cattle grazing	Feral pigs and goats	Firewood collection	None identified	Limited evidence of fire from 2017 in Leadville and Girragulang Road clusters	Flowering *E. crebra*	None present	Isolated paddock trees in predominately exotic paddock. Poor fauna habitats.
12 479 Reg	Regenerating	Dry Sclerophyll Forests (Shrubby sub-formation)	--	Feral pigs and goats	Bulldozed prior to 1990, now regenerating shrub layer.	None identified	Extensive damage from fire in 2017	Canopy absent, excessively dense Acacia shrub layer	None present	Canopy removed, with dense mid-storey. Poor fauna habitat due to acacia monoculture.
13 483 G	Good	Grassy Woodlands	Sheep and cattle grazing	Feral pigs and goats	Slashed, firewood collection, nutrient enhancement, cropping.	None identified	Limited evidence of fire from 2017	*Flowering E. albemol* & *A. floribunda*. Shrub layer absent.	Dams in paddocks	Canopy trees with no shrub layer. Native ground layer. Moderate fauna habitat.
14 483 M	Moderate	Grassy Woodlands	Sheep and cattle grazing	Feral pigs and goats	Slashed, firewood collection, nutrient enhancement, cropping.	None identified	Limited evidence of fire from 2017 in Leadville and Girragulang Road clusters	Flowering *E. albemol* & *A. floribunda*. Shrub layer absent.	Dams in paddocks	Isolated paddock trees in predominately exotic paddock. Poor fauna habitats.
15 483 L	Low	Poor condition native/exotic grassland	Sheep and cattle grazing	Feral pigs and goats	Slashed periodically, firewood collection, nutrient enhancement, cropping.	None identified	No evidence of fire	None present	Dams in paddocks	Absence of resource and frequent disturbance. Little to no fauna habitat value.
16 483 P	Poor	Exotic dominated pasture.	Sheep and cattle grazing	Feral pigs and goats	Slashed periodically, firewood collection, nutrient enhancement, cropping.	None identified	No evidence of fire	None present	Dams in paddocks	Absence of resource and frequent disturbance. Little to no fauna habitat value.

Vegetation Zone	Condition	Formation	Disturbance					Resources		
			Stock	Feral animal	Humans	Erosion	Fire	Fruit/nectar	Water	Notes
17 616 M	Moderate	Rainforests	Sheep and cattle grazing	Feral pigs and goats	--.	None identified	No evidence of fire	Ficus rubiginosa	None present	Ficus islands on exposed sandstone. Poor fauna habitats.

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4.2.2.2. Hollow-bearing tree survey

This habitat assessment was also supplemented with a complete traverse of the accessible areas of subject land during winter and spring 2021 assessing for the presence of hollow-bearing trees. The hollow-bearing tree survey was intended to inform the creation of any species polygons that may be required for candidate species. At each potential hollow-bearing tree, the following information was captured:

- Tree species (or stag)
- Diameter at breast height (DBH)
- Number of hollows from 5 size classes (<50mm, 50-100mm, 100-200mm, 200-300mm, and >300mm)
- Notes

Trees that were suspected as only having small (<50mm) hollows have not been marked, as nearly all remnant trees have some form of hollow resource of this size.

Across the study area more than 745 hollow-bearing trees were marked and have been shown on Figure 23.

4.2.2.3. Cliffline mapping

Cliffline mapping was undertaken initially using LPI topographic data which identifies cliffline and cave features. This dataset was then reviewed through field inspections and any areas that contained additional clifflines were added to the spatial layer.

Generally, there are very few suitable cave features within the landscape for cave-roosting bats. The best examples of cliffline habitats are to the west of the Leadville Cluster (Photograph 30 and Photograph 31).



Photograph 30 Cliffline habitats west of Leadville cluster



Photograph 31 Cliffline habitats north of Leadville cluster

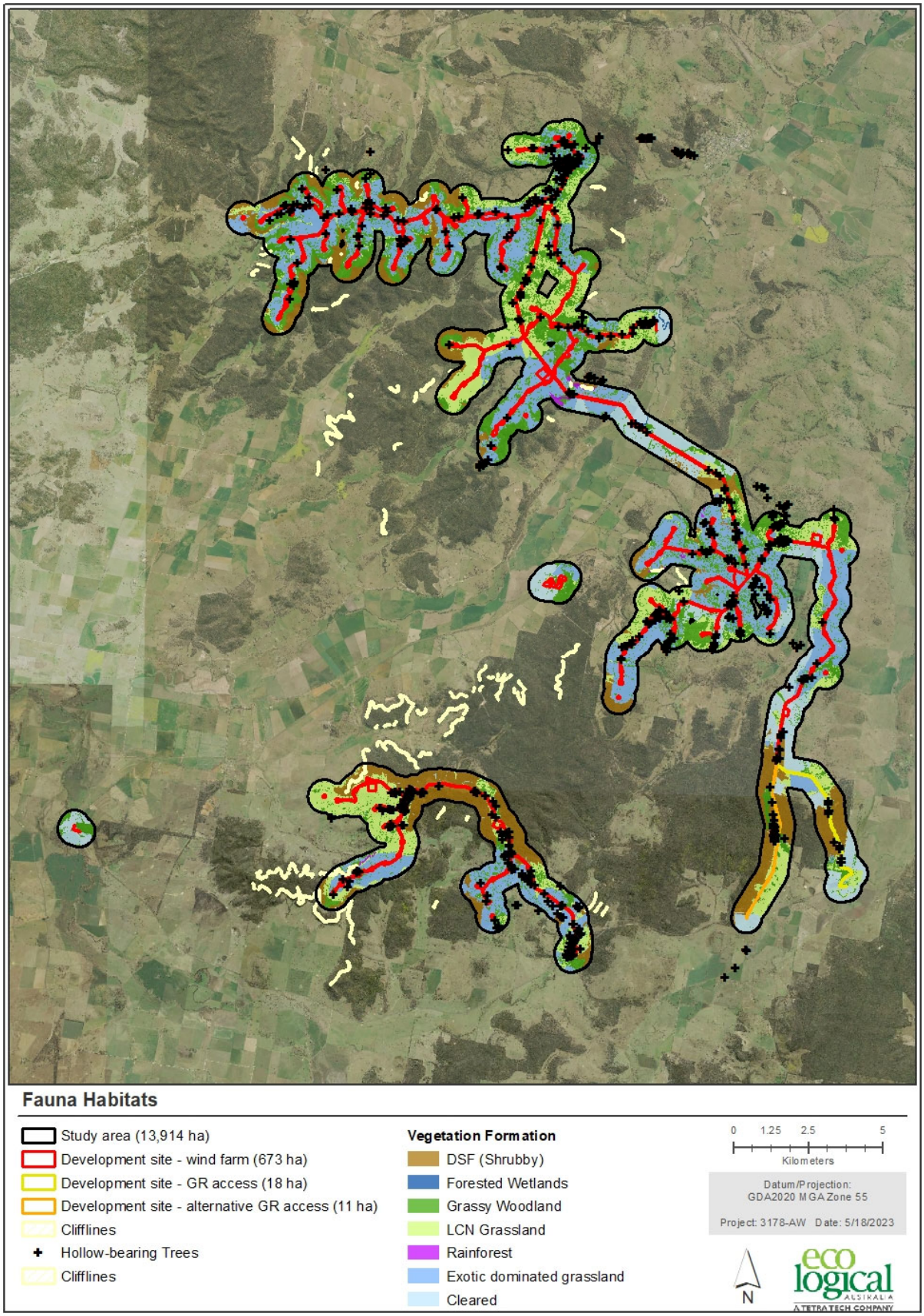


Figure 23 Fauna habitats

4.2.2.4. Important area mapping

Important area mapping was reviewed for two candidate threatened species which require assessment using this method: Regent Honeyeater and Swift Parrot. Important area mapping was reviewed through the BAMCC on 18 October 2021 for each species. Whilst these interfaces do not allow download of the entire spatial file for each species, it was determined that no areas of the study area would impact on any important area mapping for either Regent Honeyeater (Figure 24) or Swift Parrot (Figure 25).

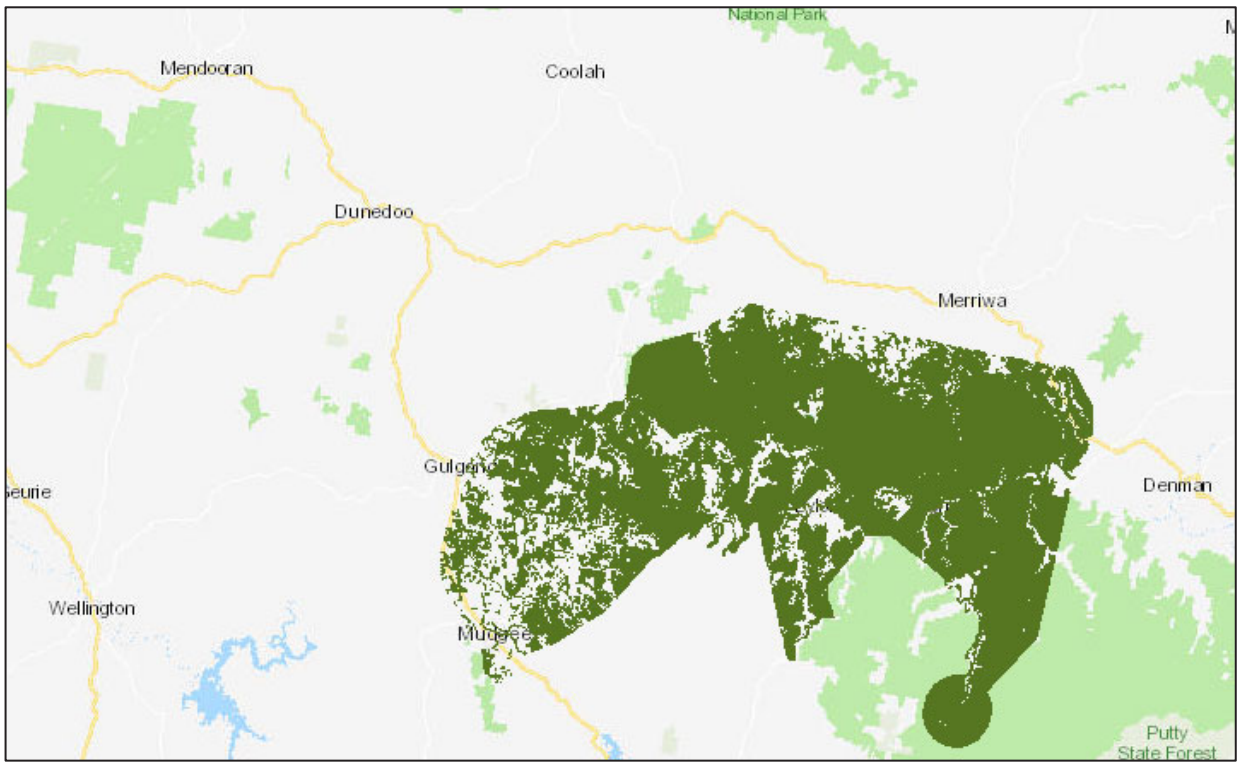


Figure 24 Regent Honeyeater important area mapping (dark green) nearest to the development site

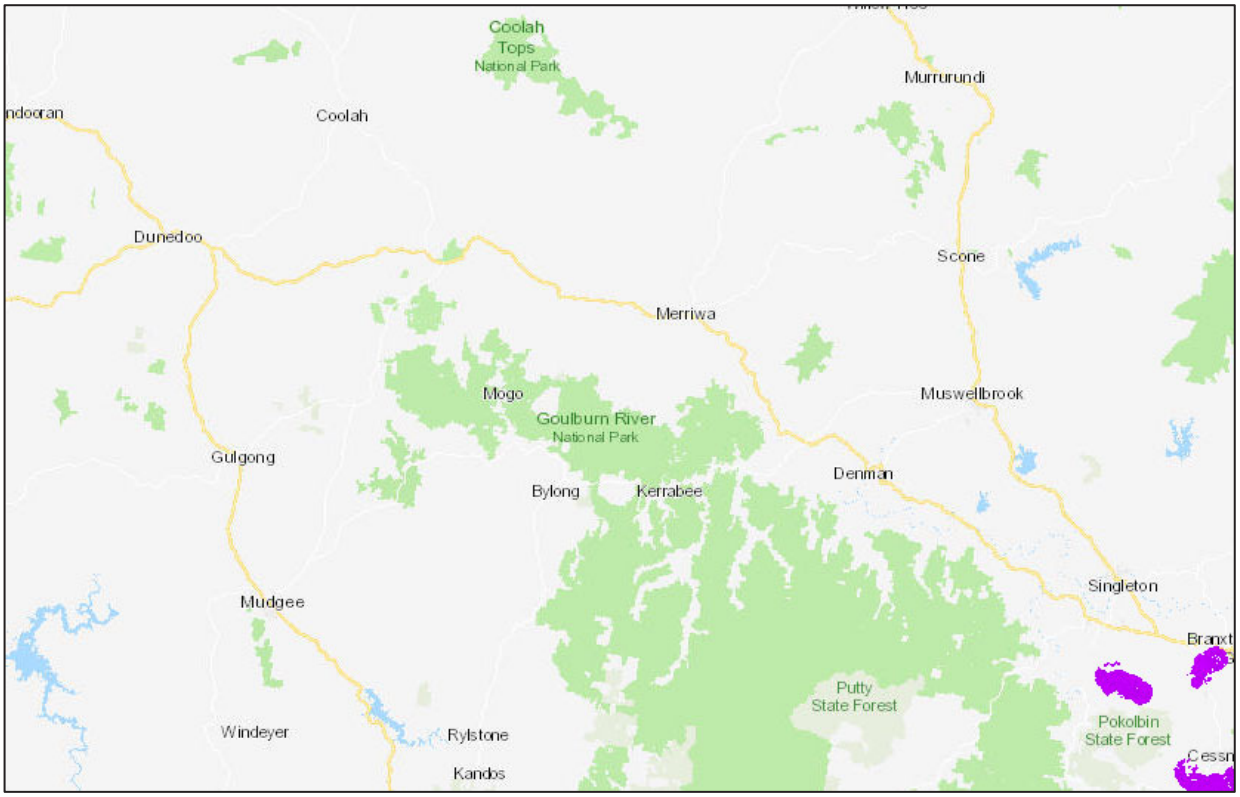


Figure 25 Swift Parrot important area mapping (purple) nearest to the development site

Based on the fauna habitat assessment, a further detailed assessment of suitability of habitats based on geographic and habitat constraints of each species in each bioregion. The condition and degradation of habitats (if applicable) was also applied at this stage to include/exclude candidate species. The assessment of species in each IBRA subregion, PCT, and their description, distribution, and threats is provided below in Table 16.

Table 16 Candidate species assessment (Brigalow Belt South Bioregion)

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
Acacia ausfeldii	Ausfeld's Wattle	Other Footslopes and low rises on sandstone	Yes						Yes			*Acacia ausfeldii* is an erect or spreading shrub 2 - 4 m high with branchlets angled or flattened, resinous and smooth. The phyllodes (leaves) are narrowly elliptic to linear-oblong, straight to slightly curved, 2 - 7 cm long, 2 - 5 mm wide, hairless and are dotted with resin glands. Acacia ausfeldii phyllodes have a prominent mid-vein and less pronounced lateral veins, they also have an obtuse apex with a short sharp tip. There is a small gland located near the base of the phyllode and the pulvinus is less than 2 mm long. Two or sometimes 3 flower clusters stemming from the leaf axil and the flower stalks are 4 - 9 mm long, hairy and enclosed by small oval shaped bracts. Flower heads are bright yellow and 6 - 8 mm in diameter. Seed pods are straight or slightly curved and 4 - 9 cm long by 2 - 4 mm wide.	Found to the east of Dubbo in the Mudgee-Ulan-Gulgong area of the NSW South Western Slopes bioregion, with some records in the adjoining Brigalow Belt South, South Eastern Highlands and the Sydney Basin bioregions. Populations are recorded from Yarrobil National Park, Goodiman State Conservation Area and there is a 1963 record from Munghorn Gap Nature Reserve. A large population is also known from Tuckland State Forest to the northwest of Gulgong.
Anthochaera phrygia	Regent Honeyeter	As per Important Habitat Map	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	The Regent Honeyeater is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. Adults weigh 35 - 50 grams, are 20 - 24 cm long and have a wings-pan of 30 cm. Its head, neck, throat, upper breast and bill are black and the back and lower breast are pale lemon in colour with a black scalloped pattern. Its flight and tail feathers are edged with bright yellow. There is a characteristic patch of dark pink or cream-coloured facial-skin around the eye. Sexes are similar, though males are larger, darker and have larger patch of bare facial-skin. The call is a soft metallic bell-like song; birds are most vocal in non-breeding season. It has recently been placed in the genus Anthochaera along with the wattlebirds, and was formerly known by the name Xanthomyza phrygia.	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.
Aprasia parapulchella	Pink-tailed Legless Lizard	Or within 50m of rocky areas N/A|Rocky areas	Yes	Yes	Yes	Yes		Yes	Yes		Yes	The Pink-tailed Legless Lizard (also known as the Pink-tailed Worm-lizard) is worm-like, with a dark-brown head and nape, gradually merging with the pale grey or grey-brown body. The tail, nearly as long as its body, is pink or reddish-brown towards the tip. Its snout and tail are both rounded. There are no external ear openings. The broad, non-forked tongue, frequently used to wipe the eyes, and the presence of small hind-limb flaps,	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory.

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
												distinguishes it from a juvenile snake. Specimens grow to about 25 cm in length.	
Burhinus grallarius	Bush Stone-curlew	Fallen/standing dead timber including logs	Yes		Yes	Yes		Yes	Yes			The Bush Stone-curlew stands about 55 cm tall. It has a grey to light brown back, marked with black blotches, and a streaked rump. It has buff and white underparts with dark streaks, and a black band that runs from near its eye down its neck. This species has large, bright yellow eyes and a hunch-shouldered stance on long spindly legs. When disturbed it lies flat on the ground, with its head and neck outstretched. Its call is a loud eerie wailing "wee-loo", mostly heard at night.	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range.
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	Hollow bearing trees Eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger	Yes				Yes		Yes			Gang-gang Cockatoos are one of the more distinctive and charismatic members of Australia's avifauna. These birds are primarily slate-grey, with the males easily identified by their scarlet head and wispy crest, while females have a grey head and crest and feathers edged with salmon pink on the underbelly. They range in length from 32 to 37 cm, with a wingspan of 62 to 76 cm. The call has been likened to a creaking gate or cork being pulled from a bottle.	The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee.
Chalinolobus dwyeri	Large-eared Pied Bat	Cliffs Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels	Yes		Yes	Yes		Yes	Yes			A small to medium-sized bat with long, prominent ears and glossy black fur. The lower body has broad white fringes running under the wings and tail-membrane, meeting in a V-shape in the pubic area. This species is one of the wattled bats, with small lobes of skin between the ears and corner of the mouth.	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes.
Commersonia procumbens	Commersonia procumbens	Other Piliga sandstone	Yes		Yes					Yes		Prostrate shrub with slender trailing stems to 30 cm long. Plants covered with star-shaped hairs on all parts. Leaves rounded to lance-shaped, 2-5 cm long, 15-25 mm wide, with wavy or lobed margins, upper surface green and sprinkled with star-shaped hairs, lower surface densely white-hairy. Petals about 2 mm long, pinkish. Fruit capsule 6-8 mm in diameter, covered with both star-shaped hairs and bristles.	Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also known in the Pilliga, Mount Kaputar National Park, north east of Gulgong and near Denmen. Additional populations have been found in Goonoo SCA in response fires.
Delma impar	Striped Legless Lizard		Yes	Yes		Yes					Yes	The Striped Legless Lizard differs most obviously from a snake in having external ear openings, small scaly flaps for hind limbs, a long tail and a broad, undivided tongue. It is pale grey-brown above, with a darker head, and almost white below. The most distinguishing characteristic is a pattern of light and dark parallel lines running along the	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia.

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
												length of the body, although these may be very pale or even absent in some individuals. This parallel stripe pattern breaks up into a diagonal pattern on the tail. They grow to about 30 cm in length, with up to three-quarters of this being the tail.	
Dichanthium setosum	Bluegrass			Yes	Yes	Yes			Yes		Yes	Bluegrass is an upright grass less than 1 m tall. It has mostly hairless leaves about 2-3 mm wide. The flowers are densely hairy and are clustered together along a stalk in a cylinder-shape. The flower-clusters grow in pairs at the end of an 8 cm-long stem and appear mostly during summer.	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending tonorthern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas.
Diuris tricolor	Pine Donkey Orchid											The Pine Donkey Orchid (formerly known as Diuris sheaffiana and >D. colemaniae is a terrestrial species (it grows from the ground rather than from rocks or vegetation). It has between one and three leaves, to 30 centimetres long and 4 mm wide. The flower stalk is between 20-40 cm high and has 2-6 flowers, which are bright yellow to orange, speckled with red to purple and white markings. The sepals (the down-pointing slender green segments) are very long and often crossed.	Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the north of NSW. Localities in the south include Red Hill north of Narrandera, Coolamon and several sites west of Wagga Wagga. Condobolin-Nymagee road, Wattamondara towards Cowra, Eugowra, Girilambone, Dubbo and Cooyal, in the Central West. Pilliga SCA,Pilliga National Park and Bibblewindi State Forest in the north (and extending into Queensland) and Muswellbrook in the east.
Goodenia macbarronii	Narrow Goodenia							Yes				This species was removed from the Schedules of the Threatened Species Act in July 2008 and is no longer listed as threatened in NSW. The reassessment was based on an absence of evidence for either past or future reductions, or continuing declines, and a larger population size than previously known. Narrow Goodenia is an annual or short-lived perennial herb to 30 cm tall. Its leaves, at the base of the plant, are fleshy and slightly toothed, to 11 cm long by 5 mm wide. The sprays of small yellow 'crinkly' five-petalled flowers are generally produced in spring and summer.	Narrow Goodenia grows on the western slopes of the Great Dividing Range in NSW, south from the Guyra and Inverell districts. It is widely distributed throughout the tablelands, western slopes and western plains. The species also occurs in north-eastern Victoria and the Darling Downs in Queensland. In NSW it has been recorded at Tingha, Guyra, the Warrumbungle Ranges, east of Rylstone, the Pilliga and Denobollie State Forests, the Narrabri, Coonabarabran, Torrington and Tocumwal districts, Grenfell, Weddin Mountain, Gungal, the Milthorpe district, and Holbrook (the Type locality).
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	Other Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	Yes	Yes	Yes	Yes			Yes			The White-bellied Sea-Eagle is a large eagle that has long broad wings and a short, wedge-shaped tail. It measures 75–85 cm in length, and has a wingspan of 180–220 cm. Adults are predominantly white and grey. The head, breast and belly, and the feathering on the legs, are white. The back and upper surfaces of the wings are grey, and the undersides are greyish-black with a	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways.

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
												smaller area of white along the leading edge. The tail is grey at the base, and has a white tip. The large, hooked bill is grey with a darker tip, and the eye is dark brown. The legs and feet are cream-white, with long black talons. Both sexes are similar in appearance but females are larger than the males. Juveniles are brown with lighter markings. White-bellied Sea-eagles may be solitary, or live in pairs or small family groups consisting of a pair of adults and dependent young.	
Hamirostra melanosternon	Black-breasted Buzzard (Breeding)	Waterbodies Land within 40 m of riparian woodland on inland watercourses/waterholes containing dead or dying eucalypts			Yes		Yes					The Black-breasted Buzzard is one of the larger Australian birds of prey, with a wingspan of up to 1.5 metres. The wings are noticeably long, relative to its body and its short square tail. In flight this species is also recognised by its black breast and the conspicuous white patches at the base of the black 'fingered' primaries. At rest, it has a reddish nape against the black face and back.	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts.
Hieraaetus morphnoides	Little Eagle (Breeding)	Other Nest trees - live (occassionally dead) large old trees within vegetation)	Yes		Yes	Yes	Yes		Yes			The Little Eagle is a medium-sized bird of prey that occurs in two colour forms: either pale brown with an obscure underwing pattern, or dark brown on the upper parts and pale underneath, with a rusty head and a distinctive underwing pattern of rufous leading edge, pale 'M' marking and black-barred wingtips. Both forms have a black-streaked head with a slight crest, a pale shoulder band on the upperwings, a rather short and square-tipped barred tail, and feathered legs.	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW.
Hoplocephalus bitorquatus	Pale-headed Snake				Yes		Yes					The Pale-headed Snake is a medium-sized (up to 90 cm long), largely tree-dwelling snake. The back, side and tail is a uniform light brown or grey with a white or cream band on the nape, bordered by a narrow blackish bar which may be solid, or broken in the middle. The top of the head is grey, and may have a series of black spots, which are most prominent along the edge of the white nape. The lips may have black vertical bars. The belly is creamy grey sometimes with darker flecks.	A patchy distribution from north-east Queensland to the north-eastern quarter of NSW. In NSW it has historically been recorded from as far west as Mungindi and Quambone on the Darling Riverine Plains, across the north west slopes, and from the north coast from Queensland to Sydney.; A small number of historical records are known for the New England Tablelands from Glenn Innes and Tenterfield; however, the majority of records appear to be from sites of relatively lower elevation. Although the Pale-headed snake distribution is very cryptic, it now appears to have contracted to a patchy and fragmented distribution.
Indigofera efoliata								Yes				Broom-like subshrub to 40 cm high, with a woody rootstock. The shrubs are erect and	Very rare and was presumed extinct with the last known collection made in 1955 with

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
												multi-stemmed, and older plants appear leafless with their naked leaf stems. When present, leaves are 1.5-3.5 cm long, composed of 5-9 rounded leaflets up to 4 mm long and 2 mm wide, which are only present at the base of the annual growth. Flowers pea-like and pink. Pod cylindrical, 20-25 mm long and sparsely hairy. Indigofera efoliata is also different to all other Australian species with which it could be confused in having a much shorter inflorescence (flower bearing system)(4-15 mm long).	three unvouchered reports from Goonoo State Forest in 1963. In spring 2021 the species was rediscovered near Geurie. Indigofera efoliata was only known only from a few collections in the Dubbo area. Known sites were located along the Dubbo to Minore railway line and road, on Wallaringa and Geurie properties and in Goonoo State Forest.
Lathamus discolor	Swift Parrot (Breeding)	As per Important Habitat Map	Yes		Yes	Yes			Yes			The Swift Parrot is small parrot about 25 cm long. It is bright green with red around the bill, throat and forehead. The red on its throat is edged with yellow. Its crown is blue-purple. There are bright red patches under the wings. One of most distinctive features from a distance is its long (12 cm), thin tail, which is dark red. This distinguishes it from the similar lorikeets, with which it often flies and feeds. Can also be recognised by its flute-like chirruping or metallic kik-kik-kik call.	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. You can help map Distribution and Habitat. Each year the Swift Parrot Recovery Team relies on the involvement of volunteers to identify areas the birds are visiting and what resources they are using. This information directly helps the recovery effort for this species. Surveys are conducted twice a year and aim to cover the migratory winter range of this species. Mainland surveys are held over one weekend in May and a weekend in August every year. Hearing of observations of Swift Parrots outside of the count weekends are also greatly appreciated. All information helps and the Recovery Team is also very interested to receive sighting information of these birds outside the survey dates. Surveys are run in combination with the Regent Honeyeater survey effort, another Endangered migratory woodland bird. Contact BirdLife Australia on 03 9347 0757 or freecall 1800 665 766 to find out more about participating in the mainland Swift Parrot surveys.
Lophochroa leadbeateri	Major Mitchell's Cockatoo (Breeding)				Yes	Yes						An unmistakable cockatoo of the dry inland, Major Mitchell's Cockatoo is the only Australian cockatoo that is salmon-pink below and white above. It is also called the Pink Cockatoo, and until recently was listed under the name of Cacatua leadbeateri. It is smaller than the Sulphur-crested Cockatoo, but slightly larger than a Galah. Its most prominent feature is its large white-tipped	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that.

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
												crest that is banded in red and gold. Its call is a distinctive stammering whinny.	
Lophoictinia isura	Square-tailed Kite (Breeding)	Other Nest trees	Yes		Yes		Yes		Yes			The Square-tailed Kite is a reddish, medium-sized, long-winged raptor, about the size of a Little Eagle or harrier. As with most raptors, there is sexual dimorphism in morphology with females being larger than males. Males weigh approximately 500 g while females weigh 650 g. The Square-tailed Kite has a length of 50-56 cm and wingspan of 130-145 cm. Adults have a white face with thick black streaks on the crown and finer streaks elsewhere. The saddle, rump and central upper tail coverts are blackish with grey-brown barring. The underparts are predominantly grey-brown with black tips on the grey, square-tipped tail and wing edges. Square-tailed Kites have monomorphic colouration (i.e. there are no differences between males and females). A key character in flight is the long fingered, upswept wings with a large white patch at the base of the barred 'fingers'.	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	Caves 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"	Yes		Yes	Yes	Yes		Yes			This species has recently been renamed to Miniopterus orianae oceanensis or the large bent-winged bat, from Miniopterus schreibersii subsp. oceanensis or the eastern bent-wing bat. The Large Bentwing-bat has chocolate to reddish-brown fur on its back and slightly lighter coloured fur on its belly. It has a short snout and a high 'domed' head with short round ears. The wing membranes attach to the ankle, not to the base of the toe. The last bone of the third finger is much longer than the other finger-bones giving the bent wing appearance. It weighs up to 20 grams, has a head and body length of about 6 cm and a wingspan of 30 - 35 cm.	Large Bentwing-bats occur along the east and north-west coasts of Australia.
Monotaxis macrophylla	Large-leafed Monotaxis		Yes		Yes					Yes	Yes	Large-leafed Monotaxis is an erect herb to 25 cm tall. Its leaves are up to 50 mm long by 15 mm wide. The flowers are small, yellow and form dense clusters on short stalks at the ends of the branches. Plants have separate male and female flowers, with a few female flowers surrounded by numerous males.	Large-leafed Monotaxis is recorded from several highly disjunct populations in NSW: eastern edge of Deua NP (west of Moruya), Bemboka portion of South East Forests National Park, Cobar area (Hermitage Plains), the Tenterfield area, and Woodenbong (near the Queensland border). It is also in Queensland. A recent record from the eastern spur of the Nandewar Range is in the Namoi catchment.

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
Ninox connivens	Barking Owl (Breeding)	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	The Barking Owl is medium-sized owl (42 cm, 650 g), smaller than the similar Powerful Owl and larger than the Southern Boobook. It has bright yellow eyes and no facial-disc. Upperparts are brown or greyish-brown, and the white breast is vertically streaked with brown. The large talons are yellow. Males are typically larger than their mate and have a more square crown. The quick, dog-like 'wook-wook' territorial call is diagnostic, but the yapping of foxes, dogs and even Sugar Gliders is sometimes attributed to this species. Pairs of birds perform call-and-answer duets, the male's tone being the deeper, which often rise to an excited rapid pitch. This species is also famous for a rarely used high-pitched tremulous scream that has earned it the name 'screaming-woman bird'.	The Barking Owl is found throughout continental Australia except for the central arid regions. Although still common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Extensive wildfires in 2019-20 reduced habitat quality further, burnt many old, hollow-bearing trees needed as refuge by prey species and reduced the viability of some regional owl populations.
Ninox strenua	Powerful Owl (Breeding)	Hollow bearing trees Living or dead trees with hollow greater than 20cm diameter	Yes		Yes	Yes	Yes		Yes			The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with large yellow eyes and no facial-disc. Adults reach 60 cm in length, have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. Males are larger than females. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. Juvenile Powerful Owls have a white crown and underparts that contrasts with its small, dark streaks and dark eye patches. The call of this species may be heard at any time of the year, but it is more vocal during the autumn breeding season. It has a slow, deep and resonant double hoot, with the female's being higher pitched and expressing an upward inflection on the second note.	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains suggesting occupancy prior to land clearing. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations may never recover. Recent increases in population density across Sydney and some other semi-urban areas do not seem to be solely due to increased awareness of this flagship species.
Persoonia marginata	Clandulla Geebung			Yes						Yes		A spreading shrub that grows to 50 cm high and up to 1 m across. Young branches are hairy. Leaves are elliptic to obovate, 2–4 cm long and 6–23 mm wide, sparsely hairy when young and hairless when mature. Flowers are yellow with brownish hairs; have a densely hairy ovary; and occur on short stalks 2–7 mm long.	The Clandulla Geebung occurs between Kandos and Clarence in the western Blue Mountains. Populations are largely disjunct and include Clandulla, Ben Bullen and Sunny Corner State Forests; isolated populations have also been recorded from Turon and Gardens of Stone National Parks.

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
Petaurus norfolcensis	Squirrel Glider		Yes		Yes	Yes	Yes		Yes			Adult Squirrel Gliders have a head and body length of about 20 cm. They have blue-grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy averaging about 27 cm in length. Squirrel Gliders are up to twice the size of Sugar Gliders, their facial markings are more distinct and they nest in bowl-shaped, leaf lined nests in tree hollows. Squirrel Gliders are also less vocal than Sugar Gliders.	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria.
Petrogale penicillata	Brush-tailed Rock-wallaby	N/A|Other Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliffflines	Yes		Yes	Yes	Yes		Yes			The Brush-tailed Rock-wallaby has a characteristic, long and bushy, dark rufous-brown tail that is bushier towards its tip. It has long, thick, brown body-fur that tends to be rufous on the rump and greyer on the shoulders. The fur on its chest and belly are paler, and some individuals have a white blaze on their chest. It also has a characteristic white cheek-stripe and a black stripe from its forehead to the back of its head. The Brush-tailed Rock-wallaby is highly agile and can move swiftly and confidently through rugged and precipitous areas. This agility is attributed to their compact, muscular build, their long and flexible tail that is used for balance and their well padded and rough textured feet that provide excellent traction. The average weight of this species is about 8 kg for males and 6 kg for females.	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit.
Phascogale tapoatafa	Brush-tailed Phascogale		Yes			Yes			Yes			The Brush-tailed Phascogale is tree-dwelling marsupial carnivore. It has a characteristic, black, bushy 'bottlebrush' tail, with hairs up to 4 cm long. Its fur is grey above and pale cream below and it has conspicuous black eyes and large naked ears. Adults have a head and body length of about 20 cm, a tail length of about 20 cm and weigh 110 - 235 grams.	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide.
Phascolarctos cinereus	Koala (Breeding)	Other Presence of koala use trees - refer to Survey Comments field in TBDC	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	The Koala is an arboreal marsupial with fur ranging from grey to brown above, and white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows.	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
													populations on the plains west of the Great Dividing Range.
Polytelis swainsonii	Superb Parrot (Breeding)	Hollow bearing trees Living or dead E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta with hollows greater than 5cm diameter greater than 4m above ground or trees with a DBH of greater than 30cm			Yes		Yes		Yes			The Superb Parrot is a distinctive large, bright grass-green parrot with a long, narrow tail and sharply back-angled wings in flight. Males have yellow foreheads and throats and a red crescent that separates the throat from the green breast and belly. Females are slightly duller green and have a dull, light blue wash in place of the males' red and yellow markings.	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. It is estimated that there are less than 5000 breeding pairs left in the wild.
Pomaderris queenslandica	Scant Pomaderris				Yes		Yes					Scant Pomaderris is a medium-sized shrub 2 - 3m tall. The stems are whitish with tiny star-shaped hair clusters. The leaves are oval to narrow elliptical, 2.5 - 7 cm long and 10 - 25 mm wide. They are shiny on the top and woolly underneath. The small creamy yellow flowers appear during spring-summer.	Widely scattered but not common in north-east NSW and in Queensland. It is known from several locations on the NSW north coast and a few locations on the New England Tablelands and North West Slopes, including near Torrington and Coolata.
Prasophyllum petilum	Tarengo Orchid	Leek	Yes						Yes			Tarengo Leek Orchid reaches to 35 cm tall. This species can be distinguished from the more common onion orchids that grow in its habitat by the pinkish-purple base to the leaf. Each plant produces a solitary, tubular, fleshy, dull green leaf, growing to 35 cm tall. The flower-stem emerges in mid spring to early summer from a hole near the base of the leaf. The raceme, reaching to 12 cm tall, has about 20 fragrant flowers with pointed tepals. The flowers are usually a pale whitish-green, but can be pink or pale purple. Plants can be very cryptic when growing in small numbers and within tall grasses. The flowering time for this species varies from north to south. Populations around Muswellbrook and Ilford tend to flower in September, with the Boorowa and Hall populations flowering in October and the Queanbeyan area and Delegate populations in December. Annual abundance varies significantly depending on winter and early spring rainfall, biomass and potentially other variables including the severity of winter frosts. The NSW Herbarium considers Prasophyllum petilum and Prasophyllum sp. Wybong (C. Phelps ORG5269) to be synonyms (i.e. the	Natural populations are known from a total of five sites in NSW. These are near Boorowa, Queanbeyan area, Ilford, Delegate and a newly recognised population c.10 km west of Muswellbrook. It also occurs at Hall in the Australian Capital Territory. This species has also been recorded at Bowning Cemetery where it was experimentally introduced, though it is not known whether this population has persisted.

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
												same species). This taxonomic recognition will be released in the next Orchidaceae taxonomic update via the Australian Plant Census, which provides a list of currently accepted names. As it stands, the two species are treated as one for NSW regulatory purposes, with the distinction maintained under Commonwealth legislation.	
Prasophyllum sp. Wybong	Prasophyllum sp. Wybong		Yes		Yes		Yes		Yes			Prasophyllum sp. Wybong (C. Phelps ORG 5269) is a terrestrial orchid that grows to approximately 30 cm high. It has a single dull-green basal leaf that is tubular and fleshy. The single flower spike has numerous fragrant flowers. The NSW Herbarium considers Prasophyllum sp. Wybong (C. Phelps ORG5269) and Prasophyllum petilum to be synonyms (i.e. the same species). This taxonomic recognition will be released in the next Orchidaceae taxonomic update via the Australian Plant Census, which provides a list of currently accepted names. As it stands, the two species are treated as one for NSW regulatory purposes, with the distinction maintained under Commonwealth legislation.	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals.
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	Other Breeding camps	Yes		Yes	Yes	Yes		Yes			The Grey-headed Flying-fox is the largest Australian bat, with a head and body length of 23 - 29 cm. It has dark grey fur on the body, lighter grey fur on the head and a russet collar encircling the neck. The wing membranes are black and the wingspan can be up to 1 m. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle.	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations.
Swainsona sericea	Silky Swainson-pea				Yes				Yes			The Silky Swainson-pea is a prostrate or erect perennial, growing to 10 cm tall. The stems and leaves are densely hairy. The leaves are up to 7 cm long, composed of 5 - 13 narrow, pointed leaflets, each up to 15 mm long. The purple pea-shaped flowers are to 11 mm long, and are held in groups of up to 8 flowers, on a stem to 10 cm tall. The spring flowers are followed by hairy pods, up to 17 mm long.	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland.
Tylophora linearis	Tylophora linearis		Yes	Yes	Yes					Yes		Slender, almost hairless twiner with a clear sap. Leaves dark green, linear, 1-5 cm long, 0.5-3 mm wide. Flowers purplish inside, 3-6 mm in diameter, in radiating groups of 3-8.	Occurs from southern Queensland into central NSW, as far south near Temora with the majority of records occurring in the central western region. Records from Goonoo, Pillaga West, Pillaga East,

Species	Common	Habitat constraint	Kerrabee Subregion	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Description	Distribution
												Fruit is cigar shaped, up to 100mm long and approximately 5 mm diameter, hairless.	Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs.
Tyto novaehollandiae	Masked Owl (Breeding)	Hollow bearing trees Living or dead trees with hollows greater than 20cm diameter	Yes		Yes	Yes	Yes		Yes			A medium-sized owl to 40 - 50 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc that is encircled by a dark border. The feet are large and powerful, with fully feathered legs down to the toes. The owl exists in several colour forms, with wide variation in plumage. The upperparts are grey to dark brown with buff to rufous mottling and fine, pale spots. The wings and tail are well barred. The underparts are white to rufous-brown with variable dark spotting. The palest birds have a white face with a brown patch around each eye; the darkest birds have a chestnut face. The dark form of the Masked Owl is much browner than the Sooty Owl Tyto tenebricosa	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution.
Vespadelus troughtoni	Eastern Cave Bat	Caves Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds."	Yes		Yes	Yes	Yes		Yes			A small chestnut-brown bat with rufous tones on the head, and darker wings. It has smallish, conical ears and a short, up-tipped nose. The species is very difficult to separate from several other closely related species that occur in similar areas. The most reliable physical distinguishing feature is the shape of the male's penis.	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT.

4.2.3. Step 3: Candidate species requiring further assessment

Based on the assessment at 4.1 and 4.2 above, a threatened species survey plan was undertaken to establish the presence of species credit species (and their habitats). The threatened species survey strategy involved the following activities:

- Targeted threatened flora surveys in Summer and spring
- Targeted Microchiropteran bat surveys using harp traps and songmeters in summer
- Diurnal avifauna surveys
- Targeted arboreal mammal surveys in spring, summer, and autumn using call playback, IR cameras, spotlighting.
- Targeted forest owl surveys in winter using call playback, spotlighting, and songmeters.
- Targeted Koala surveys using the Spot Assessment Technique (SAT) in suitable vegetation.
- Targeted terrestrial mammal surveys using Elliot traps.

Survey effort is summarised in Table 17.

Table 17 Survey effort summary

Species	Common	Kerrabee	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Required timing	Potential habitat present, Survey type and effort undertaken across development site	Survey Month Conducted	Survey effort sufficient
Acacia ausfeldii	Ausfeld's Wattle	Yes						Yes			January;February;March;April;May;September;October;November;December	16.92 ha potential habitat. 252 hours of threatened flora searches in appropriate habitats.	September	Yes – survey effort exceeded.
Aprasia parapulchella	Pink-tailed Legless Lizard	Yes	Yes	Yes	Yes		Yes	Yes		Yes	January;February;March;April;May;September;October;November;December	0.0 ha of potential habitat. Active searches conducted in suitable habitat outside development site.	September	Yes - No habitat within development site. Species excluded based on habitat constraint.
Burhinus grallarius	Bush Stone-curlew	Yes		Yes	Yes		Yes	Yes			January;February;March;April;May;June;July;August;September;October;November;December	21.40 ha of potential habitat. 456.4 km of spotlighting.	January, February, June, August, September, November and December.	Yes – survey effort exceeds requirement
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	Yes				Yes		Yes			January;October;November;December	6.23 ha of potential habitat 451 bird surveys conducted across the study area.	January, May, June, July, August, September and December	Yes – survey effort exceeds requirement
Chalinolobus dwyeri	Large-eared Pied Bat	Yes		Yes	Yes		Yes	Yes			January;November;December	3.94 ha of potential habitat 64 harp trap nights and 466 songmeter nights conducted within appropriate habitat.	January and December	Yes – survey effort exceeds requirement
Commersonia procumbens	Commersonia procumbens	Yes		Yes					Yes		January;February;March;April;May;August;September;October;November;December	23.24 ha of potential habitat 594 hours of threatened flora searches in appropriate habitat.	February, April, May and September	Yes – survey effort exceeds requirement
Dichanthium setosum	Bluegrass		Yes	Yes	Yes			Yes		Yes	January;February;March;April;May;November;December	197.08 ha of potential habitat. 342 hours of threatened flora searches in appropriate habitats.	February, April and May	Yes – survey effort exceeds requirement
Diuris tricolor	Pine Donkey Orchid	Yes	Yes	Yes	Yes		Yes				September;October	4.48 ha of potential habitat 252 hours of threatened flora searches in appropriate habitats.	September	Yes – survey effort exceeds requirement
Goodenia macbarronii	Narrow Goodenia	Yes	Yes	Yes			Yes				January;February;September;October;November;December	4.48 ha of potential habitats 342 hours of threatened flora searches in appropriate habitats.	February and September	Yes – survey effort exceeds requirement
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	Yes		Yes	Yes	Yes		Yes			July;August;September;October;November;December	No potential habitat. No nests identified. 451 bird surveys conducted across the study area.	January, May, June, July, August, September and December	Yes – survey effort exceeds requirement

Species	Common	Kerrabee	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Required timing	Potential habitat present, Survey type and effort undertaken across development site	Survey Month Conducted	Survey effort sufficient
Hamirostra melanosternon	Black-breasted Buzzard (Breeding)			Yes		Yes					September;October;November	No potential habitat. No nests identified. 451 bird surveys conducted across the study area.	January, May, June, July, August, September and December	Yes – survey effort exceeds requirement
Hieraaetus morphnoides	Little Eagle (Breeding)	Yes		Yes	Yes	Yes		Yes			August;September;October	No potential habitat. No nests identified. 451 bird surveys conducted across the study area.	January, May, June, July, August, September and December	Yes – survey effort exceeds requirement
Hoplocephalus bitorquatus	Pale-headed Snake			Yes		Yes					January;February;March;November;December	Assumed present in PCT 84.	n/a	Yes – assumed present.
Indigofera efoliata							Yes				September;October	4.48 ha of potential habitat 252 hours of threatened flora searches in appropriate habitats.	September	Yes – survey effort exceeds requirement
Lophochroa leadbeateri	Major Mitchell's Cockatoo (Breeding)			Yes		Yes					September;October;November;December	1.14 ha of potential habitat 451 bird surveys conducted across the study area.	January, May, June, July, August, September and December	Yes – survey effort exceeds requirement
Lophoictinia isura	Square-tailed Kite (Breeding)	Yes		Yes		Yes	Yes				January;September;October;November;December	451 bird surveys conducted across the study area.	January, May, June, July, August, September and December	Yes – survey effort exceeds requirement
Monotaxis macrophylla	Large-leafed Monotaxis	Yes		Yes					Yes	Yes	January;February;August;September;October;November;December	288.07 ha of potential habitat. 252 hours of threatened flora searches in appropriate habitats.	September	Yes – survey effort exceeds requirement
Ninox connivens	Barking Owl (Breeding)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		May;June;July;August;September;October;November;December	130.41 ha potential habitats 167 acoustic detector nights, 34 person hours of call playback and 465.4 km of spotlighting.	January, February, June, July, August, September, November and December	Species detected and habitat mapped.
Ninox strenua	Powerful Owl (Breeding)	Yes		Yes	Yes	Yes	Yes				May;June;July;August	6.95 ha of potential habitat 167 acoustic detector nights, 34 person hours of call playback and 465.4 km of spotlighting.	January, February, June, July, August, September, November and December	Species detected and habitat mapped.
Persoonia marginata	Clandulla Geebung		Yes						Yes		January;February;March	3.48 ha of potential habitats 90 hours of threatened flora searches in appropriate habitat.	February	Yes – survey effort exceeds requirement

Species	Common	Kerrabee	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Required timing	Potential habitat present, Survey type and effort undertaken across development site	Survey Month Conducted	Survey effort sufficient
Petaurus norfolcensis	Squirrel Glider	Yes		Yes	Yes	Yes		Yes			January;February;March;April;May;June;July;August;September;October;November;December	79.9 ha of potential habitat 1,318 remote camera trap nights and 456.4 km of spotlighting.	January, February, June, July, August, September, November, December	Species detected and habitat mapped.
Petrogale penicillata	Brush-tailed Rock-wallaby	Yes		Yes	Yes	Yes		Yes			January;February;March;April;May;June;July;August;September;October;November;December	18.06 ha potential habitat 456.4 km of spotlighting.	January, February, June, August, September, November and December.	Yes – survey effort exceeds requirement
Phascolarctos cinereus	Koala (Breeding)	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	January;February;March;April;May;June;July;August;September;October;November;December	138.45 ha potential habitat 47 Koala Spot Assessment Technique surveys and 456.4 km of spotlighting.	January, February, March, June, August, September, November and December.	Yes – survey effort exceeds requirement
Polytelis swainsonii	Superb Parrot (Breeding)			Yes		Yes		Yes			September;October;November	79.9 ha of potential habitat 451 bird surveys conducted across the study area.	January, May, June, July, August, September and December	Yes – survey effort exceeds requirement
Pomaderris queenslandica	Scant Pomaderris			Yes		Yes					January;February;March;April;May;June;July;August;September;October;November;December	1.14 ha of potential habitat 594 hours of threatened flora searches in appropriate habitat.	February, April , May and September	Yes – survey effort exceeds requirement
Prasophyllum petilum	Tarengo Leek Orchid	Yes						Yes			September;October;November;December	3.48 ha of potential habitats 252 hours of threatened flora searches in appropriate habitats.	n/a	Yes – survey effort exceeds requirement
Prasophyllum sp. Wybong	Prasophyllum sp. Wybong	Yes		Yes		Yes		Yes			September;October	3.48 ha of potential habitats 252 hours of threatened flora searches in appropriate habitats.	September	Yes – survey effort exceeds requirement
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	Yes		Yes	Yes	Yes		Yes			October;November;December	Species excluded from assessment as no breeding camps were detected within the study area.	n/a	N/A
Swainsona sericea	Silky Swainson-pea			Yes				Yes			September;October;November	6.41 ha of potential habitat 252 hours of threatened flora searches in appropriate habitats.	September	Yes – survey effort exceeds requirement
Tylophora linearis	Tylophora linearis	Yes	Yes	Yes					Yes		YES	26.72 ha of potential habitat	February, April and May	Yes – survey effort exceeds requirement

Species	Common	Kerrabee	Inland slopes Subregion	Pilliga Subregion	Liverpool Ranges Subregion	PCT84	PCT267	PCT281	PCT479	PCT483	Required timing	Potential habitat present, Survey type and effort undertaken across development site	Survey Month Conducted	Survey effort sufficient
												342 hours of threatened flora searches in appropriate habitats.		
Tyto novaehollandiae	Masked Owl (Breeding)	Yes		Yes	Yes	Yes		Yes				6.95 ha of potential habitat. 167 acoustic detector nights, 34 person hours of call playback and 465.4 km of spotlighting.	January, February, June, July, August, September, November and December	Species detected and habitats mapped
Vespadelus troughtoni	Eastern Cave Bat	Yes		Yes	Yes	Yes		Yes			YES	14.12 ha of potential habitat 64 harp trap nights and 466 songmeter nights conducted within appropriate habitat.	January and December	Yes – survey effort exceeds requirement

4.2.4. Targeted transects for threatened flora

Targeted surveys in February involved targeted searches of suitable habitats for the appropriate threatened species across the windfarm as shown on Figure 26. These surveys were undertaken prior to any formal development footprint for the project, and so targeted the most likely area to detect threatened species.

Surveys were undertaken in areas of potential habitat for threatened species. Areas that were dominated by exotic pasture grasses and weeds were not surveyed. The level of effort across the development site is consistent with that required under the *Surveying threatened plants and their habitats* (DPE, 2020), whereby in accordance with the effort prescribed in Table 3 (of the flora guideline) indicates that 2.5 hours of searching is required for every 10ha of habitat. Generally, the level of effort invested significantly exceeded the requirements of the survey areas.

The exact dates and staff undertaking threatened flora surveys is described in Table 18.

Table 18: Targeted threatened flora survey dates

Date	Surveyors	Effort	Equivalent area of habitat searched in accordance with the survey guideline
15 - 19 February 2021	Lily Gorrell, Liam Scanlan	90 hours	360 ha
28 - 30 April 2021	Lily Gorrell, Sophie Montgomery	54 hours	216 ha
10 - 14 May 2021	Alex Pursche, Dan Watts, Liam Scanlan, Sophie Montgomery	180 hours	720 ha
31-May-21	Alex Pursche, Sophie Montgomery	18 hours	72 ha
6 - 15 September 2021	Lily Gorrell, Liam Scanlan	180 hours	720 ha
21 - 24 September 2021	Sophie Montgomery, Liam Scanlan	72 hours	288 ha

At the completion of threatened species surveys, *Dichanthium setosum* (Bluegrass), which is listed under the BC Act as Vulnerable and EPBC Act as Vulnerable, was identified in one location – outside the development site. The occurrence of this species is a novel find in the Coolah region, as this is at the far south-western extent of the species distribution. The location of this find was outside the survey area. The location of this species is within a localised area containing logs and rocks, approximately 150m from the development site. The location of this patch appears to have persisted as grazing and soil disturbance is limited in this location by steep topography and boulders. The habitat where this species has been identified is not similar to those habitats in the development site (which are located along open crests and ridgelines).

A sample of the species was sent to the National Herbarium of NSW for confirmation. Following receipt of confirmation of the specimen, a subsequent survey was undertaken in more marginal habitats for this species in April and May 2021 (Figure 26). At completion of these additional surveys, the species was

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identified in one additional location along a creekline nearby to the Mount Hope – Girragulang Road connector transmission line. The location of all identified samples of *D. setosum* is shown on Figure 28.

The revised development footprint has avoided all areas of known and potential habitat for *D. setosum*.

Threatened flora surveys in September were conducted over 14 survey days, assessing areas of suitable habitat. During these surveys, a 100m grid approach was undertaken in accordance with Surveying threatened plants and their habitats (DPIE, 2020). The location of surveys is shown on Figure 27.

No additional threatened flora species were identified.



Photograph 32 *Dichathium setosum*

Weather conditions during each survey day are provided in Table 19 as recorded at Dunedoo Post Office (station 064009).

Weather in the preceding 3 months to each survey was exceptional, with above average rainfall and mild conditions due to a three year La Nina phase in eastern Australia.

Table 19 Weather conditions during threatened flora surveys

Date	Rainfall	Minimum temperature	Maximum temperature
15-Feb-21	0	12.2	26
16-Feb-21	0	15	28.1
17-Feb-21	0	16.5	27.1
18-Feb-21	0	14.5	27.3
19-Feb-21	0	13.5	29.4
28-Apr-21	0	10	24
29-Apr-21	0	7.7	24.6
30-Apr-21	0	9.4	23.9
10-May-21	0	7	22.5
11-May-21	0	9.8	19
12-May-21	0	4.8	21
13-May-21	0	No data available	20.5
14-May-21	0	3.8	Data not available
31-May-21	0	No data available	20.3
6-Sep-21	0.4	No data available	16.3
7-Sep-21	0	-1.8	20
8-Sep-21	0	-0.2	22.2
9-Sep-21	0	0.9	24
10-Sep-21	0	1.1	25.7
11-Sep-21	0	2.3	27.2
12-Sep-21	0	12.1	28
13-Sep-21	0	4	17.4
14-Sep-21	1.6	3.3	No data available
15-Sep-21	0	No data available	18.5
21-Sep-21	0.1	4	12.5
22-Sep-21	0	-1.3	20.3
23-Sep-21	0	0.6	23.4
24-Sep-21	0	3.2	25.7

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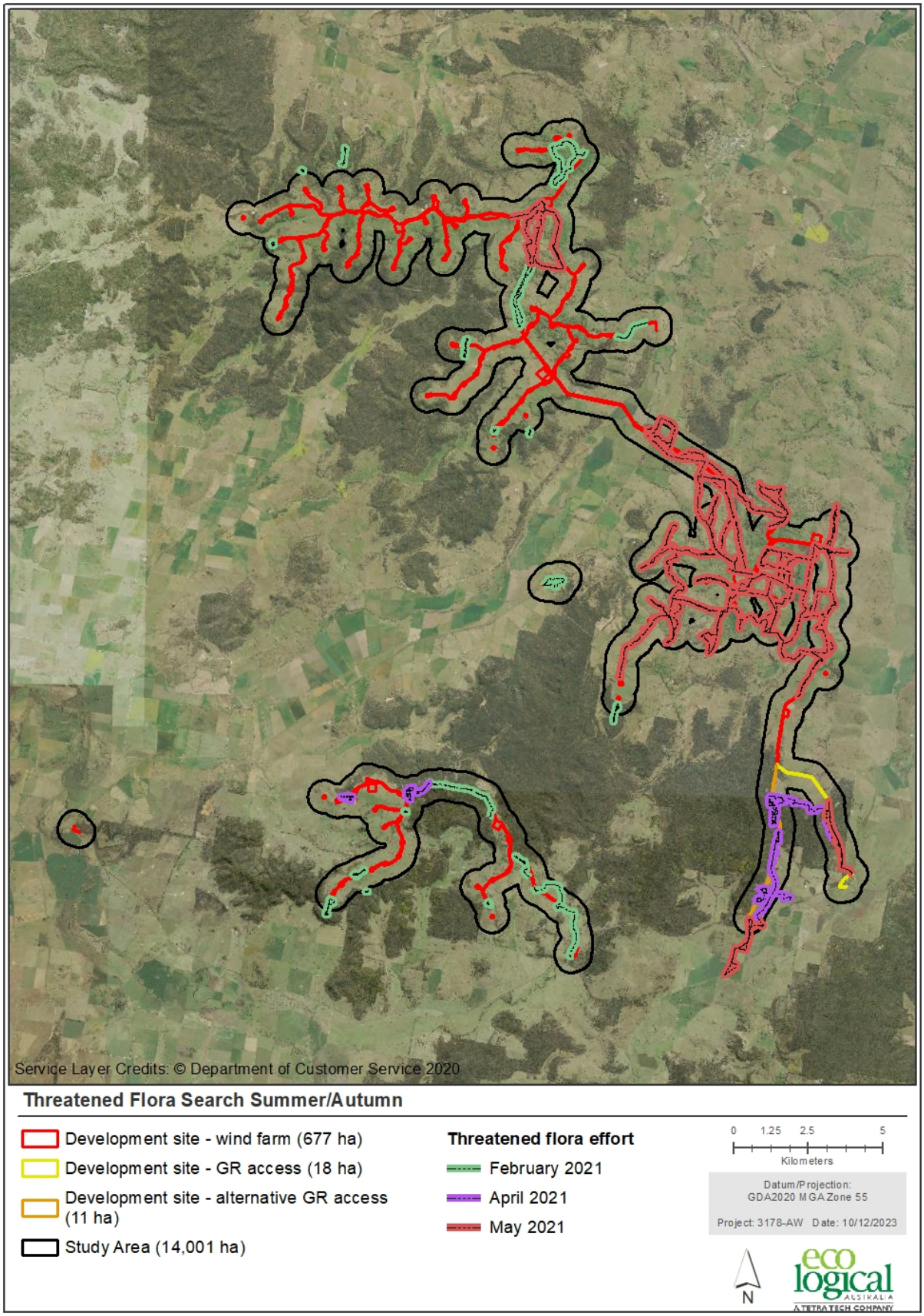


Figure 26 Threatened flora survey effort (summer/autumn)

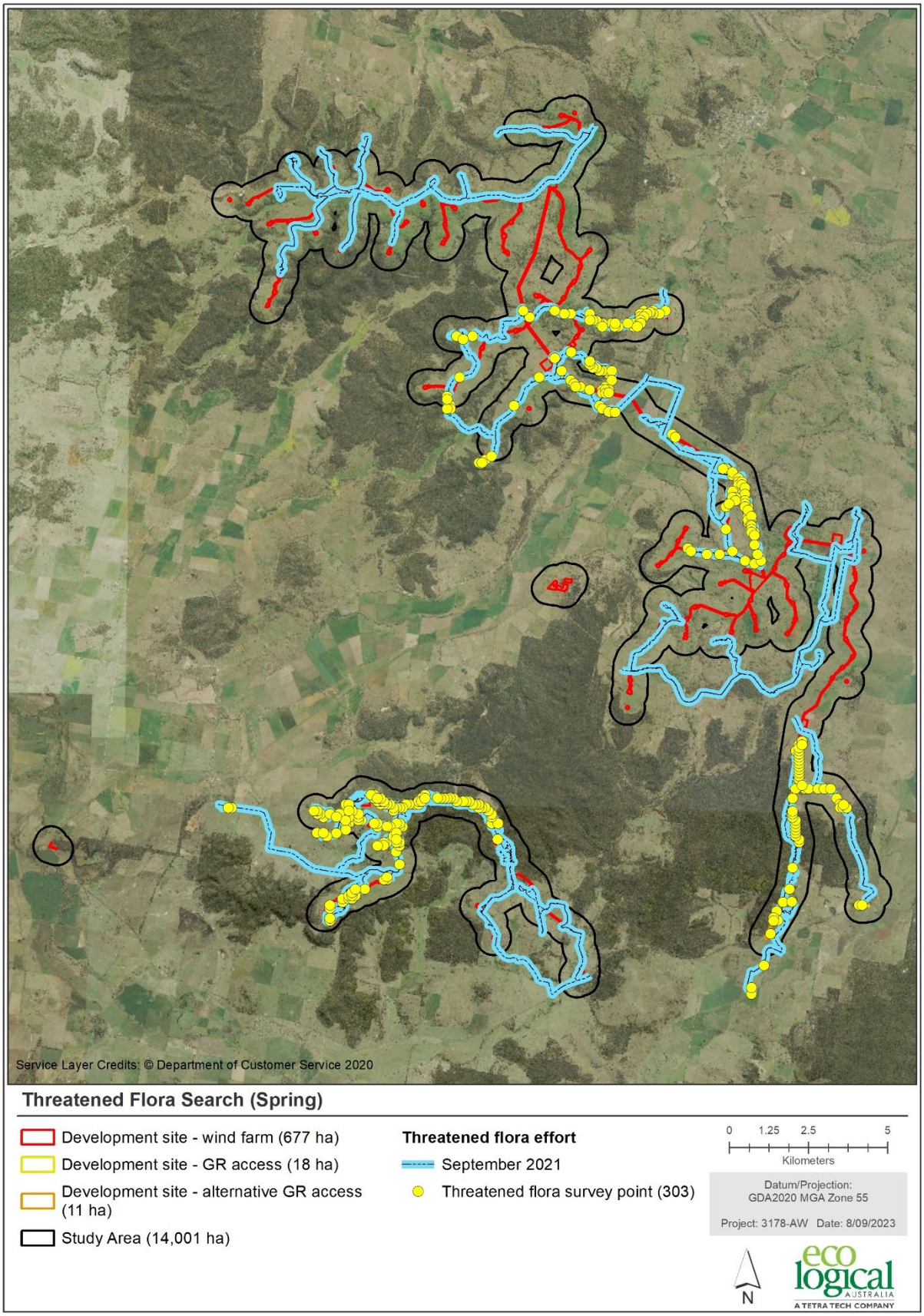


Figure 27 Threatened flora surveys (spring)

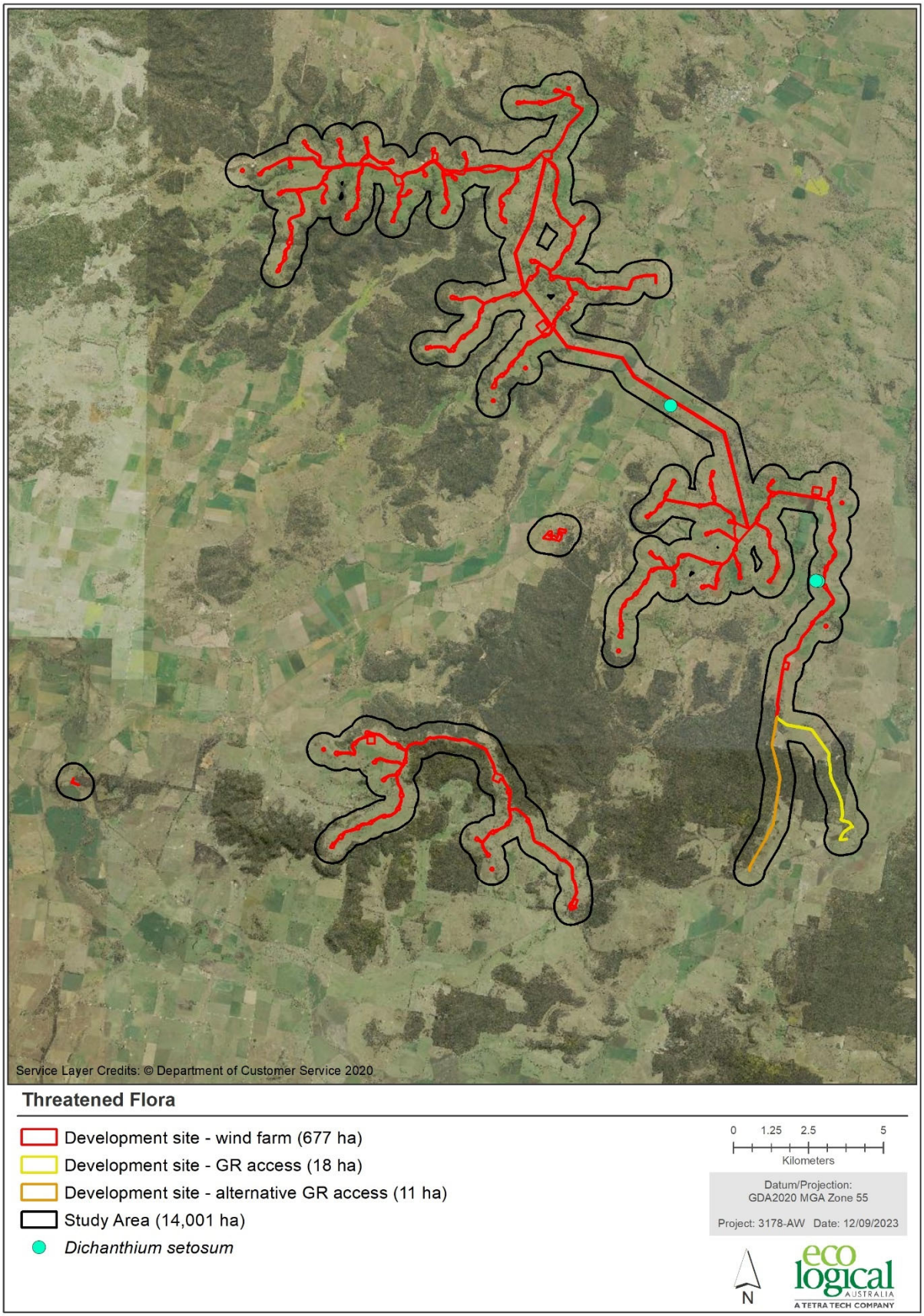


Figure 28 Threatened flora

4.2.5. Targeted threatened fauna surveys

Targeted threatened fauna surveys included the following targeted surveys:

- Targeted Microchiropteran bat surveys using harp traps and songmeters in summer
- Diurnal avifauna surveys
- Targeted arboreal mammal surveys in spring, summer, and autumn using call playback, IR cameras, spotlighting.
- Targeted forest owl surveys in winter using call playback, spotlighting, and songmeters.
- Targeted Koala surveys using the Spot Assessment Technique (SAT) in suitable vegetation

The effort and detailed methods for each targeted survey are described below.

4.2.6. Microchiropteran bat surveys

4.2.6.1. Methods

Microchiropteran bat surveys were undertaken to target candidate threatened species identified in Section 4.2.3.

Bat surveys were undertaken by using both harp traps and songmeters (Songmeter Mini) across the study area, with priority given to those areas that contain potential bat roosting and breeding habitats. Surveys were conducted between December 2020 and February 2021, with a focus over the potential breeding timing for locally known threatened bats.

Harp traps were placed in natural flyways in the landscape, making use of overhanging branches, cliff edges, and forest trails. Harp traps were checked daily at dawn, and approximately 1 hour after dark. All harp traps were left in situ for a period of 4 nights each. Harp trapping was only conducted at Leadville and Mount Hope, as these wind farm clusters contained clifflines and other suitable habitat for breeding Microchiropteran bats.

Songmeter minis were also used to assess bat species by continuously recording ultrasonic data from sunset to sunrise. Songmeters were left in situ for a minimum of 4 nights, and up to 30 nights. Songmeters were used across all three wind farm clusters.

A total of 64 harp trap nights, and 466 songmeter nights were undertaken across the project. The location of all threatened Microchiropteran bat surveys is shown on Figure 29. Detail of horizontal bat surveys including locations and dates are provided in Table 20.

All songmeter data was sent to Greg Ford at Balance! Environmental for analysis.



Photograph 33 Harp trap installation under overhanging *E. albemol*



Photograph 34 Songmeter mini fixed to *A. floribunda*

Table 20 Bat survey effort details

Method	Unit ID	Wind farm cluster	Date Set	Date Collect	Number of night	Staff
Harp trap	New_Harp 1	Leadville	30 November 2020	4 December 2020	4	Alex Pursche, Tom Schmidt
Harp trap	New_Harp 3	Leadville	30 November 2020	4 December 2020	4	Alex Pursche, Tom Schmidt
Harp trap	New_Harp 4	Leadville	30 November 2020	4 December 2020	4	Alex Pursche, Tom Schmidt
Harp trap	New_Harp 7	Leadville	30 November 2020	4 December 2020	4	Alex Pursche, Tom Schmidt
Harp trap	New_harp 4	Mount Hope	18 January 2021	22 January 2021	4	Alex Pursche, Mike Lawrie
Harp trap	New_harp 8	Mount Hope	18 January 2021	22 January 2021	4	Alex Pursche, Mike Lawrie
Harp trap	New_harp 6	Mount Hope	18 January 2021	22 January 2021	4	Alex Pursche, Mike Lawrie
Harp trap	New_harp 2	Mount Hope	18 January 2021	22 January 2021	4	Alex Pursche, Mike Lawrie
Harp trap	New_harp 5	Mount Hope	18 January 2021	22 January 2021	4	Alex Pursche, Mike Lawrie
Harp trap	New_harp 7	Mount Hope	18 January 2021	22 January 2021	4	Alex Pursche, Mike Lawrie
Harp trap	Mud_harp 3	Mount Hope	18 January 2021	22 January 2021	4	Tom Kelly, Bec Croake
Harp trap	Mud_harp 4	Mount Hope	18 January 2021	22 January 2021	4	Tom Kelly, Bec Croake
Harp trap	Mud_harp 2	Mount Hope	18 January 2021	22 January 2021	4	Tom Kelly, Bec Croake
Harp trap	Mud_harp 5	Mount Hope	18 January 2021	22 January 2021	4	Tom Kelly, Bec Croake
Harp trap	Mud_harp 6	Mount Hope	18 January 2021	22 January 2021	4	Tom Kelly, Bec Croake
Harp trap	Mud_harp 1	Mount Hope	18 January 2021	22 January 2021	4	Tom Kelly, Bec Croake
		Subtotal harp trap nights	64			
Songmeter	SM_Bustard	Girragulang Road	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Flannyflower	Girragulang Road	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Helioporus	Girragulang Road	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Hibbertia	Girragulang Road	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly

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Method	Unit ID	Wind farm cluster	Date Set	Date Collect	Number of night	Staff
Songmeter	SM_Lionfish	Girragulang Road	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Spicebush	Girragulang Road	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Toadfish	Girragulang Road	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Bustard	Leadville	30-Nov-20	4-Dec-20	4	Alex Pursche, Tom Schmidt
Songmeter	SM_Firetail	Leadville	30-Nov-20	4-Dec-20	4	Alex Pursche, Tom Schmidt
Songmeter	SM_Lionfish	Leadville	30-Nov-20	4-Dec-20	4	Alex Pursche, Tom Schmidt
Songmeter	SM_Lotus	Leadville	30-Nov-20	4-Dec-20	4	Alex Pursche, Tom Schmidt
Songmeter	SM_Bustard	Mount Hope	21-Dec-20	20-Jan-21	30	Alex Pursche, Sophie Montgomery
Songmeter	SM_Firetail	Mount Hope	21-Dec-20	20-Jan-21	30	Alex Pursche, Sophie Montgomery
Songmeter	SM_Lionfish	Mount Hope	21-Dec-20	20-Jan-21	30	Alex Pursche, Sophie Montgomery
Songmeter	SM_Lotus	Mount Hope	21-Dec-20	20-Jan-21	30	Alex Pursche, Sophie Montgomery
Songmeter	SM_Lotus	Mount Hope	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Spicebush	Mount Hope	21-Dec-20	20-Jan-21	30	Alex Pursche, Sophie Montgomery
Songmeter	SM_Toadfish	Mount Hope	21-Dec-20	20-Jan-21	30	Alex Pursche, Sophie Montgomery
Songmeter	SM_Wedgie	Mount Hope	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
Songmeter	SM_Wolverine	Mount Hope	21-Jan-21	17-Feb-21	27	Mike Lawrie, Tom Kelly
		Subtotal songmeter nights	466 nights			

4.2.6.2. Results

Harp traps yielded poor results across the survey. This is due to the large expanses between habitat patches, and generally poor condition of native vegetation present. Over the 64 trap nights, only fifteen (15) bats were captured comprising of the following five species:

- *Nyctophilus geoffroyi*
- *Ozimops planiceps*
- *Vespadelus vulturnus*
- *Nyctophilus gouldii*
- *Chalinolobus gouldii*

None of these species are threatened under the BC Act or EPBC Act.

Songmeter data was moderately more useful, with analysis identifying the following 18 species of Microchiropteran bat:

- *Austronomus australis*
- *Chalinolobus dwyeri*
- *Chalinolobus gouldii*
- *Chalinolobus morio*
- *Falsistrellus tasmaniensis*
- *Miniopterus orianae*
- *Nyctophilus sp.*
- *Ozimops petersi*
- *Ozimops planiceps*
- *Ozimops ridei*
- *Rhinolophus megaphyllus*
- *Saccolaimus flaviventris*
- *Scoteanax rueppellii*
- *Scotorepens balstoni*
- *Scotorepens orion*
- *Vespadelus darlingtoni*
- *Vespadelus regulus*
- *Vespadelus vulturnus*

Of these species three are listed under the BC Act as vulnerable:

- *Chalinolobus dwyeri*
- *Miniopterus orianae oceansis*
- *Saccolaimus flaviventris*

The location of threatened species identified during the field surveys is shown on Figure 30. Detailed analysis of the songmeter calls is provided in Appendix K.

4.2.7. Avifauna surveys

4.2.7.1. Methods

Avifauna surveys were conducted as part of a general census of avifauna species across the study area, as well as targeted threatened species surveys and bird utilisation surveys. Generally, each bird survey was conducted by a single observer over a 20 minute period identifying any birds heard or observed within a 2 ha search.

Within each season, surveys were conducted across the project. Initial baseline surveys were randomly assigned across the wind farm, capturing data throughout all three clusters. During this baseline survey period from 26 August 2020 to 14 May 2021, a total of 158 bird surveys were undertaken by ELA staff.

In winter 2021, a second survey was undertaken to measure bird utilisation and target winter migrant bird species from 21 June to 16 August 2021. Across the study area, 37 fixed point locations were established (Mount Hope = 13, Girragulang Road = 12, Leadville = 12). Fixed points were located across each wind farm cluster to provide a reasonable subsampling of ridges and hills, whilst providing spatial independence from each survey site. Each fixed survey point was surveyed four times each, twice in the morning (generally within 2 hours of dawn) and twice in the afternoon. These 148 fixed site surveys were supplemented by 28 additional opportunistic survey sites to provide a total of 176 surveys across the study area.

Further details about the bird surveys and methodology are provided in Section 6.2. The location of bird surveys is shown on Figure 29.

4.2.7.2. Results

A total of 82 species of bird were identified across the avifauna surveys. Eight threatened avifauna species were identified during surveys as described in Table 21. No species credit, or ecosystem/species credit species were identified during surveys.

A detailed description of bird activity and utilisation is provided further below in Section 6.2.

Table 21 BC Act and EPBC Act listed species detected during bird utilisation surveys.

Species	Common	BC Act	EPBC Act
Falco subniger	Black Falcon	Vulnerable	Not listed
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not listed
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Not listed
Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not listed
Chthonicola sagittata	Speckled Warbler	Vulnerable	Not listed
Circus assimilis	Spotted Harrier	Vulnerable	Not listed
Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not listed
Hirundapus caudacutus	White-throated Needletail	Not listed	Vulnerable, Marine, Migratory

4.2.8. Arboreal and terrestrial mammal surveys

4.2.8.1. Methods

Arboreal and terrestrial mammal surveys involved baited remote cameras and spotlighting across the study area, supplemented by diurnal surveys and habitat searches.

Remote cameras were fixed on trees with bait stationed positioned approximately 2 m from the camera. Cameras were baited using a bait ball of oats, honey, and peanut butter. Cameras were set to record continuously during the survey period with a 5 image burst for each detection.

All images were analysed manually by ELA ecologists. The location of remote cameras is shown on Figure 29 and the unit ID, number of days in situ, and number of images is detailed in Table 22. An example of an arboreal orientation of a remote camera is shown on Photograph 39. A total of 57 deployments over 1,318 days total effort was undertaken across the study area.

Sample images of some of the fauna identified are shown on Photograph 35 to Photograph 38.

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Photograph 35 Red-necked Wallaby



Photograph 36 Feral Pig



Photograph 37 Squirrel Glider



Photograph 38 Wild Dog pup



Photograph 39 Arboreal camera setup

Table 22 Infrared Camera survey effort summary

Wind farm cluster	Unit ID	Date Set	Date Collect	Days
Mount Hope	06_BRWN_09	22-Jun-21	14-Jul-21	22
Mount Hope	01_4630	22-Jun-21	14-Jul-21	22
Mount Hope	19_Hunt31	23-Jun-21	12-Jul-21	19
Mount Hope	03_4750	23-Jun-21	12-Jul-21	19
Mount Hope	23_New_41	23-Jun-21	12-Jul-21	19
Mount Hope	10_Hunt_05	23-Jun-21	12-Jul-21	19
Mount Hope	02_8579	22-Jun-21	14-Jul-21	22
Mount Hope	14_Hunt_37	22-Jun-21	14-Jul-21	22
Mount Hope	22_Hunt_19	23-Jun-21	12-Jul-21	19
Mount Hope	04_IR_9003	23-Jun-21	12-Jul-21	19
Girragulang Road	12_Hunt_08	23-Jun-21	14-Jul-21	21
Girragulang Road	13_Hunt_17	26-Jun-21	14-Jul-21	18
Girragulang Road	18_Hunt_23	27-Jun-21	14-Jul-21	17
Girragulang Road	09_Hunt_04	27-Jun-21	14-Jul-21	17
Girragulang Road	Hunt_43	27-Jun-21	14-Jul-21	17
Leadville	17_IR_22	30-Jun-21	13-Jul-21	13
Leadville	06_Brwn_07	30-Jun-21	13-Jul-21	13

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Wind farm cluster	Unit ID	Date Set	Date Collect	Days
Leadville	21_Hunt_16	30-Jun-21	13-Jul-21	13
TXL	11_Hunt_07	28-Jun-21	14-Jul-21	16
TXL	4749	28-Jun-21	14-Jul-21	16
TXL	15_Hunt_12	28-Jun-21	14-Jul-21	16
TXL	20_Hunt_39	28-Jun-21	14-Jul-21	16
Leadville	31_9003	29-Jun-21	14-Jul-21	15
Leadville	08_BRWN_99	30-Jun-21	14-Jul-21	14
Mount Hope	37_Hunt_03	22-Dec-20	20-Jan-21	29
Leadville	33_Hunt_03	30-Nov-20	4-Dec-20	4
Girragulang Road	Camera_08	21-Jan-21	17-Feb-21	27
Mount Hope	36_Hunt_02	22-Dec-20	20-Jan-21	29
Leadville	32_Hunt_02	30-Nov-20	4-Dec-20	4
Girragulang Road	Camera_02	21-Jan-21	16-Feb-21	26
Girragulang Road	Camera_03	20-Jan-21	16-Feb-21	27
Leadville	35_Hunt_08	30-Nov-20	4-Dec-20	4
Leadville	34_Hunt_07	30-Nov-20	4-Dec-20	4
Mount Hope	Camera_88	22-Dec-20	21-Jan-21	30
Mount Hope	39_Hunt_08	21-Dec-20	20-Jan-21	30
Girragulang Road	Camera_10	21-Jan-21	17-Feb-21	27
Mount Hope	38_Hunt_07	22-Dec-20	20-Jan-21	29
Girragulang Road	Camera_09	20-Jan-21	16-Feb-21	27
Mount Hope	40_Hunt_09	22-Dec-20	20-Jan-21	29
Girragulang Road	IR_12	21-Jan-21	17-Feb-21	27
Mount Hope	Camera_10	22-Dec-20	20-Jan-21	29
Girragulang Road	Camera_11	20-Jan-21	16-Feb-21	27
Mount Hope	Camera_11	22-Dec-20	20-Jan-21	29
Mount Hope	Camera_12	22-Dec-20	20-Jan-21	29
Mount Hope	Camera_13	22-Dec-20	20-Jan-21	29
Girragulang Road	Camera_88	20-Jan-21	16-Feb-21	27
Mount Hope	IR_99	21-Jan-21	17-Feb-21	27
Mount Hope	Camera_008	21-Jan-21	17-Feb-21	27
TXL	07_BRWN_12	4-Aug-21	10-Sep-21	37
TXL	29_1746	4-Aug-21	10-Sep-21	37
TXL	24_Hunt_08	4-Aug-21	10-Sep-21	37
TXL	25_HUNT_19	4-Aug-21	10-Sep-21	37
TXL	30_8579	4-Aug-21	10-Sep-21	37

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Wind farm cluster	Unit ID	Date Set	Date Collect	Days
TXL	26_Hunt_23	4-Aug-21	10-Sep-21	37
TXL	28_Hunt41	4-Aug-21	10-Sep-21	37
TXL	27_Hunt_31	4-Aug-21	10-Sep-21	37
Girragulang Road	16_Hunt_15	23-Jun-21	14-Jul-21	21

Elliot trapping was conducted in better components of PCT281 to specifically target terrestrial mammals, including Eastern Pygmy Possum. Elliot traps were set along two drainage lines, Cainbil Creek, and an unnamed 1st order creek, nearby to the alternate access route. Traps were placed in the most likely habitats for this species, where ground cover included a mix of native tussocks and grasses, as well as nearby food and shelter resources as shown in Figure 29. At each of the two sites, 25 ground Elliot A traps were baited with oats, honey, peanut butter mix, and set in likely locations approximately 10m apart. Traps were checked each evening and each morning within 2 hours of sun rise/set. The Elliot trapping survey summary is presented in Table 23.

Table 23 Elliot trapping survey summary

Target area	Dates	Staff	Number of trap nights
GR Alternate Access	31 January – 4 March	Alex Pursche, Lachlan Metzler	100
GR Alternate Access	31 January – 4 March	Alex Pursche, Lachlan Metzler	100

Spotlighting was conducted over 43 events over 29 nights, predominately from a vehicle moving slowly in first gear. Spotlighting was undertaken using a handheld led spotlight (Olight M3X) which is capable of picking up eyeshine for up to 1km. This style of light is most suitable in the open vegetation across the study area. Across the study area 465.4 km of spotlighting was undertaken across all seasons. The exact dates and staff of surveys are shown in Table 24.

Table 24 Spotlighting survey summary

Wind farm cluster	Date	Staff	Distance (km)
Leadville	30-Nov-20	Tom Schmidt, Alex Pursche	20.2
Leadville	1-Dec-20	Tom Schmidt, Alex Pursche	17.0
Leadville	2-Dec-20	Tom Schmidt, Alex Pursche	16.9
Leadville	3-Dec-20	Tom Schmidt, Alex Pursche	17.9
Mount Hope	18-Jan-21	Alex Pursche, Mike Lawrie	16.2
Mount Hope	18-Jan-21	Tom Kelly, Bec Croake	18.4
Mount Hope	19-Jan-21	Alex Pursche, Tom Kelly	18.4
Mount Hope	19-Jan-21	Mike Lawrie, Bec Croake	16.2
Mount Hope	20-Jan-21	Mike Lawrie, Tom Kelly	16.2
Mount Hope	20-Jan-21	Alex Pursche, Bec Croake	18.4

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Wind farm cluster	Date	Staff	Distance (km)
Mount Hope	21-Jan-21	Tom Kelly, Bec Croake	16.2
Mount Hope	21-Jan-21	Alex Pursche, Mike Lawrie	18.4
Girragulang Road	15-Feb-21	Sophie Montgomery, Alex Pursche	24.6
Girragulang Road	16-Feb-21	Sophie Montgomery, Alex Pursche	24.0
Girragulang Road	17-Feb-21	Sophie Montgomery, Alex Pursche	13.6
Girragulang Road	18-Feb-21	Sophie Montgomery, Alex Pursche	13.1
Mount Hope	21-Jun-21	Alex Pursche, Dan McKenzie	20.5
Mount Hope	22-Jun-21	Alex Pursche, Alice Si	17.3
Mount Hope	22-Jun-21	Dan McKenzie, Tom Kelly	0.3
Mount Hope	22-Jun-21	Dan McKenzie, Tom Kelly	0.4
Mount Hope	22-Jun-21	Dan McKenzie, Tom Kelly	1.1
Mount Hope	22-Jun-21	Dan McKenzie, Tom Kelly	0.6
Girragulang Road	25-Jun-21	Alex Pursche, Alice Si	13.8
Girragulang Road	26-Jun-21	Alex Pursche, Alice Si	15.4
Girragulang Road	28-Jun-21	Dan McKenzie, Alice Si	12.2
Girragulang Road	29-Jun-21	Alex Pursche, Sophie Montgomery	7.1
Leadville	29-Jun-21	Dan McKenzie, Alice Si	0.6
Leadville	29-Jun-21	Dan McKenzie, Alice Si	3.6
Leadville	30-Jun-21	Sophie Montgomery, Dan McKenzie	7.5
Leadville	30-Jun-21	Sophie Montgomery, Dan McKenzie	7.5
TXL	2-Aug-21	Alex Pursche, Liam Scanlan	8.6
TXL	3-Aug-21	Alex Pursche, Liam Scanlan	6.7
Leadville	3-Aug-21	Sophie Montgomery, Janene Devereaux	10.0
Leadville	4-Aug-21	Sophie Montgomery, Janene Devereaux	10.0
TXL	10-Sep-21	Alex Pursche, Dan McKenzie	8.7
TXL	10-Sep-21	Alex Pursche, Dan McKenzie	3.2
TXL	11-Sep-21	Alex Pursche, Sophie Montgomery	6.9
TXL	11-Sep-21	Alex Pursche, Sophie Montgomery	7.1
Leadville	4-Aug-21	Janene Deveraux, Sophie Montgomery	10.5
TXL	31-Jan-22	Alex Pursche, Lachlan Metzler	2
TXL	1-Feb-22	Alex Pursche, Lachlan Metzler	2
TXL	2-Feb-22	Alex Pursche, Lachlan Metzler	2
TXL	3-Feb-22	Alex Pursche, Lachlan Metzler	2

4.2.8.2. Results

Spotlighting surveys identified common species from a heavily modified agricultural environment. Throughout all three wind farm clusters and the alternate access route, the most common species

encountered were exotic pests including Red Fox, Feral Pig, European Rabbit, and Brown Hare, which were all recorded on nearly every survey. Intermittently, arboreal fauna including Common Brush-tailed Possum and Common Ringtail Possum were also identified. Nocturnal avifauna that was identified included Barn Owl, Tawny Frogmouth, and Southern Boobook. Little Red Flying Foxes were identified on two evenings at Mount Hope, feeding on flowering *A. floribunda* during January 2021.

During spotlighting within the alternate access route corridor near Uarbry, a large, white-breasted Tyto owl was observed within an unburnt patch of PCT281. The observation was brief, and the individual bird was not observed again in an hour of searching. Following conclusion of the survey, it is likely that the individual was a Masked Owl, due to the size and habitat (shrubby open woodland with numerous large trees and hollows). This individual was observed approximately 250m east of the transmission line.

No other threatened species were identified during spotlighting surveys.

Elliot trapping only captured one individual *Antechinus flavipes*, and no other species were captured.

Remote camera surveys identified 29 species. By far the most common species identified were Feral Pigs, Black Rats, and Foxes. Squirrel Glider which is listed as Vulnerable under the BC Act was identified at three locations as shown on Figure 30. On each occasion, this species was identified in only one image, suggesting the population is either very small, or the cameras were set at the periphery of the species habitats.

The complete list of species identified on remote cameras is provided in Table 25.

Table 25 Remote camera survey results

Common	Scientific	Exotic	BC Act	EPBC Act
Yellow-footed Antechinus	Antechinus flavipes		Not listed	Not listed
Wedge-tailed Eagle	*Aquila audax*		Not listed	Not listed
Cattle	*Bos sp.*	Yes	Not listed	Not listed
Wild Dog	Canus lupis familiaris	Yes	Not listed	Not listed
Feral Goats	Capra hircus	Yes	Not listed	Not listed
Australian Raven	*Corvus coronoides*		Not listed	Not listed
Pied Butcherbird	*Cracticus nigrogularis*		Not listed	Not listed
Grey Butcherbird	*Cracticus torquatus*		Not listed	Not listed
Galah	Eolophus roseicapilla		Not listed	Not listed
Feral Cat	*Felis catus*	Yes	Not listed	Not listed
Australian Magpie	*Gymnorhina tibicen*		Not listed	Not listed
Brown Hare	Lepus capensis		Not listed	Not listed
Eastern Grey Kangaroo	*Macropus giganteus*		Not listed	Not listed
Common Wallaroo	*Macropus robustus*		Not listed	Not listed
Red-necked Wallaby	*Macropus rufogriseus*		Not listed	Not listed
Noisy Miner	*Manorina melanocephala*		Not listed	Not listed

Common	Scientific	Exotic	BC Act	EPBC Act
House Mouse	Mus musculus	Yes	Not listed	Not listed
European Rabbit	*Oryctolagus cuniculus*	Yes	Not listed	Not listed
Sheep	*Ovis sp.*	Yes	Not listed	Not listed
Squirrel Glider	*Petaurus norfolcensis*		V	
Eastern Bearded Dragon	Pogona barbata		Not listed	Not listed
Black Rat	*Rattus rattus*	Yes	Not listed	Not listed
Pied Currawong	*Strepera graculina*		Not listed	Not listed
Feral Pig	*Sus scrofa*	Yes	Not listed	Not listed
Short-beaked Echidna	*Tachyglossus aculeatus*		Not listed	Not listed
Common Brushtail Possum	*Trichosurus vulpecula*		Not listed	Not listed
Wombat	*Vombatus ursinus*		Not listed	Not listed
Red Fox	*Vulpes vulpes*	Yes	Not listed	Not listed
Swamp Wallaby	*Wallabia bicolor*		Not listed	Not listed

4.2.9. Forest owl surveys

4.2.9.1. Methods

Forest owl surveys were conducted for Barking Owl, Masked Owl, and Powerful Owl in winter 2021 using call playback (34 person hours) and songmeters (167 nights). This survey effort was supplemented by extensive spotlighting surveys (465.4 km), as described above.

Call playback sequence included calls of all three species, with periods of 2-5 mins of continuous calls broadcast at ~ 110% of natural volume interspersed with periods (2-5 mins) of silence to listen between each species. Simultaneously, spotlighting searches on foot were conducted to search for owls. Spotlighting was conducted along transects through potential habitat areas to provide a total survey of approximately 30 minutes with two observers at each location.

Across the wind farm and alternate access route 17 sites were surveyed on two occasions each (total 34 surveys) at the locations shown in Figure 29 and presented in Table 26.

Table 26 Call playback survey summary

Wind farm cluster	Date	Staff
Mount Hope	21-Jun-21	Dan McKenzie, Alex Pursche
Mount Hope	21-Jun-21	Dan McKenzie, Alex Pursche
Mount Hope	22-Jun-21	Dan McKenzie, Tom Kelly
Mount Hope	22-Jun-21	Dan McKenzie, Tom Kelly
Mount Hope	22-Jun-21	Alex Pursche, Alice Si
Girragulang Road	22-Jun-21	Alex Pursche, Alice Si
Girragulang Road	23-Jun-21	Alex Pursche, Alice Si
Girragulang Road	23-Jun-21	Alex Pursche, Alice Si
Girragulang Road	23-Jun-21	Tom Kelly, Alice Si

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Wind farm cluster	Date	Staff
Girragulang Road	23-Jun-21	Tom Kelly, Alice Si
Girragulang Road	25-Jun-21	Alex Pursche, Alice Si
Girragulang Road	25-Jun-21	Alex Pursche, Alice Si
Girragulang Road	26-Jun-21	Alex Pursche, Alice Si
Leadville	26-Jun-21	Alex Pursche, Alice Si
Leadville	28-Jun-21	Dan McKenzie, Alice Si
Leadville	28-Jun-21	Dan McKenzie, Alice Si
Leadville	28-Jun-21	Alex Pursche, Sophie Montgomery
Leadville	29-Jun-21	Dan McKenzie, Alice Si
Leadville	29-Jun-21	Dan McKenzie, Alice Si
Leadville	29-Jun-21	Alex Pursche, Sophie Montgomery
Leadville	29-Jun-21	Alex Pursche, Sophie Montgomery
Leadville	30-Jun-21	Sophie Montgomery, Dan McKenzie, Finley Woodforth
TXL	30-Jun-21	Sophie Montgomery, Dan McKenzie, Finley Woodforth
TXL	02-Aug-21	Alex Pursche, Liam Scanlan
Leadville	02-Aug-21	Alex Pursche, Liam Scanlan
Leadville	03-Aug-21	Sophie Montgomery, Janene Devereaux
TXL	03-Aug-21	Sophie Montgomery, Janene Devereaux
TXL	03-Aug-21	Alex Pursche, Liam Scanlan
TXL	03-Aug-21	Alex Pursche, Liam Scanlan
Leadville	03-Aug-21	Alex Pursche, Liam Scanlan
Leadville	04-Aug-21	Sophie Montgomery, Janene Devereaux
TXL	04-Aug-21	Sophie Montgomery, Janene Devereaux
TXL	10-Sep-21	Alex Pursche, Dan McKenzie

Eleven songmeters were set out to supplement call playback and spotlighting surveys (as described above). Each songmeter was fixed to a tree in large patches of woodland or forest vegetation, and set record audio data from sunset to sunrise. Songmeters were generally set out for between 14 and 16 days, with a total survey effort of 167 nights across the wind farm (Table 27).

Table 27 Songmeter audio data summary

Unit ID	Set date	Collection date	Days in situ
Firetail	20210623	20210707	14
Lotus	20210623	20210709	16
Lionfish	20210622	20210707	15
Spicebush	20210622	20210708	16
Wombat	20210622	20210707	15
Bustard	20210622	20210708	16

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Unit ID	Set date	Collection date	Days in situ
Flannyflower	20210625	20210710	15
Wedgie	20210626	20210711	15
Toadfish	20210629	20210714	16
Hibbertia	20210629	20210713	15
Heleioporus	20210630	20210713	14

All songmeter data was analysed using clustering software (Wildlife Acoustics Kaleidoscope Pro v5.4.2) to assist the analysis of acoustic recordings for detection of Masked Owl and Barking Owl only. Powerful Owl was not undertaken in this analysis, as the open farmland habitats are unsuitable for the species. This software efficiently locates targeted signatures based on user defined parameters, allowing time to be spent examining potential vocalisations of target species rather than sifting through sound generated by other sources. The data was analysed by ELA senior ecologist May-le Ng, who is experienced in acoustic analysis, owl surveys and familiar with the vocalisations of the target species.

The search parameters used to search for the call signatures of each species are included in Table 28. These values are based on reference calls known to belong to each species from a variety of habitats and locations within the species' range to account for call types and variations (Appendix L).

Table 28: Signal parameters for Masked Owl and Barking Owl

Parameter	Masked Owl	Barking Owl
Minimum Frequency (Hz)	1,500	0
Maximum Frequency (Hz)	5,512	2,000
Minimum Length of Detection (s)	0.65	0.3
Maximum Length of Detection (s)	2	0.577
Maximum inter-syllable gap (s)	0.35	0.115
Cluster analysis settings (Default except):	FFT Window 21.33ms max clusters = 2,000	FFT Window 21.33ms max clusters = 2,000
Computer resources	1/9	1/9

Recording data was combined with the reference call dataset and the search parameters were applied within Kaleidoscope Pro. The software builds groups of similar signals (clusters), with the most common signal type matching the search parameters grouped into the first cluster. Clusters are only built if there are enough similar signals to form a cluster so the addition of reference data assists in building clusters that are relevant to the target species, which are sometimes rare in the landscape and therefore may otherwise be missed if there aren't enough signals to form a cluster. It is noted that call playback, a technique where reference calls are broadcast into the environment via a speaker to initiate a response from the target species, was used at some recorder stations during field surveys and captured within the recording data. The call playback can therefore also be detected during the analysis.

Analysis for the target species occurred separately as each species requires a different set of signal parameters. Analysis for each recorder station continued until the presence of the target species was confirmed via call detections, or the end of recordings was reached. Analysis of data for a recorder

station ceased for a given target species once that species was detected within recordings from that station.

For efficiency, examination of results focussed on clusters that contained reference calls. We assume that clusters without reference calls are unlikely to contain calls of the target species because a cluster is a group of similar signals and calls from target species should be similar enough that they are clustered with reference calls.

To note, analysis of acoustic recordings can identify the presence of a species near an acoustic recorder station. The absence of calls or other recognisable sounds emitted by a species within the recordings does not confirm the absence of the species from the study area.

Masked owl vocalisations can be described as screeches and chatters. Plate 1 provides a visual representation (spectrogram) of example Masked Owl calls.

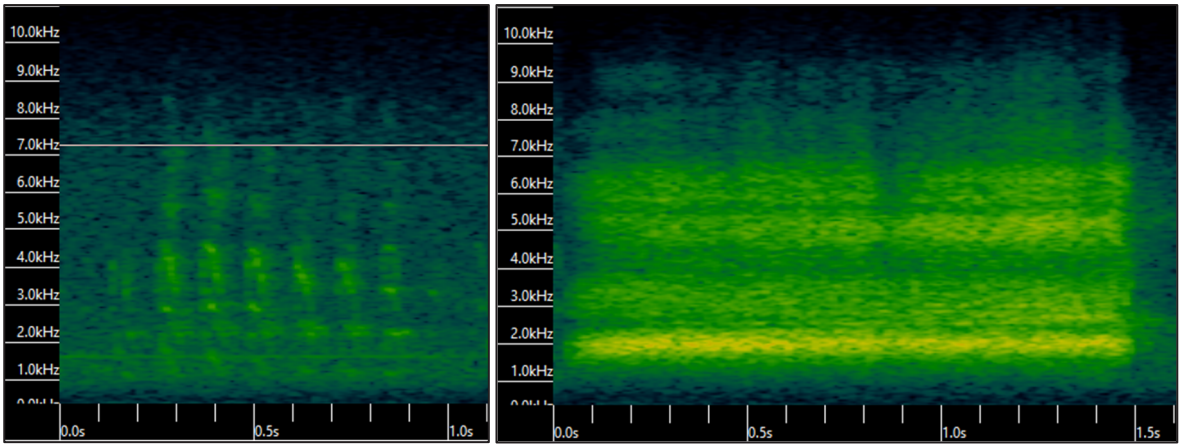


Plate 1: Spectrogram of Tyto novaehollandiae chatter (left) and screech (right) examples (Bird Observers Club of Australia, 2007) viewed in Kaleidoscope Pro v5.4.2 (Wildlife Acoustics)

Barking Owl vocalisations can be described as a quick, dog-like bark, a tremulous scream or trilling. Plate 2 provides a visual representation (spectrogram) of example Barking Owl calls.

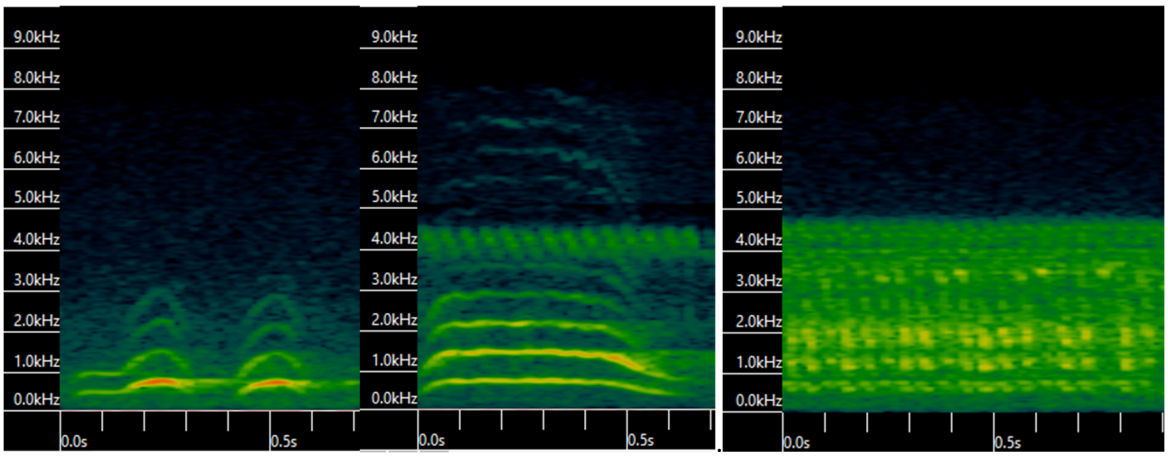


Plate 2: Spectrogram of *Ninox connivens* call (left), scream (centre), trill (right) examples (Bird Observers Club of Australia, 2007) viewed in Kaleidoscope Pro v5.4.2 (Wildlife Acoustics)

4.2.9.2. Results

Call playback at 34 event sites did not prompt any response from Masked Owl, Barking Owl, or Powerful Owl. Commonly encountered species included Barn Owl, Southern Boobook, and domestic dogs.

Over 2,438 hours (over 101 days) of songmeter recording data was collected across the study area by 11 acoustic sound recorders between 19 January and 14 July 2021, inclusive. Table 29 summarises the data collected at each recorder station and across the project.

Table 29: Summary of recorded data

Site	Number of files	Total length of recording
BUSTARD	248	10 days 4 hours 21 mins
FIRETAIL	211	8 days 11 hours 52 mins
FLANNYFLOWER	224	9 days 5 hours 27 mins
HELEIOPORUS	198	8 days 1 hours 28 mins
HIBBERTIA	198	8 days 1 hours 43 mins
LIONFISH	245	9 days 14 hours 34 mins
LOTUS	236	9 days 15 hours 38 mins
SPICEBUSH	245	10 days 0 hours 21 mins
TOADFISH	229	9 days 6 hours 38 mins
WEDGIE	230	9 days 10 hours 11 mins
WOMBAT	234	9 days 14 hours 28 mins
All	**2,498**	**101 days 14 hours 46 mins**

When all recordings, including reference calls, were scanned using the parameters in Table 28, 143,738 signals were detected. When the cluster analysis was run, 74,873 of those signals were used to form 104 clusters. Of these, 63 clusters contained reference calls (36,301 target signals). Of the target signals, 26,800 signals were manually checked for Masked Owl calls. Commonly encountered sounds within the target signals included those emitted by Barn Owl, Feral Pig, Common Brushtail Possum, Red Fox, Eastern Grey Kangaroo, Cow, Sheep and Sulphur-Crested Cockatoo. Call playback for Masked Owl was detected at LOTUS, SPICEBUSH AND HELEIOPORUS, providing confidence that detection of Masked Owl would occur if they are present within the recording dataset. Masked Owl was not detected.

When all recordings, including reference calls, were scanned using the parameters in Table 28, 162,938 signals were detected. When the cluster analysis was run, 121,462 of those signals were used to form 331 clusters. Of these, 187 clusters contained reference calls (35,034 target signals, further refined to 27,258 target signals once Barking Owl was confirmed at a site and the remainder of that site data was removed from analysis). Of the target signals, 20,044 signals were manually checked for Barking Owl calls. Commonly encountered sounds within the target signals included those emitted by Dog, Cow, Torresian Crow, Australian Magpie, Eastern Grey Kangaroo and various pigeon species. Dogs were prevalent in the recordings at WEDGIE, SPICEBUSH, TOADFISH, HIBBERTIA, HELEIOPORUS and FLANNYFLOWER. Call playback for Barking Owl was detected at LOTUS and SPICEBUSH, providing confidence that detection of Barking Owl would occur if they are present within the recording dataset.

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Barking Owl was detected at three songmeters within the Mount Hope cluster, at the location shown on (Figure 30).

4.2.10. Koala surveys

26 Koala Spot Assessment Technique (Phillips and Callaghan 2011) surveys were completed in June 2021 targeting areas that represent the highest quality and most connected habitat across the wind farm. For each SAT survey, a central tree was selected. A search of the ground within 1 m of the base of the centre tree and the nearest 29 trees (>10cm DBH) was undertaken for Koala faecal pellets. Approximately 2 person minutes of search effort was undertaken at each tree. A total of 780 trees were inspected as detailed in Appendix M.

The *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guid*e (DPE, 2022) was published more than 6 months after completion of the original 26 SAT surveys and submission of the BDAR. Item 4 of the Biodiversity Offsets Scheme Accredited Assessor Update 36 (DPIE, 2020) stipulates; "Where survey has been completed prior to the publication of a survey guide, the Department expects the assessor (or surveyor) to have applied current best-practice in searching for the target species (in accordance with BAM s6.5.1.4)". As ELA applied best-practice when undertaking the original koala survey efforts, the surveys undertaken can still be considered valid. However, in recognition of the species importance an additional 22 SAT surveys were completed bringing the total to 48 SAT surveys undertaken involving approximately 1,440 trees.

No evidence of Koala was recorded and no further analysis has been undertaken.

4.2.11. Reptile surveys

Active searches were undertaken for reptiles in all areas of potential rocky habitat at suitable locations in September 2021. Potential habitat was rocky outcrops that contain loosely embedded rock (i.e. rocks that could be turned to search). A total of approximately 50 rocks were turned at each location (if available) across the study area. Other outcrops within the development site only contain larger, deeply embedded boulders and were not considered suitable habitat.

A total of ten surveys searching 50 rocks at each location was undertaken. At the time of survey the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft* (DEC, 2004) was the currently appropriate survey guidelines. This guideline indicates in section 5.3.4.ii.a that survey effort should be replicated for a single survey for every 200ha of habitat (for sites west of the ranges). Based on the predicted species habitats for reptiles, a total of 282 ha of habitat is present within the development site. As such only two survey sites are required for this project. Based on a 30 minute survey at two sites (total 1 hour searching), the current survey effort conducted at ten sites exceeds the survey requirement for *A. parapulchella*.

No threatened reptiles were recorded during the targeted survey.

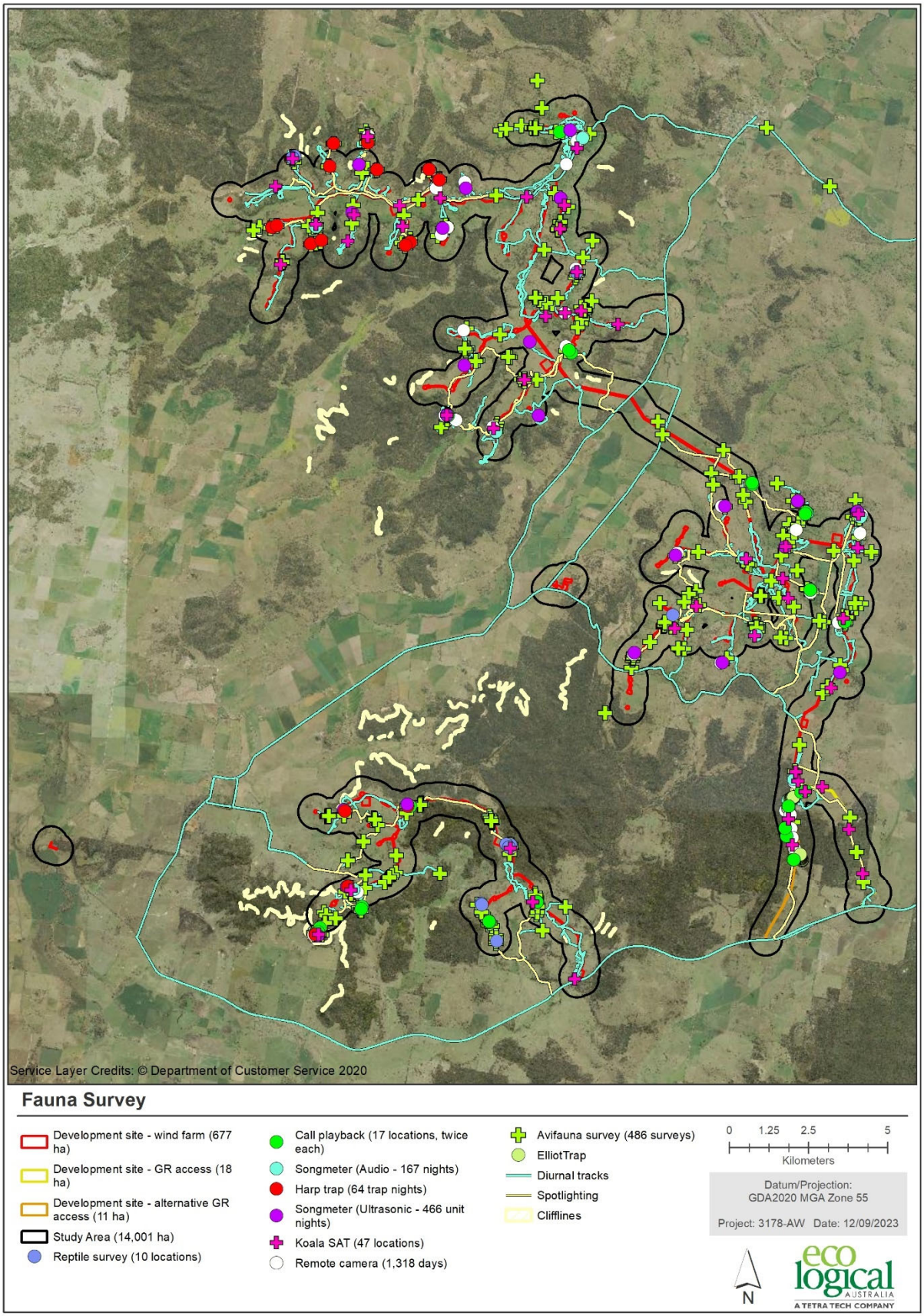


Figure 29 Fauna survey effort

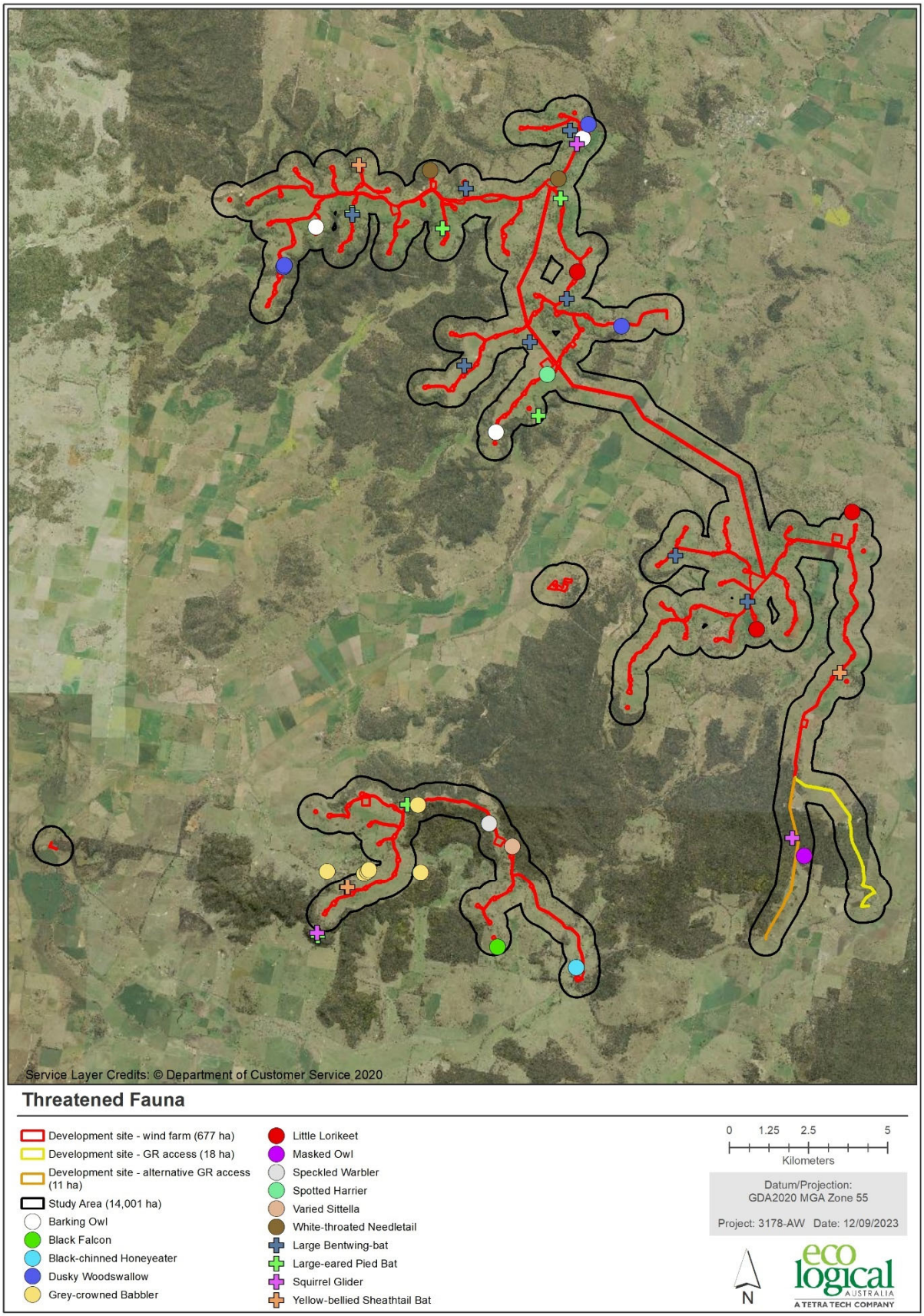


Figure 30 Threatened fauna

4.3. Species credit summary

Following completion of targeted surveys, the species credit species that are present on the development site are outlined in Table 30 and shown on Figure 31 to Figure 36. Species credit species polygons have been derived using the predicted PCTs in which each species occurs as well as any buffers or guidance provided in TBDC or threatened species survey guides.

Table 30: Species credit species included in the assessment

Species	Common Name	Species polygon mapping method	Number of individuals / Habitat (ha) in study area	Biodiversity Risk Weighting
Chalinolobus dwyeri	Large-eared Pied Bat	Breeding habitat is 100m from cliffs and escarpments, foraging habitat species polygon includes 2km from cliffs and escarpments. All PCTs where the species is predicted included in the analysis (PCT 267, 281 only)	0 ha potential breeding habitat along clifflines impacted by the project 3.94 ha of foraging habitats	3
Hoplocephalus bitorquatus	Pale-headed Snake	Assumed present in PCT84 due to new areas in the development footprint.	1.04 ha of habitat present.	2
Miniopterus orianae	Large Bentwing-bat	Breeding habitat is 100m from 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".	0 ha of potential habitat identified within 100m of the development site.	3
Tyto novahollandiae	Masked Owl	A 100m buffer has been applied to potential nest trees which includes trees with hollows >200mm and includes all woodland and forest vegetation within predicted PCTs including PCT84 and 281 only	9.95 ha	2
Ninox connivens	Barking Owl	A 100m buffer has been applied to potential nest trees which includes trees with hollows >200mm and includes all woodland and forest vegetation within predicted PCTs including PCT84, 281, 479, 483 only	130.37 ha	2
Ninox strenua	Powerful Owl	A 100m buffer has been applied to potential nest trees which includes trees with	9.95 ha	2

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Species	Common Name	Species polygon mapping method	Number of individuals / Habitat (ha) in study area	Biodiversity Risk Weighting
		hollows >200mm and includes all woodland and forest vegetation within predicted PCTs including PCT84 and 281 only		
Petaurus norfolcensis	Squirrel Glider	All habitat is mapped as being all woodland and forest within PCTs where the species is associated including PCT84 & 281 only.	14.12 ha	2

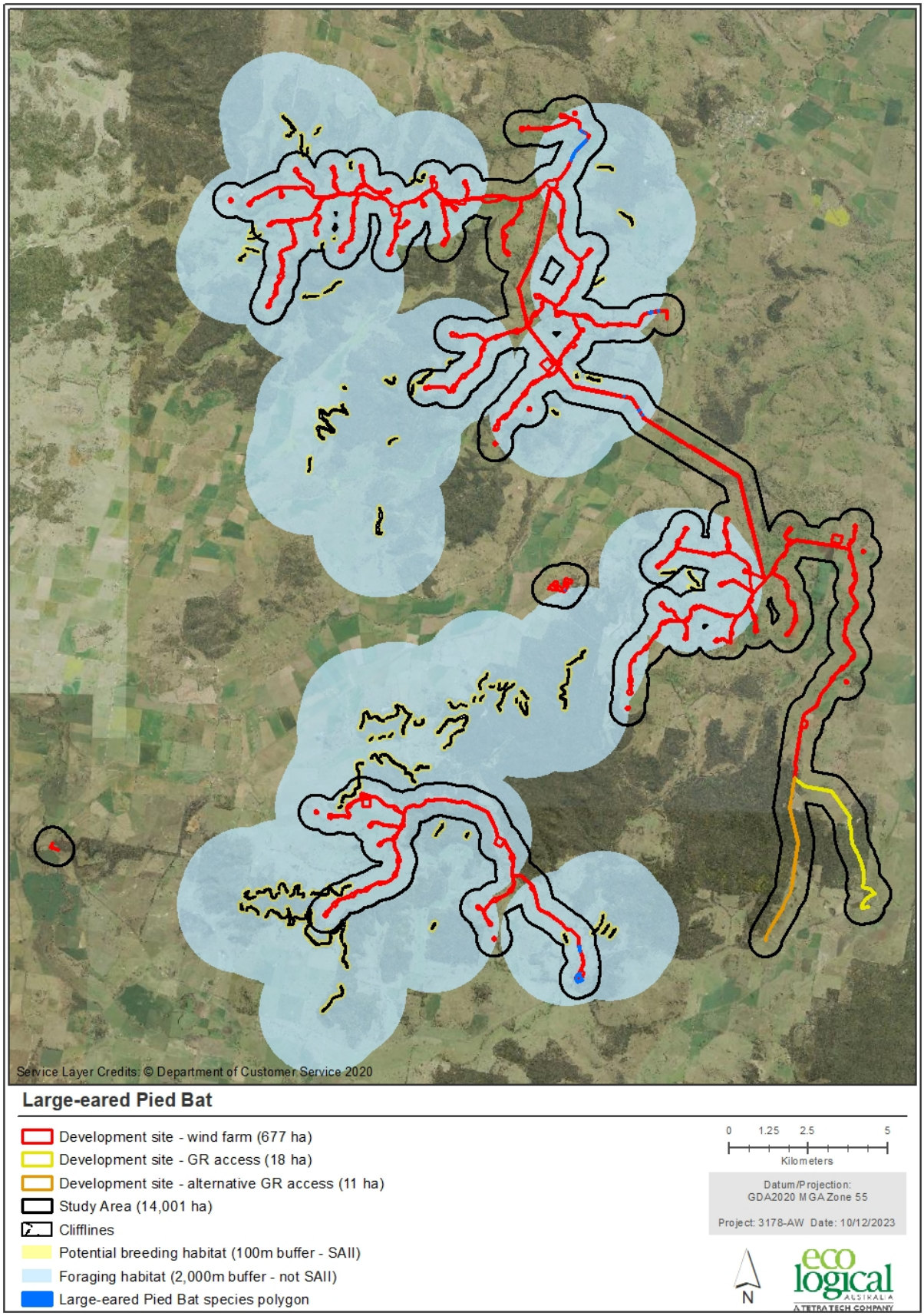


Figure 31 Large-eared Pied Bat species polygon

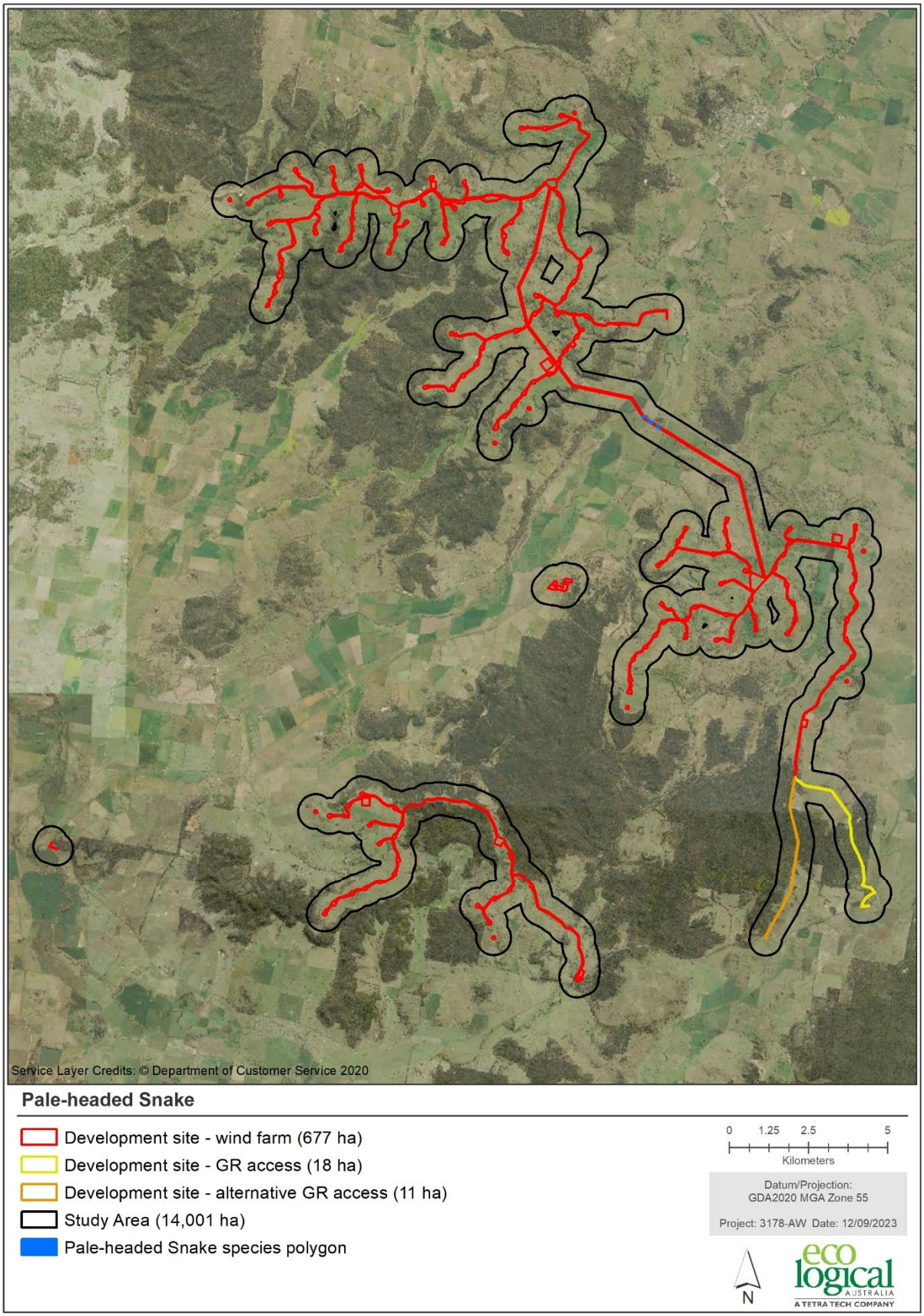


Figure 32 Pale-headed Snake species polygon

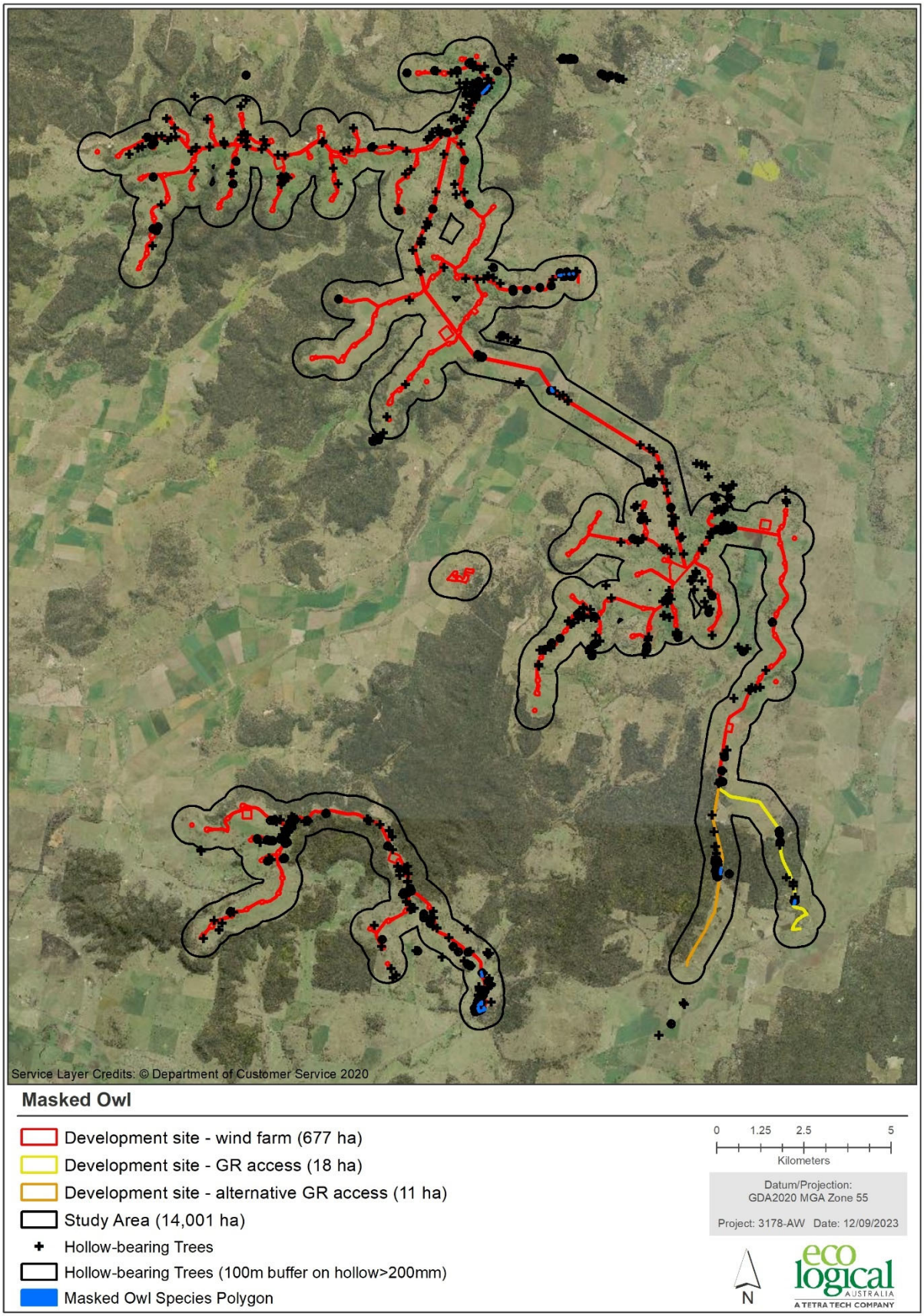


Figure 33 Masked Owl species polygon

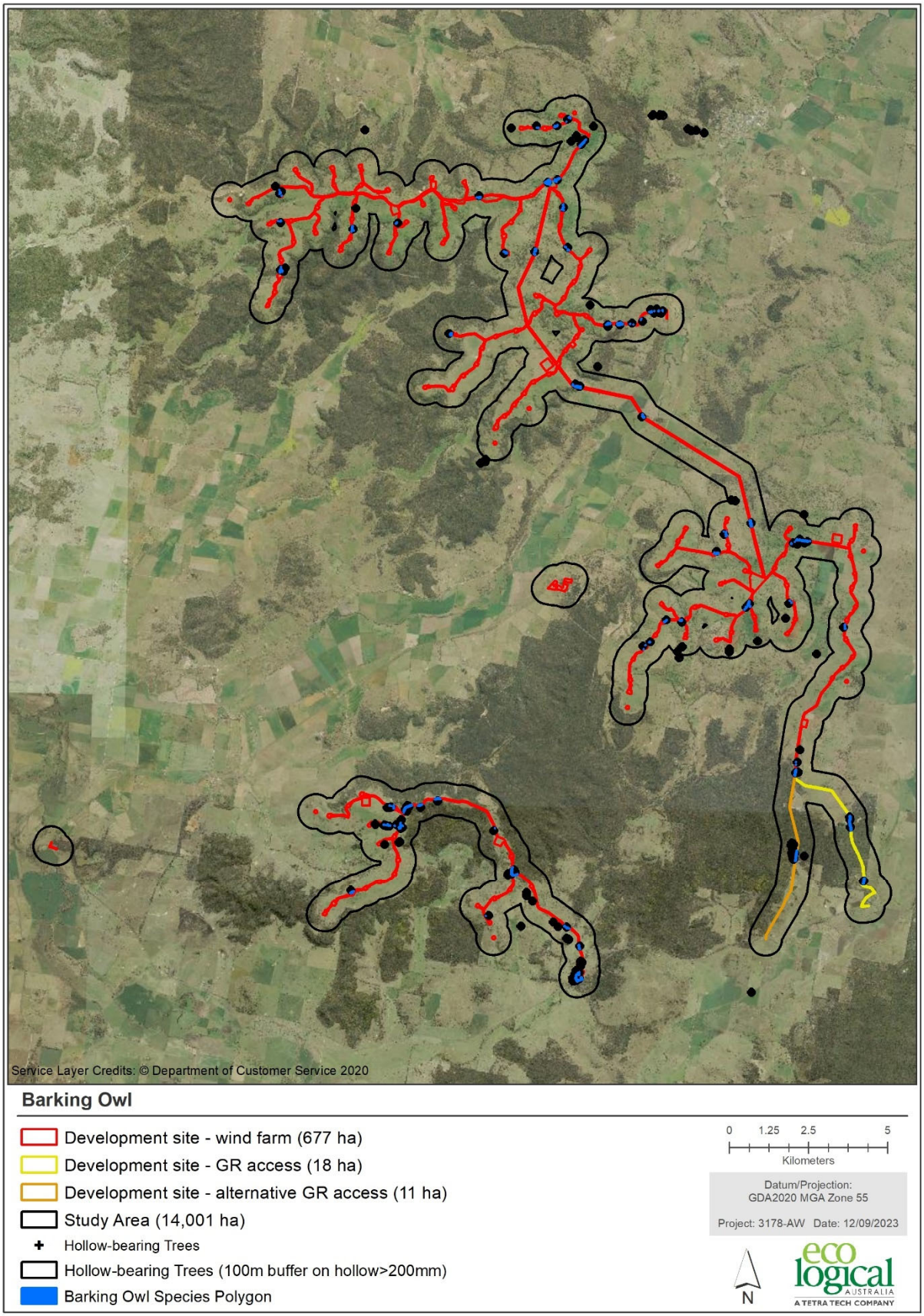


Figure 34 Barking Owl species polygon

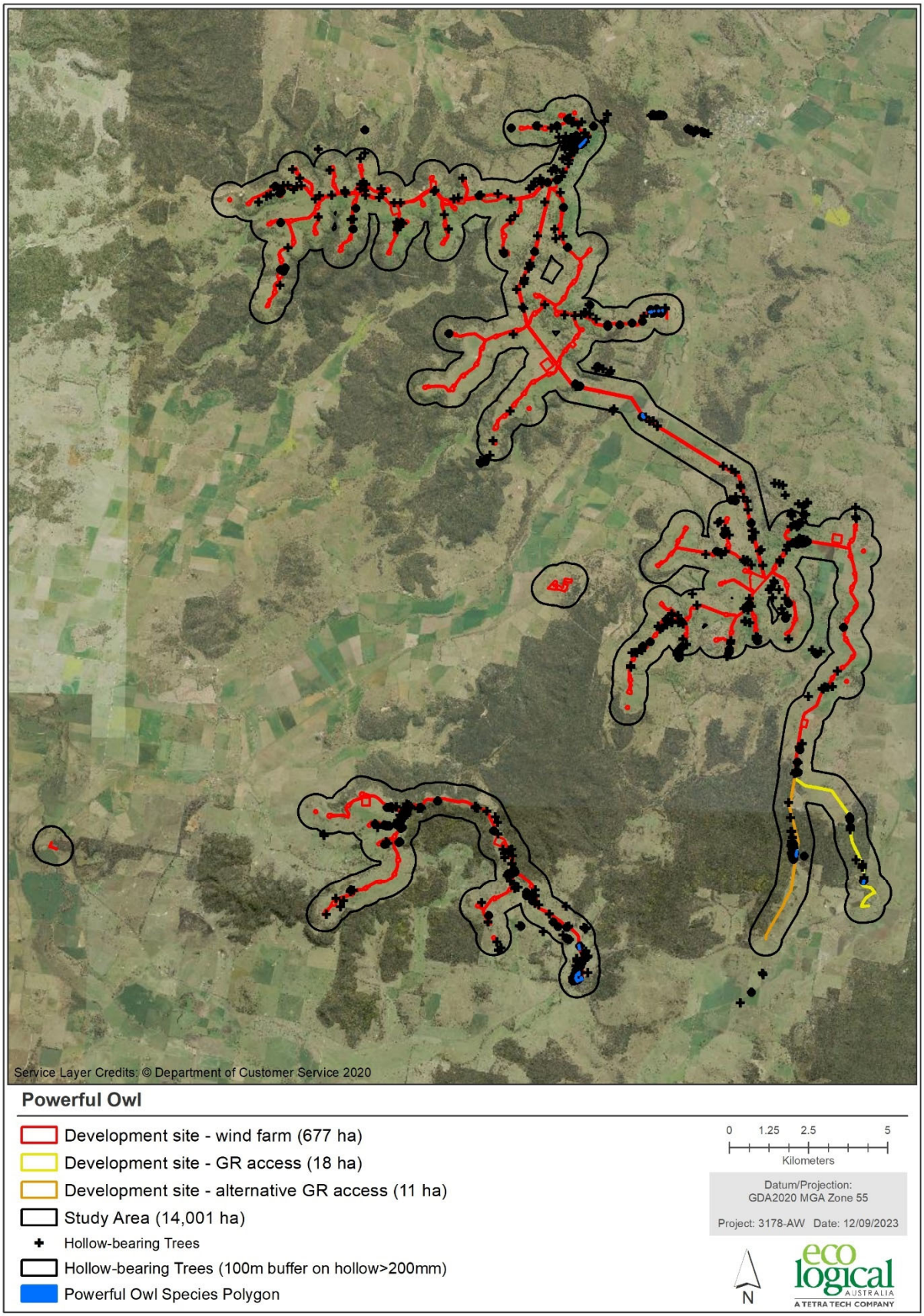


Figure 35 Powerful Owl species polygon

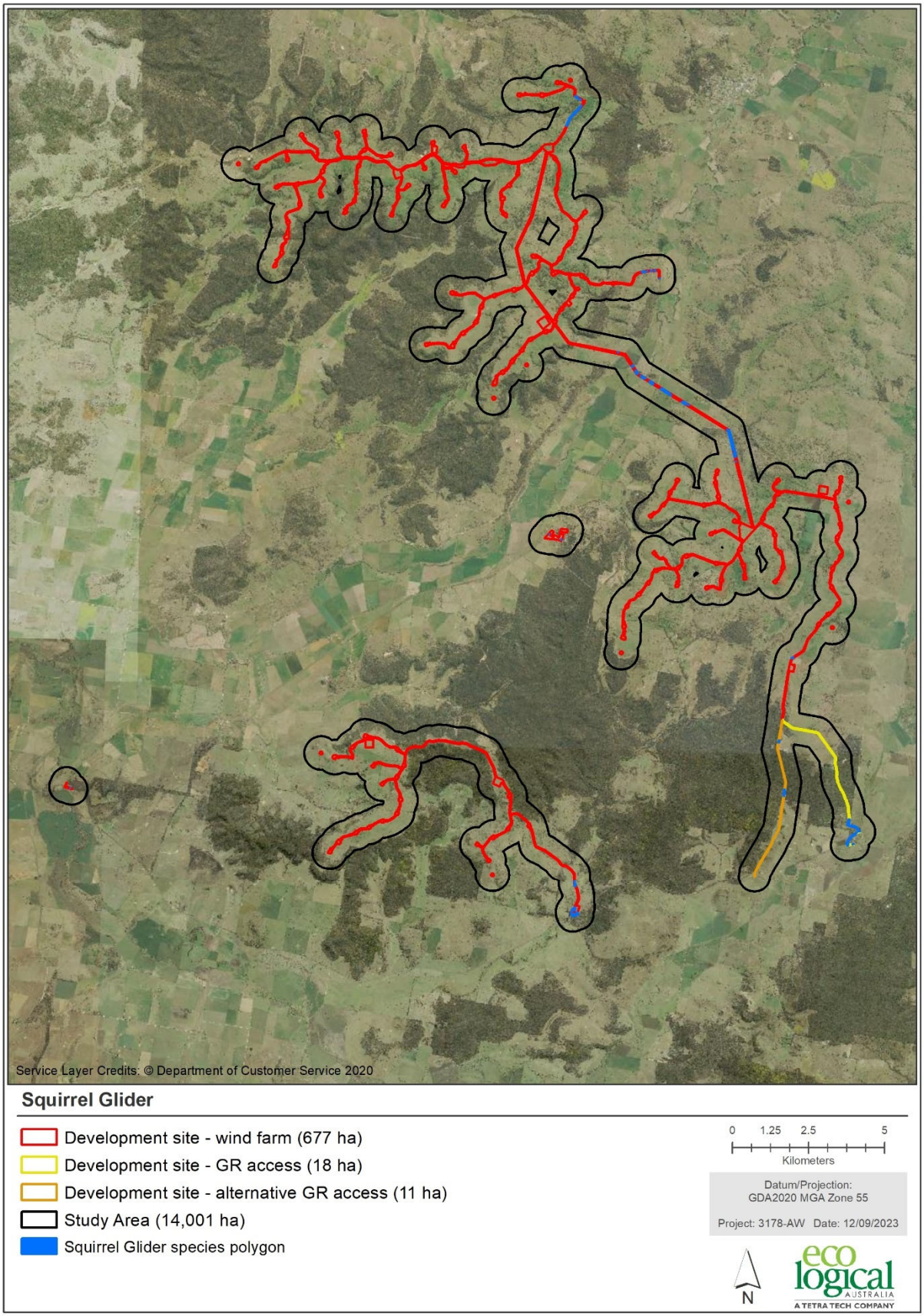


Figure 36 Squirrel Glider species polygon

4.4. Expert reports

No expert reports have been used in the preparation of this BDAR.

5. Prescribed impacts

5.1. Identification of prescribed additional biodiversity impact entities

Prescribed additional biodiversity impacts (prescribed impacts) must be assessed as part of the Biodiversity Offsets Scheme (BOS), as per clause 6.1 of the BC Regulation. Such prescribed impacts (including direct and indirect impacts) are impacts:

- on the habitat of threatened entities including:
    - karst, caves, crevices, cliffs, rocks and other geological features of significance, or
    - human-made structures, or
    - non-native vegetation
- on areas connecting threatened species habitat, such as movement corridors
- that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)
- on threatened and protected animals from turbine strikes from a wind farm
- on threatened species or fauna that are part of a TEC from vehicle strikes.

A review of the likely prescribed impacts of the Project have been undertaken as described in Table 31 below.

Table 31 Prescribed impact review

Prescribed impact	Requirement for consideration	Response
Karst, caves, crevices, cliffs, rocks and other geological features of significance.	If karst, caves, crevices, cliffs, rocks or other geological features of significance are on the site, the assessor must: • prepare a list of threatened entities that use or are likely to use these habitat features on the subject land and within the surrounding assessment area • describe how these features provide habitat for, or are used by, each threatened entity (based on published literature and other reliable sources).	There are no Karst or other areas of geological significance within the development site. All areas of caves, crevices, cliffs, and rocks, and their appropriate buffer zones, have been avoided through detailed design. Threatened species likely to use these cliffs and crevices as potential foraging habitats includes Large Bentwing-bat and Large-eared Pied Bat, both of which were recorded in low numbers across the site. There are no breeding roosts identified for each of these species within the development site. No additional assessment has been undertaken for this prescribed impact.
Human-made structures and non-native vegetation	If human-made structures (e.g. bridges, culverts, abandoned buildings) and non-native vegetation (e.g. camphor laurel trees) provide habitat for threatened species, the assessor must: • provide a description of the type of human-made structure or non-native vegetation habitat • prepare a list of threatened species that use these features as habitat • describe how each threatened species could, or does, use the human-made structure or non-native vegetation as habitat (based on published literature and other reliable sources).	There are no bridges, culverts, abandoned buildings, or non-native vegetation that provide habitat for threatened fauna species within the development site. There are no areas of human-made habitats or vegetation that provide habitats for threatened flora species within the development site. No additional assessment has been undertaken for this prescribed impact.

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Prescribed impact	Requirement for consideration	Response
Habitat connectivity	The assessor must use the map of native vegetation cover to identify areas of habitat connectivity between the subject land and the assessment area. Where corridors or other areas of connectivity link habitat for threatened entities, the assessor must: • prepare a list of threatened entities that are likely to use or are a part of the connectivity or corridor • describe the importance of the connectivity to threatened entities, particularly for maintaining movement that is crucial to the species' life cycle (based on published literature and other reliable sources).	Areas of connectivity have been identified throughout the study area, as shown on Figure 6 and Figure 23. Threatened species likely to use these areas of habitat connectivity include: • Barking Owl • Masked Owl • Squirrel Glider • Dusky Woodswallow • Speckled Warbler • Grey-crowned Babbler (Eastern subspecies) All of these species are highly mobile and will be unaffected by the Project. Revision of the development site has removed the requirement to develop a large transmission easement which would have affected Squirrel Glider. The removal of this requirement will maintain connectivity between two large patches of burned forest. If developed, the alternative access to Girragulang Road will require development of a 10m wide easement which is easily traversable by the species. The remaining two portions of this forest however are both of sufficient size to allow the species to persist.
Water bodies, water quality and hydrological processes	Where water bodies or any hydrological processes that sustain threatened entities occur on the subject land, the assessor must: • prepare a list of threatened entities that may use or depend on water bodies or hydrological processes for all or part of their life cycle, or • prepare a list of threatened entities that will be, or are likely to be impacted by changes to existing water bodies or hydrological processes or the construction of a new water body • describe the habitat provided for each threatened entity by the water body or hydrological process, including consideration of water quality, volume, flow paths and seasonal patterns (based on published literature and other reliable sources).	The project will not affect water bodies, water quality, or any hydrological processes. All crossings within the wind farm are across ephemeral paddock drainages and will not affect any permanent waterbodies. Crossings of the Coolaburragundy River will be spanned by transmission lines, with no proposed disturbance within the riparian zone itself.

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Prescribed impact	Requirement for consideration	Response
Wind farm developments	For a wind farm development, the assessor must identify a list of protected animals that may use the development site as a flyway or migration route, including: • resident threatened aerial species • resident raptor species • nomadic and migratory species that are likely to fly over the proposed development site. For the species identified above, the assessor must perform a targeted survey: • using appropriate methods as per Section 5.3 (of the BAM) • using methods that measure movement of a species (e.g. ultrasonic bat detectors on monitoring masts or other structures of suitable height) • at times of the year appropriate for identifying the species • as part of an ongoing monitoring program post development approval, and/or • in accordance with any guide published by the Department for this purpose. The technique, effort and timing of targeted surveys for each species must be documented and justified in the BAR. Based on the outcomes of the targeted surveys, the assessor must: • predict and map the habitual flight paths for nomadic and migratory species likely to fly over the proposed development site on the Site Map and Location Map • map the likely habitat for resident threatened aerial and raptor species on the Site Map.	Detailed assessment undertaken for this prescribed impact as described in Chapter 6 of this report.

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Prescribed impact	Requirement for consideration	Response
Vehicle strikes	Where the proposal may result in vehicle strike on threatened fauna, or animals that are part of a TEC, the assessor must: • a. identify potential impact locations on the Site Map, and • b. prepare a list of threatened fauna or animals that are part of a TEC at risk of vehicle strike.	The project will manage vehicle movement through a Construction Environment Management Plan including a Traffic Management Plan to facilitate movement of all componentry from the port of Newcastle to the development site. High strike risk traffic and movement (speeds >60km/h) will be undertaken on existing formed roads, and will not increase the risk of vehicle strike on threatened fauna or animals that are part of a TEC, beyond that which currently exists. All new roads within the Project will be trafficked at a slower speed (likely <40km/h) and will unlikely lead to any increased risk of vehicle strike.

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6. Prescribed impacts due to Wind Farm Developments

In order to assess the likely prescribed Wind Turbine Strike impacts of the Project, a series of detailed site investigations were undertaken to identify protected resident and nomadic animals and the likely impact on those species. In order to assess the likely impacts on aerial species, the following tasks were undertaken:

- Bat activity monitoring
- Bird utilisation monitoring
- Baseline collision risk assessment
- Collision strike modelling for at risk species

6.1. Bat activity monitoring

Horizontal and vertical bat activity modelling was undertaken within the Project area in two survey events:

1. Horizontal bat activity monitoring using ultrasonic detectors at ground level over Summer 2020/2021; and

2. Vertical bat activity monitoring using ultrasonic detectors at fixed heights on metmasts.

Specific methods of each bat monitoring approach are detailed below.

6.1.1. Horizontal bat activity monitoring methods

Horizontal bat survey methods are described in Section 4.2.6.

6.1.2. Vertical bat activity monitoring

Bat activity monitoring was undertaken at two metmasts within the study area, one at Girragulang Road and one at Mount Hope. Each metmast has been temporarily constructed to record pre-construction wind data within the wind farm.

On each metmast, three ultrasonic detectors were fixed in a westerly direction, to measure bat activity:

- At approximately 2m above ground level, a Songmeter Mini Bat Ultrasonic Recorder (Wildlife Acoustics™)
- At approximately 50m, a SMM-u2 ultrasonic microphone was fixed to the mast and connected to a SM4BAT FS Recorder (Wildlife Acoustics™) at ground level via a 50m extension cable.
- At approximately 100m, a SMM-u2 ultrasonic microphone was fixed to the mast and connected to a SM4BAT FS Recorder (Wildlife Acoustics™) at ground level via two 50m extension cables.

All cables were fixed to the mast using nylon and stainless steel cable ties every 1m, and any connections in cables were secured using thread-locker and self-amalgamating tape to prevent unwanted disconnection. All three microphones were positioned in a westerly direction, towards the centreline between metmast cables. SM4BAT units were selected for recording data at height as they have the benefit of microphone extension cables, allowing regular data downloading without climbing the mast.

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For simplicity of operation, a Songmeter Mini Bat was used at the base. Both units have similar sensitivity profiles, and are not expected to provide different results (Figure 37).



Photograph 40 SMM-U2 ultrasonic microphone fixed to metmast



Photograph 41 SM4BAT devices fixed to base of metmast

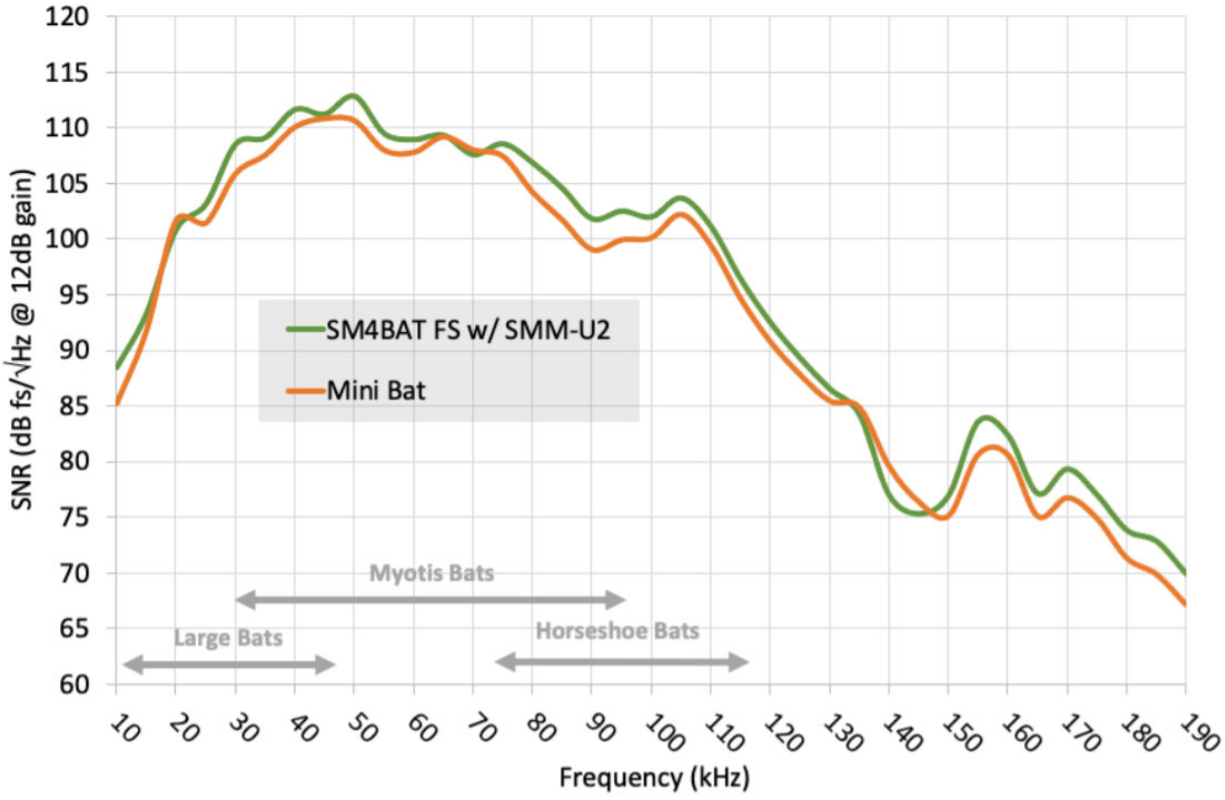


Figure 37 Comparative ultrasonic microphone sensitivity on SM Mini Bat (orange line) and SM4BAT (green line) (Wildlife Acoustics)

Temperature data was measured on each metmast at 10m and 104m above ground height. Wind speed data was measured at 30, 50, 70, 89, and 108.3m above ground level. Wind direction, humidity, and air pressure was also recorded on each metmast but the data is not presented in this report. All data was recorded every 10 minutes and consolidated by calendar date. Data was then truncated to only include data from 1800 – 0650, to provide minimum temperature and average wind speeds each evening. Weather data collected at the Girragulang Road metmast is shown on Figure 38 and Figure 39. Weather data collected at the Mount Hope metmast is shown on Figure 40 and Figure 41.

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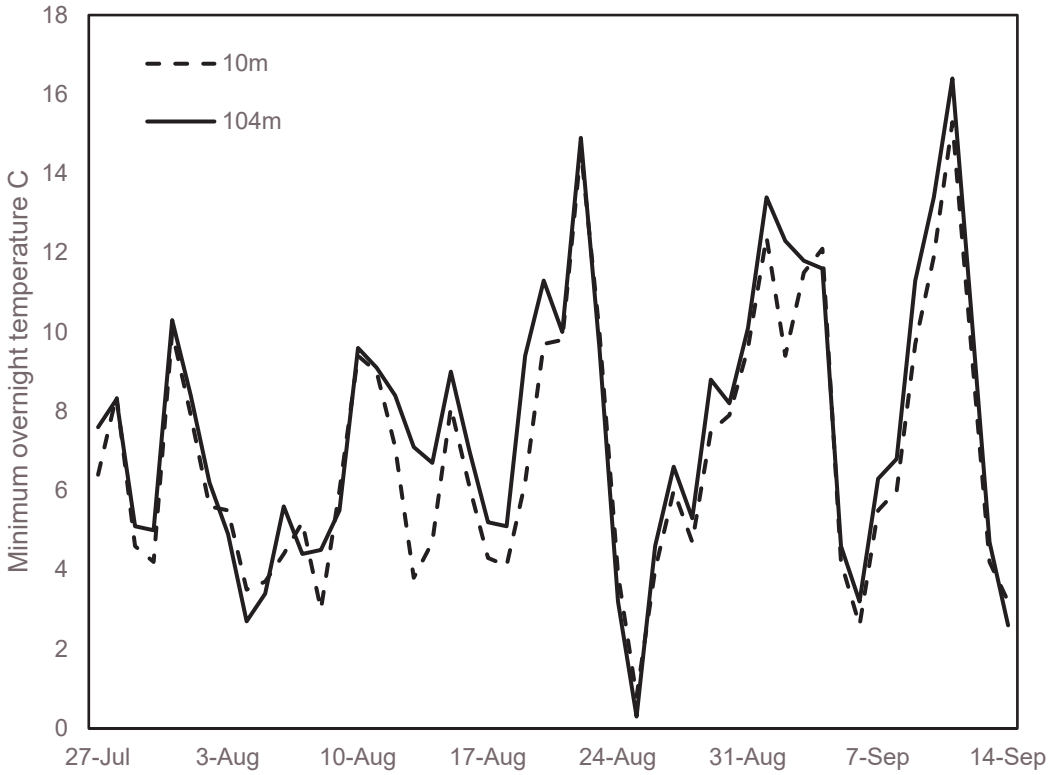


Figure 38 Minimum overnight temperature at Girragulang Road metmast

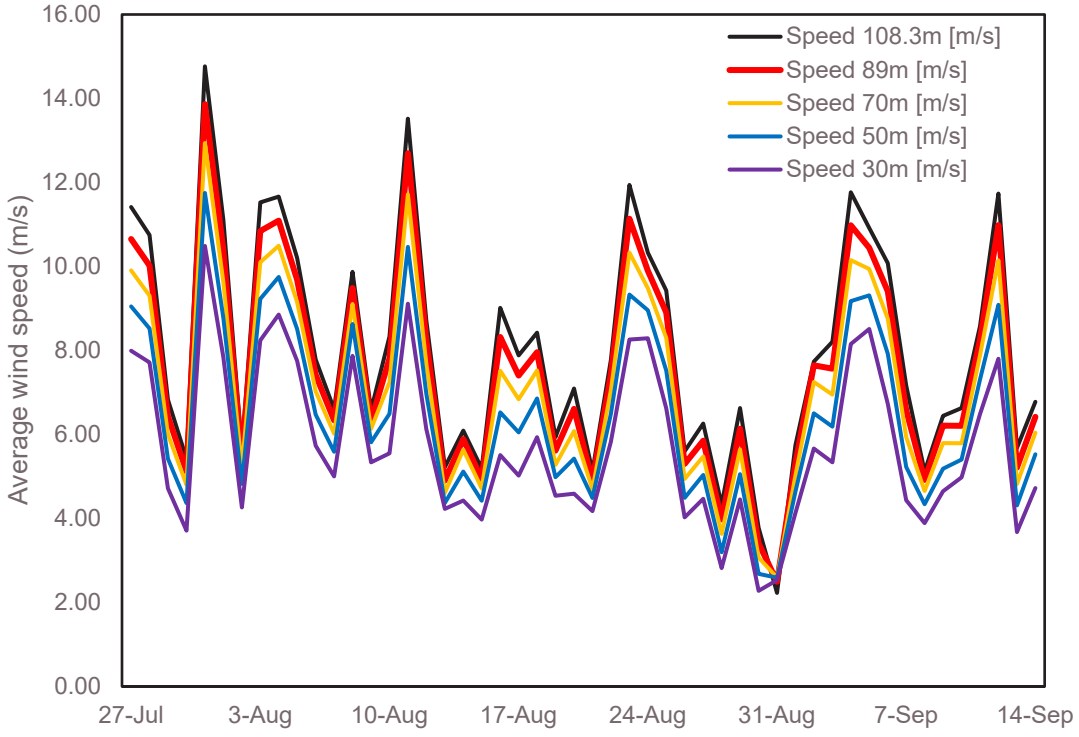


Figure 39 Average overnight windspeed at Girraguland Road metmast

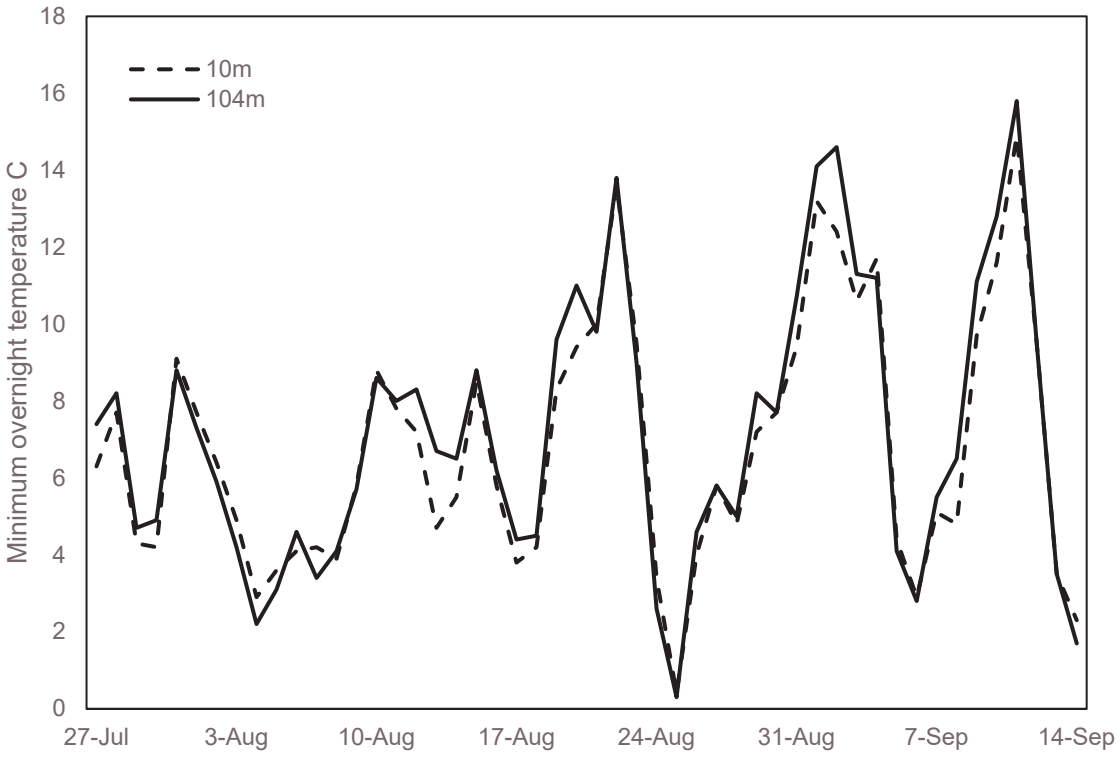


Figure 40 Minimum overnight temperature at Mount Hope metmast

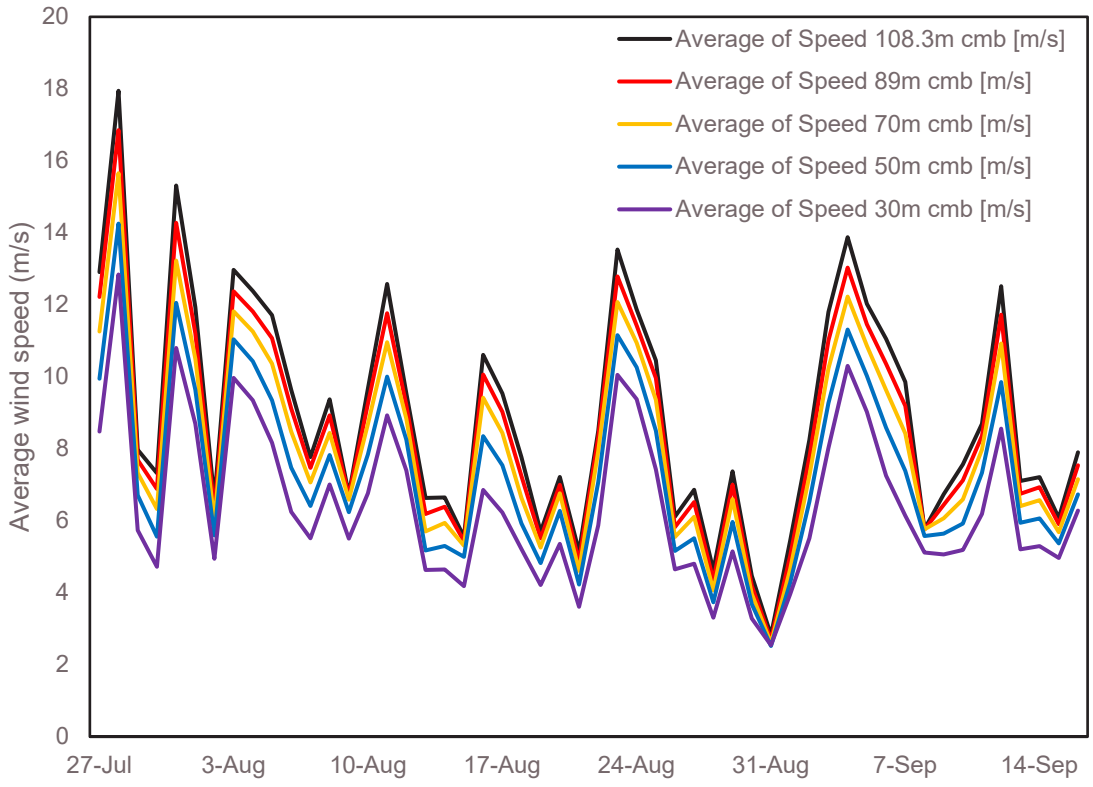


Figure 41 Average overnight windspeed at Mount Hope metmast

6.1.3. Bat monitoring results

All bat data was analysied by Greg Ford at Balance! Environmental.

Horizontal bat surveys over the summer of 2021/2021 positively identified 18 species of microchiropteran bats (microbat) across the study area.

Within the Girragulang Road cluster, 14 species of microbats were identified, including two threatened species:

- *Miniopterus orianae*
- *Saccolaimus flaviventris*

All of these species were recorded in extremely low numbers with only 1 and 3 detections of each species respectively across 182 detector nights. No species listed under the EPBC Act were identified. The most commonly detected species within the Girragulang Road cluster was *Chalinolobus gouldii* and *Vespadelus vulturnus* with 1004 and 1052 detections each. Details of all detections positively identified are shown in Table 32.

Within the Leadville cluster, 14 species of microbats were identified, including two threatened species:

- *Chalinolobus dwyeri*
- *Saccolaimus flaviventris*

All of these species were recorded in very low numbers with only 30 and 2 detections of each species respectively across 16 detector nights. *Chalinolobus dwyeri* is listed as vulnerable under the EPBC Act. The most commonly detected species within the Leadville cluster was *Vespadelus vulturnus* and *Vespadelus regulus* with 55 and 43 detections each. Details of all detections positively identified are shown in Table 33.

Within the Mount Hope cluster, 16 species of microbats were identified, including two threatened species:

- *Chalinolobus dwyeri*
- *Saccolaimus flaviventris*

Chalinolobus dwyeri and *Saccolaimus flaviventris* were recorded in extremely low numbers with only 4 and 2 detections of each species respectively across 330 detector nights. *Chalinolobus dwyeri* is listed as vulnerable under the EPBC Act. The most commonly detected species within the Mount Hope cluster was *Chalinolobus gouldii* and *Vespadelus vulturnus* with 1285 and 964 detections each. Details of all detections positively identified are shown in Table 34.

Complete analysis of all bat data is presented in Appendix K.

Table 32 Bat species positively identified at Girragulang Road

Species	BC Act	EPBC Act	GR_Bustard	GR_Flannyflower	GR_Helioporus	GR_Hibbertia	GR_Lionfish	GR_Spicebush	GR_Toadfish	Species Total	Calls per night
Chalinolobus gouldii			50	354	99	213	54	158	76	1004	5.52
Chalinolobus morio				24	2		2	15	2	45	0.25
Nyctophilus sp.				5	2	3		16	4	30	0.16
Scoteanax rueppellii						1		3		4	0.02
Scotorepens balstoni			2	4	1	3	5	3	1	19	0.10
Vespadelus darlingtoni				1						1	0.01
Vespadelus regulus			11	63	12	43	10	55	20	214	1.18
Vespadelus vulturnus			20	544	40	97	24	230	97	1052	5.78
Miniopterus orianae	Vulnerable						1			1	0.01
Austronomus australis			8	14	13	21	4	13	26	99	0.54
Ozimops petersi			4	22	41	7	5	18	16	113	0.62
Ozimops planiceps				17	25	1	6	11	7	67	0.37
Ozimops ridei				2			4			6	0.03
Saccolaimus flaviventris	Vulnerable					3				3	0.02
Total positively resolved calls			95	1050	235	392	115	522	249	2658	
Total calls			158	1489	443	623	170	837	460	4180	

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Table 33 Bat species positively identified at Leadville

Site	BC Act	EPBC Act	LV_Bustard	LV_Firetail	LV_Lionfish	LV_Lotus	Species Total	Calls per night per unit
Rhinolophus megaphyllus				2			2	0.13
Chalinolobus dwyeri	Vulnerable	Vulnerable	3	26	1		30	1.88
Chalinolobus gouldii			13	16	2	6	37	2.31
Nyctophilus sp.				5		5	10	0.63
Scoteanax rueppellii				3		1	4	0.25
Scotorepens balstoni				2		2	4	0.25
Scotorepens orion				4		1	5	0.31
Vespadelus regulus			11	29		3	43	2.69
Vespadelus vulturnus			1	37	3	14	55	3.44
Austronomus australis				8	1	9	18	1.13
Ozimops petersi			5	9		2	16	1.00
Ozimops planiceps			8	22	2	5	37	2.31
Ozimops ridei			2		1		3	0.19
Saccolaimus flaviventris	Vulnerable		2				2	0.13
Total positively resolved calls			45	163	10	48	266	
Total calls			74	213	18	82	387	

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Table 34 Bat species positively identified at Mount Hope

Species	BC Act	EPBC Act	MH_Bustard	MH_Firetail-1	MH_Firetail-2	MH_Lionfish	MH_Lotus 1	MH_Lotus 2	MH_Spicebush	MH_Toadfish	MH_Wedgie	MH_Wolverine	Species Total	Calls per night per unit
Chalinolobus dwyeri	Vulnerable	Vulnerable		2			1			1			4	0.01
Chalinolobus gouldii			113	103	41	69	121	19	175	328	180	25	1174	3.56
Chalinolobus morio				29	1	1	6	3	6	4	4	1	55	0.17
Nyctophilus sp.			7	17	12	9	6	5	3	9	7	5	80	0.24
Scoteanax rueppellii				2	3		1		5	10	6		27	0.08
Scotorepens balstoni			1	2	5	3	8	2	18	7	53		99	0.30
Scotorepens orion									2	2	4		8	0.02
Vespadelus darlingtoni				2	2		1	2			1		8	0.02
Vespadelus regulus			214	152	48	106	113	38	117	106	54	16	964	2.92
Vespadelus vulturnus			97	82	74	114	187	117	84	295	196	39	1285	3.89
Miniopterus orianae				7	1	1	1		2			1	13	0.04
Austronomus australis			30	58	11	16	50	11	34	158	25	1	394	1.19
Ozimops petersi			4	16	15	6	2	2	15	18	15	2	95	0.29
Ozimops planiceps			15	63	14	15	41	12	48	48	3		259	0.78
Ozimops ridei			1	4	4		2	5	9	5	3		33	0.10
Saccolaimus flaviventris	Vulnerable		1							1			2	0.01
Total positively resolved calls			483	539	231	340	540	216	518	992	551	90		
Total calls			873	1021	350	573	908	409	762	1889	1133	124	8042	

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Vertical bat monitoring positively identified 12 species at the two monitoring locations. A similar suite of species was recorded at both metmasts at all heights, with the exception of *Scotorepens balstoni* that was only recorded at Mount Hope, and *Nyctophilus* sp. which was only recorded at Girragulang Road (Table 35).

Table 35 Vertical bat species detection

Species	BC Act	EPBC Act	Girragulang Road			Mount Hope			Species Total
			0	50	100	0	50	100	
Chalinolobus gouldii			159	6	3	141	26	4	339
Nyctophilus sp.			10						10
Scotorepens balstoni						1			1
Vespadelus darlingtoni			1				2	4	7
Vespadelus regulus			8	4	1	18	29	12	72
Vespadelus vulturnus			28			13	2	1	44
Miniopterus orianae	Vulnerable		4	1	1	7	20	16	49
Austronomus australis			37	10	3		18	14	82
Ozimops petersii			11	1	2	1	10	14	39
Ozimos planiceps			246	108	120	47	230	146	897
Ozimops ridei			11	11	31	2	57	43	155
Saccolaimus flaviventris	Vulnerable		2						2
Total positively resolved calls			517	141	161	230	394	254	
Total calls			608	176	211	301	481	303	2080

The number of calls detected at each metmast at each height was variable, with no clear pattern present. The number of calls at Girragulang Road was generally higher at ground level, whereas there was no such clear trend at Mount Hope. Numbers of calls per night ranged from 3.9 to 16 (Figure 42).

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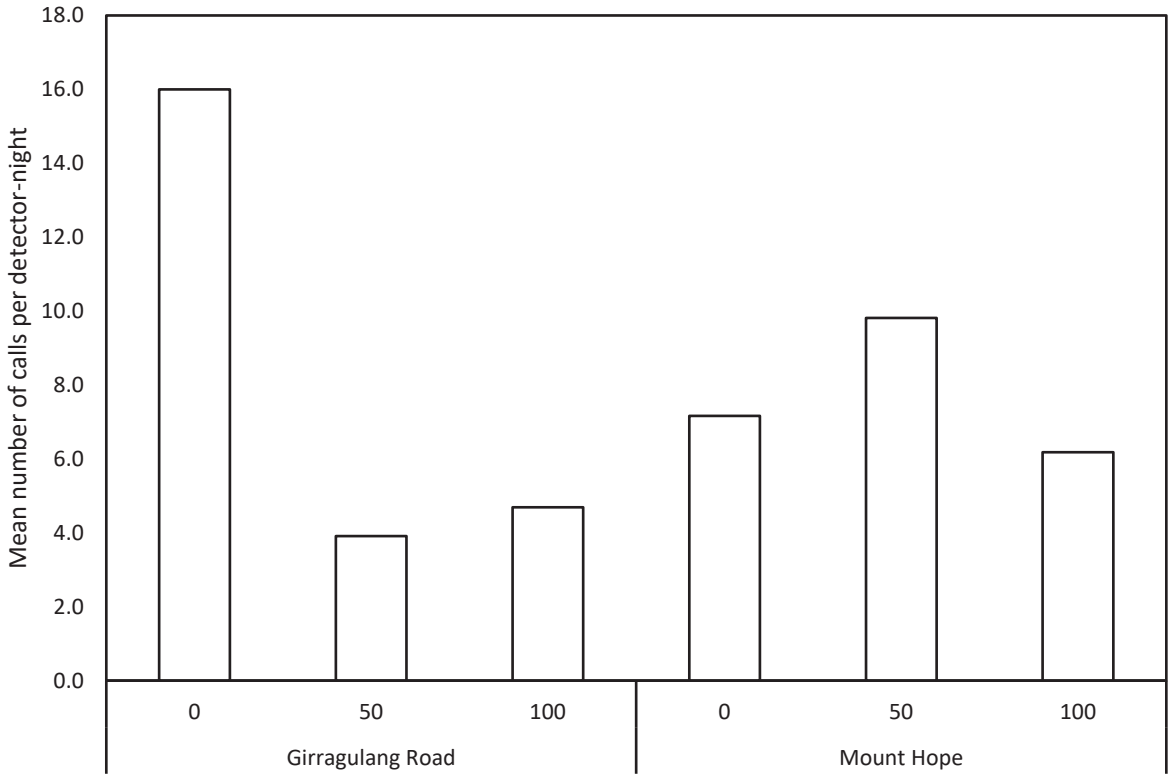


Figure 42 Vertical bat activity levels at Girragulang Road and Mount Hope metmasts

Bat activity by species was also considered as a proportion of total activity to give insight into which species were contributing most to activity at each height (Figure 43). The vast majority of detections were from *Ozimops planiceps* and *Chalinolobus gouldii*, both of which are common microbats that occur in woodland habitats. Generally, there was no clear trend in the frequency of detections or species occurrence at each survey site. This indicates that the bat assemblage and occupancy at 100m (the lower end of the RSA for the proposed turbines) is not significantly different to those bats detected at the ground level. Whilst two threatened species were recorded at the met masts, the records of *S. flaviventris* were so low that there is unlikely to be any detectable trend in the vertical distribution of this species. Only two detections of this species were recorded at Girragulang Road at ground height. M. orianiae oceansis was recorded more consistently across both detectors, with up to 20 detections at the Mount Hope 50m detector over the survey period. These numbers are still very low for the species and is consistent with the summer data recording.

Complete data for vertical bat data collection is provided in Appendix K. Based on the results of the vertical and horizontal bat activity surveys, the following species will require a collision strike risk assessment:

- *Chalinolobus dwyeri*
- *Miniopterus orianae*
- *Saccolaimus flaviventris*

In addition, a consolidated risk assessment will be required for all non-threatened micro- and megachiropteran bats.

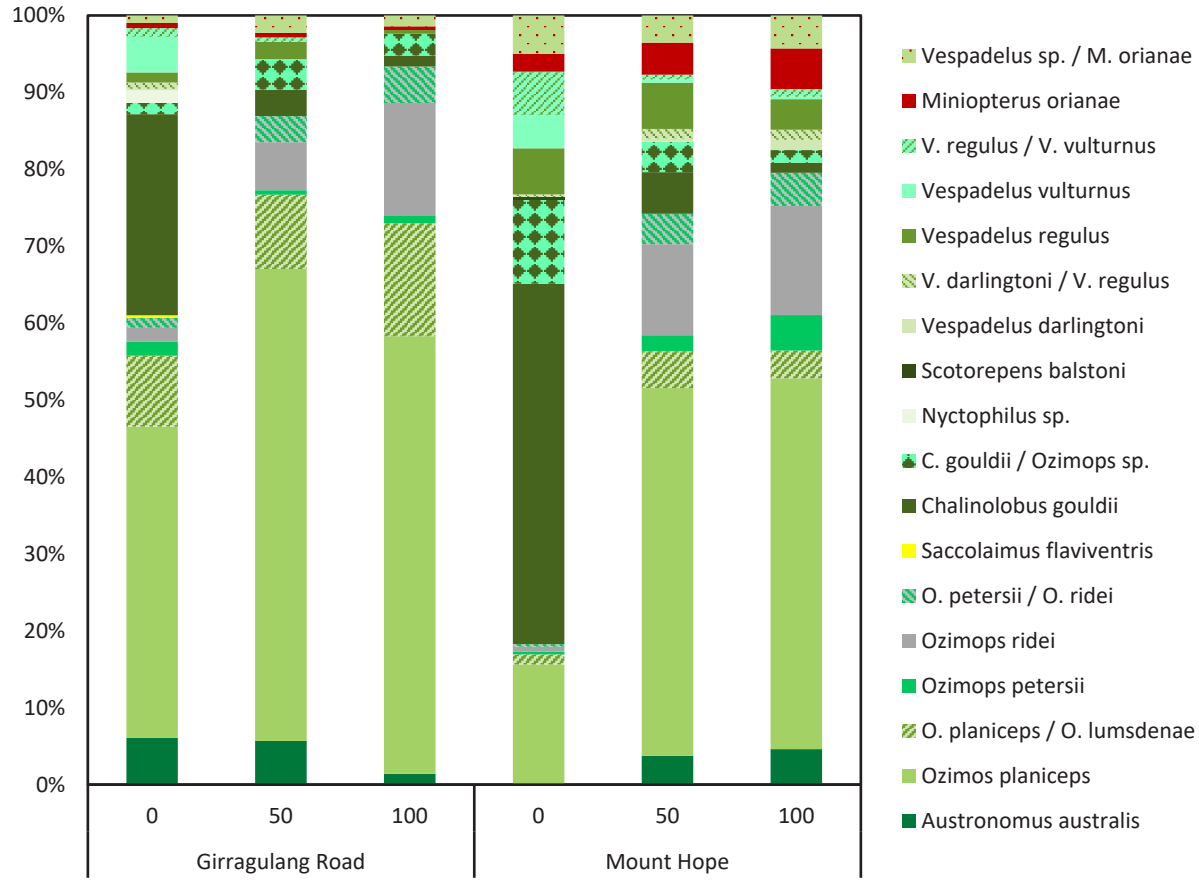


Figure 43 Proportion of calls at each detector height by species

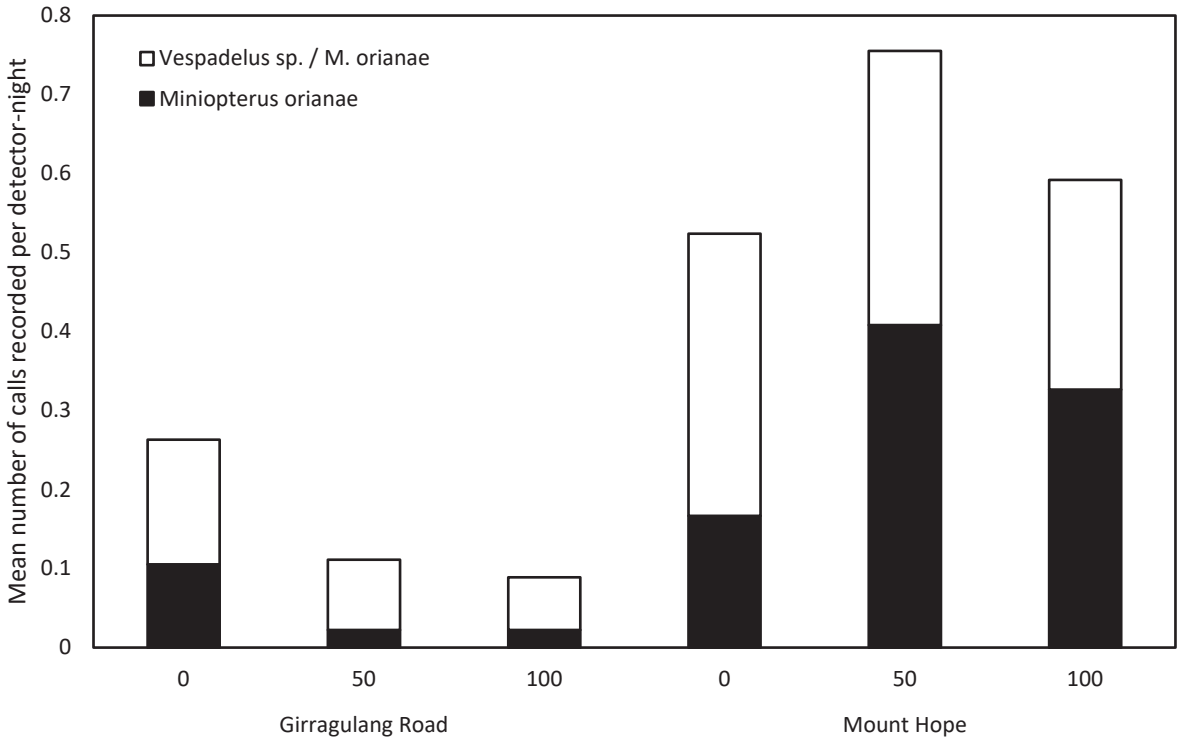


Figure 44 *Miniopterus orianiae oceansis vertical activity*

6.2. Bird utilisation monitoring

The bird utilisation survey was undertaken to identify the type, frequency, and behaviour of protected aerial species within the Study Area. The bird utilisation study was undertaken across three survey events across the Study Area, including:

- A combined summer/autumn survey concurrently with summer surveys
- A targeted winter survey for winter migrants
- A targeted spring survey for spring migrants

6.2.1. Methods

The bird utilisation study was conducted at point locations across the study area. At each point location, the following information was collected using pre-constructed Survey123 pro-formas:

At each site:

- The Cluster name (Mount Hope, Girragulang Road, Leadville)
- The site name/Turbine ID
- Start and end time
- Survey date
- Observers
- Location
- Vegetation structure
- Fauna habitats present
- Landscape element and landscape position

Within each site, all birds recorded in a 20 minute period within an approximately 2ha radius of the survey site were identified to species and the following information collected:

- Bird species
- Count
- Altitude from observer (<20m, 20-40m, 40-60m, 60-80m, and >80m). Additionally, all birds recorded at a heigh lower than the observer were also recorded and selected as <0m.
- Bird habitat (Flying above canopy, In/on bridge, In building, Farm/fire dam, In dead tree (stag), Edge of water, In/on post or stump, Flying within canopy, On ground, In grass, In tree hollow, In litter, In reeds, In tree, In water, On fence, On log, On rock, Over water, Powerline, or On road)
- Provisions were also made for general survey notes and photographs if needed.

Within each season, surveys were conducted across the project. Initial baseline surveys were randomly assigned across the wind farm, capturing data throughout all three clusters. During this baseline survey period from 26 August 2020 to 14 May 2021, a total of 158 bird surveys were undertaken by ELA staff.

In winter 2021, a second survey was undertaken to measure bird utilisation and target winter migrant bird species from 21 June to 16 August 2021. Across the study area, 37 fixed point locations were established (Mount Hope = 13, Girragulang Road = 12, Leadville = 12). Fixed points were located across each wind farm cluster to provide a reasonable subsampling of ridges and hills, whilst providing spatial independence from each survey site. Each fixed survey point was surveyed four times each, twice in the

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morning (generally within 2 hours of dawn) and twice in the afternoon. These 148 fixed site surveys were supplemented by 28 additional opportunistic survey sites to provide a total of 176 surveys across the study area.

In addition to fixed point surveys, any observation of avifauna flying at a height greater than 60m was recorded using Collector for ArcGIS. The species, estimated height, and behaviour was recorded for a period of 5 minutes. In addition, the flight path was digitised to allow for spatial consideration of raptor/high flying species. The location of bird utilisation sites is shown on Figure 29.

6.2.2. Results

A total of 451 bird utilisation surveys were conducted by ELA across the study area between August 2020 and September 2021. The surveys were conducted over all four seasons and detected 107 avifauna species, a full list of which is in Appendix L.

General bird surveys were conducted between August 2020 and May 2021 with surveys located haphazardly across the study area or co-located with Microchiropteran bat survey sites. The winter and spring bird utilization surveys consisted of 37 fixed point survey sites which were surveyed four times and aimed to determine species diversity, abundance, and flight heights of species. The methodology used is described in more detail below.

The results of all bird survey are summarized in Table 36. The general surveys included the highest number of surveys and consequently the highest number of species detected and highest total bird count. The average number of species detected per survey across all surveys was 5.7 species. However, the average number of species per survey was highest during the general surveys with 6.0 species. The average bird count per survey was highest during the general surveys and lowest during the spring surveys. Bird survey data has been grouped into their relevant wind farm cluster location: Mount Hope (MH), Leadville (LV) and Girragulang Rd (GR).

Table 36 Summarised findings of bird utilisation surveys.

	General				Winter				Spring			
	MH	LV	GR	Total	MH	LV	GR	Total	MH	LV	GR	Total
Number of surveys	74	31	50	**155**	52	48	48	**148**	52	48	48	**148**
Total number of species	62	61	38	**86**	35	52	37	**63**	37	50	28	**61**
Average number of species per survey	6.1	8.1	4.5	**6**	5.4	5.4	5.7	**5.5**	4.9	6.3	6	**5.7**
Total bird count	1044	589	1313	**2946**	891	825	896	**2612**	681	729	754	**2164**
Average bird count per survey	14.1	19	26.3	**19**	17.1	17.2	18.7	**17.7**	13.1	15.2	15.7	**14.6**

Eight BC Act and EPBC Act listed species were identified during bird utilisation surveys within the study area. These species are listed below in Table 21.

The five most abundant species detected during the surveys include:

- Noisy Miner (*Manorina melanocephala*)
- Common Starling (*Sturnus vulgaris*)
- Eastern Rosella (*Platycercus eximius*)
- Australian Magpie (*Gymnorhina tibicen*)
- Musk Lorikeet (*Glossopsitta concinna*)

The following raptor species were identified during the avifauna surveys:

- Nankeen Kestrel (*Falco cenchroides*)
- Wedge-tailed Eagle (*Aquila audax*)
- Black-shouldered Kite (*Elanus axillaris*)
- Brown Goshawk (*Accipiter fasciatus*)
- Brown Falcon (*Falco berigora*)
- Black Falcon (*Falco subniger*)
- Australian Hobby (*Falco longipennis*)
- Spotted Harrier (*Circus assimilis*)
- Southern Boobook (*Ninox boobook*)

The findings of all seasonal bird utilisation surveys are discussed in more detail in the following sections.

6.2.3. Baseline bird utilisation survey

The flight heights of the five most abundant native species, raptor species, and BC Act and EPBC Act listed species detected within the study area are summarized in Table 37. The five most abundant species were generally recorded flying between 0-20 m or in the valley below the survey site. However, there were ten Galahs and one Sulphur-crested Cockatoo recorded flying between 40-60 m above ground on one occasion.

The majority of threatened species detected during survey were recorded flying between 0-20 m above ground or in the valley below. Only two Dusky Woodswallows were recorded flying higher than 40 m above ground. Raptors were recorded flying at the highest heights during the general bird surveys, with 13 Wedge-tailed Eagles flying more than 40 m above ground and one Brown Falcon flying 60-80 m above ground.

Most birds detected during the general bird utilization surveys were recorded flying 0-20 m above ground or in the valley below, with 96% of birds recorded flying within these height classes.

Table 37 Baseline avifauna summary

	Individuals recorded	Height classes					
		< 0 m	< 20 m	20-40 m	40-60 m	60-80 m	> 80 m
Most abundant species							
Noisy Miner	319	105	214	0	0	0	0
Eastern Rosella	260	71	188	1	0	0	0
Australian Magpie	250	117	132	1	0	0	0

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	Individuals recorded	Height classes					
		< 0 m	< 20 m	20-40 m	40-60 m	60-80 m	> 80 m
Galah	214	93	97	14	10	0	0
Sulphur-crested Cockatoo	183	161	17	4	1	0	0
Total	1226	547	648	20	11	0	0
BC or EPBC Act listed species							
Varied Sitella	2	0	2	0	0	0	0
Speckled Warbler	9	6	3	0	0	0	0
Grey-crowned Babbler	7	7	0	0	0	0	0
Dusky Woodswallow	10	8	0	0	2	0	0
Spotted Harrier	1	1	0	0	0	0	0
White-throated Needletail	2	0	0	2	0	0	0
Total	31	22	5	2	2	0	0
Raptors							
Wedge-tailed Eagle	21	1	0	7	9	2	2
Nankeen Kestrel	27	8	15	4	0	0	0
Brown Falcon	3	0	1	1	0	1	0
Brown Goshawk	5	1	1	1	0	0	0
Black-shouldered Kite	2	1	1	0	0	0	0
Total	**58**	**11**	**18**	**13**	**9**	**3**	**2**
All birds detected	**2946**	**1174**	**1648**	**79**	**37**	**6**	**2**

6.2.4. Winter bird utilisation survey

A total of 148 bird utilisation surveys were conducted across the study area between June 2021 and August 2021 (Figure 45). A total of 63 species were detected during the winter bird utilisation surveys, these are included in the total bird species list (Appendix L). The average number of species per survey was 5.5 species and the average bird count per survey was 17.7 birds. The five most abundant species, all raptor species, and their flight heights are listed in Table 38 below.

There were five BC Act listed species detected, including:

- Little Lorikeet (*Glossopsitta pusilla*)
- Varied Sitella (*Daphoenositta chrysoptera*)
- Speckled Warbler (*Chthonicola sagittata*)
- Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*)
- Black Falcon (*Falco subniger*)

The flight heights of the five most abundant native species, all raptor species and all BC Act listed species detected within the study area are summarized in Table 38. The five most abundant species were generally recorded flying between 0-20 m or in the valley below the survey site. However, ten Australian

Magpies, two Musk Lorikeets and four Australian Ravens were recorded flying 40-60 m above ground. As well as four Australian Ravens flying more than 80 m above ground.

The majority of threatened species detected were recorded flying 0-20 m above ground. However, three Black Falcons were recorded flying more than 80 m above ground. Other raptor species were also recorded flying at high heights. Nine Wedge-tailed Eagles were recorded flying more than 60 m above ground and one Nankeen Kestrel was recorded soaring more than 80 m above ground.

Most of the birds detected during the winter bird utilization surveys were recorded flying 0-20 m above ground or in the valley below, with 91% of birds recorded flying within these height classes.

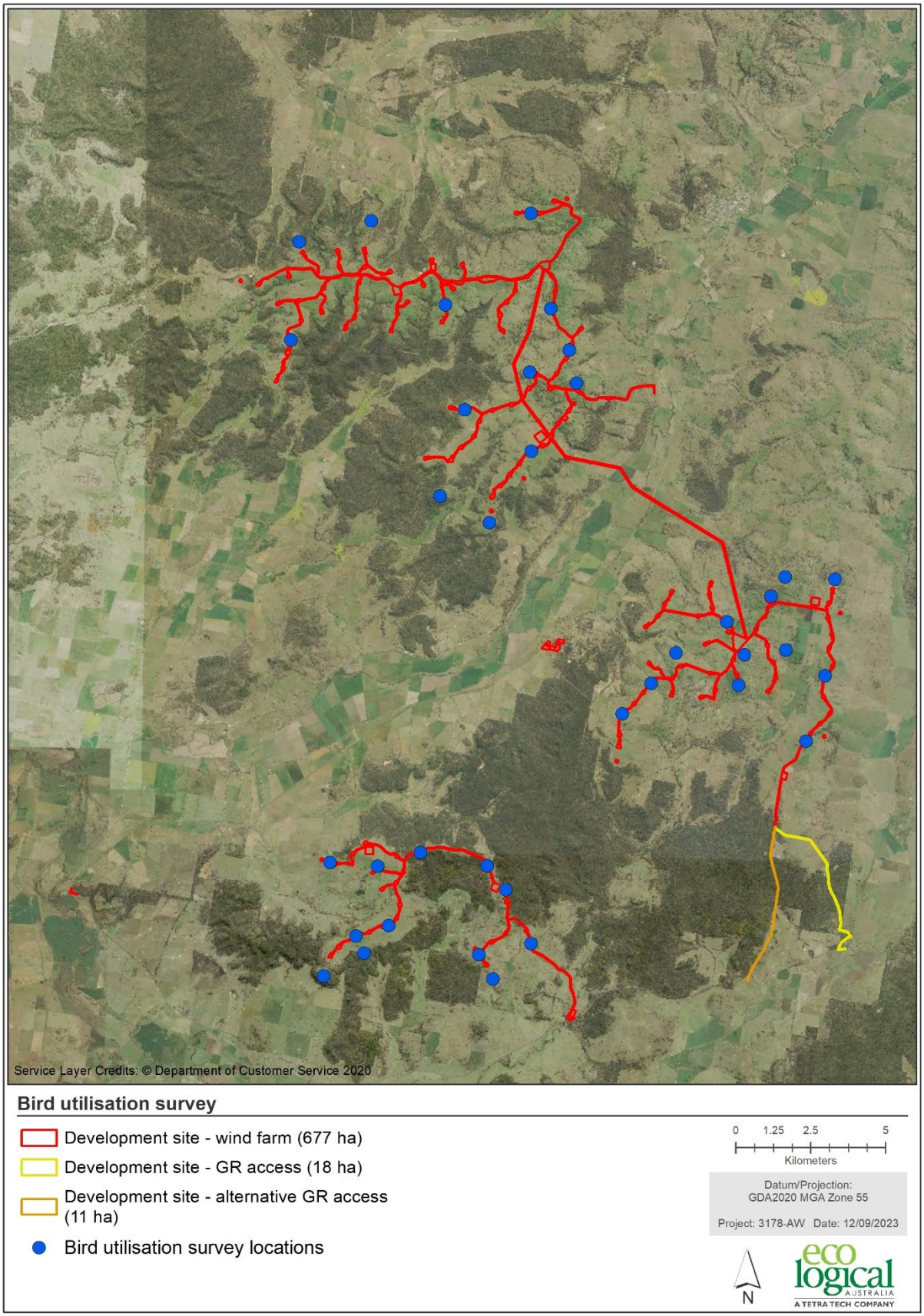


Figure 45 Bird utilisation survey locations

Table 38 Winter avifauna summary

	Individuals recorded	Height classes					
		< 0 m	< 20 m	20-40 m	40-60 m	60-80 m	> 80 m
Most abundant species							
Noisy Miner	560	97	463	0	0	0	0
Eastern Rosella	297	47	246	4	0	0	0
Australian Magpie	292	33	244	5	10	0	0
Musk Lorikeet	184	12	159	11	2	0	0
Australian Raven	178	29	101	40	4	0	4
Total	1511	218	1213	60	16	0	4
Threatened species							
Little Lorikeet	6	0	6	0	0	0	0
Varied Sitella	5	1	4	0	0	0	0
Speckled Warbler	2	0	2	0	0	0	0
Black Falcon	3	0	0	0	0	0	3
Total	16	1	12	0	0	0	3
Raptors							
Wedge-tailed Eagle	17	1	2	5	0	1	8
Nankeen Kestrel	61	8	29	18	5	0	1
Brown Falcon	3	1	1	0	1	0	0
Australian Hobby	1	0	1	0	0	0	0
Black-shouldered Kite	10	0	3	7	0	0	0
Total	**92**	**10**	**36**	**30**	**6**	**1**	**9**
All birds detected	**2612**	**396**	**1980**	**191**	**28**	**1**	**16**

6.2.5. Spring bird utilization survey

A total of 148 bird utilization surveys were conducted across the study area between the 6th and 12th September 2021. A total of 61 species were detected during the surveys, these are included in the total bird species list (Appendix L). The average number of species detected per survey was 5.7 species and the average bird count per survey was 14.6 birds. The five most abundant species, all raptor species and their flight heights are listed in Table 39 below.

There were two BC Act listed species detected, including:

- Speckled Warbler (*Chthonicola sagittata*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)

The flight heights of the five most abundant native species, raptor species and BC Act listed species detected within the study area are summarized in Table 39. The five most abundant species were

generally recorded flying between 0-20 m or in the valley below the survey site and there were no records of any individuals flying higher than 40 m above ground.

No threatened species were recorded flying higher than 40 m above ground. However, 150 Dusky Woodswallows were recorded flying between 20-40 m above ground. Five raptor species were detected during the spring bird utilization surveys. One Nankeen Kestrel was recorded soaring more than 80 m off the ground and six Wedge-tailed Eagles were recorded flying more than 60 m above ground.

The majority of birds detected during spring bird utilization surveys were recorded flying 0-20 m above ground or in the valley below, with 81% of birds recorded flying within these height classes.

Table 39 Spring avifauna summary

	Individuals recorded	Height classes					
		< 0 m	< 20 m	20-40 m	40-60 m	60-80 m	> 80 m
Most abundant species							
Noisy Miner	242	52	190	0	0	0	0
Eastern Rosella	226	9	215	2	0	0	0
Musk Lorikeet	207	11	132	64	0	0	0
Australian Magpie	183	17	161	5	0	0	0
Striated Pardalote	154	32	118	4	0	0	0
Total	1012	121	816	75	0	0	0
Threatened species							
Dusky Woodswallow	150	0	0	150	0	0	0
Speckled Warbler	2	0	2	0	0	0	0
Total	152	0	2	150	0	0	0
Raptors							
Nankeen Kestrel	28	0	9	13	5	0	1
Wedge-tailed Eagle	14	0	1	5	2	3	3
Brown Goshawk	2	0	0	0	2	0	0
Australian Hobby	1	0	1	0	0	0	0
Black Shouldered Kite	1	0	1	0	0	0	0
Total	46	0	12	18	9	3	4
All birds detected	2164	264	1487	380	16	3	4

6.2.6. Avifauna flight height summary

The flight heights of the five most abundant species, all BC Act or EPBC Act listed species, and all raptor species identified during the general, winter, and spring bird utilisation surveys are summarised below in Table 40. A small proportion of Australian Magpies (1.4%), Musk Lorikeets (0.5%), and Galahs (4.7%) were recorded flying 40-60 m above ground. No Noisy Miners or Eastern Rosellas were recorded flying more than 40 m above ground.

The majority of threatened species were recorded flying less than 40 m above ground. However, two Dusky Woodswallow's were recorded flying 40-60 m above ground and three Black Falcons were recorded flying more than 80 m above ground.

The relative abundance of raptor species flying more than 40 m above ground was 16.3%. The four species recorded flying at these heights were Nankeen Kestrel, Wedge-tailed Eagle, Brown Goshawk and Brown Falcon. The relative abundance of Wedge-tailed Eagles flying more than 40 m above ground was 29.3% (the highest among all raptor species).

Overall, 98.4% of the 7,722 birds detected during the surveys were recorded flying less than 40 m above ground.

Table 40 Avifauna flight height summary

	Individuals recorded	Height classes					
		< 0 m	< 20 m	20-40 m	40-60 m	60-80 m	> 80 m
Most abundant species							
Noisy Miner	1121	254	867	0	0	0	0
Eastern Rosella	783	127	649	7	0	0	0
Australian Magpie	724	167	536	11	10	0	0
Musk Lorikeet	391	23	291	75	2	0	0
Galah	214	93	97	14	10	0	0
Total	3233	664	2440	107	22	0	0
Threatened species							
Dusky Woodswallow	160	8	0	150	2	0	0
Speckled Warbler	13	6	7	0	0	0	0
Grey-crowned Babbler	7	7	0	0	0	0	0
Varied Sittella	7	1	6	0	0	0	0
Little Lorikeet	6	0	6	0	0	0	0
Black Falcon	3	0	0	0	0	0	3
White-throated Needletail	2	0	0	2	0	0	0
Spotted Harrier	1	1	0	0	0	0	0
Total	199	23	19	152	2	0	3
Raptors							
Nankeen Kestrel	116	16	53	35	10	0	2
Wedge-tailed Eagle	58	9	18	14	2	4	11
Black-shouldered Kite	13	1	5	7	0	0	0
Brown Goshawk	7	1	1	1	2	0	0
Brown Falcon	6	1	2	1	1	1	0
Australian Hobby	2	0	2	0	0	0	0
Total	**202**	**28**	**81**	**86**	**15**	**5**	**13**

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	Individuals recorded	Height classes					
		< 0 m	< 20 m	20-40 m	40-60 m	60-80 m	> 80 m
All birds detected	7722	1834	5115	650	81	10	22

6.2.7. Seasonal trends in flight height

Relative bird abundance within flight height classes was compared between seasons and wind turbine clusters (Figure 46). The Girragulang Road cluster (b) exhibited the least variation in flight height among seasons, while the Mount Hope and Leadville clusters exhibited some variation among seasons with a slightly higher proportion of birds recorded at 20-40m during winter and spring. Overall, across all surveys and all clusters, there were no strong seasonal trends in bird flight height.

What was consistent across all clusters was the high prevalence of bird activity well below the RSA of the proposed turbines, with the majority of activity focused below 20m height.

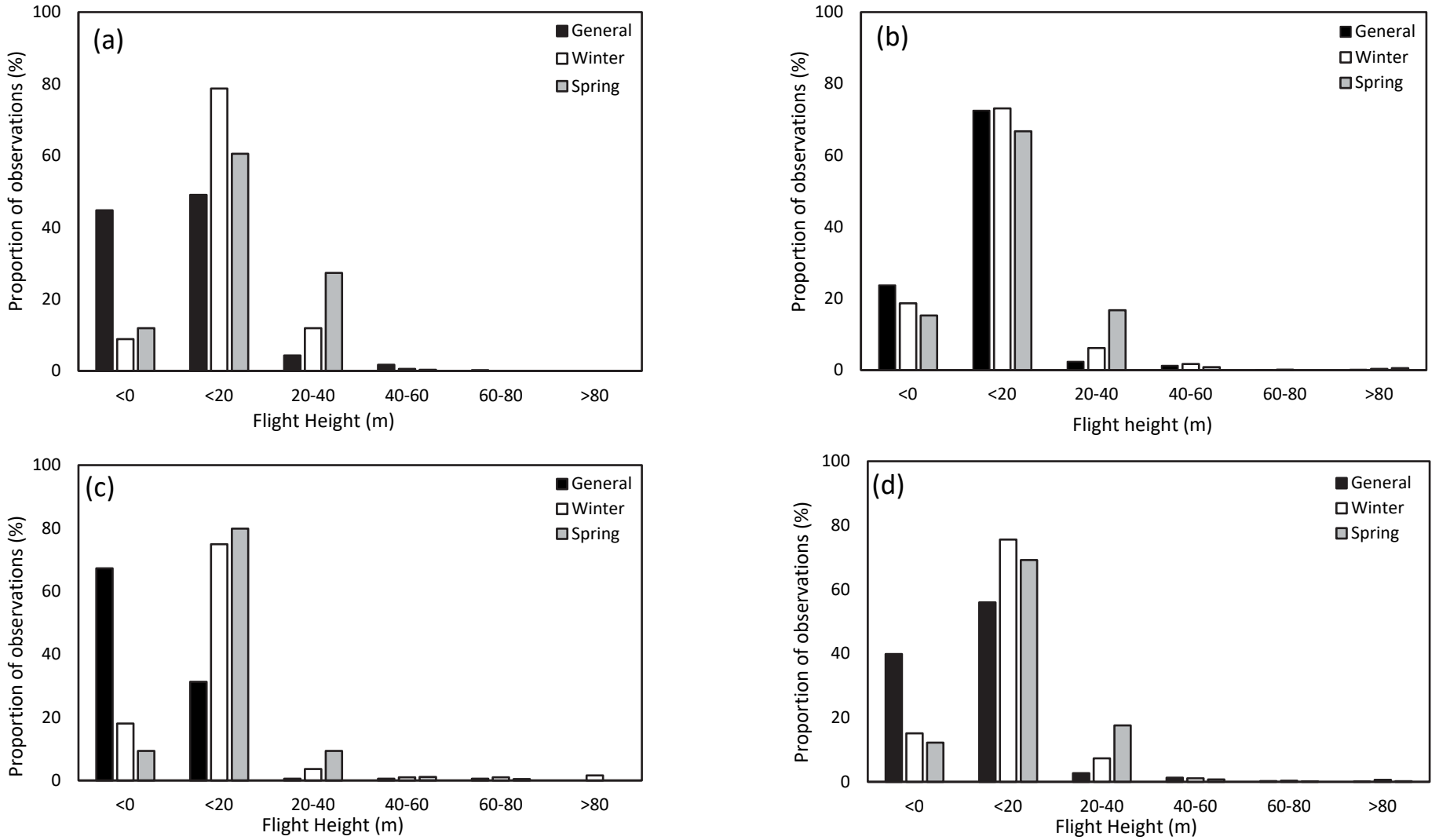


Figure 46: Proportional bird flight height in (a) Mount Hope, (b) Girragulang Road, (c) Leadville, and (d) Consolidated data across all clusters

6.3. Wind Farm strike data review

In order to understand the candidate list of species that have been impacted at other wind farms in NSW, a database review was undertaken for publicly available information on bird and bat strike. The review included consideration of any available data presented on:

- the NSW Major Projects Website; to establish a list of approved wind farms nearby to the project, and capture any biodiversity data available in BDAR/BAR etc
- Individual project websites, to review any monitoring reports and gather a list of species that have been recorded as fatalities due to wind turbine strike.

This review focussed on approved and operational Wind Farms. Those Wind Farms that are currently under preparation, but do not have a project approval have not been considered in this review.

For those projects that contained sufficient data available publicly, the following information was gathered and tabulated:

- Wind farm name
- IBRA region
- EIS Year
- Project status (in planning, approved, under construction, or operational)
- Number of turbines
- Turbine brand/model; to determine the rotor swept area maximum, minimum, and nacelle height
- The distance to the Valley of the Winds Wind farm
- Availability of biodiversity assessments
- Availability of turbine strike data

A summary of the review is shown below on Table 41, and the location of each windfarm relative to the Project is shown on Figure 47.

Of the 24 wind farms identified in the review, 15 (62.5%) are operational but only five (5) have strike data reporting available to the public.

All available strike monitoring was reviewed to understand the species likely to be at risk of turbine strike, and identified that there is a significant paucity of available data from wind farms in NSW.

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Table 41 Wind farm review

Wind Farm Name	IBRA Region	EIS Year	Status	Number of turbines	Turbine brand/model	Rotor swept area (m max)	Nacelle height (m)	Rotor swept area (m min)	Distance to Project (km)	BDAR Available?	Strike Data Publicly Available?
Valley of the Winds	Brigalow Belt South, NSW South Western Slopes, Sydney Basin	2022	In planning	131	Not yet selected	250	170	90	N/A	N/A	N/A
Liverpool Range*	Brigalow Belt South	Sub: 2013 Det: 2018	Approved	267	Not yet selected	165	80-101	35-65	26	Yes	No
Uungula	NSW South Western Slopes	Sub: 2020 Det: 2021	Approved	97	Not yet selected	250	165	80	86	Yes	No
Bodangora	NSW South Western Slopes	Sub: 2011 Det: 2013	Operational	33	GE 3.43-130	150	85	20	78	Yes	Yes
Crudine Ridge	South Eastern Highlands, NSW South Western Slopes	Sub: 2012 Det: 2016	Under construction	37	GE 3.63 MW	160	91.5	23	110	Yes	No
Blayney	South Eastern Highlands	Commissioned 2000	Operational	15	Vestas V47-660kW	68	45	21	195	No	No
Flyers Creek	South Eastern Highlands	Sub: 2011 Det: 2014	Approved	38	Not yet selected.	160	90	20	190	Yes	No
Sapphire	New England Tablelands	Sub: 2011 Det: 2013	Operational	75	Vestas 3.6MW	200	137	74	296	Yes	Yes
White Rock S1	New England Tablelands	Stage 1 & Stage 2: 2012	Operational	70	Goldwind 121 2.5MW	150	89.5	29	295	Yes	Yes
White Rock S2	New England Tablelands	Stage 2 Mod Det: 2019	Approved	48	Goldwind 140	200	130	30	295	Yes	No
Glen Innes	New England Tablelands	Sub: 2007, Det: 2009	Approved	25	Not yet selected.	150	89	28	300	Yes	No
Crookwell	South Eastern Highlands	Commissioned 1998	Operational	8	Vestas V44-600 Kw	65	45	25	290	No	No
Crookwell 2	South Eastern Highlands	Det: 2005	Operational	28	GE 3.4 MW	160	95	30	295	Yes	No
Crookwell 3	South Eastern Highlands	Det: 2020	Approved	16	Vestas V126-3.45MW	150	87	24	295	Yes	No
Collector	South Eastern Highlands	Det: 2013	Operational	54	Vestas 4.2 MW	150	91.5	33	330	Yes	No
Gullen Range	South Eastern Highlands	Det: 2009 Commissioned: 2014	Operational	73	GW100-2.5MW (56 turbines), GW82-1.5MW (17 turbines)	130 & 126	80 & 85	30 & 44	300	Yes	Yes
Silverton	Broken Hill Complex	Det: 2009 Commissioned: 2020	Operational	58	GE 3.43-130	180	110	40	800	Yes	Yes
Biala	South Eastern Highlands	Det: 2017 Commissioned: 2020	Operational	31	Goldwind 3.5 MW	180	110	40	300	Yes	No
Gunning	South Eastern Highlands	Commissioned: 2011	Operational	31	Acciona AW-77 1.5 MW	110	71.5	33	325	No	No

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Wind Farm Name	IBRA Region	EIS Year	Status	Number of turbines	Turbine brand/model	Rotor swept area (m max)	Nacelle height (m)	Rotor swept area (m min)	Distance to Project (km)	BDAR Available?	Strike Data Publicly Available?
Cullerin Range	South Eastern Highlands	Commissioned: 2009	Operational	15	Senvion 2MW	128	80	32	325	Yes	No
Woodlawn	South Eastern Highlands	Commissioned: 2011	Operational	23	Suzlon S88 2.1MW	124	80	36	355	Yes	No
Bango	NSW South Western Slopes	Det: 2018	Under construction	46	GE Cypress 5.3 MW	200	121	42	305	Yes	No
Capital	South Eastern Highlands	Det: 2006, Commissioned: 2009	Operational	67	Suzlon S88 2.1MW	124	80	36	360	Yes	No
Capital 2	South Eastern Highlands	Det: 2011	Approved	41	Not yet selected.	157	94	31	360	Yes	No
Taralga	South Eastern Highlands	Det: 2012, Commissioned: 2015	Operational	51	Vestas: 21x(V100 1.8 MW), 21x(V90 2.0MW), 9x(V90 3.0 MW)	21xWTGS = 130, 30xWTGS = 125	80	21xWTGS = 30, 30xWTGS = 35	280	No	No

* Liverpool Range Wind farm is currently under modification. Data presented is based on approved project.

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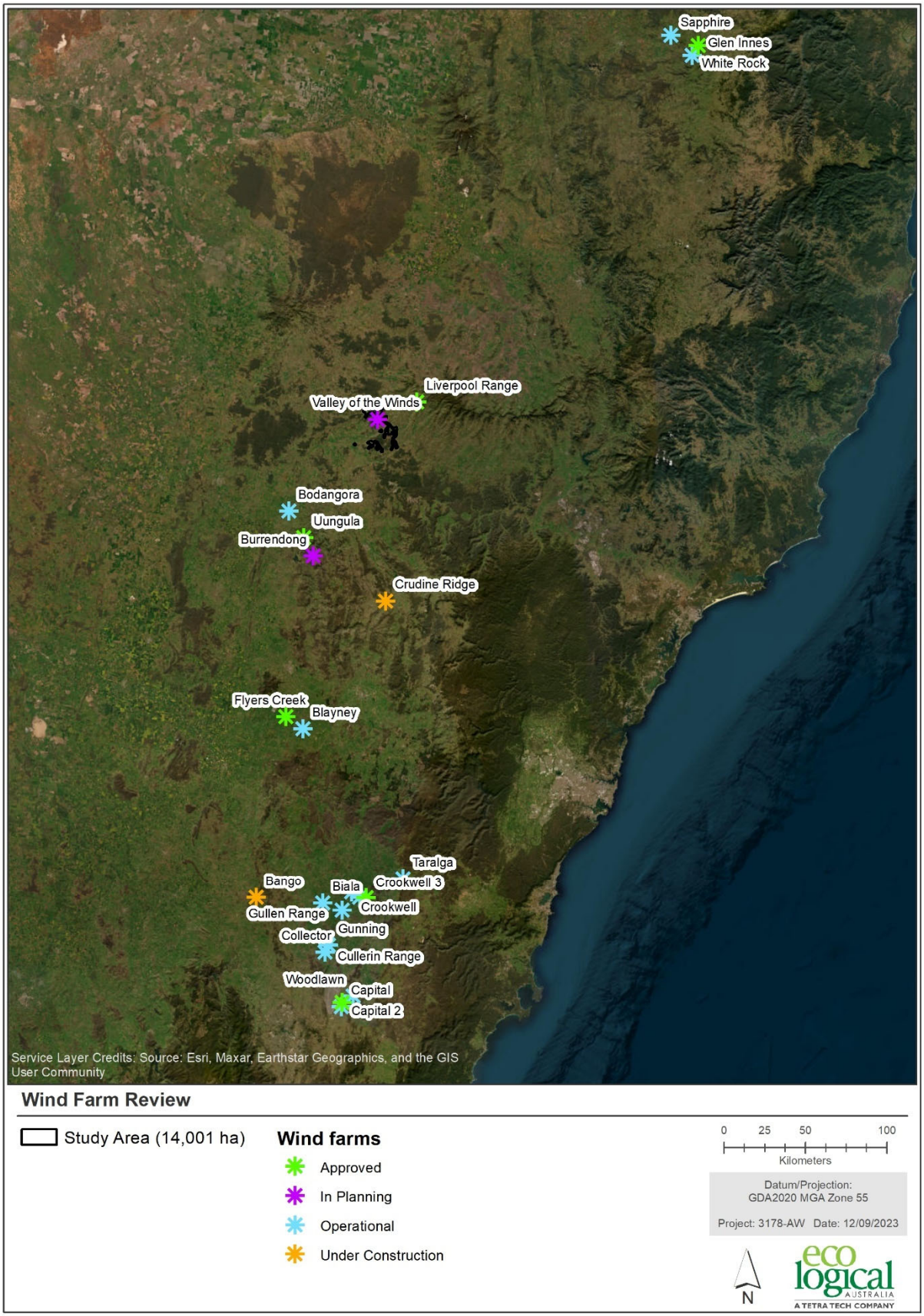


Figure 47 Wind farm review

The wind farm review identified 59 species as at risk of strike. These species were identified as at risk of strikeby detection as mortalities across the operational wind farms. Across these wind farms, six regularly represented species had sufficient data to consider the number of collisions per turbine per year, including four birds: Wedge-tailed Eagle (Figure 48), Nankeen Kestrel (Figure 49), Australian Magpie (Figure 50), and White-throated Needletail (Figure 51), and two microchiropteran bats: Gould's Wattled Bat (Figure 52) and White-striped Freetail-bat (Figure 53). All of these species share a distribution across all of the wind farms in review, including the Project.

Across all of these species the strike rates were generally low, with less than 0.4 collisions per turbine per year for all species. The review identified that there is generally a trend of decreasing strike rate per year, with increasing lower RSA height. This may be indicative of a spatial separation from the RSA to woodland/forest habitat types, or may be an artefact of individual wind farm locations/habitat types present. The consistency across all six species, indicates a reasonable trend exists. Interestingly, White Rock and Sapphire Wind Farms have significant differences in the strike rates, given they are located close to each other and in similar habitats.

The nacelle height and RSA dynamics for the Project are expected to be a similar swept area for Sapphire Wind Farm, but with a nacelle height 50m greater (and thus 50m additional ground clearance).

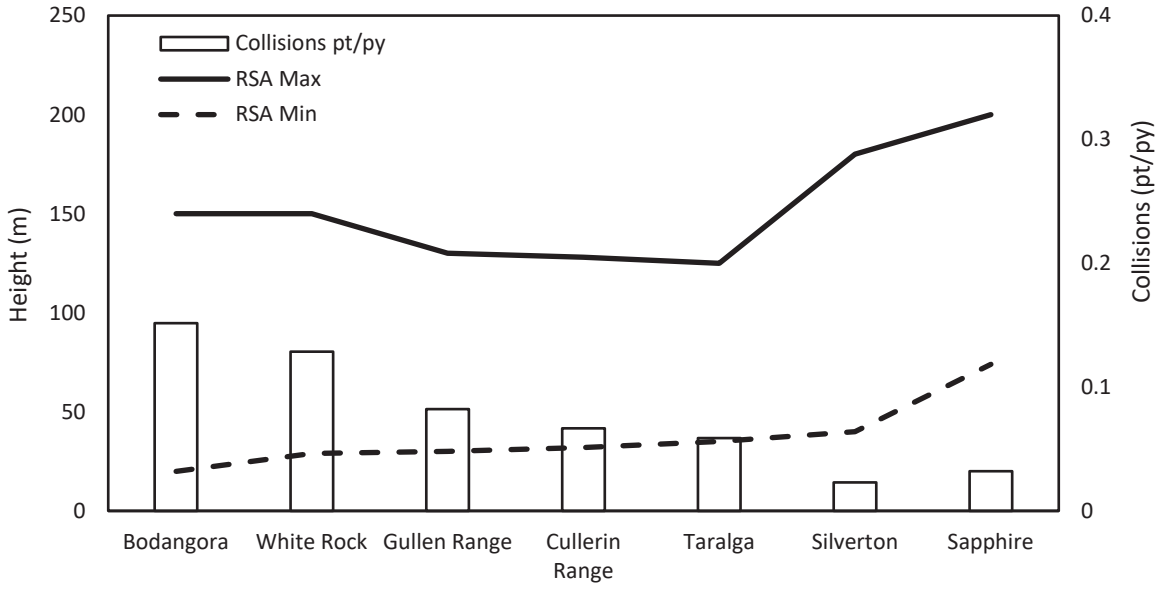


Figure 48 Wedge-tailed Eagle collision rate at NSW wind farms

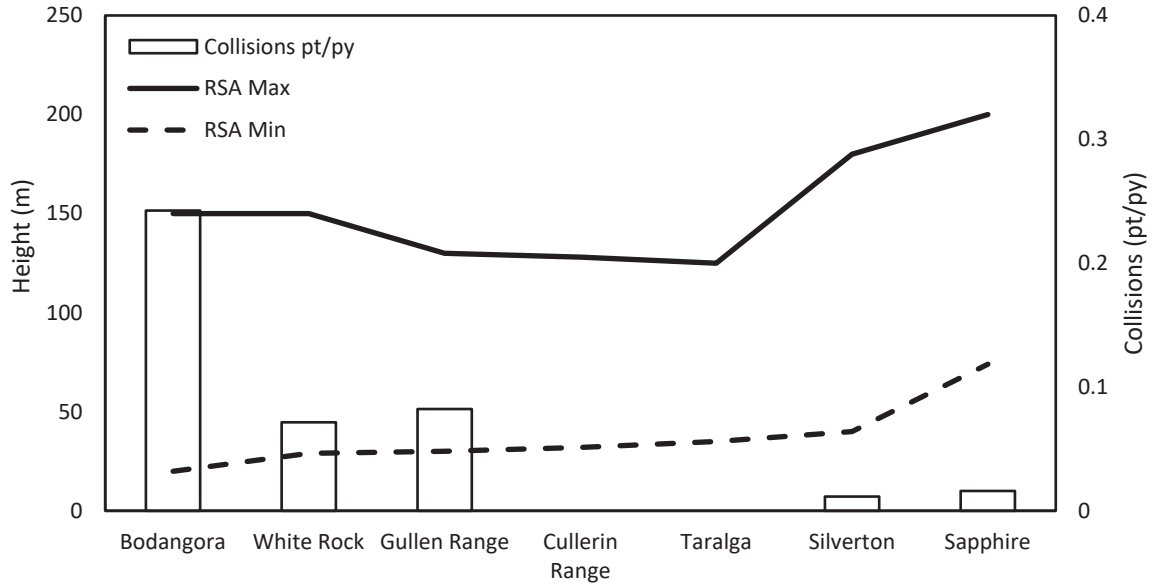


Figure 49 Nankeen Kestrel collision rate at NSW wind farms

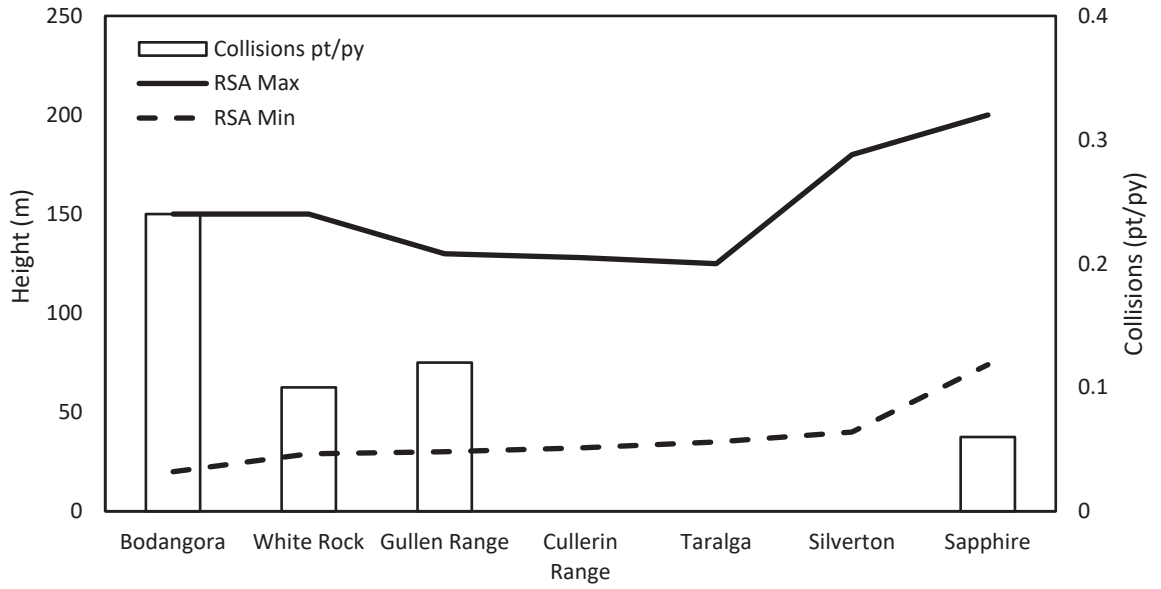


Figure 50 Australian Magpie collision rate at NSW wind farms

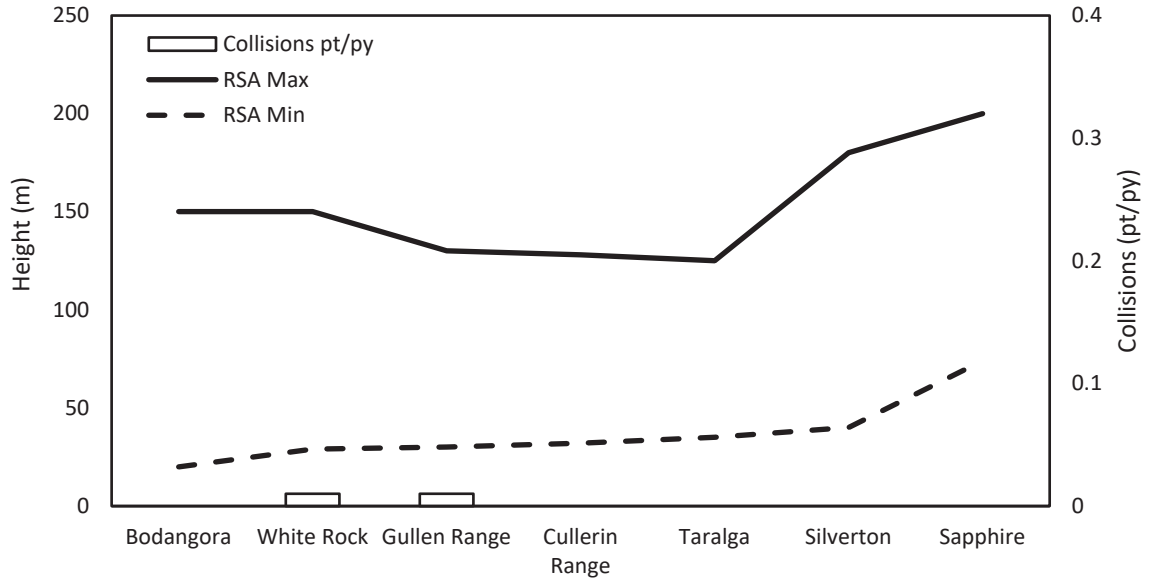


Figure 51 White-throated Needletail collision rate at NSW wind farms

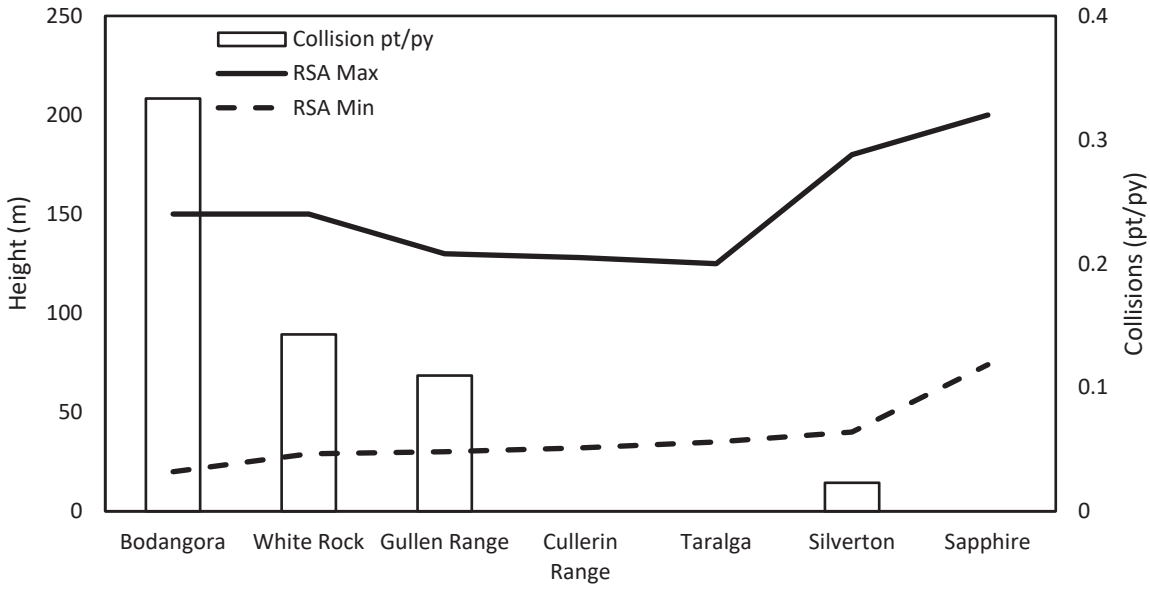


Figure 52 Gould's Wattled Bat collision rate at NSW wind farms

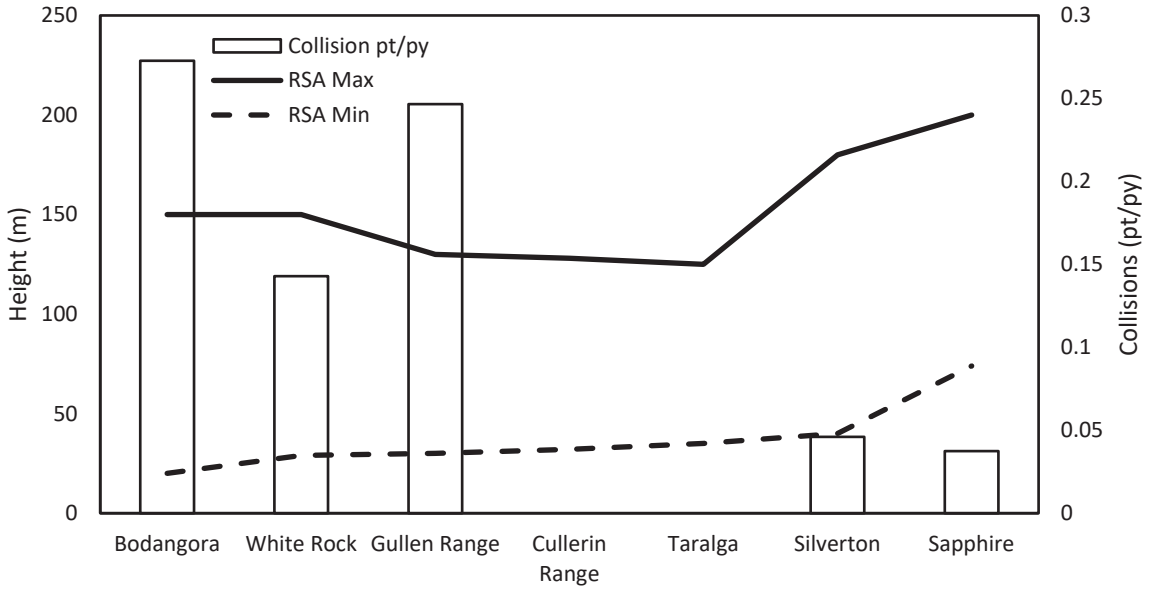


Figure 53 White-striped Freetail-bat collision rate at NSW wind farms

6.4. Aerial habitat mapping

Using data collected during the field surveys, the habitual paths of aerial species was drafted by consolidating flight path data. A total of 161 aerial flights were recorded.

During surveys 10 aerial species were identified outside of bird utilisation surveys, and recorded incidentally whilst staff were traversing the study area. The most frequently observed species was Wedge-tailed Eagle and Nankeen Kestrel, both of which are resident aerial species. No threatened species were included within this dataset. The location of all observed flights is shown on Figure 54.

Within the Mount Hope cluster, seven species were identified in 48 recorded flights. The most frequently observed species were Wedge-tailed Eagle and Nankeen Kestrel. Wedge-tailed Eagle was observed soaring between 2 and 100m above observer height, with an average flight height of 54m. Nankeen Kestrel was observed soaring and fluttering between 8 and 50m height, with an average of 21.75m. The majority of observations were of Wedge-tailed Eagles soaring between 100 and 500m, parallel to ridgelines, utilising updrafts created by gully heads. These areas are also heavily vegetated with dry sclerophyll forest. Flight paths cross from one gully head to another generally at low points along ridges.

Within the Girragulang Road cluster, six species were observed in 62 flights. Similarly to Mount Hope, the most frequently observed species within Girragulang Road were Wedge-tailed Eagle and Nankeen Kestrel. Wedge-tailed Eagle was observed soaring between 20 and 150m above observer height, with an average flight height of 59m. Nankeen Kestrel was observed soaring and fluttering between 0 and 30m height, with an average of 13.2m. Observations within Girragulang Road were less aligned with ridgelines and gully habitats, as the topography is milder with less drastic topographic variance. The undulating hills within Girragulang Road likely produce more variable wind dynamics which makes predictability of flight paths less reliable.

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Within the Leadville cluster, five species were observed in 51 flights. Similarly to Mount Hope and Girragulang Road, the most frequently observed species within Leadville were Wedge-tailed Eagle and Nankeen Kestrel. Wedge-tailed Eagle was observed soaring between 10 and 150m above observer height, with an average flight height of 51.6m. Nankeen Kestrel was observed soaring and fluttering between 10 and 80m height, with an average of 31m. Observations within Leadville were strongly aligned with ridgelines and gully habitats, as the topography contains abrupt variance between valley floor and ridgelines. Flight paths within Leadville also corresponded to bird traverses between larger patches of remnant burnt bushland.

All species identified within the aerial flight path analysis have been included below in the baseline collision risk assessment.

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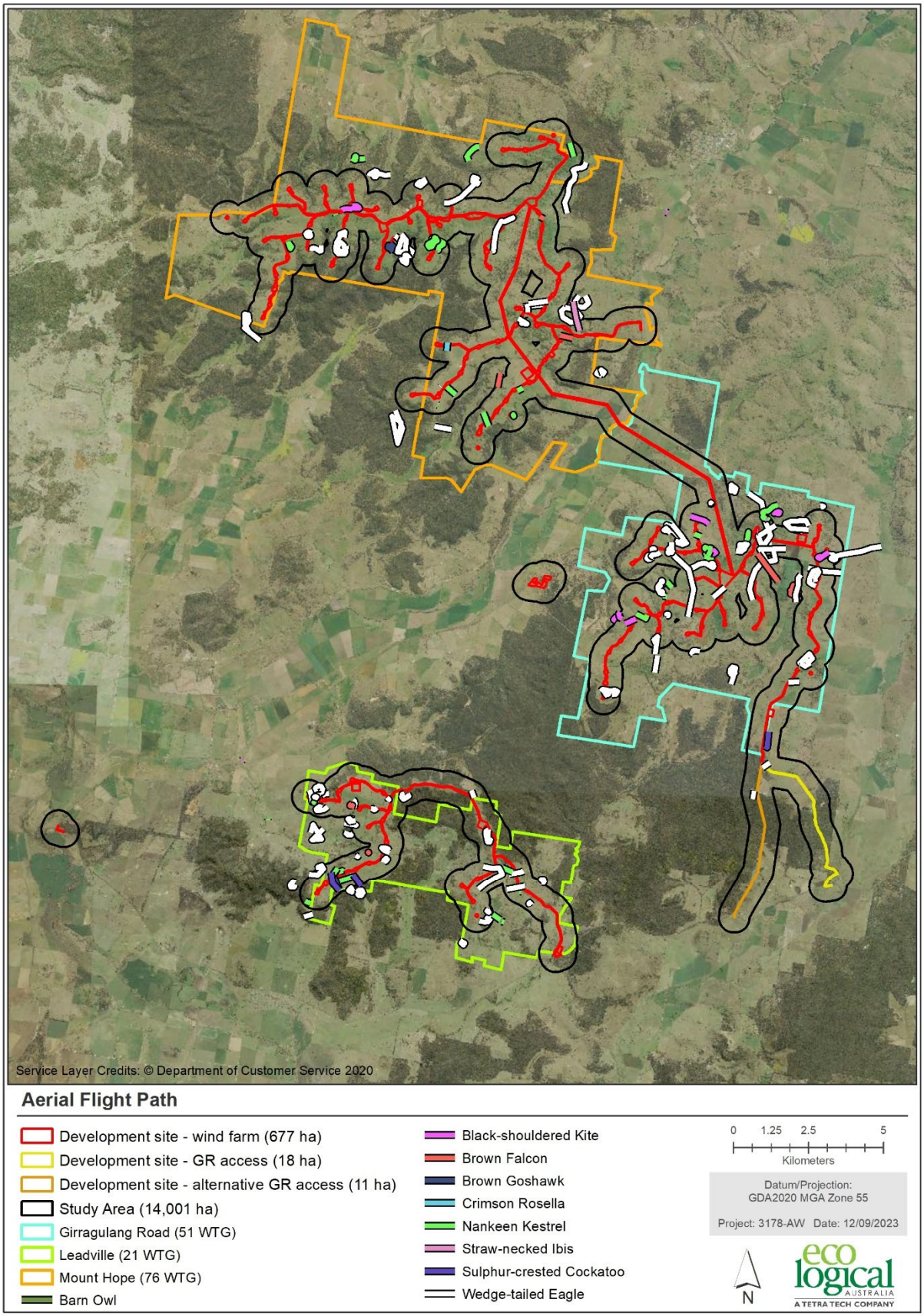


Figure 54 Aerial flight path recording

6.5. Barrier effect

Consideration has been given to whether the current wind farm layout will create a barrier effect to migratory species that may transit the region each year. The current wind farm layout contains 131 turbines, which are spaced no closer than 463m. Accounting for blade length, there will always be at least 283m of space between the rotor swept areas of adjacent turbines. When the prevailing wind is not perpendicular to this space, the gap between the rotor swept area would be increased.

Field surveys across the development site identified only one migratory species, White-throated Needletail, which was identified following storm fronts at a height of more than 300m above Mount Hope Road. The direction and flight of this species is dependent on the prevailing direction of storms on a given day. No migratory pattern was observed for this species. No other migratory species were observed during surveys.

The flight path mapping of local resident species identified that the majority of Wedge-tailed Eagle flights occur parallel to ridges, where updrafts from valleys provide lift. The current wind farm layout does not create a long-slope barrier.

Finally, the wind farm layout is separated into three clusters, with gaps (calculated off the closest turbines) of 6.7 km between the Mount Hope and Girragulang Road cluster, 6.6 km between the Girragulang Road and Leadville Cluster, and 12.7 km between the Leadville and Mount Hope cluster.

The current wind farm layout is unlikely to create an impassable barrier to migratory or locally nomadic species.

6.6. Baseline Collision Risk Assessment

A baseline collision risk assessment was undertaken for aerial fauna species identified as species of concern within the development site. A species of concern is any species that:

- Any threatened species listed under the BC Act and/or EPBC Act recorded within the study area
- Species known to be prone to collision, as evidenced by fatality at another wind farm in NSW (Section 6.3 above)
- Was recorded flying within the rotor swept area of the turbines (>80m above ridge line)

Each species was subject to a risk assessment, as adapted from Brett Lane & Associates (2017). The risk assessment was designed to identify species of moderate (or greater) risk that would require additional collision modelling and monitoring.

The risk assessment operates by identifying for each species the likelihood of a collision event (Table 42) with the consequence of the collision rate (Table 43). The likelihood and consequence assessment is then used to determine a species collision risk rating for the project (Table 44). This risk rating was then applied to all species previously recorded as a strike fatality, as well as all threatened species identified during BUS surveys.

Table 42 Likelihood ratings for collision risk assessment

Likelihood	Description
Certain	It is very probable that the risk event could occur in any year (>95%)

Likelihood	Description
Almost certain	It is more probable than not that the risk event could occur in any year (65 - 95%)
Likely	It is equally probable that the risk event could or could not occur in any year (35 - 65%)
Unlikely	It is less probable than not that the risk event could occur in any year (<5 - 35%)
Rare	It is improbable that the risk event could occur in any year (<5%).

Table 43 Consequence ratings for collision risk assessment

Consequence	Description
Severe	Extreme loss in numbers of individuals, leading to reduction in regional or state population viability for a period of at least 10 years
High	Major loss in numbers, leading to reduction in regional or state population viability for between five and ten years
Moderate	Moderate loss in numbers of individuals, leading to a minor reduction in localised or regional population viability for between one and five years
Low	Repeated loss of small numbers of individuals but no reduction in local or regional population viability
Negligible	Occasional individuals lost but no reduction in local or regional population viability

Table 44 Collision risk rating

Likelihood	Consequence				
	Negligible	*Low*	*Moderate*	*High*	*Severe*
Certain	Negligible	Low	High	Severe	Severe
Almost certain	Negligible	Low	Moderate	High	Severe
Likely	Negligible	Low	Moderate	High	High
Unlikely	Negligible	Negligible	Low	Moderate	High
Rare	Negligible	Negligible	Negligible	Low	Low

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Table 45 Bird and Bat Risk Assessment

Common name	Species Name	BC Act	EPBC Act	Reason for assessment	Likelihood	Consequence	Risk rating
Australian Hobby	*Falco longipennis*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Australian Magpie	*Gymnorhina tibicen*	Not listed	Not listed	P	Almost certain	Low	Low
Australian Owlet Nightjar	*Aegotheles cristatus*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Australian Raven	*Corvus coronoides*	Not listed	Not listed	P	Almost certain	Low	Low
Australian Wood Duck	*Chenonetta jubata*	Not listed	Not listed	P	Likely	Negligible	Negligible
Barking Owl	*Ninox connivens*	Vulnerable	Not listed	P, TS	Unlikely	Low	Negligible
Barn Owl	*Tyto alba*	Not listed	Not listed	P	Likely	Low	Low
Black Falcon	*Falco subniger*	Vulnerable	Not listed	P, TS	Unlikely	Moderate	Low
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Black-shouldered Kite	*Elanus axillaris*	Not listed	Not listed	P	Likely	Negligible	Negligible
Brown Falcon	*Falco berigora*	Not listed	Not listed	P	Likely	Negligible	Negligible
Brown Goshawk	*Accipiter fasciatus*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Common Bronzewing	*Phaps chalcoptera*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Common Starling	*Sturnus vulgaris*	Not listed	Not listed	P	Likely	Negligible	Negligible
Crested Pigeon	*Ocyphaps lophotes*	Not listed	Not listed	P	Likely	Negligible	Negligible
Crimson Rosella	*Platycercus elegans*	Not listed	Not listed	P	Likely	Negligible	Negligible
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	Vulnerable	Not listed	TS	Likely	Low	Low
Eastern Rosella	*Platycercus eximius*	Not listed	Not listed	P	Likely	Negligible	Negligible
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Galah	*Eolophus roseicapilla*	Not listed	Not listed	P	Likely	Negligible	Negligible
Grey Butcherbird	*Cracticus torquatus*	Not listed	Not listed	P	Unlikely	Negligible	Negligible

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Common name	Species Name	BC Act	EPBC Act	Reason for assessment	Likelihood	Consequence	Risk rating
Grey Fantail	*Rhipidura albiscapa*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Grey Shrike-thrush	*Colluricincla harmonica*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Grey Teal	*Anas gracilis*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	Vulnerable	Not listed	TS	Unlikely	Low	Negligible
Large Bentwing-bat	*Miniopterus orianae oceanensis*	Vulnerable	Not listed	TS	Likely	Low	Low
Large-eared Pied Bat	*Chalinolobus dwyeri*	Vulnerable	Vulnerable	TS	Unlikely	Low	Negligible
Laughing Kookaburra	*Dacelo novaeguineae*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Little Lorikeet	*Glossopsitta pusilla*	Vulnerable	Not listed	TS	Unlikely	Low	Negligible
Little Raven	*Corvus mellori*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Magpie-lark	*Grallina cyanoleuca*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Masked Owl	*Tyto novaehollandiae*	Vulnerable	Not listed	P, TS	Unlikely	Low	Negligible
Megachiropteran bats	*All other non-threatened megachiropteran bats*	Not listed	Not listed	P	Unlikely	Low	Negligible
Microchiropteran bats	*All other non-threatened microchiropteran bats*	Not listed	Not listed	P	Unlikely	Low	Negligible
Musk Lorikeet	*Glossopsitta concinna*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Nankeen Kestrel	*Falco cenchroides cenchroides*	Not listed	Not listed	P	Likely	Moderate	Moderate
Noisy Miner	*Manorina melanocephala*	Not listed	Not listed	P	Likely	Negligible	Negligible
Pacific Black Duck	*Anas superciliosa*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Pied Currawong	*Strepera graculina*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Red Wattlebird	*Anthochaera carunculata*	Not listed	Not listed	P	Unlikely	Negligible	Negligible

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Common name	Species Name	BC Act	EPBC Act	Reason for assessment	Likelihood	Consequence	Risk rating
Red-rumped Parrot	*Psephotus haematonotus*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Speckled Warbler	*Chthonicola sagittata*	Vulnerable	Not listed	TS	Unlikely	Low	Negligible
Spotted Harrier	*Circus assimilis*	Vulnerable	Not listed	P, TS	Unlikely	Low	Negligible
Spotted Pardalote	*Pardalotus punctatus*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Striated Pardalote	*Pardalotus striatus*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Sulphur-crested Cockatoo	*Cacatua galerita*	Not listed	Not listed	P	Likely	Low	Low
Tawny Frogmouth	*Podargus strigoides*	Not listed	Not listed	P	Unlikely	Negligible	Negligible
Varied Sittella	*Daphoenositta chrysoptera*	Vulnerable	Not listed	TS	Unlikely	Low	Negligible
Wedge-tailed Eagle	*Aquila audax*	Not listed	Not listed	P	Almost certain	Moderate	Moderate
White-throated Needletail	*Hirundapus caudacutus*	Not listed	Vulnerable/Marine/Migratory	P	Unlikely	Low	Negligible
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Vulnerable	Not listed	P, TS	Likely	Low	Low

P = previously recorded as strike mortality, TS = threatened species

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6.7. Collision strike modelling for at-risk species

The collision risk assessment identified two species of moderate concern:

- Nankeen Kestrel
- Wedge-tailed Eagle

As such collision strike modelling was undertaken for these two species, adapting the methodology described in Environmental Resources Management (2013), with the refined Band spreadsheet for wind turbine collision risk.

The collision strike assessment followed three steps:

- Step 1. Assess individual species collision risk
- Step 2 Assess bird activity for at-risk species
- Step 3 Incorporate steps 1 and 2 to estimate number of bird collisions

6.7.1. Step 1. Assess individual species collision risk

Collision risk for each of the at-risk species identified above was undertaken using the refined Band model (Band, 2000 & Band 2007) as presented in Christie & Urquhart (2015). This model estimates the collision risk based on the blade rotation and bird speed/size, based on a range of up-wind and down-wind trajectories. The collision risk assessment uses parameter inputs for the turbine specifications, as well as each bird species dimension and behaviour. Model parameters for each species are shown in Table 46.

Table 46 Band Collision Risk Model parameters – Nankeen Kestrel & Wedge-tailed Eagle

Model parameter	Value	
Turbine		
Radius (m)	90	
Blades	3	
Pitch (degrees)	24	
Maximum chord width (m)	2	
Period (s)	4.29	
	Nankeen Kestrel	**Wedge-tailed Eagle**
Length (m)	0.3	1.06
Wingspan (m)	0.7	2.32
Speed relative to air (m/s)	15	15
Flapping (0) or Gliding (1)	1	1

For each species, the strike risk was modelled at wind speeds of 0, 5, and 10 m/s, to incorporate variability in wind speeds likely to be experienced within the Project area (Table 47). The mean risk across all wind speeds was then used for the collision assessment. Based on this calculation the *Band collision risk* for Nankeen Kestrel is 5.09% and Wedge-tailed Eagle is 10.92%.

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Table 47 Band Collision Risk Model – Wind speed collision risk

Radius	Chord	Nankeen Kestrel			Wedge-tailed Eagle		
		Risk (Wind speed 0 m/s)	Risk (Wind speed 5 m/s)	Risk (Wind speed 10 m/s)	Risk (Wind speed 0 m/s)	Risk (Wind speed 5 m/s)	Risk (Wind speed 10 m/s)
0.05	0.73	0.0008	0.0008	0.0009	0.0014	0.0014	0.0014
0.1	0.79	0.0007	0.0008	0.0008	0.0013	0.0014	0.0014
0.15	0.88	0.0006	0.0007	0.0008	0.0013	0.0013	0.0014
0.2	0.96	0.0005	0.0007	0.0008	0.0013	0.0013	0.0014
0.25	1	0.0004	0.0006	0.0007	0.0013	0.0013	0.0013
0.3	0.98	0.0006	0.0004	0.0006	0.0016	0.0012	0.0013
0.35	0.92	0.0008	0.0004	0.0005	0.0021	0.0013	0.0012
0.4	0.85	0.0010	0.0006	0.0004	0.0024	0.0016	0.0012
0.45	0.8	0.0012	0.0007	0.0004	0.0028	0.0019	0.0014
0.5	0.75	0.0014	0.0009	0.0005	0.0032	0.0022	0.0016
0.55	0.7	0.0016	0.0010	0.0007	0.0035	0.0025	0.0018
0.6	0.64	0.0017	0.0011	0.0008	0.0038	0.0027	0.0020
0.65	0.58	0.0018	0.0012	0.0008	0.0041	0.0029	0.0022
0.7	0.52	0.0019	0.0013	0.0009	0.0043	0.0031	0.0024
0.75	0.47	0.0019	0.0013	0.0010	0.0046	0.0033	0.0026
0.8	0.41	0.0020	0.0014	0.0010	0.0048	0.0035	0.0027
0.85	0.37	0.0020	0.0014	0.0011	0.0050	0.0037	0.0029
0.9	0.3	0.0020	0.0014	0.0011	0.0052	0.0038	0.0030
0.95	0.24	0.0020	0.0014	0.0011	0.0053	0.0039	0.0031
1	0	0.0014	0.0010	0.0008	0.0049	0.0037	0.0030

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Direction	Angle	Nankeen Kestrel			Wedge-tailed Eagle		
		Risk (0 m/s)	Risk (5 m/s)	Risk (10 m/s)	Risk (0 m/s)	Risk (5 m/s)	Risk (10 m/s)
Upwind	0	4.76%	6.48%	11.64%	8.39%	11.84%	22.29%
	5	4.76%	6.47%	11.62%	8.39%	11.83%	22.27%
	10	4.74%	6.43%	11.53%	8.36%	11.77%	22.11%
	15	4.72%	6.36%	11.38%	8.31%	11.65%	21.83%
	20	4.73%	6.27%	11.16%	8.36%	11.48%	21.43%
	25	4.79%	6.17%	10.89%	8.60%	11.27%	20.91%
	30	4.90%	6.07%	10.55%	9.01%	11.08%	20.28%
	35	5.05%	6.03%	10.17%	9.62%	11.09%	19.55%
	40	5.20%	6.04%	9.74%	10.28%	11.30%	18.73%
	45	5.33%	6.09%	9.27%	10.91%	11.72%	17.82%
	50	5.45%	6.14%	8.76%	11.51%	12.22%	16.86%
	55	5.55%	6.17%	8.27%	12.05%	12.69%	15.87%
	60	5.62%	6.17%	7.89%	12.54%	13.10%	15.16%
	65	5.67%	6.15%	7.65%	12.98%	13.47%	15.03%
	70	5.71%	6.12%	7.42%	13.39%	13.81%	15.15%
	75	5.73%	6.07%	7.19%	13.80%	14.15%	15.31%
	80	5.77%	6.04%	6.99%	14.21%	14.48%	15.39%
	85	5.89%	6.08%	6.80%	10.66%	10.67%	10.70%
	90	0.87%	0.87%	0.87%	2.01%	2.01%	2.01%
Downwind	95	5.70%	5.76%	6.21%	10.65%	10.66%	10.68%
	100	5.35%	5.34%	5.66%	13.84%	13.84%	14.19%
	105	5.10%	5.03%	5.23%	13.17%	13.10%	13.29%
	110	4.88%	4.76%	4.86%	12.55%	12.42%	12.52%

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Direction	Angle	Nankeen Kestrel			Wedge-tailed Eagle		
		Risk (0 m/s)	Risk (5 m/s)	Risk (10 m/s)	Risk (0 m/s)	Risk (5 m/s)	Risk (10 m/s)
	115	4.66%	4.49%	4.51%	11.95%	11.77%	11.78%
	120	4.43%	4.22%	4.17%	11.33%	11.11%	11.05%
	125	4.20%	3.95%	3.86%	10.68%	10.42%	10.31%
	130	3.96%	3.67%	3.55%	9.99%	9.70%	9.56%
	135	3.71%	3.40%	3.24%	9.27%	8.95%	8.77%
	140	3.45%	3.12%	2.95%	8.52%	8.16%	7.97%
	145	3.20%	2.84%	2.66%	7.75%	7.36%	7.15%
	150	2.95%	2.57%	2.39%	7.06%	6.55%	6.33%
	155	2.78%	2.31%	2.12%	6.57%	5.79%	5.51%
	160	2.65%	2.12%	1.88%	6.27%	5.24%	4.79%
	165	2.59%	1.98%	1.71%	6.18%	4.87%	4.28%
	170	2.58%	1.90%	1.60%	6.19%	4.69%	3.96%
	175	2.58%	1.89%	1.54%	6.20%	4.67%	3.83%
	180	2.57%	1.88%	1.53%	6.20%	4.66%	3.82%
	Average	**4.39%**	**4.69%**	**6.20%**	**9.67%**	**10.15%**	**12.93%**

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6.7.2. Step 2. Assess bird activity for at-risk species

The total risk area is measured off the distance of internal electrical reticulation (150.4km) then multiplied by 250m (top of blade height). The Proportional risk of this area is the proportional RSA:

$$Proportional\ risk = (\pi \times r^2 \times N_{turbines})/\text{Total risk area}$$

Based on a top of blade height of 250m and internal wind farm electrical reticulation distance of 150.4km the total risk area = 37.6km^2. Based on 131 turbines with 90m blades the turbine risk area = 3.766 km^2; therefore, the *Proportional risk window* is 0.10.

Once individual species collision risk had been established, the frequency of encounter was modelled based on the findings of field surveys (Section 4.2.7). The number of birds at risk was calculated by reviewing the total number of individuals observed within the RSA (>80m above observer) divided by the number of surveys undertaken in each survey period – *Birds at risk per survey*.

The number of *Birds at risk per BUS survey (per hour)* is the hourly rate of occurrence of each species, as calculated by a 20 minute survey multiplied by 3. The *Birds at risk per day* was calculated by multiplying the *Birds at risk per BUS survey (per hour)* by 10 hours of activity per day for both Nankeen kestrel and Wed-tailed Eagle. The number of *Birds at risk per month* was calculated by multiplying the *Birds at risk per day* by 30.4.

The number of Birds passing through the rotor area was calculated by *Birds at risk per month* by the *Proportional risk window*.

6.7.3. Step 3. Incorporate steps 1 and 2 to estimate number of bird collisions

The final step was to incorporate all data to calculate an approximate number of birds at risk per month. Values were calculated using a separate model inputs for each survey season, to detect whether any period would have a greater likelihood of impacts to avifauna species.

For each survey period the number of collisions per month is estimated by multiplying the *Birds at risk per month* by the *Band collision risk*.

Based on the calculation of collision frequency, between 0.002 and 0.173 Nankeen Kestrels would be struck each year based on the 0 and 99% avoidance scenario's.

Based on the calculation of collision frequency, between 0.029 and 2.89 Wedge-tailed Eagles would be struck each year based on the 0 and 99% avoidance scenario's.

Data is presented in Table 48 below.

Table 48 Collision estimate for Nankeen Kestrel and Wedge-tailed Eagle

Species	Band collision risk	Season	Observations (surveys)	Number of surveys	Observations in RSA	Birds at risk per BUS survey	Birds at risk per BUS survey (per hour)	Birds at risk per day	Birds at risk per month	Total risk area (km2)	Turbine risk area (km2)	Proportional risk window	Birds passing through rotor area	No avoidance	95% avoidance	99% avoidance
Nankeen Kestrel	0.0509	Summer/Autumn	27 (17)	158	0	0.000	0.000	0.000	0.000	37.6	3.766	10.02%	0.00	0.0000	0.0000	0.0000
	0.0509	Winter	67 (40)	176	1	0.006	0.017	0.170	5.182	37.6	3.766	10.02%	0.52	0.0264	0.0013	0.0003
	0.0509	Spring	28 (19)	148	1	0.007	0.020	0.203	6.162	37.6	3.766	10.02%	0.62	0.0314	0.0016	0.0003
Wedge-tailed Eagle	0.1092	Summer/Autumn	21 (12)	158	2	0.013	0.038	0.380	11.544	37.6	3.766	10.02%	1.16	0.1263	0.0063	0.0013
	0.1092	Winter	18 (13)	176	9	0.051	0.153	1.534	46.636	37.6	3.766	10.02%	4.67	0.5101	0.0255	0.0051
	0.1092	Spring	14 (10)	148	3	0.020	0.061	0.608	18.486	37.6	3.766	10.02%	1.85	0.2022	0.0101	0.0020

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7. Avoiding and Minimising Impacts on Biodiversity Values

Following preliminary scoping studies, the development footprint has been subject to a number of revisions in collaboration between ELA and ACEN, to avoid and minimise impacts on biodiversity.

Avoidance of high value vegetation such as CEECs was considered a priority, with areas of habitat, such as hollow bearing trees also heavily influencing the placement and design of infrastructure and access tracks. The following sections outline the strategies employed to reduce the overall footprint of the Project, through impact avoidance and minimisation techniques.

All areas of aquatic habitat have been avoided through designing and appropriate operational footprint. All crossings of key fish habitat will be spanned by transmission lines, with no ground disturbance within the riparian corridor.

7.1. Avoiding impacts

ACEN has designed the development site by taking steps to avoid, minimise and mitigate impacts to biodiversity values. An original larger investigation area was surveyed in 2019, and the site selected and refined over several iterations to avoid the areas of highest biodiversity value. This report presents a refined footprint to that proposed in the Environment Impact Statement (EIS) in 2022.

The Central-West Orana Transmission Line (CWO-REZ Transmission Line) runs north-west from the existing 500kV network near Merriwa, passing south of Dunedoo before connecting to the existing network east of Wellington. As a Candidate Foundation Generator (CFG) for the CWO-REZ, the project would connect directly to the proposed CWO-REZ transmission line, which will allow for the project's output to be transmitted across the NEM. ACEN has undertaken extensive consultation with EnergyCo regarding the proposed and how the project would connect to that infrastructure. It is confirmed that the overhead transmission line running south from the Girragulang Road and Leadville clusters will no longer form part of this project. This infrastructure and will be assessed as part of the CWO REZ transmission line extension project that is to be separately developed by EnergyCo. The removal of electrical connectivity to the CWO REZ Transmission line has reduced the development site of this Project by 12%.

ACEN has also removed 17 turbines from the EIS wind farm layout to reduce amenity impacts for nearby dwellings and biodiversity impacts. This refinement follows extensive consultation with the NSW Department of Planning and Environment (DPE) as well as the Biodiversity Conservation and Science Directorate (BCS) regarding the extent of potential impact on threatened ecological communities and other native vegetation and the project's ability to demonstrate the principles of 'avoid and minimise' regarding impacts to biodiversity. In addition to the removal of turbines, ACEN has refined the internal layout of the wind farm, to propose a narrower construction corridor, which steers around areas of higher biodiversity value (where possible).

The removal of 17 turbines (11% reduction in turbines) and associated infrastructure, including revised access tracks and hardstands, and removal of the electrical connectivity to the CWO REZ transmission line, has resulted in a 51% reduction in the development site from 1,318 ha to 695 ha (Figure 55).

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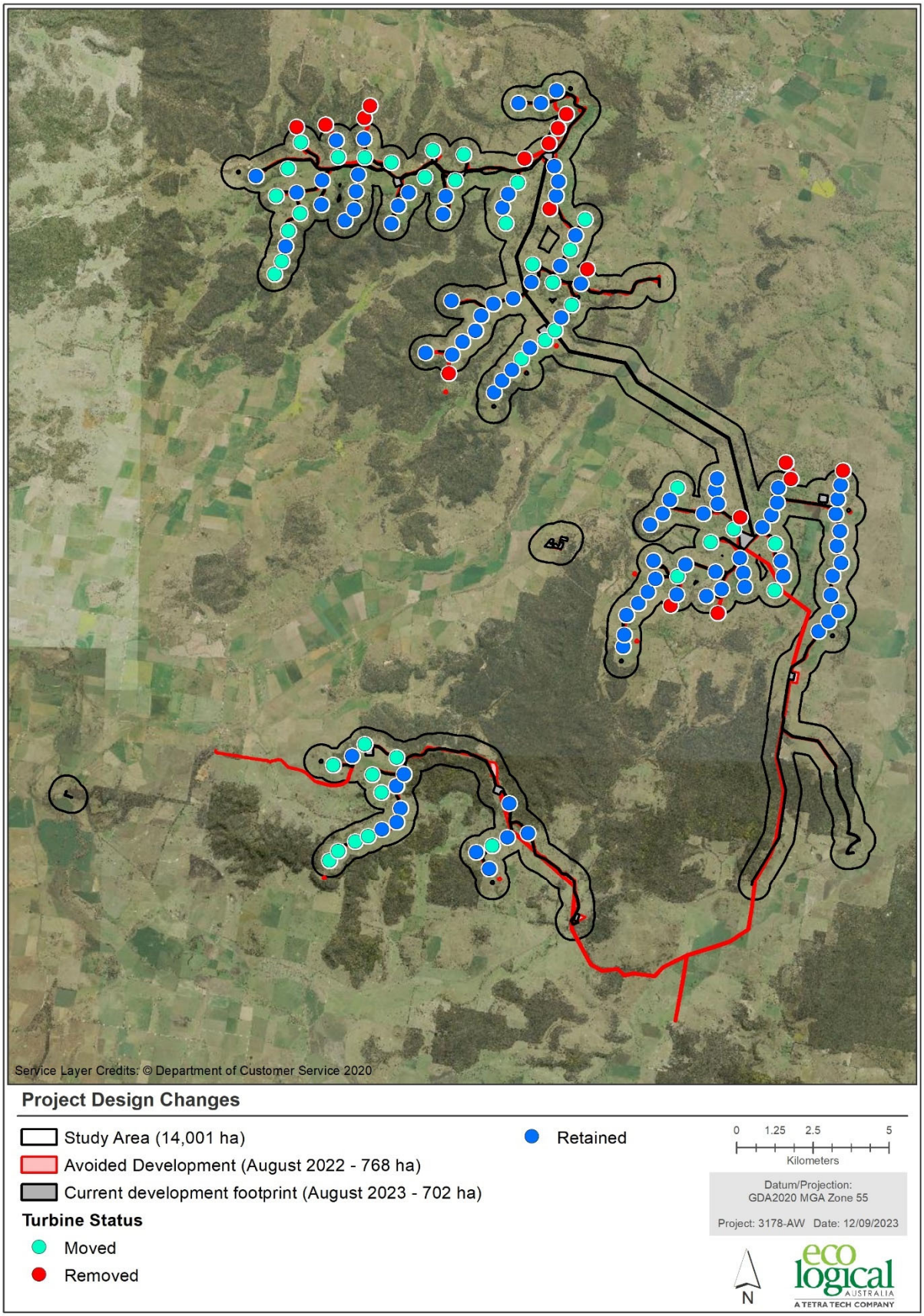


Figure 55 Project design changes

The development site, which includes both construction and operational footprints covers approximately 695 ha and is primarily used for sheep and cattle grazing and cropping. The majority of native vegetation is modified by both historical and ongoing farming practices and is generally restricted to isolated paddock trees or small patches of paddock trees with a modified understorey. Paddock areas, represent over 71% of the development site. Significant areas of the development site no longer comprise native plant communities due to historical agricultural activities including cropping and pasture improvement.

To highlight the avoidance if impacts, detailed maps have been prepared comparing the development site boundary prepared in the EIS and the revised development footprint. These detailed maps are examples of the refinement process that has been undertaken across the Project to avoid and minimise impacts to biodiversity. In particular, the following changes highlight the avoidance of impacts:

- Turbines MH64-MH68 show how the development corridor has been revised in Mount Hope cluster (Figure 57);
- Turbines MH62 and MH63 have been removed, and the development corridor has been revied in Mount Hope cluster (Figure 58);
- Refinement of development corridor around Turbines GR30, GR31, and GR23-25, to minimise impacts in the Girragulang Road cluster (Figure 59);
- Turbines GR21 and GR22 have been removed, and refinement of development corridor around GR18-GR20 to avoid and minimise impacts (Figure 60);
- Modification of development corridor throughout the Leadville cluster to reduce impacts, with an example shown about LV13, LV14, and LV23 (Figure 61).

A summary of the comparative impacts between the previous and current footprints is shown on Figure 57 to Figure 61.

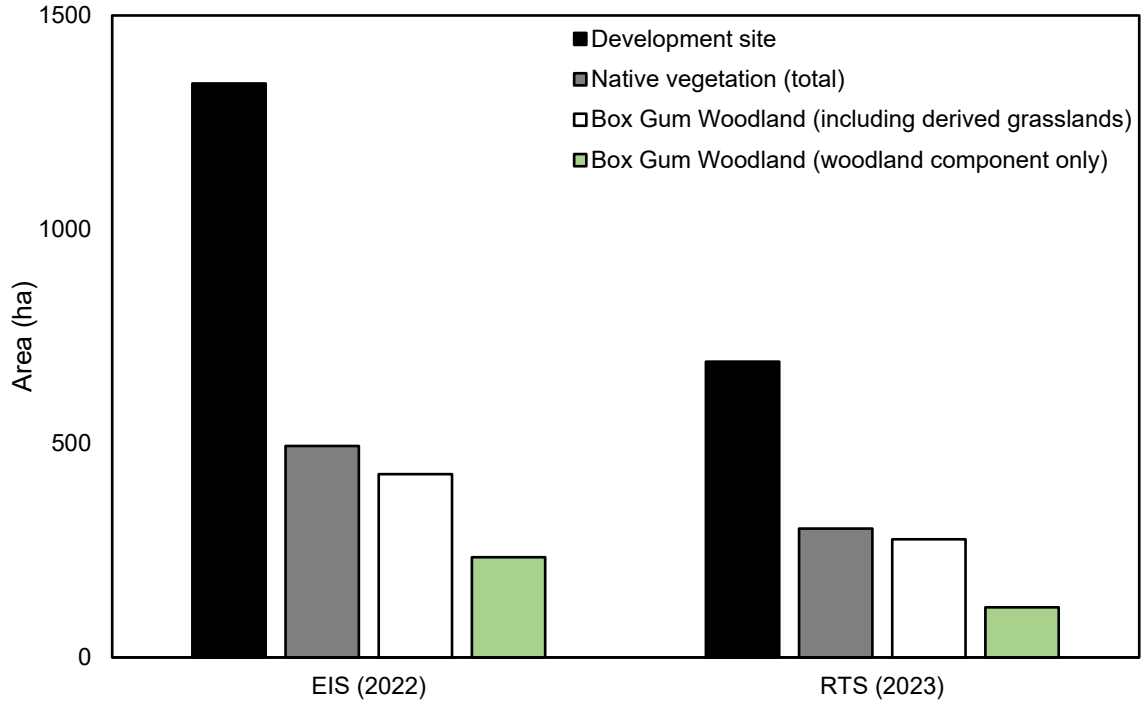


Figure 56 Comparison of development site footprints between EIS (April 2022) and RTS (October 2023)

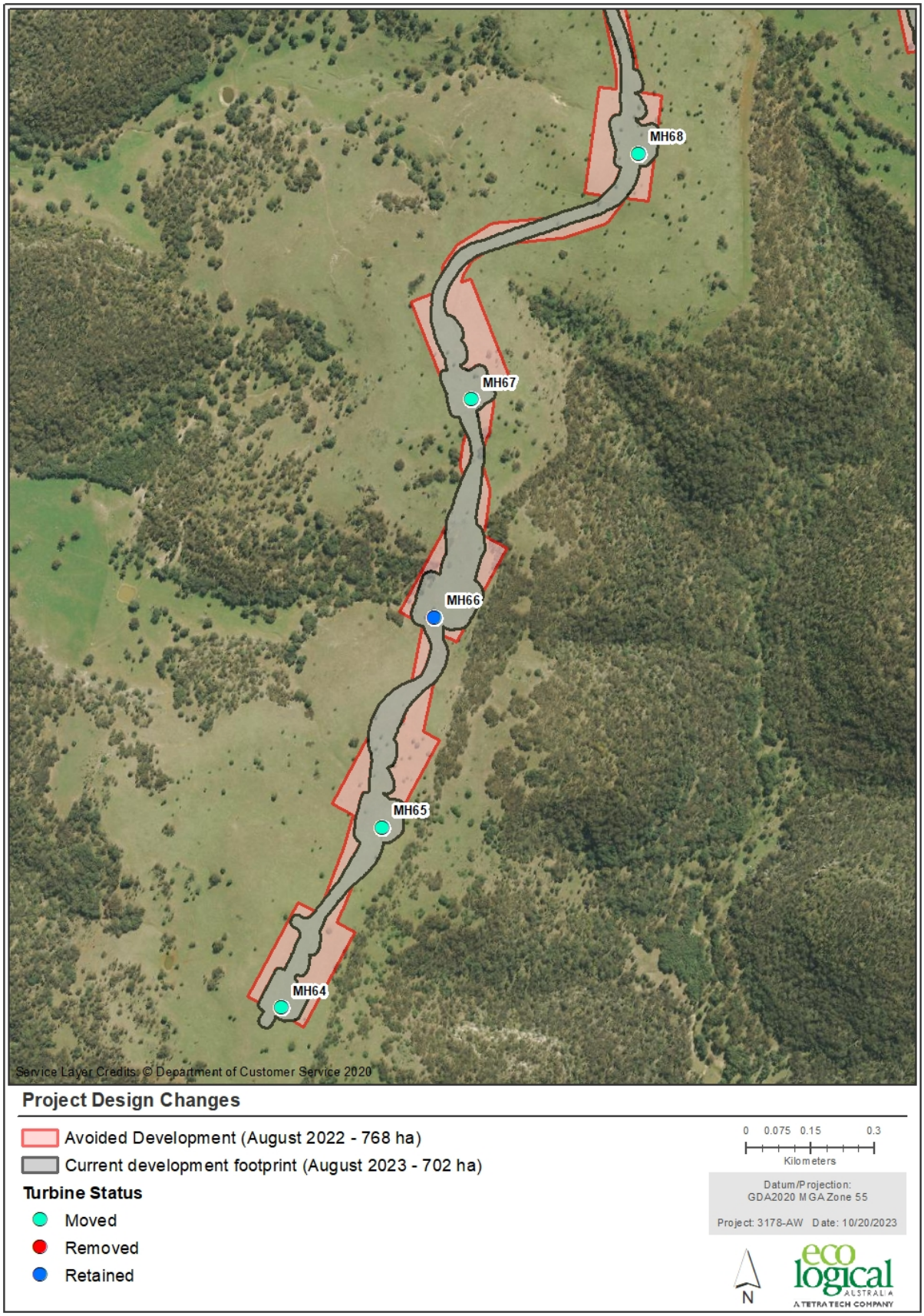


Figure 57 Design changes in Mount Hope cluster to minimise impacts



Figure 58 Design changes in Mount Hope cluster to avoid and minimise impacts

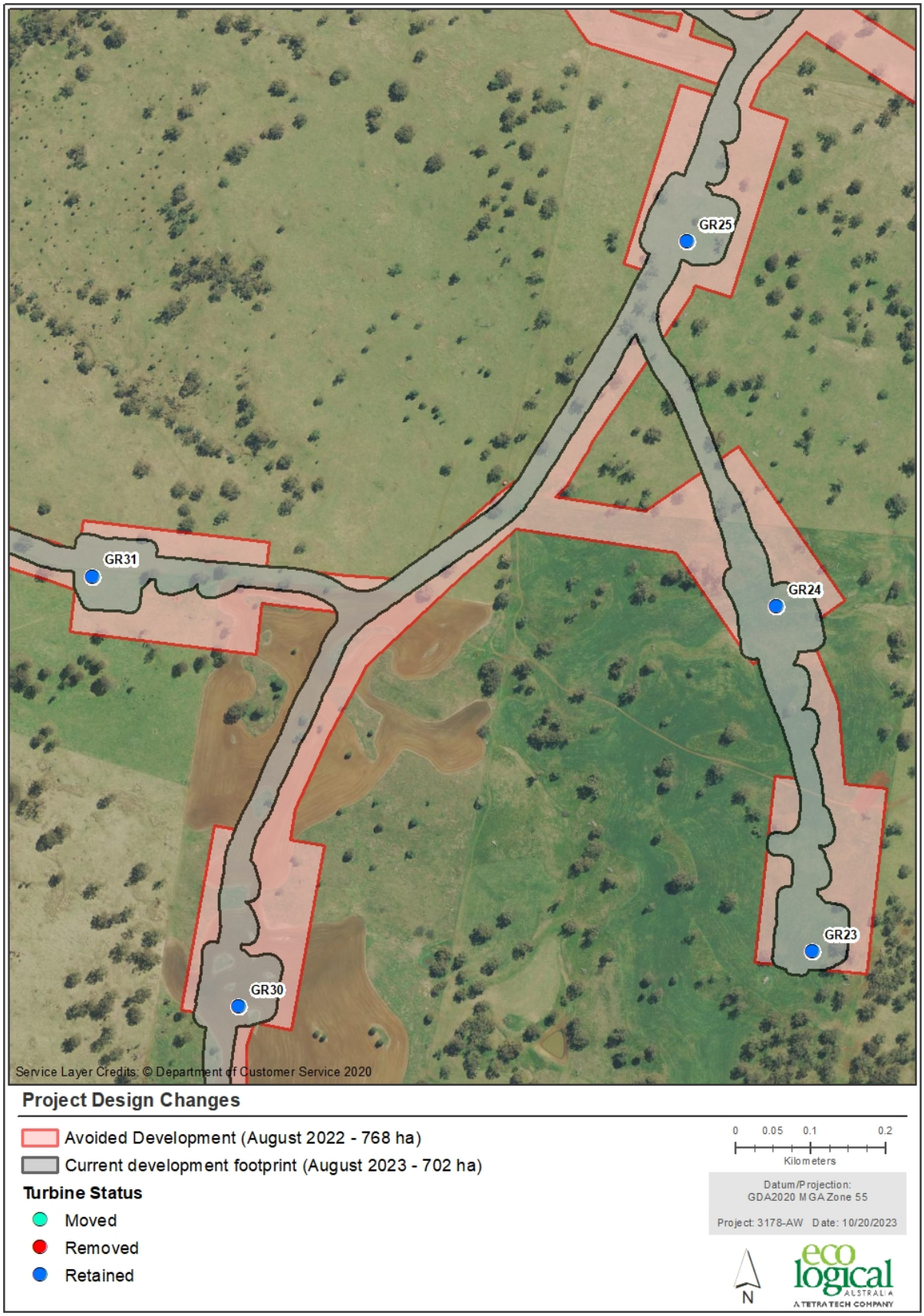


Figure 59 Design changes in Girragulang Road cluster to minimise impacts

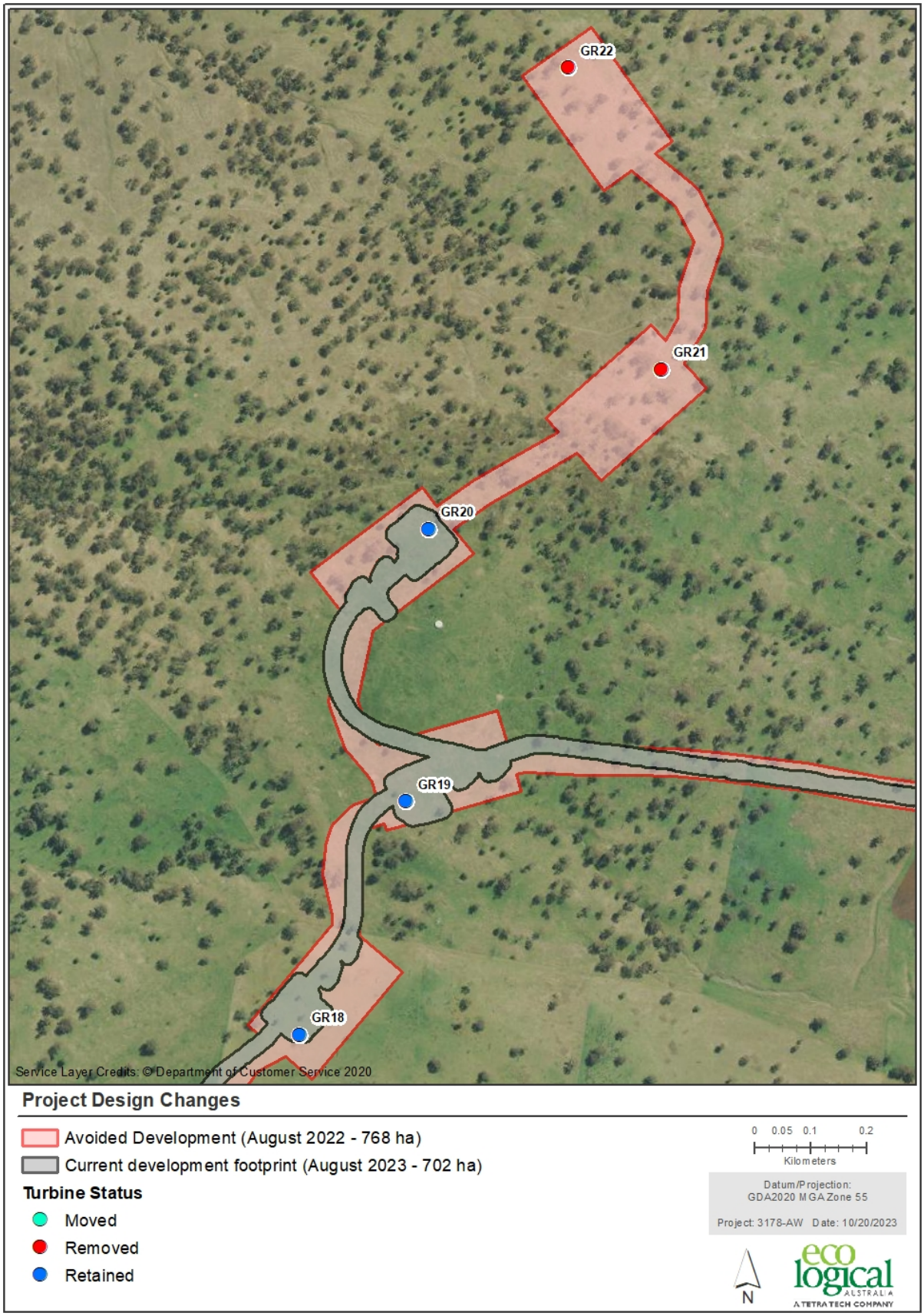


Figure 60 Design changes in Girragulang Road cluster to avoid and minimise impacts

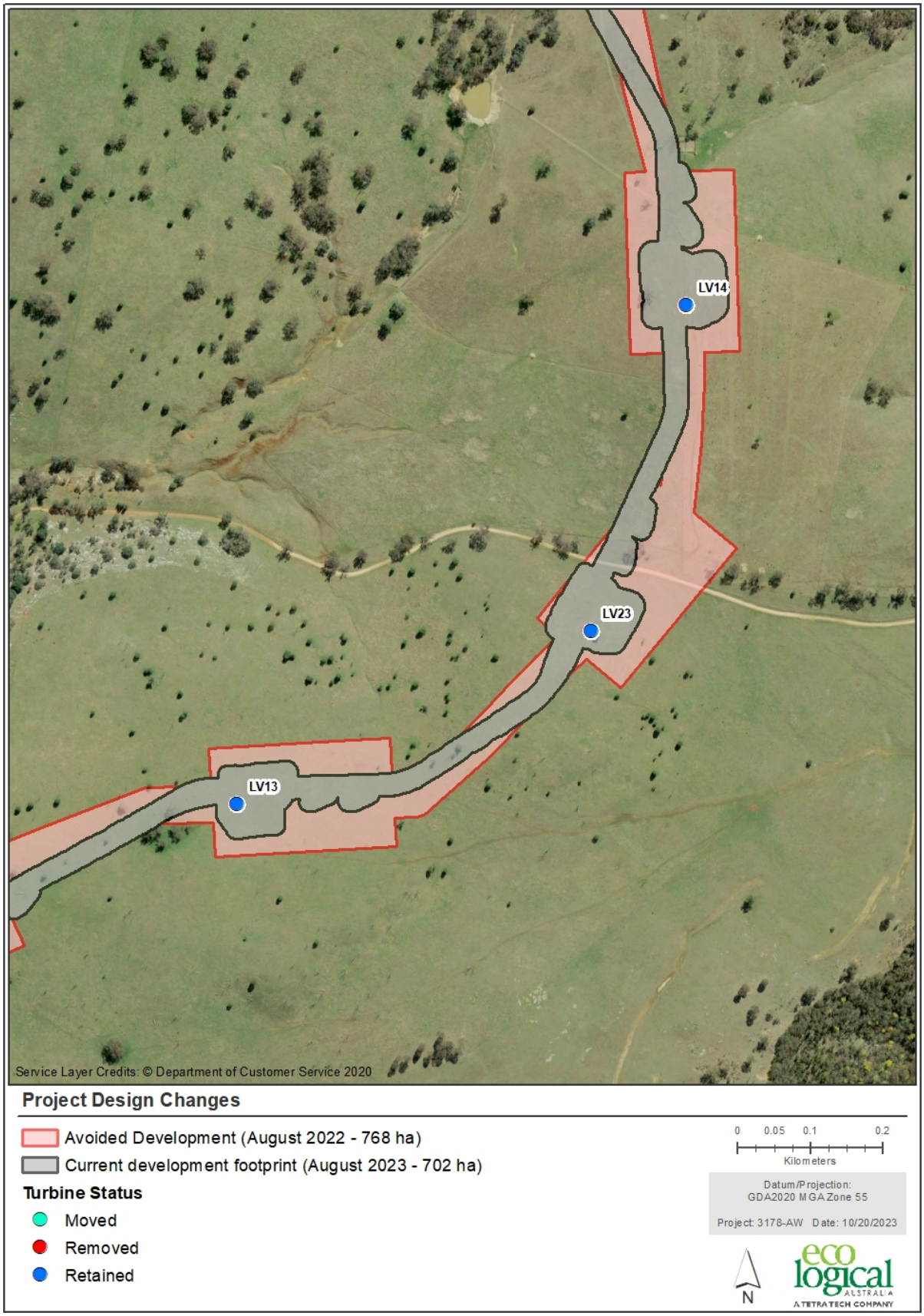


Figure 61 Design changes in Leadville cluster to minimise impacts

7.1.1. Locating a project to avoid and minimise impacts on vegetation and habitat

The development has been located in a way which avoids and minimises impacts as outlined in Table 49.

Table 49: Locating a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
locating the project in areas where there are no biodiversity values	Areas of cleared land and low condition vegetation have been utilised wherever possible.	The placement of the development site has centred around the areas of lowest biodiversity value within the development boundary (cleared paddock), avoiding larger woodland areas where possible.
locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition	Impacts to native vegetation have generally been restricted to isolated paddock trees or small, isolated patches of trees. Larger areas of more intact native vegetation have been avoided wherever possible.	The placement of the development site has centred around the area of lowest biodiversity value (cleared paddock). The transmission line south of the Girragulang Road cluster has now been removed from the project.
locating the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an EEC or CEEC), indicated by the biodiversity risk weighting for a species	The development site has not been able to completely avoid impacts to areas providing species habitat and EEC vegetation.	The placement of the development site has centred around the area of lowest biodiversity value (cleared paddock) and aimed to minimise impacts to CEEC and species habitat by avoiding higher quality remaining vegetation within and surrounding the development site.
locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The development footprint has been centred around the area of least biodiversity impact with the aim to conserve connectivity values surrounding the development site.	The major connectivity features within the landscape are within vegetated gullies within each of the wind farm clusters. Connectivity will be retained in these areas around the periphery of the proposal.

Regarding measures to avoid and minimise impacts during site selection and planning phase, the suitability of the development site has been selected with consideration given to limiting the amount of intact vegetation to be removed. The original investigations for the Project included a broader area than the current development site, and multiple iterations of the development site boundary have resulted in a development site that largely avoids intact native vegetation, with majority of the proposed development site being located on land with little to no biodiversity value. Table 50 below identifies the key changes in development design between the initial proposal (as presented in the scoping study in 2019) and the final proposal.

Table 50 Project development design changes

Development feature	Initial proposal (Scoping Study 2019)	EIS proposal	Final proposal	Result
Wind turbine locations	175 wind turbines proposed across three wind farm clusters.	Reduced to 148 turbines.	Reduced further to 131 turbines	25% reduction in wind turbines.

Development feature	Initial proposal (Scoping Study 2019)	EIS proposal	Final proposal	Result
Internal access tracks and electrical reticulation	Not included in original design	Internal access follows existing cleared farm tracks where possible.	Revised access corridor and less extensive clearing required.	Majority of all other tracks to be located in cleared paddocks and low condition native grassland. Electrical reticulation to be trenched along access tracks to consolidate area of ground disturbance.
Internal transmission lines (between wind farm clusters)	Connector transmission line between Girragulang Road and Mount Hope not included in original design. Connector transmission lines proposed directly between Leadville and Girragulang Road clusters through approximately 7.2km of forested vegetation.	Connector transmission line between Girragulang Road and Mount Hope crosses valley floor that is predominately cleared for cropping. Connector transmission lines proposed directly between Leadville and Girragulang Road abandoned, in preference for direct connection to REZ Transmission line from Leadville.	No change from EIS proposal	Areas of better-quality vegetation have generally been avoided by following cleared areas.
External transmission lines (wind farm to REZ Transmission line)	Approximately 75km of 500kv transmission line proposed from Girragulang Road cluster to Mount Piper to Bayswater Transmission line south of Merriwa, impacting CEEC and Regent Honeyeater important areas.	Approximately 15km of up to 500kv transmission line between Girragulang Road/Leadville clusters, to connect to the Central West Renewable Energy Zone Transmission line	External transmission removed from the project	Avoidance of significant areas of native vegetation. Significant reduction in area of CEEC impacted. Avoidance of Regent Honeyeater important areas.
Substations	Not included in original design	Located within category 1 land with little to no biodiversity value	Situated in existing cleared areas	Low impact and preservation of better-quality areas
Component haulage and construction access	Access to Mount Hope cluster via Neilrex Road and Mount Hope Road, resulting in potential major road upgrades through moderate condition native vegetation	Access to Mount Hope now follows existing farm tracks off Black Stump Way, no upgrades to public roadways required.	No change from EIS	Low impact and preservation of better-quality areas

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Development feature	Initial proposal (Scoping Study 2019)	EIS proposal	Final proposal	Result
Ancillary infrastructure (site offices, laydown areas, etc)	Not included in original design	Located within cleared land with little to no biodiversity value	Minor changes from EIS proposal	Low impact and preservation of better-quality areas
Workers camp	Not included in original design	Located within category 1 land with little to no biodiversity value	Adjusted footprint to retain all trees within the lot.	Low impact and preservation of better quality areas

Based on the biodiversity values present and the design changes proposed by ACEN, the final site location analysis is provided below:

Table 51 Project location analysis

Location consideration	Project response
Alternative modes or technologies that would avoid or minimise impacts on biodiversity values	Wind energy generation has a significantly smaller disturbance footprint compared to a similar energy output from solar energy. Coal and gas energy generation would have a larger environmental footprint as they would require both a power station as well as large-scale ancillary impacts (such as mines or gas wells).
Alternative routes that would avoid or minimise impacts on biodiversity values	A number of alternative transmission line routes have been assessed to inform the final corridor, ensuring it follows existing cleared areas where possible.
Alternative locations that would avoid or minimise impacts on biodiversity values	No other locations for the project have been considered, however two previously identified clusters of turbines have been removed, resulting in reduced overall biodiversity impacts.
Alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values.	The location of development within the property has been selected based on the lowest biodiversity impact.

7.1.2. Prescribed impacts

The following analysis was undertaken to demonstrate how the project has avoided prescribed impacts where possible.

Table 52 Avoidance of prescribed impacts through project location

Prescribed impact consideration	Project response
Locate surface works to avoid direct impacts on the habitat features identified in Chapter 6 (prescribed impacts)	All development has been located to avoid all direct impacts to caves and cliffs.
Locate subsurface works, in both the horizontal and vertical planes, to avoid and minimise operations beneath the habitat features identified in Chapter 6 (of the BAM). For example, locating longwall panels away from geological features of significance, groundwater-dependent plant communities and their supporting aquifers	Minimal subsurface activities are proposed and will not affect any geological features of significance, groundwater-dependent plant communities and their supporting aquifers
Locate the proposal to avoid severing or interfering with corridors connecting different areas of habitat and migratory flight paths, to important habitat or local movement pathways	Field assessment and did not identify any migratory flight paths (Section 6.2.2).
Optimise the proposal layout to minimise interactions with threatened entities; for example, design a wind farm that has: • 100 m turbine-free buffers around features that attract and support aerial species, such as forest edges, riparian corridors, wetlands, ridgetops and gullies • turbine-free corridors in zones of regular movement for species of concern, to avoid a barrier effect	All forest edges, riparian corridors, wetlands and gullies have been avoided. Turbines have been positioned along ridgetops as these are the areas which contain the least biodiversity values. Throughout the study area, there are numerous turbine-free zones to allow for movement of species of concern. There is unlikely to be a barrier effect from the proposed layout.
Locate the proposal to avoid impacts on water bodies or hydrological processes	No impacts to any water bodies or hydrological processes are proposed.

In order to minimise prescribed impacts, the following elements have been included into the project design (Table 53).

Table 53 Design elements to minimise prescribed impacts

Design element	Project response
Engineering solutions, such as proven techniques to: • minimise fracturing of bedrock underlying features of geological significance, or groundwater-dependent communities and their supporting aquifers • restore connectivity and movement corridors	The project will not result in any impacts to bedrock underlying features of geological significance. The project is unlikely to impact any connectivity or movement corridors.
Design elements that minimise interactions with threatened entities, such as: • designing turbines to dissuade perching and minimise the diameter of the rotor swept area	Turbines will not have any additional external features that would persuade perching, other than those items required for safe operation of the turbine. The large rotor swept area of the turbine is a mandatory requirement of the project. A smaller RSA would necessitate more turbines to be built and

Design element	Project response
• designing fencing to prevent animal entry to transport corridors • providing vegetated buffers rehabilitated with native species	would allow turbines to be build closer together further increasing any barrier effect of the proposal. This project does not propose to provide any additional vegetated buffers other than those that already exist within the study area.
Maintaining environmental processes that are critical to the formation and persistence of habitat features not associated with native vegetation	The project will not change any environmental processes that are critical to persistence of habitat features (i.e. caves and cliffs).
Maintaining hydrological processes that sustain threatened entities	Hydrological processes will be unaffected by the project.
Controlling the quality of water released from the site, to avoid or minimise downstream impacts on threatened entities.	Any runoff captured within the construction and operational footprint will be released in accordance with construction site and erosion standards.

7.1.3. Offsetting of prescribed impacts

Ecosystem credits have been calculated for woodland areas over which a 90m blade would arc. Given the lower blade tip will be approximately 90m from the ground, the impacts are likely to be minimal. In recognition of this a 10% loss has been applied to overswept areas of woodland. The 10% loss has been calculated as 1/10th of the area (Table 54) and added to the relevant vegetation zone as a total loss. Given the small areas of this impact (3.2ha across 6 BAMC calculations), these areas have been added to existing area calculations, and no separate BAMC case has been opened.

Table 54 Total impact area for prescribed impacts

IBRA Sub	Zone	GR Cluster	LV Cluster	MH Cluster	Total
Inland Slopes	10 479 B		0.52		0.52
Kerrabee	10 479 B		0.77		0.77
Pilliga	11 479 M			0.48	0.48
Pilliga	14 483 G	0.61			0.61
Inland Slopes	15 483 M		0.87		0.87
Kerrabee	15 483 M		2.50		2.50
Liverpool Range	15 483 M	7.56		0.81	8.37
Pilliga	15 483 M	2.28		15.23	17.51
Talbragar Valley*	15 483 M			0.04	0.04
Total		**10.45**	**4.66**	**16.55**	**31.66**

* Area added to Pilliga Subregion calculations

8. Assessment of Impacts

The project will have several discrete impact types as part of the development of an operational wind farm including ground disturbance and vegetation removal for the development of roads, internal reticulation, substations, turbine footings and pads, site offices and internal transmission lines. There may also be a requirement to clear native vegetation within a construction footprint around the wind turbines, to allow for sufficient space to set down componentry and temporary laydown areas.

8.1. Direct impacts

The direct impacts of the development on:

- native vegetation and threatened ecological communities are outlined in Table 55
- threatened species and threatened species habitat is outlined in Table 56
- prescribed biodiversity impacts are outlined in Section 6.4.

Direct impacts including the final project footprint (construction and operation) are shown on Figure 4.

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Table 55: Direct impacts to native vegetation

Vegetation zone	PCT Name	IBRA Subregion	Girragulang Road access	Girragulang Road alternative access	Girragulang Road cluster	Intersection Upgrade	Leadville Cluster	Mount Hope Cluster	Workers Camp	Total
01 84 M	River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Pilliga			1.14					1.14
02 267 M	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Kerrabee		0.37						0.37
	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Pilliga		0.30						0.30
03 267 L	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Kerrabee		2.64						2.64
	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Pilliga		1.40						1.40
04 281 G	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Liverpool Range			0.11					0.11
	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Pilliga		0.55						0.55
05 281 M	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Inland Slopes				0.00				0.00
	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Kerrabee	1.27	0.01			1.24			2.52
	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Liverpool Range			3.90			0.25		4.16
	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Pilliga	1.53		1.64			2.49	0.01	5.67

Vegetation zone	PCT Name	IBRA Subregion	Girragulang Road access	Girragulang Road alternative access	Girragulang Road cluster	Intersection Upgrade	Leadville Cluster	Mount Hope Cluster	Workers Camp	Total
06 281 L	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Kerrabee	0.03				3.70			3.73
	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Pilliga	0.21							0.21
10 479 B	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Inland Slopes					0.92			0.92
	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Kerrabee		0.39						0.39
	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Pilliga	5.09	3.15	0.01					8.25
11 479 M	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Inland Slopes					0.35			0.35
	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Kerrabee					4.39			4.39
	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Pilliga	0.41	1.81				1.80		4.03

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Vegetation zone	PCT Name	IBRA Subregion	Girragulang Road access	Girragulang Road alternative access	Girragulang Road cluster	Intersection Upgrade	Leadville Cluster	Mount Hope Cluster	Workers Camp	Total
12 479 Reg	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Inland Slopes					2.20			2.20
	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Kerrabee					3.50			3.50
13 479 L	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Liverpool Range			1.87					1.87
	Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Pilliga			2.32					2.32
14 483 G	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Pilliga			0.22					0.22
15 483 M	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Inland Slopes					1.09			1.09
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Kerrabee					7.97			7.97
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Liverpool Range			21.73			7.35		29.09
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Pilliga	0.95		5.01			61.97		67.93
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Talbragar Valley						0.00		0.00
16 483 L	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Inland Slopes					20.87			20.87
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Kerrabee					30.22			30.22

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Vegetation zone	PCT Name	IBRA Subregion	Girragulang Road access	Girragulang Road alternative access	Girragulang Road cluster	Intersection Upgrade	Leadville Cluster	Mount Hope Cluster	Workers Camp	Total
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Liverpool Range			18.43			5.57		24.00
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Pilliga	2.43	0.12	1.68			79.41		83.64
17 483 P	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Inland Slopes					0.85			0.85
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Kerrabee					28.67			28.67
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Liverpool Range			80.64			9.63		90.27
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Pilliga	0.56		31.17			169.25	6.87	207.85
	Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Talbragar Valley						0.47		0.47
Total			12.49	8.93	171.68	0.00	105.97	338.21	6.87	644.15

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Table 56: Direct impacts on threatened species and threatened species habitat

Species	Common Name	Number of individuals / Habitat (ha) in study area	BC Act	EPBC Act
Chalinolobus dwyeri	Large-eared Pied Bat	0 ha potential breeding habitat along clifflines impacted by the project 3.94 ha of foraging habitats	Vulnerable	Vulnerable
Hoplocephalus bitorquatus	Pale-headed Snake	1.04 ha of habitat present.	Vulnerable	Vulnerable
Tyto novahollandiae	Masked Owl	9.95 ha	Vulnerable	
Ninox connivens	Barking Owl	130.37 ha	Vulnerable	
Ninox strenua	Powerful Owl	9.95 ha	Vulnerable	
Petaurus norfolcensis	Squirrel Glider	14.12 ha	Vulnerable	

8.2. Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 57.

All vegetation zones within the development site have been assumed to result in a future vegetation integrity score of 0. This is a substantial overestimate of the true impacts of the project as:

- Temporary construction impacts outside of hard stand will be rehabilitated back to pre-development condition. This will account for more than 50% of the development footprint.
- Impacts to grasslands and ground cover underneath transmission line spans will be unaffected
- The proposed development will be entirely rehabilitated at decommissioning.

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Table 57 Change in vegetation integrity score – Brigalow Belt South Bioregion

Zone	IBRA Subregion	Stage	BAMC Case	VI Score Before	VI Score After
05 281 M	Pilliga	GR Access Moorfield Road	21962	78.8	0
06 281 L	Pilliga	GR Access Moorfield Road	21962	100	0
10 479 B	Pilliga	GR Access Moorfield Road	21962	55.2	0
11 479 M	Pilliga	GR Access Moorfield Road	21962	66.7	0
15 483 M	Pilliga	GR Access Moorfield Road	21962	32.7	0
16 483 L	Pilliga	GR Access Moorfield Road	21962	28.5	0
17 483 P	Pilliga	GR Access Moorfield Road	21962	5.7	0
05 281 M	Kerrabee	GR Access Moorfield Road	40556	36.6	0
06 281 L	Kerrabee	GR Access Moorfield Road	40556	19.1	0
02 267 M	Pilliga	GR alternative access	40557	43.3	0
03 267 L	Pilliga	GR alternative access	40557	38.3	0
04 281 G	Pilliga	GR alternative access	40557	79.1	0
10 479 B	Pilliga	GR alternative access	40557	55.2	0
11 479 M	Pilliga	GR alternative access	40557	66.7	0
16 483 L	Pilliga	GR alternative access	40557	29.6	0
02 267 M	Kerrabee	GR alternative access	40560	72	0
03 267 L	Kerrabee	GR alternative access	40560	23.6	0
10 479 B	Kerrabee	GR alternative access	40560	37.7	0
04 281 G	Liverpool Range	GR cluster	39289	38.1	0
05 281 M	Liverpool Range	GR cluster	39289	67.4	0
13 479 L	Liverpool Range	GR cluster	39289	8	0
15 483 M	Liverpool Range	GR cluster	39289	25.3	0
16 483 L	Liverpool Range	GR cluster	39289	27	0
17 483 P	Liverpool Range	GR cluster	39289	7.8	0
01 84 M	Pilliga	GR cluster	40564	27.3	0
05 281 M	Pilliga	GR cluster	40564	78.8	0
10 479 B	Pilliga	GR cluster	40564	55.2	0
11 479 M	Pilliga	GR cluster	40564	66.7	0
13 479 L	Pilliga	GR cluster	40564	12.3	0
14 483 G	Pilliga	GR cluster	40564	70.3	0
15 483 M	Pilliga	GR cluster	40564	34.3	0
16 483 L	Pilliga	GR cluster	40564	29.6	0
17 483 P	Pilliga	GR cluster	40564	6	0
05 281 M	Kerrabee	LV cluster	21960	34.8	0
06 281 L	Kerrabee	LV cluster	21960	18.5	0

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Zone	IBRA Subregion	Stage	BAMC Case	VI Score Before	VI Score After
10 479 B	Kerrabee	LV cluster	21960	36.2	0
12 479 Reg	Kerrabee	LV cluster	21960	10.8	0
15 483 M	Kerrabee	LV cluster	21960	56	0
16 483 L	Kerrabee	LV cluster	21960	29.6	0
17 483 P	Kerrabee	LV cluster	21960	8	0
10 479 B	Inland Slopes	LV cluster	21961	100	0
11 479 M	Inland Slopes	LV cluster	21961	78.6	0
12 479 Reg	Inland Slopes	LV cluster	21961	33.9	0
15 483 M	Inland Slopes	LV cluster	21961	36.1	0
16 483 L	Inland Slopes	LV cluster	21961	41.8	0
17 483 P	Inland Slopes	LV cluster	21961	100	0
05 281 M	Liverpool Range	MH cluster	40567	67.4	0
15 483 M	Liverpool Range	MH cluster	40567	25.3	0
16 483 L	Liverpool Range	MH cluster	40567	27	0
17 483 P	Liverpool Range	MH cluster	40567	7.8	0
01 84 M	Pilliga	MH cluster	40568	27.3	0
05 281 M	Pilliga	MH cluster	40568	78.8	0
11 479 M	Pilliga	MH cluster	40568	66.7	0
15 483 M	Pilliga	MH cluster	40568	34.3	0
16 483 L	Pilliga	MH cluster	40568	29.6	0
17 483 P	Pilliga	MH cluster	40568	6	0
17 483 P	Pilliga	Workers Camp	40555	6	0

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8.3. Indirect impacts

The indirect impacts of the development are outlined in Table 58.

Table 58: Indirect impacts

Indirect impact	Nature	Extent	Frequency	Biodiversity affected	Duration/ Timing	Consequence
Inadvertent impacts on adjacent habitat or vegetation	Trampling grass and groundcover by site vehicles	Limited to within the construction footprint	Daily during construction phase	Native vegetation	Daily, during the construction phase.	Minimal impact to native vegetation during construction phase. All impacts within the construction footprint have been included within vegetation integrity loss.
Reduced viability of adjacent habitat due to edge effects	No impacts likely as the development is situated in an existing agricultural landscape. Potential edge effects are likely as a result of the transmission lines or accessways.	Limited to within the construction footprint of the transmission lines	Daily during construction and operational phase of the project	Native vegetation, threatened species habitats	Daily, for the life of the project.	Minimal edge effects along transmission line routes through existing native vegetation.
Reduced viability of adjacent habitat due to noise, dust or light spill	Noise and dust created from machinery (no night works proposed therefore no light spill)	Noise and dust likely to carry further than 10 m from Development boundary	Daily, during construction works Nightly during construction, operation of development	Fauna species and their habitats	Construction noise expected to only persist for the construction period. Operational noise to occur daily, for the life of the project	Short term impacts. No measurable impact likely.
transport of weeds and pathogens from the site to adjacent vegetation	Spread of weed seed or pathogens becoming established within study area.	Potential for spread into adjacent habitat	Daily, during construction works	Native vegetation	Sporadic throughout construction period	Weed and pathogens to be managed under a Biodiversity Management Plan during construction phase. No impacts expected following commissioning of the operational phase of the project.

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Indirect impact	Nature	Extent	Frequency	Biodiversity affected	Duration/ Timing	Consequence
Increased risk of starvation or exposure and loss of shade or shelter	No increase of starvation or exposure or loss of shade and shelter expected.	n/a	n/a	n/a	n/a	n/a
loss of breeding habitat	No loss of breeding habitat expected due to indirect impacts.	n/a	n/a	n/a	n/a	n/a
trampling of threatened flora species	No trampling of threatened flora species expected.	n/a	n/a	n/a	n/a	n/a
Inhibition of nitrogen fixation and increased soil salinity	No inhibition of nitrogen fixation and increased soil salinity expected.	n/a	n/a	n/a	n/a	n/a
Fertiliser drift	No fertiliser drift expected.	n/a	n/a	n/a	n/a	n/a
rubbish dumping	Minor littering. Inappropriate construction waste disposal.	Potential for rubbish to spread via wind into adjacent vegetation	Potential to occur at any time throughout construction or operational phases	Adjacent native vegetation and habitats.	During working hours for construction	Minor, short term impacts.
wood collection	There is very little wood available for collection within the project.	Minor (but unlikely) collection possible by construction crew staff.	Potential to occur at any time throughout construction or operational phases	Adjacent native vegetation and habitats.	During working hours for construction	Minor, short term impacts.
removal and disturbance of rocks including bush rock	There is very little bush rock available for removal or disturbance within the project.	Minor (but unlikely) collection possible by construction crew staff.	Potential to occur at any time throughout construction or operational phases	Adjacent native vegetation and habitats.	During working hours for construction	Minor, short term impacts.
increase in predators	There is already an extensive population of feral Pigs, Foxes, and Cats, within the study area.	Unlikely to increase the risk of any pest vertebrates.	n/a	n/a	n/a	n/a

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Indirect impact	Nature	Extent	Frequency	Biodiversity affected	Duration/ Timing	Consequence
increase in pest animal populations	There is already an extensive population of feral Pigs, Foxes, Cats, Rabbits, Hares, Rats, and Mice within the study area.	Unlikely to increase the risk of any pest vertebrates.	n/a	n/a	n/a	n/a
changed fire regimes	The project will not change the current fire regime in any way.	n/a	n/a	n/a	n/a	n/a
disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	No disturbance to any specialist breeding habitats are likely.	n/a	n/a	n/a	n/a	n/a
sedimentation and contaminated and/or nutrient rich run-off	No increase in sediment or contaminated run off is expected. All construction works to be managed under an Erosion and Sediment plan.	n/a	n/a	n/a	n/a	n/a

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8.4. Prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Table 59.

Table 59: Direct impacts on prescribed biodiversity impacts

Prescribed biodiversity impact	Description (Nature, extent and frequency)	Consequences	Justification	Additional information
Karst, caves, crevices, cliffs, rocks and other geological features of significance	No impacts	n/a	n/a	n/a
Human made structures or non-native vegetation	No impacts	n/a	n/a	n/a
Habitat connectivity	Disruption of connectivity due to transmission line route has been removed from the development site.	Clearing of a 70m wide easement through burned bushland no longer required	Transmission line removed from development site.	n/a
Water bodies, water quality and hydrological processes	No direct impacts to ground. All crossings will be spanned by transmission lines.	n/a	n/a	n/a
Wind turbine strikes on protected animals	Bird and bat strike likely.	Minor ongoing impacts to common species.	Detailed bird and bat strike assessment undertaken as part of the preparation of this BDAR.	Section 8.5
vehicle strikes	No impacts	n/a	n/a	n/a

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8.5. Discussion of Wind Turbine Strike on Protected Animals

An assessment has been undertaken to determine the impacts of wind turbine strike on protected animals as required by Section 8.3.5 of the BAM.

Table 60 Additional information for wind farm developments

Prescribed impact consideration	Project justification/response
Predict the impact on species living in, or likely to fly over, the proposed development site, including bat or bird strike and barotrauma	Collision risk assessment has been undertaken as part of this BDAR and is described in detail in Section 6.5.
Predict the rate and timing of impact per turbine per year for species likely to be affected	The rate and timing of collisions with turbines has been modelled for moderate and high risk species as described in Section 6.7.
Predict the consequences of impacts for the persistence of populations	The rate, timing, and consequence on protected species has been undertaken and is described in detail in Section 6.5.
Predict the cumulative impacts of the proposed development alongside existing wind farms, on species mortality, movement patterns and use of adjacent habitat	The proposed wind farm is not collocated with any other wind farms locally. The nearest wind farm is the Liverpool Range Wind farm which is proposed for 11 km east of the project at it's closest point.
Predict the likelihood and nature of impacts on aerial species living in, or likely to fly over, the proposed development site, including barriers to migratory pathways, and breeding, feeding and resting resources	The project is unlikely to have any significant impact on aerial species living within or flying over the development site as assessed in Section 6.7.
Predict the impact of avoidance behaviour for migratory species relative to migration distances, and the availability of suitable habitat for breeding, feeding and resting over the migration route	Field studies and database review identified that the project is located at the periphery of the activity range for migratory species, which was also evidenced by the limited number of records identified. No breeding, feeding, or resting areas were identified for migratory species.
Justify predictions with reference to data, collision risk modelling (if available), relevant literature or other published sources including any publications by the Department	The rate and timing of collisions with turbines has been modelled for moderate and high risk species as described in Section 6.7.
Map the disturbance zone around wind turbines, and the significant landscape and habitat features within that zone, for species likely to be affected, e.g., hollow bearing trees and important habitat for migratory species.	Disturbance zones around wind turbines have been incorporated into the construction areas footprint which allows for an area of additional impact around each turbine. No hollow-bearing trees or other significant habitat features outside of this zone are likely to be impacted.

8.6. Mitigating and managing direct and indirect impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 61.

These measures are to be documented in a Biodiversity Management Plan, prior to commencement of construction.

Table 61: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
timing works to avoid critical life cycle events such as breeding or nursing	Moderate	Minor	Active breeding or nesting identified during pre-clearance surveys will be avoided in August, September and October which is the breeding/nesting period for most fauna species.	Impacts to fauna during nesting/nursing avoided	Construction	Site manager
instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	Major	Minor	Pre-clearance surveys will be undertaken prior to tree clearing. A qualified ecologist/licenced wildlife handler will supervise tree removal in accordance with best practise methods.	Any fauna utilising habitat within the Development Site will be identified and managed to ensure clearing works minimise the likelihood of injuring resident fauna	Prior to construction	Site ecologist
relocate habitat features (fallen timber, hollow logs) from within the development site	Moderate	Minor	A procedure will be developed for the relocation of habitat features (e.g. fallen timber, hollow logs) to adjacent retained habitat.	Enhancement of retained habitats	Prior to construction	Site manager

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Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chain-saw, rather than heavy machinery, is preferable in situations where partial clearing is proposed	Moderate	Minor	Clearing protocols will be developed that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance (e.g. removal of native vegetation by chainsaw instead of heavy machinery where only partial clearing is proposed). Fencing (or other barriers as required) and signage will be placed around those areas of vegetation to be maintained to prevent any accidental construction damage and provide a permanent barrier between the development footprint and retained areas. The type of fencing during construction may be of a temporary nature and scale that is robust enough to withstand damage during this stage of work. Use of appropriate machinery for vegetation removal adjacent to retained areas.	Vegetation to be retained outside of the Development Site boundary will not be disturbed	Construction	Site manager
sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Minor	Negligible	Appropriate controls will be implemented to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways. All works within proximity to the drainage lines will have adequate sediment and erosion controls (e.g. sediment barriers, sedimentation ponds). Revegetation will also commence as soon as is practicable to minimise risks of erosion. Suitable species will be used as ground cover species in any revegetation areas.	Erosion and sedimentation will be controlled	Construction and decommissioning	Site manager

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Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Minor	Negligible	Construction works will predominately be undertaken during daylight hours. Noise impacts around batch plants and compounds to be managed where they impact on residents.	Noise impacts associated with the development will be managed	Construction / operation /decommissioning	Site manager
light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	Minor	Negligible	Construction works will generally be undertaken during daylight hours. Occasionally night lights will be used during concrete pours. Lights associated with operation will be directional to avoid unnecessarily shining light into adjacent retained vegetation where possible.	Light impacts of construction will be avoided.	Minor	Negligible
adaptive dust monitoring programs to control air quality	Minor	Negligible	Dust suppression measures will be implemented to limit dust on site. Revegetation will also be commenced as soon as practicable to minimise areas likely to create dust. Suitable species will be used as ground cover species in any revegetation areas.	Mitigate dust created during construction activities	Minor	Negligible
temporary fencing to protect significant environmental features such as riparian zones	Minor	Negligible	Temporary fencing to be installed when works are within 100m of any threatened flora. Threatened flora to have a 10m exclusion zone around known locations. Temporary fencing also required to demarcate the exact easement of the transmission line during construction.	Protection of threatened flora.	Construction	Site manager
hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Minor	Negligible	All machinery will be cleaned prior to entering and exiting the construction site to minimise the transport of weeds to vegetated areas to be retained. Weeds that are present within the study area that are listed under the NSW Biosecurity Act 2015 will be managed in accordance with a weed management plan.	Weed impacts managed	Construction	Site manager

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Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Minor	Negligible	All personnel working on the project will undertake an environmental induction as part of their site familiarisation. This will include: • site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and noxious weeds) • what to do in case of environmental emergency (e.g. chemical spills, fire, injured fauna) • key contacts in the case of an environmental emergency.	Staff trained and aware of environmental issues and responsibilities on site	Construction	Site manager

8.7. Mitigating prescribed impacts and adaptive management strategy

Measures proposed to mitigate and manage prescribed biodiversity impacts at the development site are to be documented in an approved Bird and Bat Adaptive Management Plan (BBAMP). The BBAMP is to include:

- Up to 12 months of bird utilisation studies at the 33 designated sites described in this report, across four (4) seasons, to provide more accurate risk data
- Carcass monitoring during the first 2 years of the operation of the wind farm, to estimate the number of birds and bats struck by turbine blades
- Scavenger assessment, to allow adjustment of carcass search data for carcasses removed prior to surveys.
- Bird Utilisation Studies at a subset of the 33 sites, to measure the ongoing impacts of the wind farm on bird populations locally
- Monitoring of bats across four (4) seasons, to measure the ongoing impacts of the wind farm on microbat populations locally.
- A strategy and notification protocol in the event that the wind farm significantly impacts protected or threatened species.
- The BBAMP is to be implemented for the first five (5) years of operation of the project.

The BBAMP is to include the following elements as described in Table 62 below.

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Table 62 BBAMP Framework

Description	BBAMP Framework	BBAMP Content
Objectives and consent conditions	Briefly define the overall objectives for the BBAMP and strategies to avoid and mitigate residual prescribed impacts.	Purpose and objectives of the BBAMP Conditions of consent relevant to turbine strike; and Any ongoing commitments identified in the BDAR e.g., avoid and mitigate measures
BDAR summary information	Summarise the proposed survey methodology for obtaining site utilisation data for birds and bats i.e., baseline data that can be used to detect change in site usage pre and post construction and during operation. Conduct a preliminary review of baseline data on threatened and at-risk species that may be impacted by turbine collisions.	Summary of BDAR survey and risk assessment outcomes, including, but not limited to: • A description of survey method and effort • Species detection survey results, including the relevant location, timing and season/s detected • Reference to Site and Location maps that identify the coordinates for survey i.e., transects, point surveys, elevation of acoustic detectors etc. • Risk assessment outcomes for each species; and • Maps of turbine array and associated risk ratings
Monitoring Program	Provide an overview of the intended methodology for monitoring pre and post construction site utilisation, strike rates and impacts and how it will achieve outcomes, including: • Monitoring method i.e., carcass detection dogs, additional BBUS surveys etc. • Monitoring duration – propose a monitoring duration that is ecologically defensible. For example, will the proposed monitoring duration accurately capture species distribution and fluctuation across climatic conditions and seasons, which may vary across several years • Monitoring frequency – summarise a monitoring frequency based on individual turbine risk metrics	A description of the monitoring program. • Schedule of intended monitoring frequency, with supporting justification. • Any other relevant information used to support development of the monitoring program. BCS recommends that: • The BBAMP considers the efficiency of different methods of monitoring e.g., success rates of carcass detection dogs over human observer teams • The monitoring schedule should consider species biology and seasonal movements when developing their framework and BBAMP BCS Suggests that: • Monitoring frequency should be monthly, • Monitoring occurs for the first five years of operation to cover a range of climatic variabilities; and • The need for continued monitoring is informed by data taken during the first five years of survey

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Description	BBAMP Framework	BBAMP Content
Turbine selection	An overview of turbines and their associated risk factors should be included in the proposed monitoring program above and presented as a table. The table should include a preliminary risk matrix for turbines based on their location, proximity to habitat features such as caves or woodland patches etc. If the turbine design layout is still being conceptualised, the framework should outline the steps taken to assess the operational risks of turbines.	Description of the approach to selecting turbines subject to monitoring. BCS recommends that a subsample of turbines across all risk categories are selected for mortality monitoring. For example: • 10% of turbines in the low-risk category • 15% of turbines in the medium risk category • 20% of turbines in the high-risk category, and • 25% of turbines in the very high-risk category
Trigger Action Response Plan	The framework should contain a Trigger Action Response Plan (TARP) table which indicates the proposed triggers for adaptive management if strikes occur (based on explicit commitments). It is recommended that the proponent uses actual strike rates, rather than percentages of a species population as triggers, given the population parameters of many species are unknown. The framework should define the triggers for threatened/at-risk species and provide adaptive management responses (table format) which can be implemented as tiered impacts. For example: • Strike of 1 at-risk individual = low tier impact and response, • Strike of 3 at-risk individuals = high tier impact and response A clear link should be established between triggers and specific adaptive management strategies for avoidance/minimisation An example of a trigger may be: • Any impact where more than three carcasses, feather spots; or injured individuals (likely caused as a result of turbine collision) of a single species are found under or close to (<120 metres from) a wind turbine within a two-month cycle.	Description and justification for species-specific impact thresholds for at-risk target species considered to be at high or very high risk of strike; Description and justification of the adaptive management actions to be implemented in response to exceeding an impact threshold, including those considered but not selected for implementation. Information supporting the design of impact thresholds and adaptive management action Outline of any ongoing avoid, minimise and mitigate commitments identified in the BDAR Impact thresholds must be • Quantitative and capable of accurate measurements • Based on the best available information on species biology and status; and • Based on specific, measurable, achievable, relevant, and time-bound (SMART) principles.

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Description	BBAMP Framework	BBAMP Content
Offsetting and compensatory measures	The framework should identify the offsetting quanta proposed for all strikes. We recommend that strikes to threatened species are offset annually and consider the extrapolated total, after the results of carcass persistence surveys and survey efficiency trials have been applied. Credit quanta should be tiered and calculated according to the conservation status of individual species that may be struck i.e. Vulnerable, Endangered and Critically Endangered.	The approach to calculating proposed offsets and meeting offset obligations (in consultation with BCS) The offset liability for strikes to each species and the process for annually retiring accrued offset obligations.
Turbine strike notification	Provide an overview of the information that will be captured after a strike event, and the process for notifying appropriate agencies	Description of the approach for turbine strike notification. Suggested data metrics include, but are not limited to: • Type of find (incidental or formal monitoring, human, dog) • Detection date • Turbine number • Distance from tower base • Coordinates • Species • Age (juvenile or adult) and sex • Number of carcasses detected • Map showing the strike location in relation to turbine • Photographs of the carcass • Description of the operational, land management, environmental and seasonal conditions which could have contributed to the strike • Associated TARP triggers
Calculate fall zone	Developed prior to commencement of operations	Description of the approach to calculating the fall zone as defined by the smallest and largest animals likely to be struck. The area of the potential fall zones for each turbine for each survey to be mapped
Carcass search method	Developed prior to commencement of operations	Include resume of the searchers (dog and/or human), including training in the BBAMP reporting, referencing any relevant certifications. For each carcass search undertaken, record the: • Date, time and duration of the survey

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Description	BBAMP Framework	BBAMP Content
		• Turbine identifier • Detection method (i.e. human searcher or dog searcher) • Prevailing weather conditions (e.g. temperature, wind speed and wind direction) • Description of groundcover vegetation (e.g. grass height) • GPS tracklog of search path. Where carcasses, featherspot or injured bird or bat are found, record the: • Unique carcass identification number • Species name • Age and sex (where possible) • Description of injury(ies) (e.g. suspected scavenger) • Date and time of discovery • GPS coordinates • Distance and direction to associated turbine • Photograph • Qualifications of the person identifying the specimen
Carcass persistence trials	Developed prior to commencement of operations	Include resume of the searchers (dog and/or human), including training in the BBAMP reporting, referencing any relevant certifications. For each carcass placement, record the following data for submission with the BBAMP reporting. At the start of the trial period: • Carcass unique identification number • Species • Carcass size class • Date and time of placement • GPS coordinates • Distance and direction to associated turbine • Vegetation formation surrounding the potential fall zone Throughout the trial period, record: • Date and time of the scavenger visit(s), o Presence or absence of the carcass, • Carcass condition (intact, partially scavenged, heavily scavenged), • Scavenger species (or probable scavenger), • Signs of scavengers in the area (e.g., tracks, scat), and

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Description	BBAMP Framework	BBAMP Content
		• Any changes to habitat or visibility. Carcass persistence results for each day throughout the 30-day trial. For the calculation of carcass persistence, include in the BBAMP reporting the: • Statistical software/package and methods used to analyse carcass persistence trial data, • Distribution chosen, and • Mean time to scavenge and 95% confidence interval for each covariate.
Searcher efficiency trials	Developed prior to commencement of operations	Include resume of the searchers (dog and/or human), including training in the BBAMP reporting, referencing any relevant certifications. For each searcher efficiency trial, record the following data for submission with the BBAMP reporting: • Date, time and duration of survey • Name and description of searcher(s) (dog and/or human) • GPS tracklog of search path. • Prevailing weather conditions (e.g., temperature, wind speed and direction) For each trial carcass used: • Carcass unique identification number • Species (genus and species) • Carcass size class • Carcass condition at placement (intact, partially scavenged and/or decomposed) • Date and time of placement • GPS coordinates • Distance and direction to associated wind turbine • Vegetation formation within the potential fall zone • Found or missed by the searcher Searcher efficiency outcome of each searcher (and size class where relevant) in BBAMP reporting.
Calculate mortality rates	Developed prior to commencement of operations	Outline calculation method and assumptions for actual turbine strikes Annual turbine strike rates for each species – extrapolated total, after the results of carcass persistence surveys and survey efficiency trials have been applied.

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Description	BBAMP Framework	BBAMP Content
Operational risk assessment – target species	Developed prior to commencement of operations	Description of the approach to ongoing target species risk assessment Details of any adjustments to a species risk rating and associated justification (history of changes appended to the BBAMP) • Implications for adaptive management and offsetting
Operational risk assessment – turbine locations	Developed prior to commencement of operations	Description of the approach to ongoing turbine risk assessment Details of any adjustments to a turbine risk rating and associated justification (history of changes appended to the BBAMP) • Implications for adaptive management and offsetting
Annual reporting requirements	Developed prior to commencement of operations	Description of the approach to BBAMP reporting If applicable, justification for alternative approaches to those recommended in the guide Annual reporting should include • Annual strike reports for each turbine • Detected strike mortality data • Actual mortality estimates from statistical analysis • Offsetting outcomes from the previous reporting year • Details of all strike notifications completed to date • Methodology of mortality monitoring • Results of carcass persistence trials • Results of searcher efficiency • Whether any triggers were reached and action taken; and • Data or information to support changing turbine risk ratings
BBAMP review	Developed prior to commencement of operations	Description of the approach to BBAMP review and updates If applicable, justification for alternative approaches BBAMP should be reviewed as per project conditions and should consider • Ongoing process improvement and incorporation of new technology • An analysis of flight paths and habitat predictions and collisions to date • Individual turbine risk • Improvements to the monitoring program • Adjustments to impact thresholds and adaptive management plans

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Description	BBAMP Framework	BBAMP Content
		• Unforeseen limitations and issues during operation; and • Matters requested by decision maker

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9. Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been considered.

9.1. Serious and Irreversible Impacts (SAII)

The concept of serious and irreversible impacts (SAII) is a central component of the NSW Biodiversity Offsets Scheme. It is fundamentally about protecting threatened species and threatened ecological communities that are most at risk of extinction from potential development impacts or activities. Clause 6.7 (2) of the Biodiversity Conservation Regulation 2017 (BC Reg) provides:

> *"An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct…"*

The *Guidance to assist a decision-maker to determine a serious and irreversible impact* (DPIE, 2019) is provided to ensure assessments of SAII are consistent across NSW.

9.1.1. Box Gum Woodland SAII

Box Gum Woodland is a TEC listed as Critically Endangered under the BC Act. This TEC has been identified as a candidate SAII under Principle 1 (reduction in geographic extent) and Principle 2 (reduction in ecological function). The Extent of Occupancy (EOO) for this TEC 70.28 million hectares, and the current Area of Occupancy (AOO) is 15.1 million hectares. The TBDC indicates that under Principle 1, this TEC has a 'Population reduction of >80% in 10 years or three generations", and under principle 2 "<50 individuals or <250 individuals where threats are known".

This TEC extends across nine bioregions, and based on the State Vegetation Type Map (SVTM) (Figure 62). There are 109 PCTs across NSW that are associated with this TEC, which total a current extent of approximately 1.8 million ha currently in NSW.

This report assesses a total of 281 ha of impact to this TEC, of which up to 119 ha impacts are to woodlands and up to 162 ha are derived grasslands. This impact overestimates the final impacts to this TEC, as there is a significant construction buffer around the final development. The proposed development corridor allows for considerable micro siting within it's bounds, and through a detailed design process, we can expect the total project impact area to be reduced by more than 25%. Flexibility within the development corridor will allow the project to significantly reduce any Serious and Irreversible Impacts.

The proponent has avoided the best areas of this TEC (highest VI and most intact patches) within the Project Boundary, and has sought to minimise impacts to this TEC as far as possible. Given the abundance of Box Gum Woodland within the subregion and the design measures already taken to reduce impacts by nearly 50% to the TEC, there is no practical way to deliver the project while avoiding all impacts.

Following development of the project, the remaining, unaffected area of this TEC within the assessment area (500m buffer) will exceed 5,500 ha (95.16 % remaining). Within NSW, after development of the project there will remain over 1.8 million ha (99.99% remaining).

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This TEC responds well to management, and is one of the few candidate SAII TECs that could be easily recovered under the right land treatments. The current extent of Box Gum Woodland locally has been grazed and cropped for over a century, and remains locally common.

A summary of the impacts to this TEC are in Table 63, and detailed consideration of whether impacts on TECs that are serious and irreversible is included in Table 64.

Table 63: Serious and Irreversible Impacts Summary

Species / Community	Common Name	Direct impact individuals / area (ha)	Threshold
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	Box Gum Woodland	A total of 281 ha are proposed within the development including 119 ha of woodland and 162 ha of derived grassland	No threshold identified.

Table 64: Evaluation of an impact on a TEC consistent with 9.1.1 of the BAM

Impact Assessment Provisions	Assessment
1. the action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII	Measures to avoid direct and indirect impacts are detailed in Section 7 of this report. The proponent has removed turbines, removed the major transmission line, and redesigned the project to reduce the total project impacts by nearly 50%. Impacts to Woodland areas of Box Gum Woodland have been reduced by 50%.
2a. evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)	The current total geographic extent of the TEC has been estimated by calculating the area of associated PCTs as mapped on the Brigalow Belt South – Nandewar, Central West – Lachlan, Upper Hunter, and Riverina PCT Maps (Figure 62). Based on this mapping, there is potentially 1,835,977 ha of the TEC currently in NSW. The reduction of the TEC since 1970 is not known, however Section 8 of the Final Determination identified that: *"White Box Yellow Box Blakely's Red Gum Woodland has been drastically reduced in area and highly fragmented because of clearance for cropping and pasture improvement. Austin et al. (2000) found the community had been reduced to less than 1% of its pre-European extent in the Central Lachlan region. Comparable degrees of reduction have been documented for NSW south western slopes and southern Tablelands (estimated <4% remaining, Thomas et. al. 2000), and for the Holbrook area (estimated <7% remaining, Gibbons and Boak (2000). Gibbons and Boak (2000) found*

Impact Assessment Provisions	Assessment
	remnants of woodlands dominated by Eucalyptus albens, E. melliodora and E. blakelyi were severely fragmented."
2b. extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by: **i. change in community structure** **ii. change in species composition** **iii. disruption of ecological processes** **iv. invasion and establishment of exotic species** **v. degradation of habitat, and** **vi. fragmentation of habitat**	Within the operational footprint of the development site, the community structure will be entirely removed. Within the construction footprint there will be removal of trees that interfere with construction activities. There may also be temporary disturbance to the ground layer in set down areas and temporary parking areas. Species composition is expected to be reduced to 0, within all areas of the development footprint. There is unlikely to be any invasion or establishment of exotic species, beyond those that already occur throughout the study area. Habitats within the development site will be removed. Habitats that occur outside the development site may be fragmented from each other, however the majority of the development site is located in an already fragmented landscape and is unlikely to further reduce connectivity of the TEC.
2c. evidence of restricted geographic distribution (Principle 3, clause 6.7 (2) (c) BC Regulation), based on the TECs geographic range in NSW according to the: **i. extent of occurrence** **ii. area of occupancy, and** **iii. number of threat-defined locations.**	This principle is not applicable to this TEC as it does not have a restricted geographic distribution. The TECs geographic range in NSW includes the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. The Extent of Occurrence is 70.28 million hectares The Area of Occupancy is 15.1 million hectares Based on the State Vegetation Type Map (SVTM) (Figure 59) there is 1.8 million ha of the TEC currently in NSW. There are no threat-defined locations for this TEC.
2d. evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7 (2) (d) BC Regulation).	This principle is not applicable to this TEC. This TEC responds well to management.
3. Where the TBDC indicated that data is 'unknown' or 'data deficient' for a TEC for a criterion listed in subsection 9.1.1(2), the assessor must record this in the BDAR or BCAR.	N/A
4a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal: **i. in hectares, and** **ii. as a percentage of the current geographic extent of the TEC in NSW.**	The total area of the TEC to be impacted by the proposal is 281 ha. The percentage of impact to the TEC across the current geographic extent is 0.01 %.
4b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by: **i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of**	The extent of the TEC within 500m of the development is shown on Figure 63. Following development there will be approximately 5,522 ha of the TEC remaining within the assessment area. Across NSW there will remain over 1.8M ha of the TEC.

Impact Assessment Provisions	Assessment
the development footprint or equivalent area for other types of proposals **ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:** **• distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and** **• estimated maximum dispersal distance for native flora species characteristic of the TEC, and** **• other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development** **iii. describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.**	The current connectivity and isolation of patches of the TEC was measured using Euclidean distance analysis between patches of the TEC (Figure 64). The change in the proportion of area between patches (i.e. future separation of the TEC) changed from an average separation of 52.1 m before development to 52.9 m after development. The project will not isolate any patches of the TEC, as the extent of the TEC is so prevalent locally. The maximum dispersal distance for native flora species before and after the development is unchanged. The area to perimeter ratio before the development is 20.98 m^2/m. The area to perimeter ratio after the development is 20.21 m^2/m. The condition of the TEC according to the vegetation integrity score is provided in Table 14.

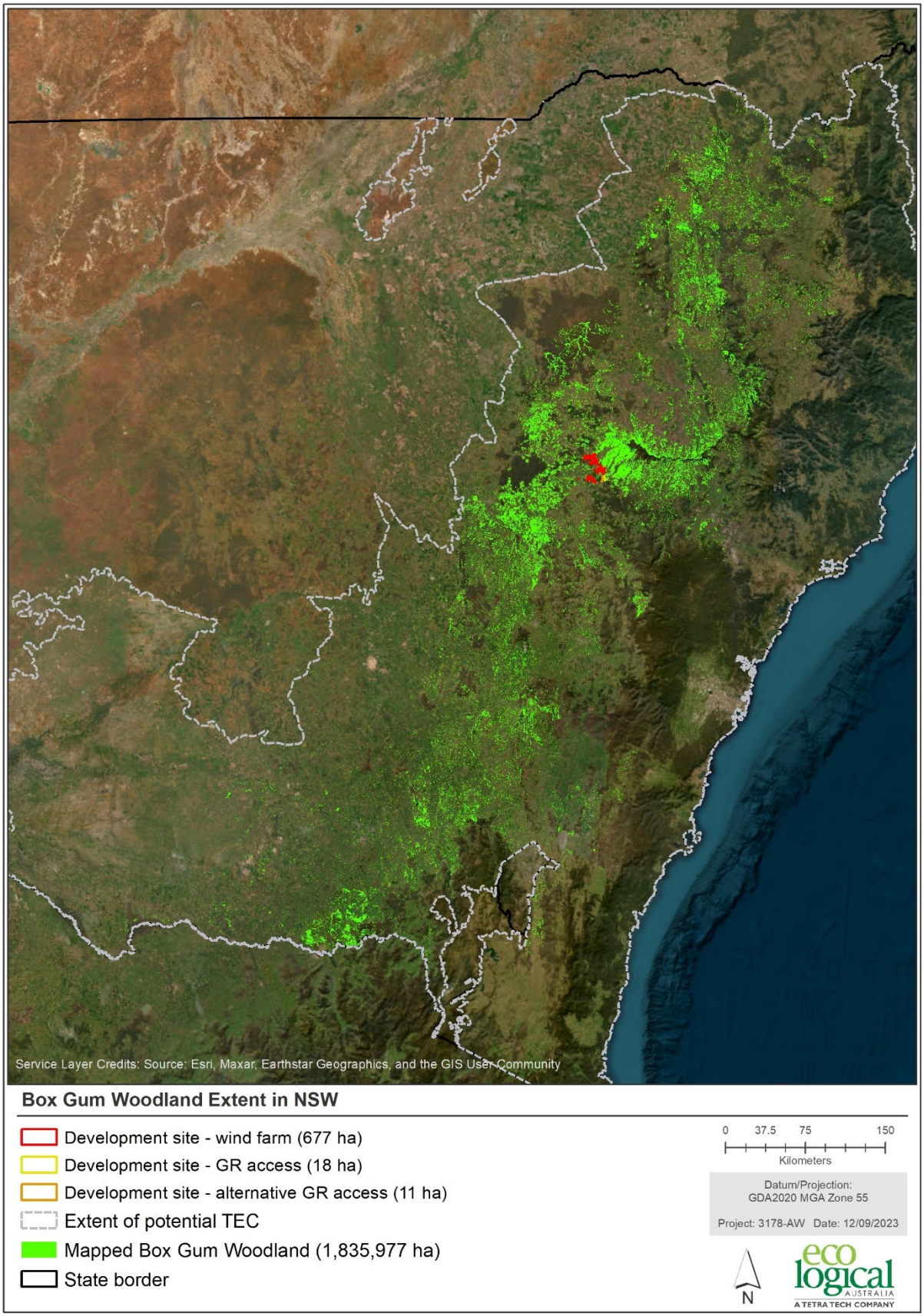


Figure 62 Extent of Box Gum Woodland TEC in NSW

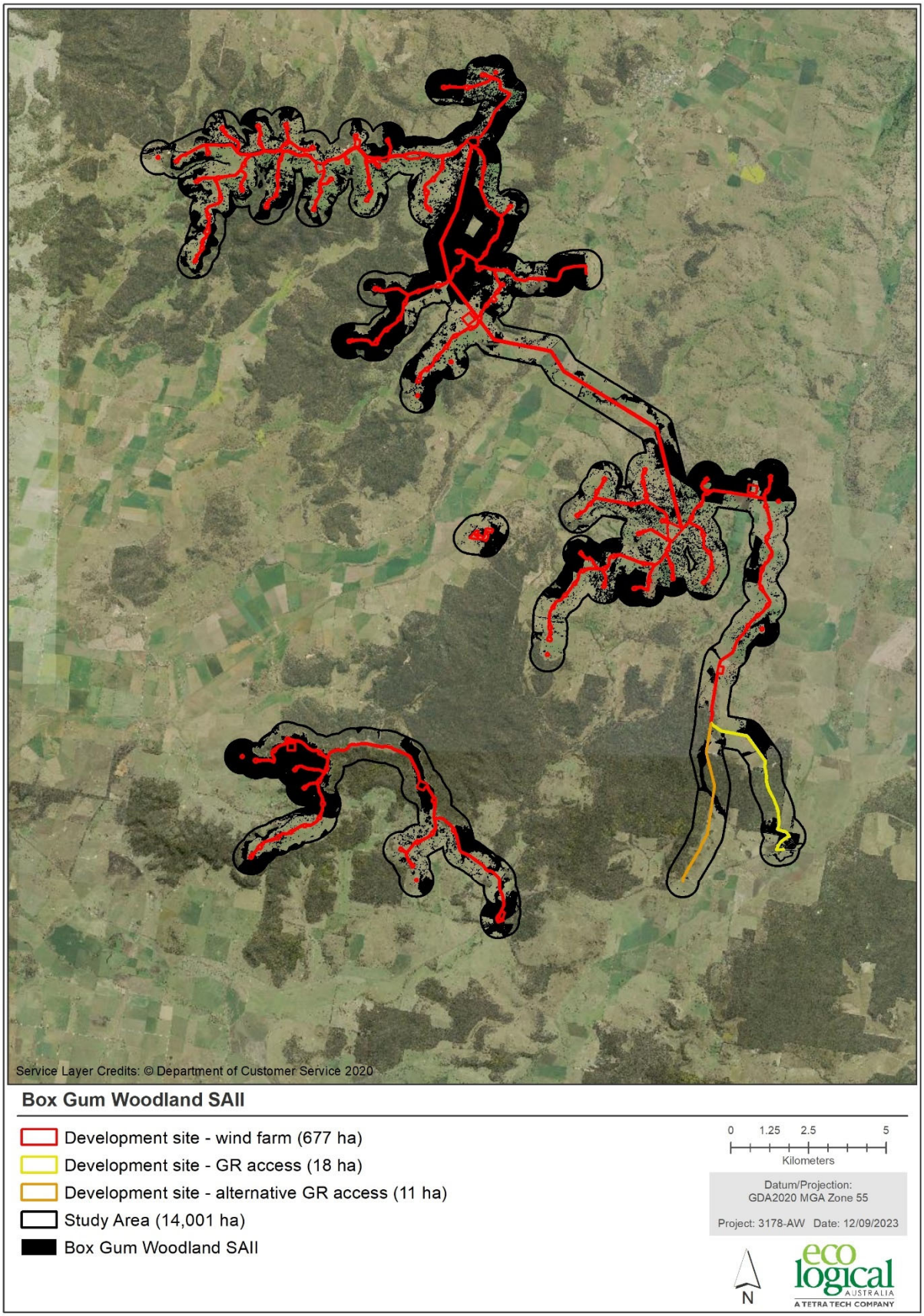


Figure 63 Extent of Box Gum Woodland TEC within 500m of the development

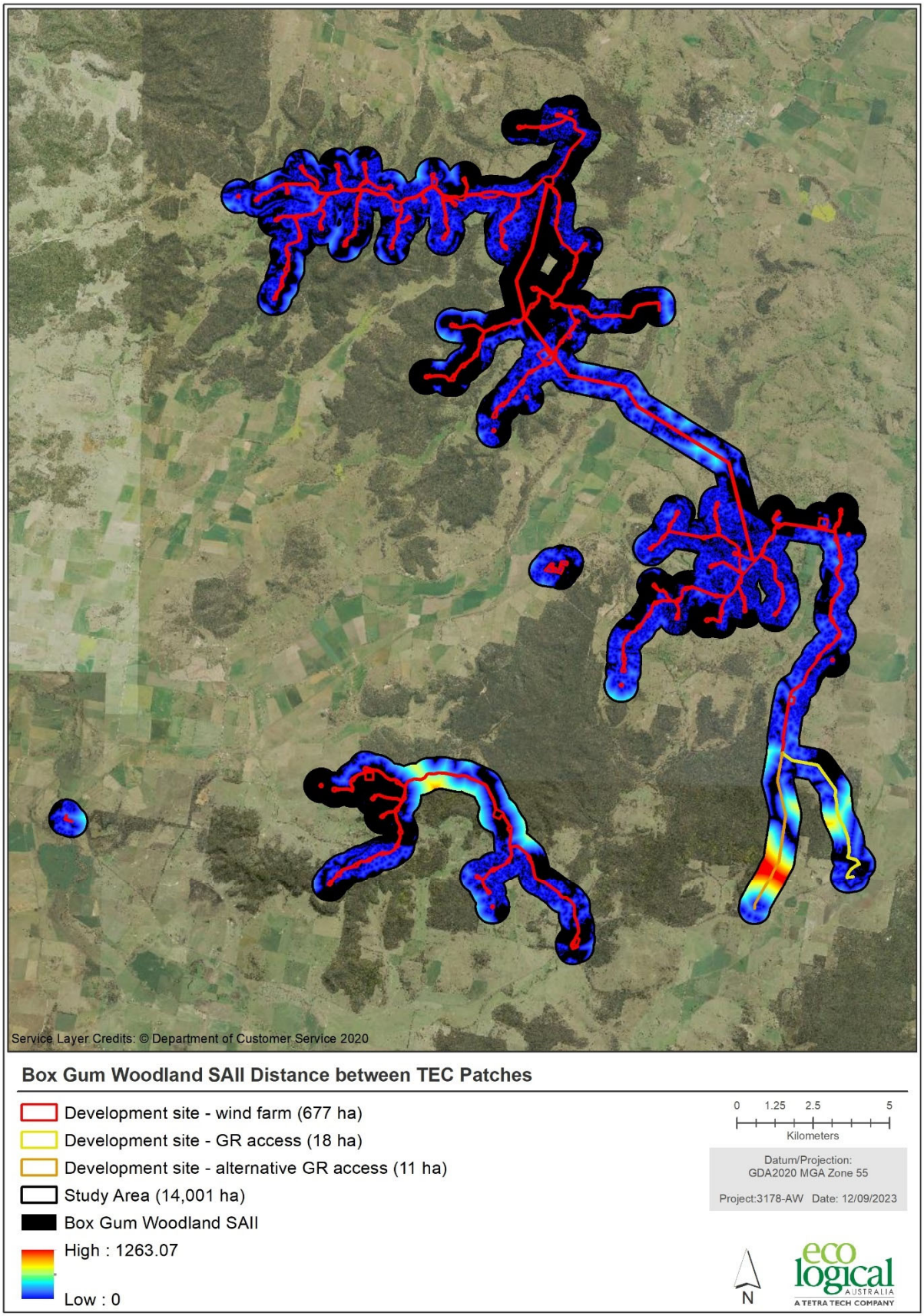


Figure 64 Patch connectivity of the TEC before the development

9.1.2. Microbat SAII Assessment

Both microbat species described below are known to roost and breed in caves (or similar manmade structures), and both are listed as potential SAII as their breeding habitat is potentially irreplaceable. Neither species is known to have a limited population size, nor be currently suffering a high rate of decline. No breeding habitat was identified for either species within the development site, and the proponent has deliberately designed the project to avoid any impacts on potential breeding habitat buffers. Neither of these species are eusocial, and all individuals are capable of contributing to the breeding population. In the context of a BAM assessment, the presence of lactative females are the trigger for known breeding habitat. Field surveys in 2020 did not identify breeding or non-breeding individuals of either species.

During metmast monitoring, Large-eared Pied Bat was not recorded at either 50m nor 100m detectors. Large Bentwing-bat was recorded at both 50m and 100m, although relatively infrequently compared to ground level detectors (Section 6.1.3). An assessment has been conducted below for both of these candidate SAII species.

The nearest known breeding population of Large-eared Pied Bat is at Ulan, approximately 14.7km south of the nearest turbine (Figure 65). Surveys of Large-eared Pied Bat identified a low abundance of this species across the development site, indicative of the species presence, but not of any significant abundance to indicate a breeding site nearby. Monitoring of breeding populations at the Ulan roost indicate a significantly greater volume of activity (500-1,000+ detections per night) than what was recorded within the development site (maximum 6 detections per night). Within the development site, there are no known or potential breeding habitats, nor the buffer zones prescribed in the 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH, 2018).

The best known breeding location for Large Bentwing-Bat is near Wee Jasper in southern NSW, and the nearest potential breeding population is at Wellington Caves, approximately 88.5 km from the development site (Figure 66). This species has wide dispersal over the non-breeding period, and is widely known across NSW. The majority of activity for this species is east of the Great Dividing Range (Figure 66). This species was recorded infrequently at height, and may be subject to minor impacts from the Project. The BBAMP framework described above is designed to monitor these impacts during the operational phase of the project (Section 8.7).

Due to the avoidance of all potential breeding habitat, the absence or low detection rate of each species from field surveys, and the lack of records in the RSA, it is unlikely that either species will be impacted by the project in any significant quantity. The project will not impact on any breeding habitat, and it is highly unlikely that there will be any direct or prescribed impacts of the project on individuals.

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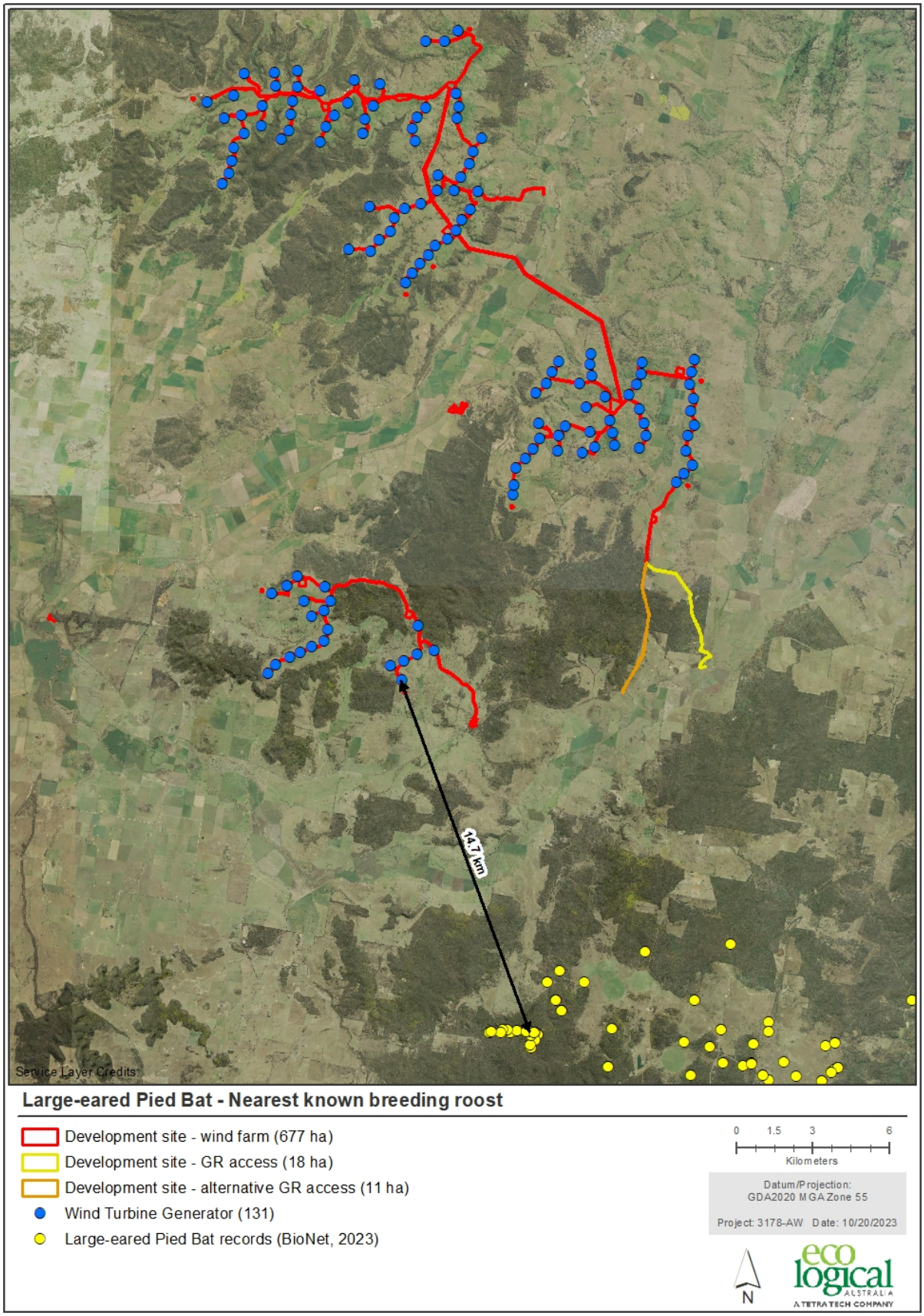


Figure 65 Closest Large-eared Pied Bat known roost

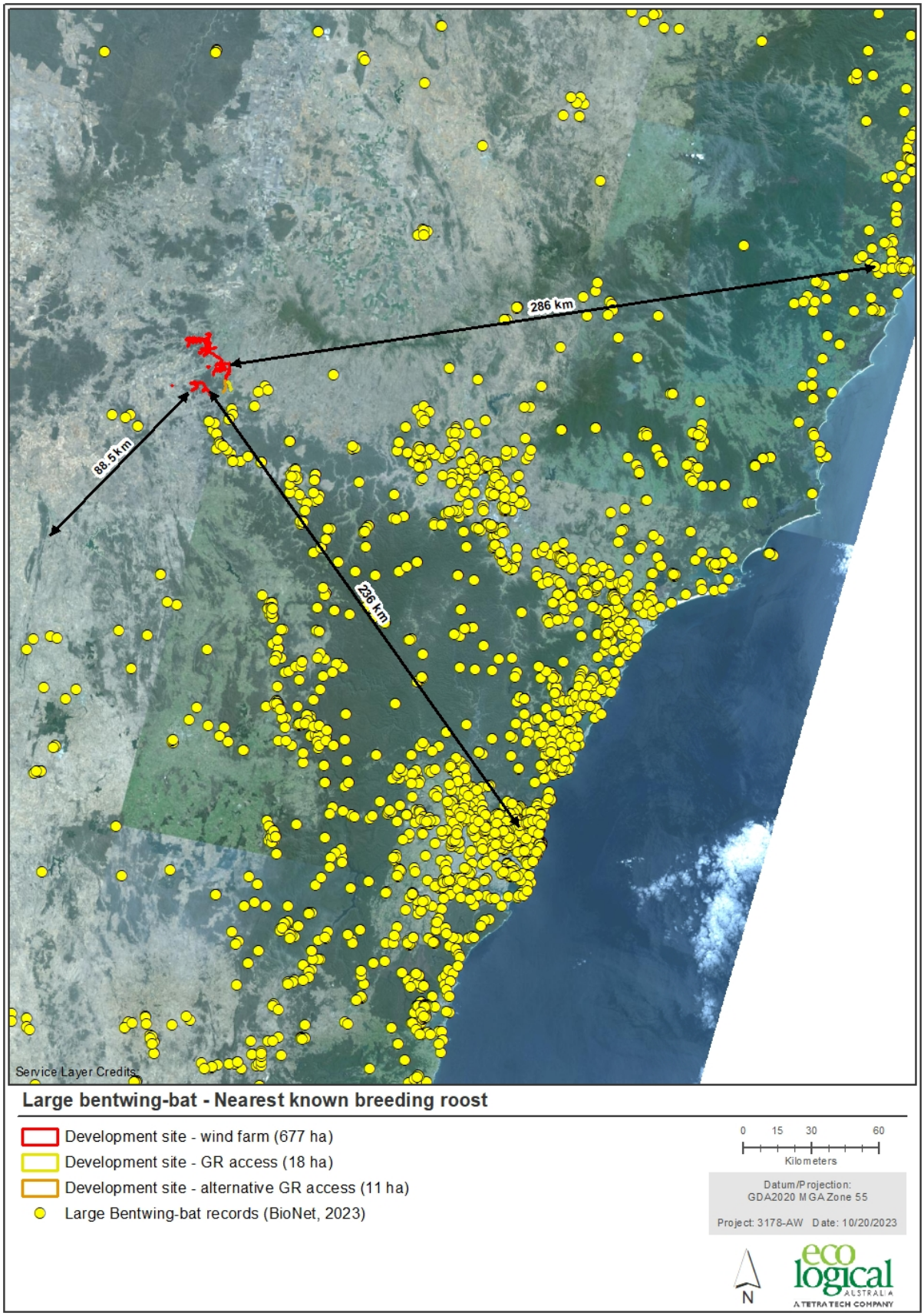


Figure 66 Closest Large Bentwing-bat known roost

9.1.2.1. Large-*eared Pied Bat SAII*

For large-eared Pied Bat an assessment has been undertaken against the provisions of 9.1.2 of the BAM. As identified in the TBDC, "*…impacts on breeding habitat used by this species could be considered potentially serious and irreversible". Breeding habitat is defined as PCTs associated with the species within 100m of rocky areas containing caves, or overhangs or crevices, cliffs or escarpments, or old mines, tunnels, culverts, and derelict concrete buildings*."

The assessment of this species is clearly described under Chapter 3.3 of the *'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method* (OEH, 2018) where it is identified as a species where breeding habitat is a potential SAII. Under this section, the identification of SAII aligns to breeding habitat only, and the guideline indicates that:

> *"breeding habitat is considered present on the subject land if there is 1) potential breeding habitat (see Table 2) AND 2) breeding individuals of the target species. Where these criteria are not met but the species is present on the subject land then the proposed impact is not a potential SAII and standard species credits will be generated (see Table 1)."*

In the case of this BDAR, no breeding individuals were captured during harp trapping, and the project has deliberately avoided all impacts to any potential breeding habitats.

This species is identified as a candidate SAII as it is unlikely to respond to management (Principle 4; https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development). This is due to the species breeding in only several known locations in NSW.

This species was not identified in any of the carcass monitoring reports reviewed in Chapter 6 of this BDAR. To monitor any potential impacts to this species, a BBAMP framework has been prepared to ensure that any unforeseen impacts are recorded, managed, and mitigated through the adaptive plan described in Section 8.7.

Evaluation of potential SAII is provided in Table 65.

Table 65 Evaluation of an impact on a TEC consistent with 9.1.2 of the BAM

Impact assessment provision	Assessment
The assessor is required to provide further information in the BDAR or BCAR for any species at risk of an SAII, including the action and measures taken to avoid the direct and indirect impact on the species at risk of an SAII. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR or BCAR.	Measures to avoid direct and indirect impacts are described in Chapter 7 and Chapter 8 of this report.
The assessor must consult the TBDC and/or other sources to report on the current population of the species including: a. evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation) presented by an estimate of the: i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or ii. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated	N/A. There is no information provided in TBDC detailing the current population size for this species. The species is known from Rockhampton in QLD (1,000km north of the project) to Bungonia in the NSW Southern Highlands (450km south of the project). There is no other evidence of any rapid rate of decline in the population of this species.

Impact assessment provision	Assessment
by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors or parasites	
evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented by: i. an estimate of the species' current population size in NSW, and ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations	N/A There is no information provided in TBDC detailing evidence of a small population size for this species. There is no other evidence of a small population size for this species.
evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2)(c) BC Regulation) presented by: i. extent of occurrence ii. area of occupancy iii. number of threat-defined locations (geographically or ecologically distinct areas in which a single threatening event may rapidly affect all species occurrences), and iv. whether the species' population is likely to undergo extreme fluctuations	N/A. there is no information provided in TBDC of a limited geographic range. This species occurs widely across NSW.
evidence that the species is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation) because: i. known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site ii. the species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or iii. life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus).	Yes, this species reproductive characteristics limit the ability for the species to increase, as it breeds in a limited number of known caves.
Where the TBDC indicates data is 'unknown' or 'data deficient' for a species for a criterion listed in Subsection 9.1.2(2.), the assessor must record this in the BDAR or BCAR.	The TBDC does not list any information for this species. All subsections of the 'SAII Principles' table are blank.
the impact on the species' population (Principles 1 and 2) presented by: i. an estimate of the number of individuals (mature and immature) present in the subpopulation on the subject land (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population, and	Information on the number of individuals of the subpopulation is difficult to determine. Due to the low number of detections on songmeters, the population within the subject land is likely to be very low. The number of impacted individuals is difficult to determine. The species was recorded on 34 detections in 466 nights of

Impact assessment provision	Assessment
ii. an estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or iii. if the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that will be impacted, along with the area of habitat to be impacted by the proposal	survey, and never at height above ground level at the metmasts. This species is unlikely to be directly affected by the project. The proposal will remove 0 ha of breeding habitat, and 3.94 ha of foraging habitat.
impact on geographic range (Principles 1 and 3) presented by: i. the area of the species' geographic range to be impacted by the proposal in hectares, and a percentage of the total AOO, or EOO within NSW ii. the impact on the subpopulation as either: all individuals will be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species will be directly impacted iii. to determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species iv. to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in relation to the target species, the assessor may refer to the relevant sections of the BDAR or BCAR.	The proposal will remove 0 ha of breeding habitat, and 3.94 ha of foraging habitat. The AOO and EOO in NSW are not specified in TBDC. As this species was not recorded at height at either of the metmasts it is unlikely the species will be impacted by the project. The project will impact some habitat (3.94 ha of foraging habitat) The remaining population will be unaffected by the project. There will not be any fragmentation of breeding habitats or foraging habitats. Changes in abiotic factors are unlikely to affect this species.
The assessor may also provide new information that can be used to demonstrate that the principle identifying the species as at risk of an SAII, is inaccurate.	In this case, the project will no affect any areas of breeding habitat. The proponent has deliberately utilised information provided in TBDC, to avoid any potential SAII for this species.

9.1.2.2. Large Bentwing-bat SAII

For Large Bentwing-bat an assessment has been undertaken against the provisions of 9.1.2 of the BAM. As identified in the TBDC,"*...impacts on breeding habitat used by this species could be considered potentially serious and irreversible"*. Breeding habitat is defined as caves, tunnels, mines or other structures known or suspected to be used by *M. schreibersii oceanensis* including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature. All breeding habitat including the cave, or other

features, used for breeding and the area immediately surrounding this feature must be mapped. Species polygon boundaries should have a 100m radius buffer around an accurate GPS point location centred on the cave/feature entrance.

The assessment of this species is under Chapter 3.4 of the *'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method* (OEH, 2018) and is identified as a species where breeding habitat only required species credits.

The best known breeding location for Large Bentwing-Bat is near Wee Jasper in southern NSW (385 km+ away), and the nearest known potential breeding population is at Wellington Caves, approximately 88.5 km from the development site (Figure 66). This species has wide dispersal over the non-breeding period, and is widely known across NSW. The majority of activity for this species is east of the Great Dividing Range (Figure 66). This species was recorded infrequently at height, and may be subject to some minor impacts from the Project. The BBAMP framework described above is designed to monitor these impacts during the operational phase of the project (Section 8.7).

This species is identified as a candidate SAII as it is unlikely to respond to management (Principle 4; https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development). This is due to the species breeding in only several known locations in NSW.

Evaluation of potential SAII is provided in Table 65.

Table 66 Evaluation of an impact on a TEC consistent with 9.1.2 of the BAM

Impact assessment provision	Assessment
The assessor is required to provide further information in the BDAR or BCAR for any species at risk of an SAII, including the action and measures taken to avoid the direct and indirect impact on the species at risk of an SAII. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR or BCAR.	Measures to avoid direct and indirect impacts are described in Chapter 7 and Chapter 8 of this report.
The assessor must consult the TBDC and/or other sources to report on the current population of the species including: a. evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation) presented by an estimate of the: i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or ii. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors or parasites	N/A. There is no information provided in TBDC detailing the current population size for this species. There is no other evidence of any rapid rate of decline in the population of this species.
evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented by: i. an estimate of the species' current population size in NSW, and	N/A There is no information provided in TBDC detailing evidence of a small population size for this species. There is no other evidence of a small population size for this species.

Impact assessment provision	Assessment
ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations	
evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2)(c) BC Regulation) presented by: i. extent of occurrence ii. area of occupancy iii. number of threat-defined locations (geographically or ecologically distinct areas in which a single threatening event may rapidly affect all species occurrences), and iv. whether the species' population is likely to undergo extreme fluctuations	N/A. there is no information provided in TBDC of a limited geographic range. This species occurs widely across NSW.
evidence that the species is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation) because: i. known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site ii. the species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or iii. life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus).	Yes, this species reproductive characteristics limit the ability for the species to increase, as it breeds in a limited number of known caves.
Where the TBDC indicates data is 'unknown' or 'data deficient' for a species for a criterion listed in Subsection 9.1.2(2.), the assessor must record this in the BDAR or BCAR.	The TBDC does not list any information for this species. All subsections of the 'SAII Principles' table are blank.
the impact on the species' population (Principles 1 and 2) presented by: i. an estimate of the number of individuals (mature and immature) present in the subpopulation on the subject land (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population, and ii. an estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or iii. if the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that will be impacted, along with the area of habitat to be impacted by the proposal	Information on the number of individuals of the subpopulation is difficult to determine. The species was recorded regularly on songmeters. The population within the subject land is utilising the area for foraging only and is likely to be low. The number of impacted individuals is difficult to determine. The species was recorded infrequently at height on the metmasts (0.3 detections per night) at 100m above the ground. The proposal will remove 0 ha of breeding habitat (potential SAII). The nearest breeding habitat is 88.5 km west of the development site. This species is an ecosystem credit species for all other habitats.

Impact assessment provision	Assessment
impact on geographic range (Principles 1 and 3) presented by: i. the area of the species' geographic range to be impacted by the proposal in hectares, and a percentage of the total AOO, or EOO within NSW ii. the impact on the subpopulation as either: all individuals will be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species will be directly impacted iii. to determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species iv. to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in relation to the target species, the assessor may refer to the relevant sections of the BDAR or BCAR.	The proposal will remove 0 ha of breeding habitat (potential SAII). The AOO and EOO in NSW are not specified in TBDC. The species was recorded infrequently at height at the metmasts with 0.3 detections per night at Mount Hope and <0.1 detectinos per night at Girragulang Road. The nearest known breeding site for this species is at Wellington Caves, which is over 88.5 km from the project. The remaining population will be unaffected by the project. There will not be any fragmentation of breeding habitats or foraging habitats. Changes in abiotic factors are unlikely to affect this species.
The assessor may also provide new information that can be used to demonstrate that the principle identifying the species as at risk of an SAII, is inaccurate.	In this case, the project will no affect any areas of breeding habitat. The proponent has deliberately utilised information provided in TBDC, to avoid any potential SAII for this species.

9.1.2.3. Summary

In the response to the exhibited BDAR, BCS noted that whilst the description in the TBDC identifies breeding habitats specifically, that the absence of any other description does not discount other impacts. The assessor has considered this and has provided the following information to inform the decision process and provide surety that the operational wind farm will have the capacity to minimise impacts relating to blade strike of these two species, and avoid SAII:

- Breeding individuals for either species were not captured during hard trapping across the development site in 2020
- The project has deliberately avoided all impacts to any potential breeding habitats for both species
- Both species were recorded in small numbers, or absent within the RSA (Section 6.1.2)

- Neither of these species were identified in any of the carcass monitoring reports reviewed in Chapter 6 of this BDAR.
- Neither species is listed under the SAII Principles under Principles 1 (rapid rate of decline), Principle 2 (small population size), or Principle 3 (limited geographic distribution).
- A BBAMP Framework is proposed in Table 62 which requires notification of impacts to threatened species to the BCD.

9.2. Additional and Appropriate Measures

At the request of DPE the proponent has investigated options to provide Additional and Appropriate Measures (AAM) to further minimise impacts to Box Gum Woodland.

The proponent proposes to provide for a 1:1 protection (measured by area) and enhancement of Box Gum Woodland within the locality, such that the impacts of the project are minimised in a local context.

The Additional and Appropriate Measures commitment from ACEN is:

- Within 5 years of Notice to Proceed (NtP), establish a Conservation Agreement under Part 5 Division 3 of the BC Act over a parcel of land equivalent in size to the clearing of Box Gum Woodland associated with the Valley of the Winds Project.
- The Conservation Agreement will include Native Vegetation Management and augmentation, to restore species composition to replicate the condition of Box Gum Woodland that was cleared.
- The priority location for delivering the AAM will be the Tomahawk property described above.
- If the proponent can further reduce impacts to Box Gum Woodland during the detailed design and construction phase, the area of restoration required can be amended to the final area of impact.

This commitment is additional to the mandatory requirement for offsets under the BOS. To avoid confusion with any offsetting obligation, the AAM will be provided under an in-perpetuity agreement (preferably a Conservation Agreement), which is enduring and enforceable under the BC Act. Should the proponent secure the AAM under a Stewardship Agreement, no ecosystem credits will be generated over the land that contributes to the AAM.

9.2.1. Identified example of Additional and Appropriate Measure

ELA have undertaken a preliminary investigation for potential AAM at 'Tomahawk', a 316 ha property nearby to Uarbry, NSW. The purpose of the investigation was to provide the NSW Department of Planning and Environment (DPE) with a site-based option to achieve 'additional measures' to compensate for loss of Box Gum Woodland within the locality. The purpose of this investigation is to provide an option for consideration by the Minister for Planning, in accordance with s7.16 of the NSW Biodiversity Conservation Act 2016 (BC Act).

The investigation included a review of publicly available land tenure information, and a site inspection to map Plant Community Types (PCTs), and review the suitability for regeneration of Box Gum Woodland. Future studies would include formal studies to satisfy requirements to establish a private land conservation agreement under Part 5 of the BC Act.

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Across Tomahawk, there is 217 ha of Box Gum Woodland, which occurs as woodland (high VI) and derived native grasslands (DNG – low VI). Within Tomahawk, there is approximately 127 ha of DNG that could be suitable for active restoration, to enhance the area of Box Gum Woodland within the locality. Utilising available seedstock from those trees removed as part of the project would ensure the long-term maintenance of genetic diversity of this community within the locality.

The predominant woodland vegetation type is typified by the following Plant Community Types (PCTs):

- 3396 Northwest Flats Box-Blakelys Red Gum Forest
- 3528 Western Hunter Flats Apple-Gum Shrub Forest
- 3781 Ulan Sandstone Ironbark-Pine Woodland

PCT 3396 is associated with Box Gum Woodland in the Threatened Biodiversity Data Collection (TBDC). 3528 is not associated with Box Gum Woodland, but contains the characteristic species of Box Gum Woodland, and as such is considered the same community.

Portions of Tomahawk are unsuitable for biodiversity offsetting as they contain:

- Existing cables managed by Telstra
- Existing dwellings and farm infrastructure
- Management area buffers from boundaries and fence lines.

The location of Tomahawk is shown on Figure 67 and the context of this property relative to the project is shown on Figure 68.

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Figure 67 Tomahawk boundary

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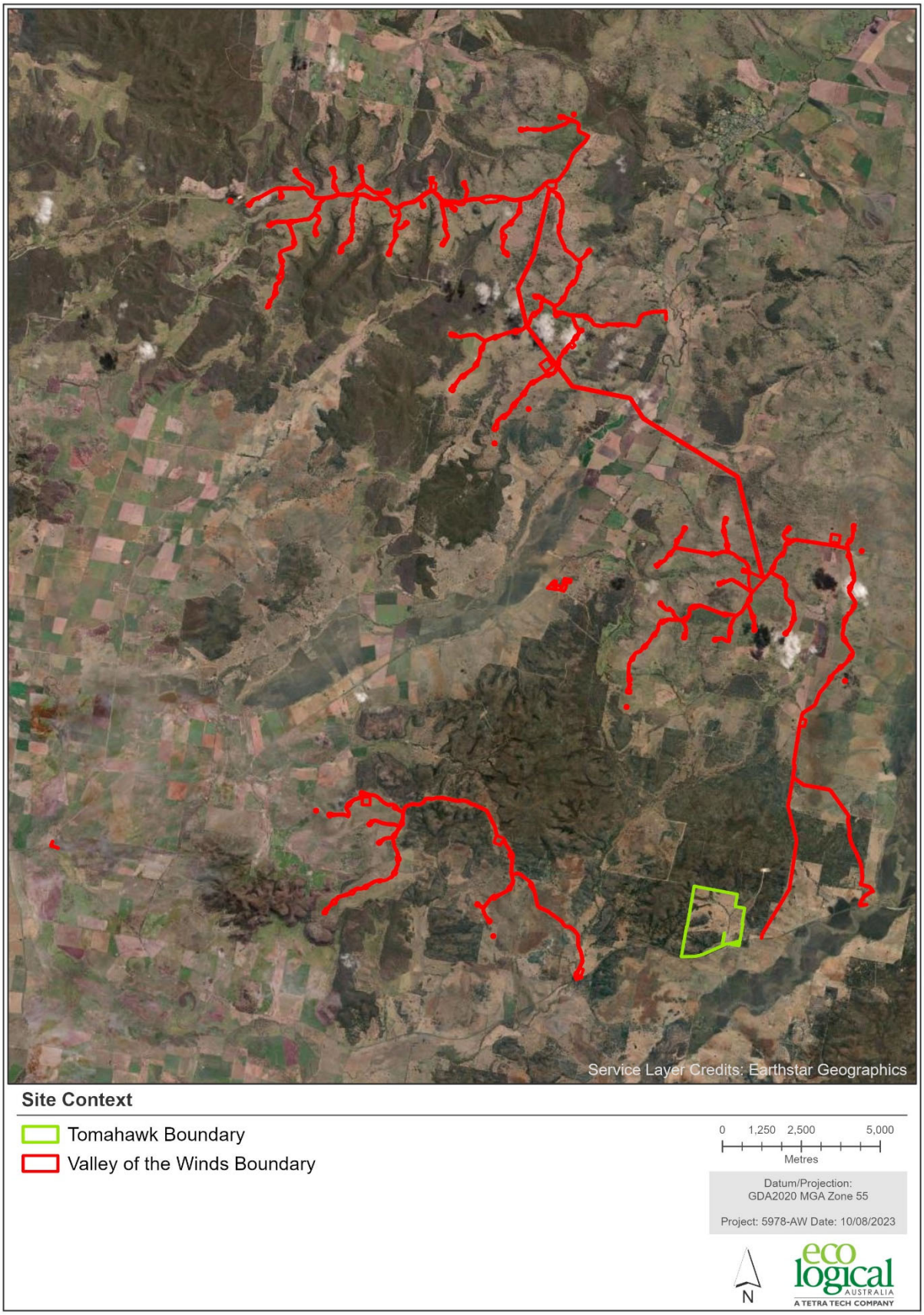


Figure 68 Tomahawk and project context

9.2.1.1.1. PCT 3396 Northwest Flats Box-Blakelys Red Gum Forest

A tall sclerophyll open forest with a grassy ground layer that occurs on flats and lower slopes in the North West Slopes, Hunter Valley and the western margin of the New England Tableland of NSW. Within the site, this PCT occurs on the flats and lower slopes and along the creeklines, comprises a varying dominance of canopy species including *Eucalyptus melliodora* (Yellow Box), *Eucalyptus moluccana* (Grey Box), commonly in association with Eucalyptus blakelyi (Blakely's red gum) and occasionally *Angophora floribunda* (Rough-Barked Apple) and *Eucalyptus crebra* (Narrow-leaved Ironbark). The mid-stratum is very sparse, with the main species being *Allocasuarina luehmannii* (Bull-oak), however may be absent in some locations. The ground layer is typically comprised of grasses and forbs with some twiners, sedges and a hardy fern and almost always includes *Aristida ramosa* and *Microlaena stipoides*, very frequently with *Glycine tabacina*, *Dichondra repens* and *Geranium solanderi*.

This PCT and associated DNG zones comprises a significant proportion of the vegetation present across Tomahawk, with these areas considered to conform to the Box Gum Woodland listed under the BC Act.



Photograph 42 3396 Good condition

9.2.1.1.2. PCT 3781 Ulan Sandstone Ironbark-Pine Woodland

A tall ironbark and Callitris sclerophyll woodland or open forest with a dry shrubby mid-stratum, occurring almost exclusively on exposed low-relief quartz-rich Triassic sandstone ranges between Wollar and Ulan in the far western Hunter River catchment. Within the site, this PCT occurs on hilly outcrops comprising of shallow sandstone. The canopy is dominated by *Eucalyptus crebra* and *Callitris endlicheri* (Black Cypress Pine), with occasional *Eucalyptus moluccana*, *Eucalyptus sideroxylon* (Mugga Ironbark) and *Eucalyptus macrorhyncha* (Red Stringybark). Common mid-storey species include *Acacia verniciflua* (Varnish wattle), *Cassinia sifton* (Sifton bush) and *Allocasuarina gymnanthera*. The sparse ground layer is comprised of hardy grasses, graminoids and small forbs, very frequently including *Pomax umbellata*, *Lomandra multiflora* and *Microlaena stipoides*, commonly *Lomandra glauca* and *Aristida ramosa*, and occasionally *Aristida vagans*.



Photograph 43 PCT3781 in Moderate condition

9.2.1.1.3. PCT 3528 Western Hunter Flats Apple-Gum Shrub Forest

A tall to extremely tall sclerophyll open forest with a dry shrub layer and grassy ground layer, on sandy-clay alluvial river flats, terraces and colluvial toe slopes in the Bylong, Ulan and Cassilis areas. Within the site, this PCT occurs on the sheltered gullies downslope from PCT 3781. The tree canopy is dominated by Angophora floribunda, with occasional presence of *Eucalyptus blakelyi*. Common mid-storey species include *Acacia verniciflua*, Acacia spectabilis (Mudgee Wattle) and *Cassinia sifton*. The ground layer is characterised by grasses, graminoids and forbs, almost always including *Microlaena stipoides*, very frequently with *Cheilanthes sieberi* subsp. *sieberi* and *Hydrocotyle laxiflora*.



Photograph 44 PCT 3528 in Good condition

The area of each PCT within Tomahawk is quantified In the table below. Areas not suitable for offsetting (such as underground cable easements) have been removed from calculations. A map of the extent of PCT is shown on Figure 69.

Table 67 Area of each PCT within Tomahawk

PCT	BC Act	EPBC Act	Area (ha)
3396 Northwest Flats Box-Blakelys Red Gum Forest	Box Gum Woodland	Box Gum Woodland	211.19
3781 Ulan Sandstone Ironbark-Pine Woodland	Not listed	Not listed	87.90
3528 Western Hunter Flats Apple-Gum Shrub Forest	Not listed	Not listed	5.36
Total			304.45

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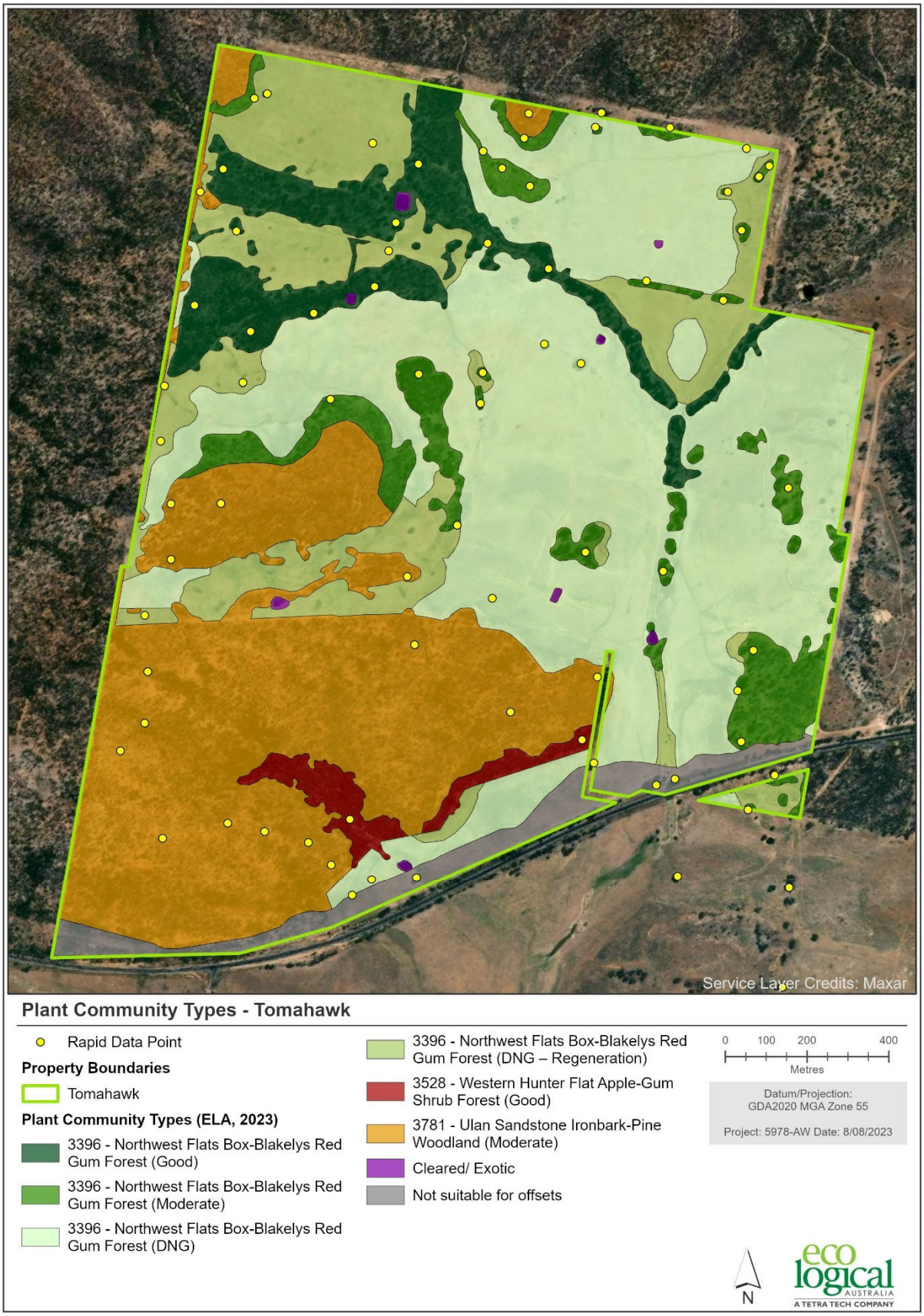


Figure 69 PCTs within Tomahawk

9.2.2. Restoration opportunities within Tomahawk

Site assessment revealed broad agricultural land-use areas associated with different vegetation types (e.g., native vs exotic) and vegetation condition (e.g., native dominated vs exotic dominated). These restoration zones were described as:

- Restoration Zone 1: Fire affected forest (i.e., Eucalypts and Acacias)
- Restoration Zone 2: Woodland with native herbaceous groundcover
- Restoration Zone 3: Mid-slope open native and exotic grass dominated pasture

The benefit of undertaking restoration activities, particularly in Zones 2-3, would be:

- Increasing extent and quality of Box Gum Woodland in the region.
- Improving native biodiversity.
- Creating habitat for fauna species i.e. increasing connectivity through the landscape.
- Better management and lowering of fuel loads (fire risk)
- Improving pollinator services.
- Reducing potential for erosion
- Carbon sequestration (i.e., diverse, perennial vegetation)

The areas of each Restoration Zone are shown on Figure 70. Key findings for each zone are described below.

Zone 1: Fire affected forest is a legacy of recent bushfire impacts (Photograph 45). The area is currently dominated vegetatively by dense Eucalypt and Acacia regrowth which if left unchecked would represent closed forest rather than woodland. These areas would not be a focus for the Project to enhance Box Gum Woodland in the locality.



Photograph 45 Fire affected forest

Zone 2: Across Tomahawk, the mid-slope contained small areas of native tree patches/canopy with predominantly (low diversity) native herbaceous groundcover (Photograph 46). Native forb and grass diversity could be enhanced in these areas through micro-scalping and patch seeding or by tube stock planting (depending on resources) to achieve high quality Box Gum Woodland composition.



Photograph 46 Mid slope patches of trees

Zone 3: Better condition areas of the mid-slope were characterised by open pastures dominated by Plains Grass (*Austrostipa aristiglumis*) and other native C3 grass species (i.e., *Austrostipsa* spp., *Rytidosperma* spp.) (Photograph 47). This zone is adjacent to areas with existing canopy trees which could supply 'seed rain' for natural tree recruitment. Burning grass biomass to open groundlayer canopy, followed by over-sowing of key (absent) native grasses – in particular *Themeda triandra* (Kangaroo Grass), and tubestock planning of desired trees and shrubs could be used to establish good quality Box Gum Woodland.

Poorer areas of the sites mid-slope were open grazing pasture dominated by introduced species (e.g., Rye Grass) and weedy grasses (e.g., African Love Grass) (Photograph 48). These areas are close to existing canopy trees which could supply seed rain for tree natural recruitment. Herbicide spraying followed by burning to provide open ground for 'strip scalping' (along contours) followed by direct seeding of native grasses into scalp zones and tubestock planning of desired trees, shrubs into covered 'scalp spoil lines' could be used to shift the composition of the pasture from exotic to native Box Gum Woodland.

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Photograph 47 Native grassland



Photograph 48 Mid slope exotic dominated grassland

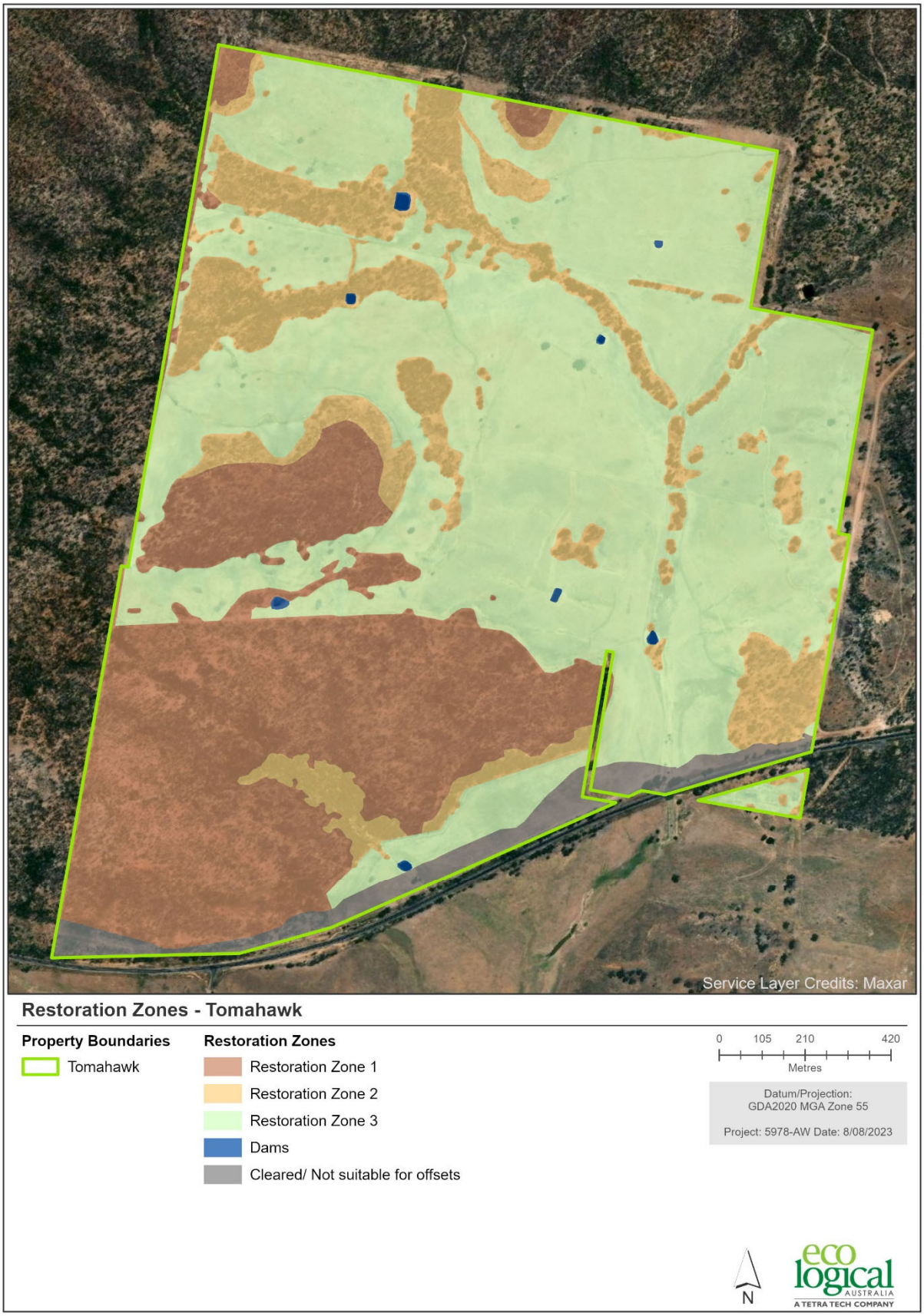


Figure 70 Restoration zones at Tomahawk

9.2.3. Restoration risks

There would be various risks associated with the implementation of a restoration and management strategy to enhance Box Gum Woodland values at-scale at this site. These would include:

- Access to native seed and plants (diversity, quality, quantity, and cost)
- Scale – large scale restoration that seeks to restore native ground layer vegetation can take much longer to plan, prepare and implement than traditional tree focussed plantings. For example, seed sourcing may take 2 to 3 seasons and is very dependent on climatic factors. Additionally, current seeding technologies typically restore ~2-5ha per day, and climatically suitable 'windows' for seeding are limited and variable, further reducing seeding opportunities/extending seeding timelines.
- Project timing – suitable lead times are required for seed and/or plant supply, site preparation (weed control, controlled burns, scalping), and restoration actions (seeding/planting).
- Access to suitable technology/machinery – scalping equipment, seed harvesters, seeders, weed management machinery (etc., sprayers, wick wipers).
- Vertebrate pests – high pig, goat and kangaroo populations could compromise restoration actions, in particular plantings. Preventative infrastructure including electrified fencing would be required to improve the success of plantings.
- Access to suitable practitioners – seed collectors/suppliers, site preparation operators (scalping, burning, weed control), restoration services (direct seeding, planting), site management services (weed control, biomass management, pest control).

9.2.4. Discussion

Tomahawk represents a viable opportunity to improving the extent of Box Gum Woodland in the locality. Restoration across this entire area is not recommended as the impacts of the project are already proposed to be offset to compensate for the loss to Box Gum Woodland. Restoration of 167 ha of DNG within 'Tomahawk' and protection of a further 90 ha of Box Gum Woodland within Tomahawk would provide for 217 ha of protection and enhancement of Box Gum Woodland within the locality.

The project proposes to clear up to 281 ha of Box Gum Woodland, and so an additional 64 ha of land would be required to provide for a 1:1 ration of protection to this TEC in the locality.

Further benefits to restoring Tomahawk would provide connectivity for adjacent forests that were burned in the Sir Ivan Fire.

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9.3. Impacts requiring offsets

The BAM identifies the circumstances in which offsetting the impacts of proposals on biodiversity will result in a no net loss outcome. No net loss refers to the standard set out in Chapter 10 of the BAM that in the opinion of the Minister will result in no net loss of biodiversity in NSW.

This includes when improvements in the condition of native vegetation or threatened species habitat at a biodiversity stewardship site offset the impacts of development, activity, clearing or biodiversity certification on biodiversity values. Such improvements are based on management actions that are undertaken at a biodiversity stewardship site.

The baseline from which the no net loss standard applies accounts for the expected annual decline or loss in biodiversity values without management. Improvement in the condition of native vegetation or threatened species habitat at a biodiversity stewardship site includes the 'gain' from the averted loss that would have occurred from the expected annual decline without undertaking the required management actions.

The BAM sets a standard that will result in no net loss of biodiversity values in NSW where:

- the impacts on biodiversity values from a development, activity, clearing or biodiversity certification proposal are avoided, minimised or mitigated through reasonable measures, as per Chapter 7 of the BAM, and
- all residual direct impacts on biodiversity values from clearing native vegetation and habitat loss are offset by:
    - retiring the required number of biodiversity credits with a class of credit that meets the 'like-for-like' rules under clause 6.3 of the BC Regulation, or
    - in the case of a development, activity, clearing or biodiversity certification proposal, undertaking biodiversity conservation actions that qualify as biodiversity conservation measures under the offset rules and are listed in the ancillary rules, and the action benefits the entity that is impacted by the proposal.

To calculate the offset requirement, the BAM includes two primary sources of information for a threatened species of TEC:

- the sensitivity of loss value (threat status) for TECs, PCTs, and threatened species
- biodiversity risk weighting for the species or the habitat component of the species that the proposal is impacting

Using this information, the offset requirements at a development is calculated following Equation 1 from the BAM:

Equation 1 **Determine the number of ecosystem credits required for the impact on vegetation that is a TEC, contains threatened species habitat, or is any other PCT**

$$\text{Ecosystem credits required for each vegetation zone} = \sum_{i=1}^{n} (\Delta\text{VI Loss} \times BRW \times area) \times 0.25$$

where:

i = the i^{th} vegetation zone on land directly impacted by the proposal

ΔVI Loss = the change (loss) in the vegetation integrity score of a vegetation zone at the development site as determined by Equation 27

BRW = means the biodiversity risk weighting applied to the vegetation zone. The biodiversity risk weighting for a TEC or a PCT containing threatened species habitat is based on the sensitivity to loss class of the TEC/PCT and the highest sensitivity to gain class of the predicted threatened species. For a PCT or TEC not associated with threatened species habitat, the sensitivity to loss class for the PCT or TEC is used with the low sensitivity gain class

area = the area in hectares of the vegetation zone

When calculating the offset requirements for a vegetation zone, Equation 1 considers the condition of vegetation (VI Loss), the sensitivity of the impacted vegetation (biodiversity risk weighting), and the quantum of impacts (area). As a result, the offsets calculated below, particularly for Box Gum Woodland, considers the sensitivity of the TEC by assigning the highest biodiversity risk weighting (score of 3).

The impacts of the development requiring offset for native vegetation are outlined in Table 68 and shown on Figure 62. The impacts of the development requiring offset for species credit species and their habitat are outlined in Table 69 and on Figure 62.

Table 68: Impacts to native vegetation that require offsets

Zone	IBRA Subregion	Stage	BAMC Case	Credits
05 281 M	Pilliga	GR Access Moorfield Road	21962	75
06 281 L	Pilliga	GR Access Moorfield Road	21962	13
10 479 B	Pilliga	GR Access Moorfield Road	21962	105
11 479 M	Pilliga	GR Access Moorfield Road	21962	10
15 483 M	Pilliga	GR Access Moorfield Road	21962	19
16 483 L	Pilliga	GR Access Moorfield Road	21962	43
05 281 M	Kerrabee	GR Access Moorfield Road	40556	29
06 281 L	Kerrabee	GR Access Moorfield Road	40556	1
02 267 M	Pilliga	GR alternative access	40557	6
03 267 L	Pilliga	GR alternative access	40557	27
04 281 G	Pilliga	GR alternative access	40557	27
10 479 B	Pilliga	GR alternative access	40557	65
11 479 M	Pilliga	GR alternative access	40557	6
16 483 L	Pilliga	GR alternative access	40557	2
02 267 M	Kerrabee	GR alternative access	40560	13
03 267 L	Kerrabee	GR alternative access	40560	27
10 479 B	Kerrabee	GR alternative access	40560	6

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Zone	IBRA Subregion	Stage	BAMC Case	Credits
05 281 M	Kerrabee	GR alternative access	40560	2
04 281 G	Liverpool Range	GR cluster	39289	3
05 281 M	Liverpool Range	GR cluster	39289	164
15 483 M	Liverpool Range	GR cluster	39289	356
16 483 L	Liverpool Range	GR cluster	39289	311
01 84 M	Pilliga	GR cluster	40564	12
05 281 M	Pilliga	GR cluster	40564	81
10 479 B	Pilliga	GR cluster	40564	1
11 479 M	Pilliga	GR cluster	40564	45
14 483 G	Pilliga	GR cluster	40564	12
15 483 M	Pilliga	GR cluster	40564	112
16 483 L	Pilliga	GR cluster	40564	31
05 281 M	Kerrabee	LV cluster	21960	28
06 281 L	Kerrabee	LV cluster	21960	44
10 479 B	Kerrabee	LV cluster	21960	62
15 483 M	Kerrabee	LV cluster	21960	294
16 483 L	Kerrabee	LV cluster	21960	584
10 479 B	Inland Slopes	LV cluster	21961	36
11 479 M	Inland Slopes	LV cluster	21961	10
12 479 Reg	Inland Slopes	LV cluster	21961	28
15 483 M	Inland Slopes	LV cluster	21961	27
16 483 L	Inland Slopes	LV cluster	21961	545
17 483 P	Inland Slopes	LV cluster	21961	53
05 281 M	Liverpool Range	MH cluster	40567	11
15 483 M	Liverpool Range	MH cluster	40567	116
16 483 L	Liverpool Range	MH cluster	40567	94
01 84	Pilliga	MH cluster	40568	0
05 281 M	Pilliga	MH cluster	40568	123
11 479 M	Pilliga	MH cluster	40568	46
15 483 M	Pilliga	MH cluster	40568	1361
16 483 L	Pilliga	MH cluster	40568	1467

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Table 69: Impacts on threatened species and threatened species habitat that require offsets

Species	Common Name	Number of individuals / Habitat (ha) in study area	BC Act	EPBC Act
Chalinolobus dwyeri	Large-eared Pied Bat	0 ha potential breeding habitat along clifflines impacted by the project 3.94 ha of foraging habitats	Vulnerable	Vulnerable
Hoplocephalus bitorquatus	Pale-headed Snake	1.04 ha of habitat present.	Vulnerable	Vulnerable
Tyto novahollandiae	Masked Owl	9.95 ha	Vulnerable	
Ninox connivens	Barking Owl	130.37 ha	Vulnerable	
Ninox strenua	Powerful Owl	9.95 ha	Vulnerable	
Petaurus norfolcensis	Squirrel Glider	14.12 ha	Vulnerable	

9.4. Impacts not requiring offsets

The impacts of the development not requiring offset for native vegetation are outlined in Table 70 and shown on Figure 71.

Table 70: Impacts to native vegetation that do not require offsets

Zone	IBRA Subregion	Stage	BAMC Case	Credits
17 483 P	Pilliga	GR Access Moorfield Road	21962	0
13 479 L	Liverpool Range	GR cluster	39289	0
17 483 P	Liverpool Range	GR cluster	39289	0
13 479 L	Pilliga	GR cluster	40564	0
17 483 P	Pilliga	GR cluster	40564	0
12 479 Reg	Kerrabee	LV cluster	21960	0
17 483 P	Kerrabee	LV cluster	21960	0
17 483 P	Liverpool Range	MH cluster	40567	0
17 483 P	Pilliga	MH cluster	40568	0
17 483 P	Pilliga	Workers Camp	40555	0

9.5. Areas not requiring assessment

Areas not requiring assessment are shown on Figure 71.

9.6. Credit summary

A summary and like for like biodiversity credit report is included in Appendix P and Appendix Q.

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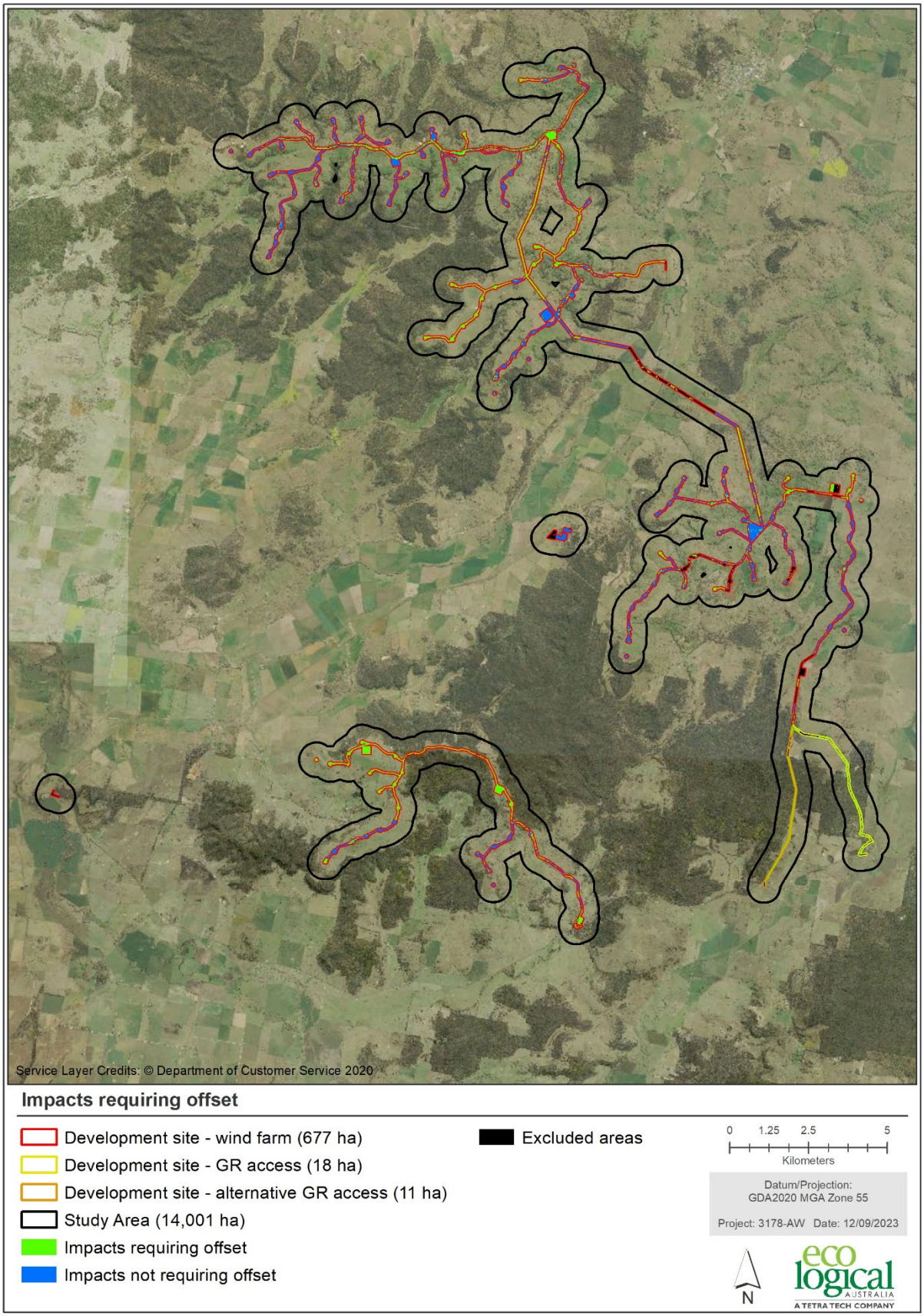


Figure 71: Impacts requiring offset, impacts not requiring offset, and impacts excluded from assessment

10. High level offset strategy

The BAM requires all biodiversity impacts to be explicitly calculated using the Biodiversity Assessment Method Calculator (BAMC), which provides a final project liability in BAM credits. BAM credits can be: ecosystem credits – whereby impacts on all native vegetation, and species habitat that are reliably predicted in that vegetation type are calculated; and species credits – whereby impacts on the extent of individual habitats (or stem counts for most threatened flora) of each species must be mapped and calculated irrespective of vegetation types.

The final ecosystem credit and species credit liability must generally be 'retired' prior to any impacts occurring. These credits can be retired by: establishing conservation agreements called Biodiversity Stewardship Agreements (BSAs) on land which generates the matching credits; or by purchase of the appropriate credits from a vendor (who has established a BSA on their own land); or by payment to the Biodiversity Conservation Fund (BCF) at the price provided in the Biodiversity Offsets Payment Calculator (BOPC).

The BAMC has been operated and the credit calculation for this project is described Section 9.5.

Based on these offsetting requirements, the greatest requirement of the project is to achieve 5,944 credits of Box Gum Woodland and 343 credits of Western Slopes Dry Sclerophyll Forests, which based on an average credit yield of 5 credits/ha, corresponds to approximately 1,200ha and 60 ha of offsets. In order to consider whether on-ground offsets could be sourced, a review was conducted to:

1. Determine to total extent of ecosystem source area (based on the BC Regulation)

2. Review availability of suitable vegetation nearby (within 50km) to the development site

In order to determine the total extent of the ecosystem credit source area, the following areas were identified as potential 'ecosystem credit source area:

- IBRA subregions in which the project occurs
- Any adjacent IBRA subregion to those in which the project occurs
- Any IBRA subregion within 100km of the project

The final ecosystem credit source area is the sum of those areas identified above, and shown on Figure 72. The total area available to source the credits from includes land from the hunter valley in the east, to Boundary Bend in the west, and from the Queensland to Victorian borders along north-south. This is a significant area that would encompass nearly all suitable vegetation that exists in NSW (with the exception of Box Gum Woodland on the New England Tablelands).

Closer to the project, a review was conducted of the areas of suitable vegetation within 50km of the development site. The review included all associated PCTs with suitable vegetation mapped within this 50km buffer and excluded any land within existing conservation reserves. This review also excluded any land within 500m of the project. Based on this review there are large areas of suitable vegetation available within 50km of the project should the proponent seek land-based offsets (Figure 73).

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Should the proponent elect to make payment to the Biodiversity Conservation Fund (BCF) to resolve their offset liability, the total value would be in excess of $20M.

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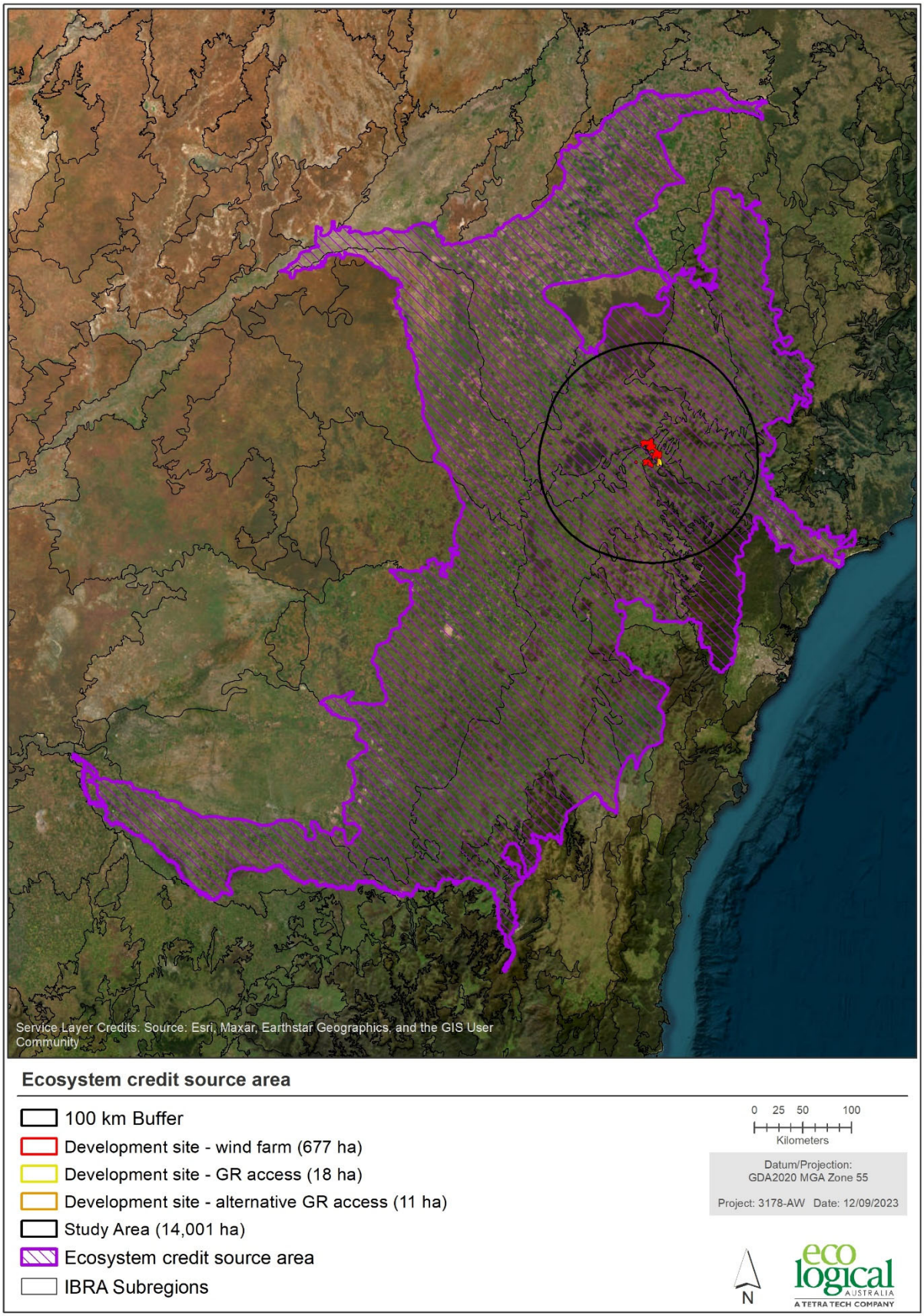


Figure 72 Ecosystem credit source area

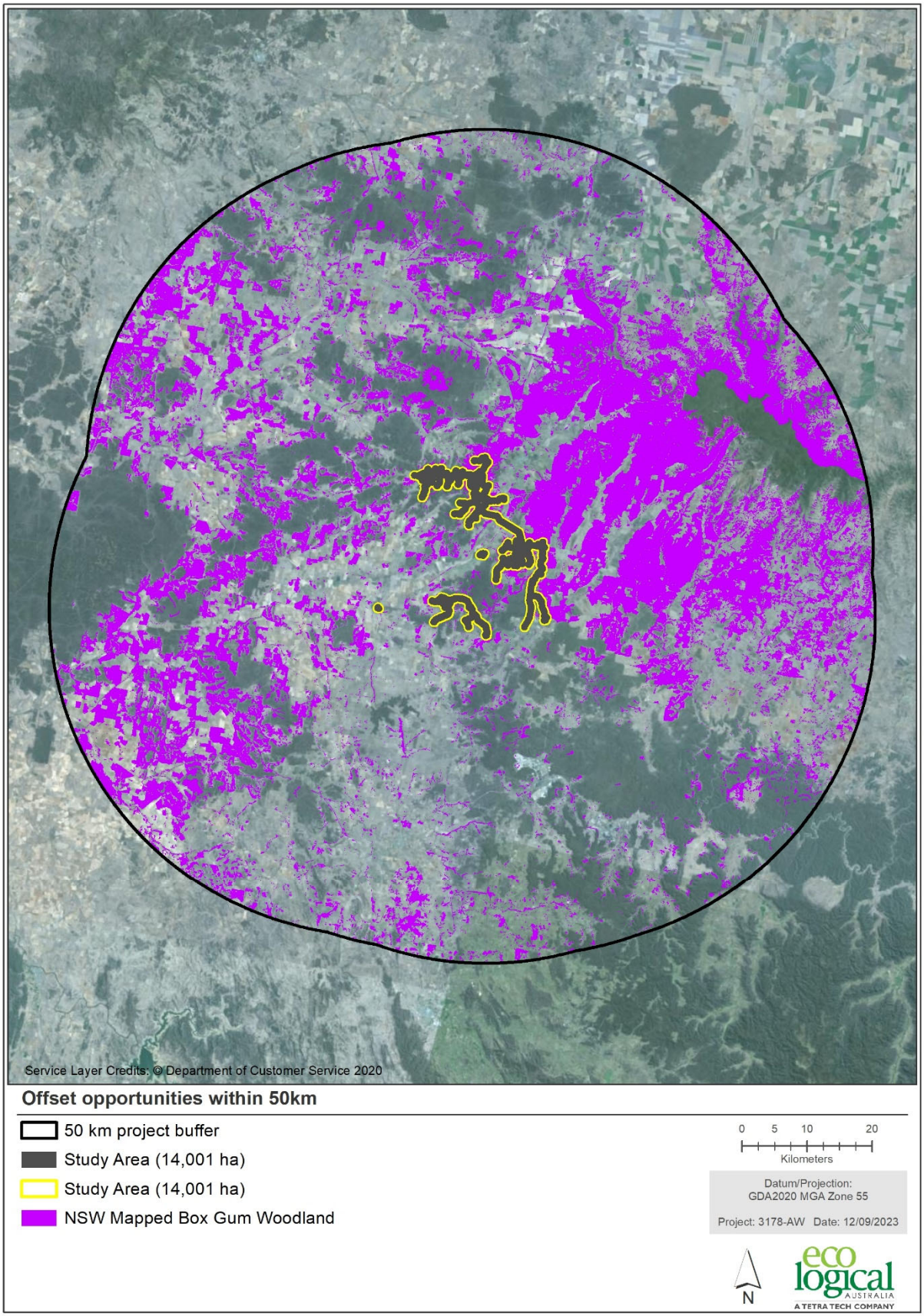


Figure 73 Box Gum Woodland within 50km of the development

11. Consistency with legislation and policy

11.1. NSW State Environmental Planning Policy 44 (Koala Habitat Protection)

The State Environmental Planning Policy 44 (Koala Habitat Protection) (SEPP44) was repealed in 2019 but has been specifically identified as requiring consideration in the SEARs for this project. Generally, this policy only applies to local development, where a Council is the consent authority and wouldn't apply to a State Significant Development. Regardless, an assessment under the SEPP44 has been undertaken below to consider impacts to potential or core Koala habitat.

11.1.1. Step 1. Is the site potential Koala habitat?

Potential Koala Habitat is defined in SEPP44 as areas of native vegetation where the trees of the types listed in Schedule 2 (of the SEPP44) constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. Under Schedule 2, only one species of tree present (*Eucalyptus albens*) is present within the development site, conservatively identified as the hybrid *E. albemol*. This species occupies more than 15% of the trees in the upper strata in high and moderate condition zones of PCT483.

11.1.2. Step 2. Is the site core Koala habitat?

Core Koala habitat is defined in SEPP44 as an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

Surveys conducted across the study area (4.2.10), including SAT surveys, spotlighting, and remote cameras, failed to identify any individual Koalas or signs thereof.

It is therefore concluded that the study area does not contain core Koala habitat, and as such a Koala plan of management is not required.

11.2. NSW Fisheries Management Act 1994

Direct impacts to aquatic habitat are associated primarily with the Transmission line crossings of the Coolaburragundy Creek and Talbragar River. Both of these waterways are Key Fish Habitat (KFH) for Eel-tailed Catfish and Purple Spotted Gudgeon. In addition, there are numerous named and unnamed drainages across the study area that are KFH for Purple-spotted Gudgeon only (Figure 74).

Potential direct impacts are associated with potential disturbance during construction of these transmission lines as well as roads and reticulation within the wind farm. All disturbance will be avoided within the watercourse itself and all transmission lines will span areas of KFH. Any crossings required will be designed and constructed in accordance with Policy and Guidelines for Fish Friendly Waterway Crossing (DPI undated), with the aim to minimise potential impacts on aquatic habitats and avoid obstruction of fish passage. The proponent will aim to avoid any obstruction of fish passage or dredging &/or reclamation. Otherwise the crossing will comply with the requirements of the FM Act (Part 7 Permit). Given the degraded nature of the aquatic habitat present and mitigation measures proposed, the direct impacts to aquatic habitat are unlikely to be significant.

Potential indirect impacts on aquatic habitat include:

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- impacts to water quality (if water is present) during construction of the creek crossing
- potential increase in run-off/sedimentation during construction, operation and decommissioning

Given the degraded nature of the aquatic habitat present and mitigation measures proposed, the direct impacts to aquatic habitat are unlikely to be significant.

The proposed development is unlikely to impact aquatic threatened species.

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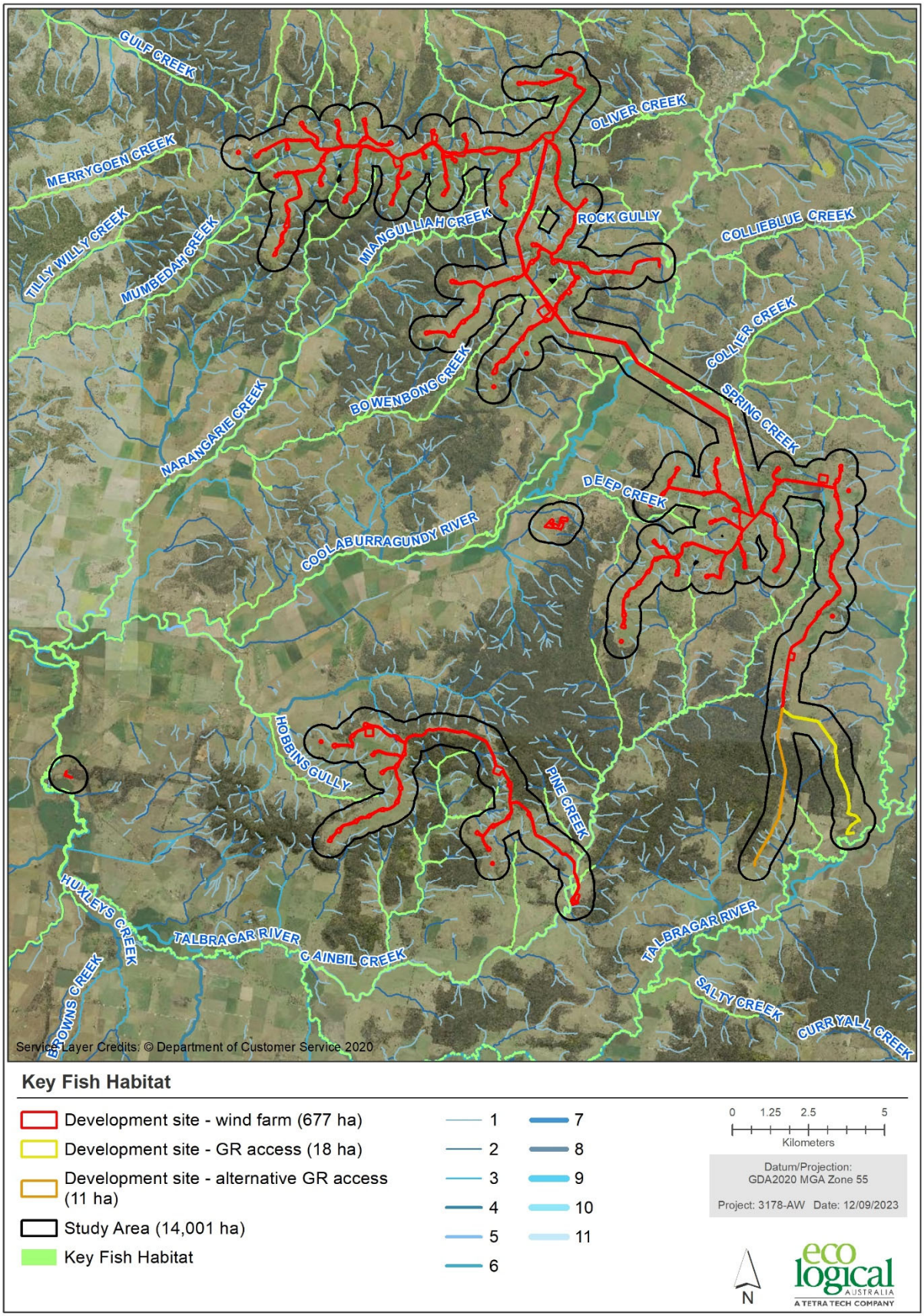


Figure 74 Key fish habitat

11.3. Commonwealth Environment Protection and Biodiversity Conservation Act 1999

This project was referred to the Commonwealth Minister for the Environment in 2020, and was declared a controlled action due to potential impacts primarily to Box Gum Woodland CEEC (Referral 2020/8668).

The referral identified potential impacts to two communities and 29 species listed under the EPBC Act. These species were derived from the project footprint identified in the referral, which has been significantly truncated through design iterations (Chapter 7). Each species has been considered throughout the development of this project, and the list of all identified MNES and whether they may be impacted is described in Table 71 below. Species that were not identified during field surveys have not been considered further.

The location of all MNES is shown on Figure 75.

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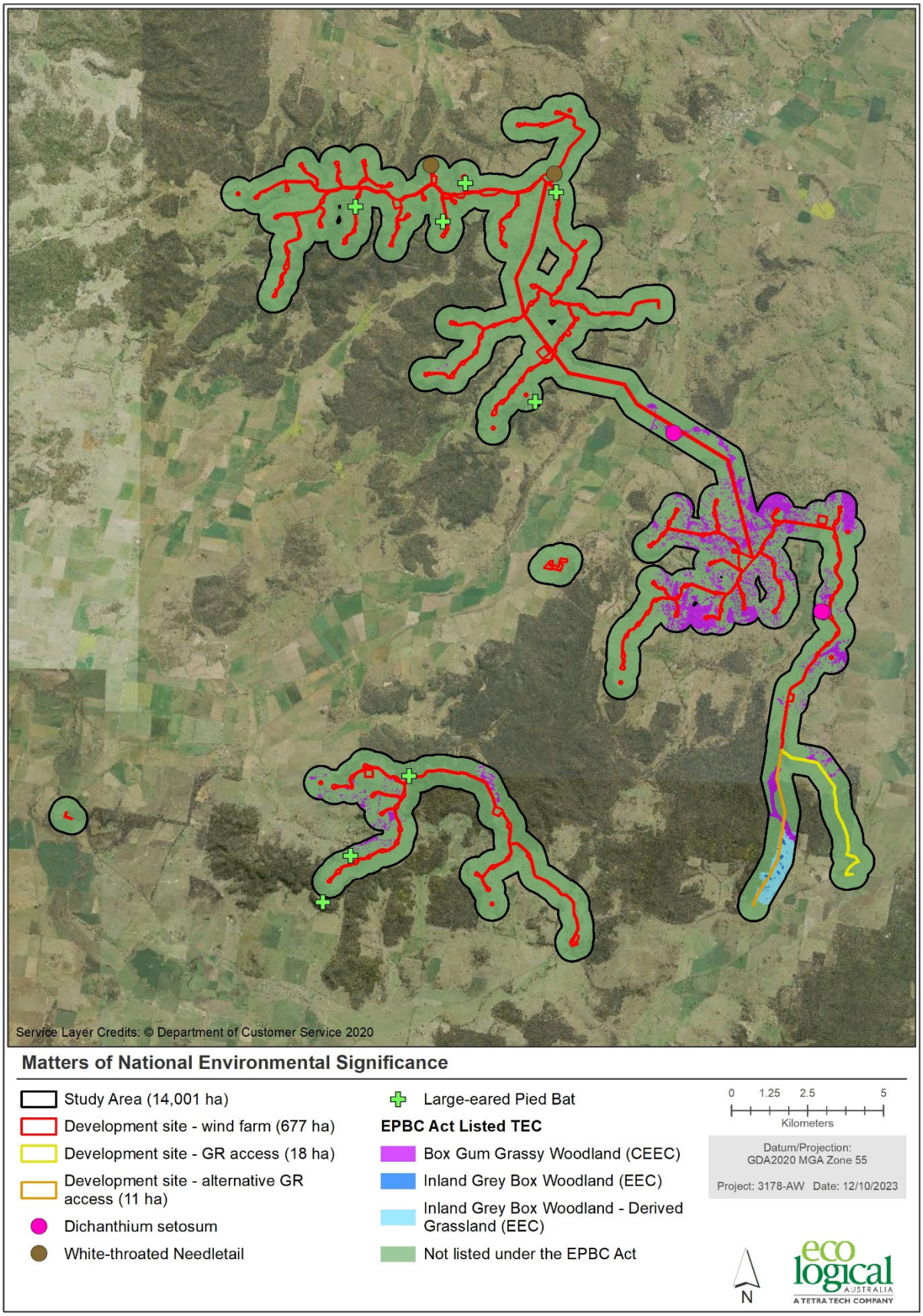


Figure 75 MNES identified in the study area

Table 71 Threatened species and communities identified by the Commonwealth for assessment

Species Name	Common Name	EPBC Act	Response	Nature	Quantum	Consequence
Species and communities identified by Commonwealth as likely to be significantly impacted						
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		Endangered	Identified within the study area. Further assessment required	Removal of vegetation within development footprint	0.67 ha of woodland removed, 4.04 ha of derived grasslands impacted	No significant residual impact
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		Critically Endangered	Identified within the study area. Further assessment required	Removal of vegetation within development footprint	35.88 ha of woodland removed	No significant residual impact
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not identified on important area mapping or by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Grantiella picta	Painted Honeyeater	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Lathamus discolor	Swift Parrot	Critically Endangered	Not identified on important area mapping or by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A

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Species Name	Common Name	EPBC Act	Response	Nature	Quantum	Consequence
Polytelis swainsonii	Superb Parrot	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Identified within the study area. Further assessment required	Removal of native vegetation which acts as foraging habitat	Removal of 3.94 ha of foraging habitat. No impacts to breeding habitat.	No significant residual impact
Nyctophilus corbeni	Corben's Long-eared Bat	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Phascolarctos cinerus	Koala (combined populations of Queensland, New South Wales and the Australian Capitol Territory)	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Hirundapus caudacutus	White-throated Needletail	CAMBA, JAMBA ROKAMBA, Vulnerable	Identified within the study area. Further assessment required	Installation of wind turbines nearby to airspace seasonally occupied by the species	Species is aerial, so the project will not remove any foraging habitat. No impacts to breeding habitat.	No significant residual impact

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Species Name	Common Name	EPBC Act	Response	Nature	Quantum	Consequence
Species and communities identified by Commonwealth with potential to be significantly impacted						
Androcalva procumbens	Commersonia procumbens	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Thesium australe	Austral Toadflax	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Pomaderris sericea	Bent Pomaderris	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Dichanthium setosum	Bluegrass	Vulnerable	Identified within the study area. Further assessment required	No removal of any individuals or species habitat	0 ha impacted	No significant impact
Petauroides volans	Greater Glider	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A

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Species Name	Common Name	EPBC Act	Response	Nature	Quantum	Consequence
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Leucochrysum albicans subsp. *tricolor*	Hoary Sunray	Engangered	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Homoranthus darwinioides	Homoranthus darwinioides	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Indigofera efoliata	Indigofera efoliata	Engangered	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Kennedia retrorsa	Kennedia retrorsa	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A

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Species Name	Common Name	EPBC Act	Response	Nature	Quantum	Consequence
Lasiopetalum longistamineum	Lasiopetalum longistamineum	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Leipoa ocellata	Malleefowl	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Prostanthera stricta	Mount Vincent Mintbush	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Ozothamnus tesselatus.	Ozothamnus tesselatus	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Androcalva rosea	Sandy Hollow Commersonia	Endangered	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A

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Species Name	Common Name	EPBC Act	Response	Nature	Quantum	Consequence
Swainsona recta	Small Purple-pea	Endangered	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Pultenaea glabra	Smooth Bush-pea	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Dasyurus maculatus maculatus	Spotted-tail Quoll (SE mainland population)	Endangered	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Tylophora linearis	Tylophora linearis	Endangered	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A
Prostanthera cryptandroides subsp. cryptandroides	Wollemi Mint-bush	Vulnerable	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A

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Species Name	Common Name	EPBC Act		Response	Nature	Quantum	Consequence
Apus pacificus	Fork-tailed Swift	Bonn, ROKAMBA	CAMBA,	Not identified by field surveys. The species will therefore not be affected by the project, and no further assessment required.	N/A	N/A	N/A

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Based on the results of the field studies, the referral notice requires the proponent to satisfy general requirements as well as identify key issues. These are detailed in Table 72 and Table 73.

Table 72 Consistency with the General Requirements of the referral notice

General Requirement	Response
Relevant regulations	
The Environmental Impact Statement (EIS) must address all matters outlined in Schedule 4 of the EPBC Regulations and all the matters outlined below in relation to the controlling provisions.	See EIS
Project description	
The title of the action, background to the action and the current status	Chapter 1
The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on Matters of National Environmental Significance (MNES).	Chapter 1
How the action relates to any other actions that have been, or are being taken in the region affected by the action.	Section 6.3
How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES.	Section 7
Impacts	
The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including:	
i. a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts;	Chapter 8
ii. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;	Chapter 8
iii. analysis of the significance of the relevant impacts; and	Section 11.3.1
iv. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	Chapter 12
Avoidance, mitigation and offsetting	
For each of the relevant matters protected that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action, including:	
i. a description and an assessment of the expected or predicted effectiveness of the mitigation measures;	Section 8.6 and 8.7
ii. any statutory policy basis for the mitigation measures;	Section 8.6 and 8.7
iii. the cost of the mitigation measures;	The cost of the mitigation measures is likely to exceed $200k

General Requirement	Response
iv. an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;	A BMP and BBAMP is required prior to construction
v. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.	The mitigation measures and monitoring program will be approved by the NSW Department of Planning, Industry and Environment (DPIE)
Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.	Chapter 10
For each of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any: i. conservation advice or recovery plan for the species of community; ii. relevant threat abatement plan for the species; iii. wildlife conservation plan for the species; and iv. any strategic assessment.	Table 74

Table 73 Consistency with Key Issues of the referral notice

Key Issue	Response
Assessment requirements	
The EIS must identify each EPBC Act listed threatened species and community and migratory species likely to be impacted by the action. For any species and communities that are likely to be impacted, the proponent must provide a description of the nature, quantum and consequences of the impacts. For species and communities potentially located in the project area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.	Table 71
For each of the EPBC Act listed threatened species and communities and migratory species likely to be impacted by the action the EIS must provide a separate: a. description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans; b. details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements; c. description of the relevant impacts of the action having regard to the full national extent of the species or community's range; and d. description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action; e. identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account; f. description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established. g. details of how the current published NSW Biodiversity Assessment Methodology has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts; and h. details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the NSW Biodiversity Assessment Methodology and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites;	Table 74

Key Issue	Response
Any significant residual impacts not addressed by the NSW Biodiversity Assessment Methodology may need to be addressed in accordance with the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy	All significant impacts are addressed by the BAM
Other approvals and conditions	
Information in relation to any other approvals of conditions required must include the information prescribed in Schedule 4 Clause 5 (a) (b) (c) and (d) of the EPBC Regulations 2000.	See EIS
Environmental Record of person proposing to take the action	
Information in relation to the environmental record of a person proposing to take action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations 2000.	See EIS
Information Sources	
For information given in the EIS, the EIS must state the source of the information, how recent the information is, how the reliability of the information was tested, and what uncertainties (if any) are in the information.	Chapter 12

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Table 74 Detailed assessment of impacted MNES

Assessment requirement	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Large-eared Pied Bat	White-throated Needletail	Bluegrass
a. description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans;	Section 3.7.2.1	Section 3.7.2.2	Section 4.2.6	Section 4.2.7	Section 4.2.4
b. details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements;	Section 3.6.2.1	Section 3.6.2.1	Section 3.6.2.1	Section 3.6.2.1	Section 3.6.2.1
c. description of the relevant impacts of the action having regard to the full national extent of the species or community's range; and	Section 11.3.1	Section 11.3.1	Section 11.3.1	Section 11.3.1	Section 11.3.1
d. description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action	Section 7	Section 7	Section 7	Section 7	Section 7

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Assessment requirement	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Large-eared Pied Bat	White-throated Needletail	Bluegrass
e. identification of significant residual adverse impacts likely to occur after the proposed activities to avoid	Section 9.1.2	Section 9.2	Section 9.2	Section 9.2	Section 9.2

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11.3.1. Revised Significant Impact Criteria

11.3.1.1. Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

This community was identified in the southern portion of the development site, along the alternative access to Girragulang Road. It occurs as patches of remnant vegetation and derived grasslands. Approximately 4.71 ha of this community will be removed by the project.

Table 75 Significant Impact Criteria for Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

Impact Criteria	Response
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
reduce the extent of an ecological community	The project will reduce the extent of the ecological community by 4.71 ha.
fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The project involves significant development of internal access tracks and transmission lines that will fragment remnant occurrences of the community. This fragmentation however will be narrow and is unlikely to impede any genetic transfer between retained patches.
adversely affect habitat critical to the survival of an ecological community	The project will remove existing habitat, which is considered to be habitat critical to the survival of the community.
modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The project is unlikely to affect any abiotic processes necessary for the community's survival.
cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The project will remove 4.71 ha of the community, however it is unlikely to result in any substantial change to the community locally.
cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	The project will not assist any invasive species, nor cause any increased mobilisation of fertilisers which would kill or inhibit the growth of species in the ecological community.
interfere with the recovery of an ecological community.	The project will not interfere with any current recovery programs within the study area.
Conclusion	The project is unlikely to significantly impact this community as the impacts are confined to small remnant patches in an existing degraded landscape.

11.3.1.2. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

This community was identified throughout the majority of the development site. It occurs as patches of remnant vegetation. Grasslands within the development site are not consistent with the EPBC Act definition of this community. Approximately 64.23 ha of this community was proposed to be removed by the project in the EIS. The revised project will seek to clear 35.88 ha (45% reduced impacts).

Table 76 Significant Impact Criteria for White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Impact Criteria	Response
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
reduce the extent of an ecological community	The project will reduce the extent of the ecological community by 35.88 ha.
fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The project involves significant development of internal access tracks and transmission lines that will fragment remnant occurrences of the community. This fragmentation however will be narrow and is unlikely to impede any genetic transfer between retained patches.
adversely affect habitat critical to the survival of an ecological community	The project will remove existing habitat, which is considered to be habitat critical to the survival of the community.
modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The project is unlikely to affect any abiotic processes necessary for the community's survival.
cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The project will remove 41.98 ha of the community, however it is unlikely to result in any substantial change to the community locally.
cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	The project will not assist any invasive species, nor cause any increased mobilisation of fertilisers which would kill or inhibit the growth of species in the ecological community.
interfere with the recovery of an ecological community.	The project will not interfere with any current recovery programs within the study area.
Conclusion	The project has been refined, and the reduced area of impact (35.88 ha) is unlikely to lead to a significant impact. Furthermore – analysis in Section 9.1.1 indicates that a remaining 1.8M ha of the community in NSW will be unaffected.

11.3.1.3. Large-eared Pied Bat

This species was recorded using ultrasonic detectors across the wind farm. This species was recorded in very low numbers, indicative of a low regional population utilising the development site for foraging only. The occurrence of this species within the development site is not considered to be an important population as described in *Matters of National Environmental Significance Significant impact guidelines 1.1* (Commonwealth of Australia, 2013) as:

- The individuals recorded are not considered to be a key source population either for breeding or dispersal as no breeding habitat was identified, and detection frequency was extremely low; and
- The population lacks evidence of a breeding site, and therefore does not acutely contribute to maintaining genetic diversity; and
- The population is not near the limit of the species range.

Table 77 Significant Impact Criteria for Large-eared Pied Bat

Impact criteria	Impact criteria
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
lead to a long-term decrease in the size of an important population of a species	The project is unlikely to lead to any long-term decrease in the size of an important population
reduce the area of occupancy of an important population	The project will not reduce the area of occupancy of an important population
fragment an existing important population into two or more populations	The project will not fragment an existing important population
adversely affect habitat critical to the survival of a species	The project will remove 3.94 ha foraging habitat for the species.
disrupt the breeding cycle of an important population	The project is unlikely to disrupt any breeding, as no breeding sites were identified.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	This species is widely known throughout the central west of NSW, but only has very few known breeding sites (nearest being at Ulan, NSW). Impacts to the species are likely to be limited to removal of foraging habitat with a low local population. The project is unlikely to remove or modify habitat such that the species is likely to decline.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project is unlikely to result in the introduction of any invasive species
introduce disease that may cause the species to decline, or	The project is unlikely to result in the introduction of any disease that may affect the species
interfere substantially with the recovery of the species.	The project will not interfere with the recovery of the species.
Conclusion	This species will not be significantly impacted.

11.3.1.4. White-throated Needletail

This species was recorded on several occasions within the Mount Hope cluster of the project. This species is a spring/summer migrant to Australia. This species is listed as both migratory and vulnerable and so has been assessed under both significant impact criteria provisions as appropriate.

The occurrence of the species within the study area is not considered to be an important population as:

- The individuals recorded are not considered to be a key source population either for breeding or dispersal as no breeding habitat was identified, and detection frequency was extremely low; and
- The population lacks evidence of a breeding site, and therefore does not acutely contribute to maintaining genetic diversity; and
- The population is not near the limit of the species range.

Table 78 Significant Impact Criteria (vulnerable species) for White-throated Needletail

Impact criteria	Impact criteria
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
lead to a long-term decrease in the size of an important population of a species	The project is unlikely to lead to any long-term decrease in the size of an important population
reduce the area of occupancy of an important population	The project will not reduce the area of occupancy of an important population
fragment an existing important population into two or more populations	The project will not fragment an existing important population
adversely affect habitat critical to the survival of a species	The project will not remove foraging habitat for the species.
disrupt the breeding cycle of an important population	The project is unlikely to disrupt any breeding, as this species does not breed in Australia.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	This species is widely known throughout the central west of NSW. Impacts to the species are likely to be limited to removal of foraging habitat with a low transient local population. The project is unlikely to remove or modify habitat such that the species is likely to decline.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project is unlikely to result in the introduction of any invasive species
introduce disease that may cause the species to decline, or	The project is unlikely to result in the introduction of any disease that may affect the species
interfere substantially with the recovery of the species.	The project will not interfere with the recovery of the species.
Conclusion	This species will not be significantly impacted.

The development site is not considered to be important habitat for a migratory species, as:

- whilst the habitat is utilised by a migratory species occasionally, the study area does not support an ecologically significant proportion of the population of the species, and

- the habitat present in the study area is not of critical importance to the species at particular life-cycle stages, and
- the habitat utilised by the species is not at the limit of the species range, and
- the habitat to be removed is not within an area where the species is declining.

Table 79 Significant Impact Criteria (migratory species) for White-throated Needletail

Impact criteria	Impact criteria
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:	
substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The project will not modify any important habitat
result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The project will not result in any invasive species that would affect any important population
seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	The project will not affect any ecologically significant proportion of the population.
Conclusion	The species will not be significantly impacted.

11.3.1.5. Bluegrass

This species was identified at two locations within the study area. None of these individuals will be impacted by the project. The occurrence of these individuals is considered to be an important population, as it is near the southern limit of the species range.

Table 80 Significant Impact Criteria for Bluegrass

Impact criteria	Impact criteria
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
lead to a long-term decrease in the size of an important population of a species	The project will not affect any individuals of this species.
reduce the area of occupancy of an important population	The project will not affect any individuals of this species.
fragment an existing important population into two or more populations	The project will not affect any individuals of this species.
adversely affect habitat critical to the survival of a species	The project will not affect any individuals of this species.
disrupt the breeding cycle of an important population	The project will not affect any individuals of this species.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The project will not affect any individuals of this species.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project is unlikely to result in the introduction of any invasive species
introduce disease that may cause the species to decline, or	The project is unlikely to result in the introduction of any disease that may affect the species
interfere substantially with the recovery of the species.	The project will not interfere with the recovery of the species.
Conclusion	This species will not be significantly impacted.

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Appendix A Definitions

The following terminology has been used throughout this report for the purposes of describing the impacts of the proposal in the context of a biodiversity assessment in accordance with the NSW Biodiversity Assessment Method 2020. This terminology may or may not align with other technical documents associated with the proposed development.

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
Extent of occurrence (EOO)	Measures the spatial spread of a taxon to determine the degree to which risks from threatening factors could impact an entire population, and is not intended to be an estimate of the amount of occupied or potential habitat.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands

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Terminology	Definition
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
NSW (Mitchell) landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
Operational Manual	The Operational Manual published from time to time by DPIE, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site..
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Residual impact	An impact on biodiversity values after all reasonable measures have been taken to avoid, minimise or mitigate the impacts of development. Under the BAM, an offset requirement is determined for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	a development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.

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Terminology	Definition
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by DPIE and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

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Appendix B Response to BCS Submission

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BCS Number	Comment	BCS Recommendation	Response
1	The site context data for BAM-C cases will require revision according to intersected IBRA subregions	1.1 BAM-C cases must be split between IBRA subregions, with separate cases for each sub-region, noting the exception suggested for the Talbragar Valley IBRA subregion. 1.2 Lists of candidate threatened species in each IBRA subregion should be reviewed to determine whether any additional species need to be assessed. 1.3 Plot data be reviewed to ensure the minimum number of plots and transects required for each IBRA subregion has been met. 1.4 Each proposed stage of the development be assigned its own separate BAM-C case and be described in detail within the BDAR. 1.5 Biodiversity credits be recalculated for each IBRA subregion.	1.1 All calculations have been split between four IBRA subregions - with the exception of Talbragar Valley, which has been incorporated into the Pilliga subregion. 1.2 The list of candidate species in each subregion has been updated in Section 4.2.3 of this report. 1.3 Plot data has been replicated across each subregion for each vegetation zone. Whereby the minimum number of plots was not collected, benchmark data has been included to supplement remaining plots. 1.4 Each proposed stage of the development has been assigned a separate BAM-C case as provided in Appendix P of this report. 1.5 Biodiversity credits have been calculated for each subregion.
2	Errors in BAM-C data transcription will require correction	2.1 Undertake an audit of Stem Size Class scores for all plots and for all data which may need manual revision as part of the RTS.	2.1 All stem size classes have been reviewed in the BAM-C and are correct.
3	Vegetation integrity plots may not be representative of site context	3.1 Include all plots in the BAM-C or provide justification in the BDAR as to why they have not been entered.	3.1 All plots collected by ELA have been entered into the BAM-C in the appropriate subregion.
4	Vegetation integrity plots should adequately sample vegetation variability across a vegetation zone and should not be duplicated across IBRA subregions	4.1 Revise the plot duplication method to meet the principles outlined in this response. 4.2 Submit a plot duplication proposal for review.	4.1 No plots have been duplicated in the BAM-C 4.2 No plot duplication proposal is required.

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BCS Number	Comment	BCS Recommendation	Response
5	Inclusion of vegetation plots located outside the project footprint must be justified	5.1 Where vegetation plots are not located in the project footprint, justification must be provided, including evidence that the plot is in the correct PCT and vegetation zone.	5.1 All plots collected for this assessment were captured within appropriate PCTs for the project footprint. Multiple iterations of the development footprint has resulted in some plots not occurring within the RtS Development Footprint. The Accredited Assessor has reviewed the plot data in conjunction with knowledge of the site and has identified in Chapter 3 the (1) distance from the plot for the development site, (2) suitability of the plot to measure vegetation integrity. Given the homogeneity of vegetation across the Development Footprint, all plots have been included in the BAM-C to measure vegetation integrity.
6	The applicability of using more appropriate local data for severely burnt vegetation within the project area should be discussed in the BDAR	6.1 Conduct an assessment to determine if the benchmarks applied to the vegetation on site are relevant given the extreme fire impact sustained. 6.2 If it is determined that the current benchmarks are not applicable, provide more appropriate local data in accordance with Section 1.4.2 of the BAM.	6.1 Review of the burnt areas of vegetation included consideration of the vegetation integrity score as well as the characteristics identified in the Biodiversity Assessment Method at severely burnt sites (DPIE, 2020). Review is included in Section 2.1 of the report. No changes to benchmark data was undertaken as a result.
7	Land Categorisation of CEEC extent requires revision	7.1 In the absence of data supporting CEEC absence, land be designated as Category 2 Regulated Land and Box Gum Woodland be assumed present. 7.2 If the proponent wishes to collect further evidence to justify the absence of Box Gum Woodland/Box Gum Grassland from portions of the project site, liaise with BCS to determine an acceptable approach.	7.1 An additional 88 BAM plots were collected across the project. The grassland layer of the PCT map was reviewed and areas that were consistent with the Final Determination for Box Gum Woodland were remapped as PCT483 Low condition. Areas that were previously mapped as Category 1 Land have been mapped as PCT Poor condition, and vegetation integrity data collected. The assessment found that the condition of PCT483 Poor is not consistent with the Final Determination of Box Gum Woodland, and the vegetation integrity score is generally very low (<10). 7.2 Additional evidence is presented in the Vegetation Integrity Plots within Chapter 3 and Appendix E of this report.
8	The criteria used to identify EPBC Act-listed Box Gum Woodland requires revision	8.1 Revise all EPBC Act TEC equivalency assessments to exclude the provisions of the LLS Act.	8.1 All EPBC Act TEC equivalencies have been reviewed and are presented in the revised report.

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BCS Number	Comment	BCS Recommendation	Response
9	Mapping of woodland extent within the project area requires review	9.1 Revise vegetation mapping for grassy woodlands within the project site according to the information and advice provided within this response.	9.1 A revised approach to woodland mapping is presented in Chapter 3 of this report. The woodland mapping approach was reviewed and agreed to by BCS Dubbo.
10	Mapping of Derived Native Grassland within the project area requires review	10.1 Audit the vegetation zone mapping to identify areas mapped as derived native grassland which contain trees and update the mapping and BAM-C calculations accordingly.	10.1 An audit of all grassland areas was undertaken and is described in Chapter 3 of this report.
11	Mapping of EPBC Act Box Gum Woodland requires revision and further evidence	11.1 Provide evidence that all vegetation has been appropriately surveyed in detail to inform TEC equivalency assessments and support the determination of non-equivalence to EPBC Act listed TECs. 11.2 If evidence has not been collected, assume the presence of the EPBC Act listed TEC	11.1 All EPBC Act TEC equivalencies have been reviewed and are presented in the revised report. 11.2 EPBC Act TECs have been assumed present in patches that do not contain site data.
12	The Inland Grey Box EBPC Act assessment requires revision	12.1 Revise the TEC equivalency assessment of EPBC Act-listed Grey Box Woodland TEC extent within the project site according to the advice contained within this response. 12.2 Contact DCCEEW for advice if there are impacts to the EPBC Act representation of this TEC which is not consistent with the TEC's BC Act listing.	12.1 EPBC Act listed Grey Box Woodland EEC has been reviewed as described in Chapter 3 of this report.
13	Further clarification is required regarding the exclusion of Hunter Floodplain Red Gum Woodland TEC	13.1 Undertake a TEC equivalency assessment for PCT 42.	13.1 The development site is not in the Hunter Catchment, and there are no PCTs that could potentially align with Hunter Floodplain Red Gum Woodland TEC.

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BCS Number	Comment	BCS Recommendation	Response
14	Explanation and further discussion should be provided regarding species identification	14.1 Provide explanation in the BDAR why a significant proportion of flora species detected could not be identified to the species level. 14.2 If BAM plots were surveyed during a period which has limited the appropriate identification of flora, provide further justification regarding the applicability of more appropriate local data in accordance with Section 1.4.2 of the BAM.	14.1 Flora species were identified to species level where possible. Due to the intensive grazing and agricultural practices present across the development site. Section 4.2.1.2 of the BAM provides guidance on identifying flora species, and the BDAR complies with this section of the BAM. 14.2 There is no prescribed survey period for collecting BAM plots, and grazing cannot be excluded from the development site.
15	The landscape vegetation cover class estimate requires revision	15.1 Include all areas of native vegetation within the landscape vegetation cover class assessment.	15.2 All areas of native vegetation cover are included in the landscape assessment.
16	The proposed development footprint requires clarification and potential revision	16.1 Clarify that all development components, which will result in surface disturbance to biodiversity values, have been included within the consolidated development footprint and are reflected in the BDAR.	16.2 Development components are all included in the development site and are shown on Figure 1.

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BCS Number	Comment	BCS Recommendation	Response
17	The removal of Brush-tailed Phascogale and Delma impar is not compliant with BAM	17.1 Conduct a targeted survey to determine the presence or absence of Brush-tailed Phascogale and Delma impar, obtain an expert report or assume presence.	17.1 Correspondence was undertaken with the BAM Helpdesk, as well as BCS Dubbo. The development site has been identified and agreed, to be outside the normal distribution of these species, and as such removed from this assessment.
18	The justification regarding the exclusion of candidate species requires review and/or revision	18.1 Review and/or revise the candidate species exclusion determinations based on the information and recommendations contained within this response. 18.2 For each vegetation zone provide a list of associated species (according to the TBDC), and provide evidence-based justification on species exclusions from each associated vegetation zone, ideally in a tabularised format.	18.1 Due to review of the vegetation zones and calculations, a new list of candidate species has been generated. Detail is provided on species exclusion based on the habitat features present within the development site in Chapter 4. 18.2 A table containing the vegetation zones and associated species is provided in Chapter 4. Species exclusion has been based on habitat and geographic constraints presented in the BAMC. A targeted survey has been undertaken in suitable habitat for all remaining species.
19	Species polygons for species credit species detected or assumed present require further information and potential revision	19.1 Review and/or revise species polygons based on the information and recommendations contained within this response. 19.2 Provide evidence-based justification for the exclusion of each vegetation zone from species polygons.	19.1 All species identified as present within the development site have had species polygons generated. The methodology for generating species polygons includes the PCTs in which the species is predicted, as well as any other limitations identified in TSPD (such as buffers from hollow-bearing trees and caves). 19.2 Species polygons include all areas of predicted PCTs where appropriate. The only exception to this is where the TBDC identifies a particular constraint on the species polygon shape (such as modifying the shape of the buffer where the potential nest tree is already located near the edge of the wooded area - as described for Barking Owl).

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BCS Number	Comment	BCS Recommendation	Response
20	The survey effort conducted for the Koala is inadequate	20.1 Conduct a targeted survey to determine the presence or absence of the Koala from previously unsurveyed areas within the project site, obtain an expert report or assume presence.	20.1 The *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guid*e (DPE, 2022) was published more than 6 months after completion of surveys and submission of the BDAR. Assessor update 36 – item 4 describes the application of new or revised survey guidelines: "Where survey has been completed prior to the publication of a survey guide, the Department expects the assessor (or surveyor) to have applied current best-practice in searching for the target species (in accordance with BAM s6.5.1.4). Assessors can use information from other published, peer-reviewed sources to guide survey technique and effort, but this must be clearly documented and justified in the BAR as well as indicating how this differs from our recently published guide." As such the level of survey effort presented in the BDAR, prior to any guideline existing, is considered adequate. In recognition of the importance of this species, a further 22 SAT surveys were undertaken (total 48 surveys and approximately 1,440 trees surveyed). This SAT effort is in addition to the 465 km of spotlighting undertaken across the development site. Details of the results of this survey are provided in Chapter 4 of this report.
21	Impacts to the Large-eared Pied Bat require clarification in the BDAR	21.1 Clarify impacts to the Large-eared Pied Bat.	21.1 A total of 3.94 ha of Large-eared Pied Bat foraging habitat will be impacted by the Project.
22	The survey effort conducted for reptiles requires clarification	22.1 Provide mapping of rocky habitat so BCS can review the spatial adequacy of targeted reptile surveys conducted.	22.1 The development site does not impact any rocky habitat that is consistent with the habitat requirements of this species. The Project is located on fine basalt that is free from rocks. No further surveys have been undertaken.
23	The survey effort for threatened flora species will require further clarification	23.1 Provide a spatial file of the grid points which were surveyed during targeted flora survey and display these grid points within the BDAR. 23.2 Provide clarification regarding the approximate proportion of the direct impact area which was surveyed for each threatened species during the correct survey window. 23.3 If multiple species were simultaneously surveyed together, provide further detail on	23.1 The location of threatened flora searches, including grid points has been included in the revised footprint. 23.2 The level of survey effort for each flora species has been clarified in Chapter 4 of this report. 23.3 Multiple species were surveyed together, with a maximum of three flora species searched for concurrently in February 2021 that could not be identified at in September. In September, six species were surveyed that could not be identified in September. The remaining four species could be surveyed in both February and September. All flora are part of similar functional groups, and the survey team was experienced in all target species. In

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BCS Number	Comment	BCS Recommendation	Response
		this giving reference to Section 6.6 of the Surveying threatened plants and their habitats guidance document.	light of s6.6 of the threatened flora survey guidelines, weather conditions during the survey are presented in s4.2.4 of this report.
24	The assumption of species presence requires further information	24.1 Provide species polygons for species assumed to be present. 24.2 Provide justification on the exclusion of any specific areas and/or vegetation zones from assumed species polygons.	24.1 All species polygons are presented in s4.3 of this report. 24.2 No areas have been excluded. For species credits known or assumed, all areas of predicted PCTs have been included, and adjusted whereby the TBDC identifies a specific buffer zone (i.e. around caves or hollow-bearing trees).
25	The justifications regarding avoidance measures undertaken will require revision after other matters are addressed	25.1 Revise determination on impact avoidance and minimisation after other matters raised in this response are addressed. 25.2 BCS suggest that justification of avoidance could be improved by providing a comparison of the areas of land intersected by the development footprint which contain biodiversity values and areas which contain no biodiversity values.	25.1 Avoidance to biodiversity has been a priority when redesigning this Project. The total footprint has been reduced, and the impacts to native vegetation have been reduced from 494 ha to 307 ha (38%) compared to the initial Project. 25.2 A map showing avoided areas and project comparison is now included in Figure 56.
26	Further avoidance should be proposed to reduce SAII impacts to Box Gum Woodland	26.1 That the consent authority notes BCS advice in relation to SAII impacts to Box Gum Woodland CEEC when considering the adequacy of avoidance and minimisation to biodiversity impacts proposed, conditioning of the project and potential project approval. 26.2 The proponent revises the currently presented development footprint and	26.1 BCS advice subject to review following consideration of revised footprint. 26.2 An avoidance strategy has been applied to areas of Box Gum Woodland across the development site. The revised footprint has reduced impacts from 428 ha to 281 ha (34% reduction). Impacts to the woodland component of this TEC have been prioritised and have reduced from 234 ha to 119 ha (49% reduction).

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BCS Number	Comment	BCS Recommendation	Response
		avoidance and minimisation strategies proposed to further reduce impacts to Box Gum Woodland CEEC.	
27	Potential SAII impacts to cave-dwelling microbats should be appropriately assessed	27.1 Undertake an SAII assessment for the Large-eared Pied Bat and Large Bent-winged Bat.	27.1 A SAII assessment has been undertaken for both Large-eared Pied Bat and Large Bent-winged Bat. The SAII assessment concluded that there will be no impacts to breeding habitats for either of these species.
28	Clarification regarding microbat survey effort is required	28.1 Explanation is required as to why fewer songmeters were analysed than were reported as deployed. 28.2 Justification of the number and placement of songmeters within the Mount Hope turbine cluster is required.	28.1 Duplication error in BDAR table 16 songmeter nights required for the project - 466 nights completed excluding metmast data. 28.2 The Mount hope cluster contains cliffs in areas outside the development site. The proponent has deliberately avoided these areas, and their buffers. Within the Mount Hope cluster development site there is 2.69 ha of potential foraging habitat and 0 ha of breeding habitat. For this area of habitat the 261 nights of survey exceeds the survey requirement.
29	Flight path data and BUS surveys are not clearly presented	29.1 Flight path data be presented at a scale where flight paths can be clearly seen. 29.2 The location of the bird utilisation survey locations should be provided on these maps and differentiated from diurnal bird surveys so the spatial adequacy of BUS surveys can be reviewed.	29.1 Flight data has been shown at the Development site scale, as well as separately for each cluster as requested. 29.2 An additional BUS map has been provided in Figure 45.
30	The Kernel density analysis maps depicting bird activity patterns require revision	30.1 If the Kernel density analysis maps are to be used they should be relevant, presenting meaningful data that will assist in the analysis of migratory pathways.	30.1 Kernel density analysis has been removed from this report. 30.2 Not applicable.

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BCS Number	Comment	BCS Recommendation	Response
		30.2 Maps be labelled correctly and represent the species intended.	
31	The baseline collision risk assessment may not accurately reflect the consequence of blade strike	31.1 Definitions of likelihood and metrics applied to the collision risk assessment be amended to better reflect the chances of occurrence. 31.2 If there is an absence of data or impacts are uncertain for specific species apply the precautionary principle and assume a worst-case scenario and/or seek advice from a suitably qualified species expert.	31.1 The likelihood metrics raised in BCSs advice is not the metrics applied in the BDAR. 31.2 The outcome for Black Falcon has been revised in recognition of BCSs advice, and is described in Chapter 6.
32	Information is required on potential barrier impacts	32.1 Further assessment of turbine barrier effects on fauna is required.	32.1 Additional assessment on barrier effects is provided in Chapter 6 of the report.
33	Prescribed impacts for wind turbine strikes should be offset	33.1 Provide a more detailed BBAMP framework giving reference to the specific points identified in this response and in consultation with BCS.	33.1 Additional information relating to the BBAMP framework has been sought from BCS and incorporated into this report.
34	Prescribed impacts on connectivity should be offset	34.1 Provide further detail regarding the assessment of residual prescribed impacts to connectivity. 34.2 Provide an offsetting method and quantum which is justifiably commensurate to the residual prescribed impacts expected to occur.	34.1 Impacts to connectivity have been reduced and the requirement for a 70m wide easement is no longer considered in this assessment. Similarly, the infrastructure corridor in this assessment has been reduced from 50m to 20m within the wind farm clusters. Given the current level of fragmentation present, connectivity is unlikely to be impacted by the proposal. 34.2 Due to the change in development site, the impacts of connectivity loss have been avoided. No offsets are therefore proposed for connectivity.

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BCS Number	Comment	BCS Recommendation	Response
35	Indirect impacts for rotor swept areas should be offset	35.1 Ecosystem credits be calculated for the indirect impacts of turbine operation on native vegetation and threatened species habitat.	35.1 Ecosystem credits have been calculated for woodland areas over which a 90m blade would arc. Given the lower blade tip will be approximately 90m from the ground, the impacts are likely to be minimal. In recognition of this a 10% loss has been applied to overswept areas of woodland. The 10% loss has been calculated as 1/10th of the area, and added to the relevant vegetation zone as a total loss. Given the small areas of this impact (3ha across 6 BAMC calculations), these areas have been added to existing area calculations, and no separate BAMC case has been opened.
36	Like-for-like credit reports should be appended to the BDAR	36.1 The accredited assessor should generate and attach a biodiversity credit report (like-for-like) from the BAM-C to the BDAR.	36.1 A like-for-like BAMC credit report is included for all calculations.
37	All site investigations and associated credit obligations be completed prior to project determination	37.1 Further investigation be conducted, prior to the credit obligation for the project being captured within consent conditions. If access cannot be obtained prior to consent being granted, a worse-case scenario must be assumed, and a maximum credit obligation calculated accordingly.	37.1 The project has been amended to only include host landholders and publicly accessible areas. No assumed areas are therefore included in this revised report.
38	Information regarding bilateral assessment requirements has been provided for the accredited assessor's convenience	38.1 Review the supporting guidance document in Attachment D and provide a consistency table to facilitate review of bilateral assessment requirements.	38.1 A consistency table has been included with respect to bilateral assessment requirements.

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Appendix C Woodland mapping correspondence

Suites 28 & 29, Level 7 19
Bolton Street Newcastle
NSW 2300

T: (02) 4064 8421

21 October 2022

Our ref: 22NEW3178

ACEN Australia
Hub Customs House, 3rd Floor, Customs House
31 Alfred St, Sydney 2000

Attention: Jeremy Ellis

Dear Jeremy

Valley of the Winds Wind Farm - Woodland Mapping Approach

Eco Logical Australia (ELA) was engaged by UPC\AC Renewables, now ACEN Australia: (ACEN) to undertake a biodiversity assessment of the proposed Valley of the Winds Wind Farm (the Project). ELA prepared a Biodiversity Development Assessment Report (BDAR) in accordance with the Biodiversity Assessment Method (BAM) for the Project, which accompanied the Environmental Impact Statement (EIS) to the NSW Department of Planning and Environment (DPE) in April 2022.

BACKGROUND

A submission on the EIS from the Biodiversity, Conservation and Science Directorate (BCS) of DPE included a request to update Plant Community Type (PCT) mapping, in accordance with the '*BCS North West Branch – Woodland Mapping Guidance*' (Woodland Mapping Guidance). It is understood that the Woodland Mapping Guidance is not a DPE endorsed assessment methodology or available to assessors preparing BDARs and was therefore provided as an attachment to the BCS submission on the EIS.

The Woodland Mapping Guidance is requested to be applied to all woodland PCTs, and only applies to those PCTs that are consistent with the *Final Determination for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* (Box Gum Woodland).

Following receipt of the BCS submission, ELA and ACEN have considered the Woodland Mapping Guidance, and met with BCS on 12 September 2022 to discuss the implications of adopting the Woodland Mapping Guidance. It was highlighted that there is currently no publicly available DPE methodology to map PCT's for assessments under the BAM, and that provision of the Woodland Mapping Guidance following submission of the BDAR (and previous interactions between ELA, ACEN, and BCS) would have a substantial change in the ecological outcomes of the project.

As part of this discussion, ELA reviewed existing data available for mapping relevant woodland PCTs, which included PCT Benchmarks and threatened ecological community descriptions, as available in the Box Gum Woodland Final Determination. ELA highlighted that components of the Woodland Mapping

Guidance required woodland polygons to be mapped by up to 20 crown widths apart, resulting in a crown cover of 0.2%, which is lower than both the PCT benchmark (17-19%) and the Box Gum Woodland Final Determination (30%). The Woodland Mapping Guidance is therefore prescribing a minimum canopy cover that is significantly different to those lines of evidence described above, devalues those areas of woodland with trees, and significantly increases PCT polygons in areas that are predominately exotic. The Woodland Mapping Guidance makes reference to Tables 6 and 7 of the *Explanatory notes for the Vegetation field handbook, version 2* (Thackway & Hnatiuk, 2009), which whilst a useful tool in assessing vegetative cover, is not referred to in the Final Determination.

Furthermore, previous BDARs submitted to the Dubbo branch of BCS were not required to follow the Woodland Mapping Guidance. This is despite areas of the same ecological communities being incorporated into their project designs, and similar mapping approaches to that prepared by ELA for Valley of the Winds.

This letter proposes an alternative woodland mapping methodology in light of the details described above. The aim of this alternative method is to map grassy woodland appropriately, in line with available information at the time of preparation of the BDAR, to ensure that mapping aligns with the PCT benchmarks, as well as the Final Determination for the relevant threatened ecological communities (TECs).

REVIEW OF RELEVANT LITERATURE

Section 4.1.1 of the BAM (2020) directs assessors to map native vegetation on the Project site, and this "*…extends to native ground cover and tree canopy cover*". The BAM makes no reference to mapping inter-canopy areas of exotic vegetation in a woodland, as native vegetation. The original vegetation mapping provided by ELA within the Valley of the Winds BDAR is compliant with this directive within the BAM.

Part 4.2 of the Box Gum Woodland Final Determination (NSW Threatened Species Scientific Committee, 2020) describes the TEC as *"…characterised by widely spaced trees with canopies not touching and projected foliage cover generally less than 30%..."*. This is consistent with a crown separation of approximately 0.25 crown widths (Thackway & Hnatiuk, 2009). The Final Determination does not make reference to any other measurement of canopy cover.

The PCT Benchmarks for PCTs 483 and 281 range from 17-19% projected foliage cover, depending on the IBRA subregion in which they occur. This is consistent with a crown separation of approximately 0.5 crown widths.

Plot data collected within the Project site indicates that the projected foliage cover of PCT281 and PCT483 (in vegetation zones that have trees) averages 33% and 12.7% respectively. The higher vegetation cover within PCT281 is recorded in a remnant patch of vegetation that has likely not been subject to land clearing and naturally has a dense canopy cover. Plot data collected within the Project site is compliant with both the PCT benchmarks, and the Final Determination.

MAPPING APPROACH

To ensure vegetation mapping within the Project site is consistent with the Final Determination and PCT Benchmarks, ELA propose the following spatial analysis to all areas of good and moderate condition PCTs 281 and 483:

1. Map canopy cover only. This will be completed using the Landsat woody extent and foliage projective cover (FPC) Ver 2.1 (25m) 2008, available from https://datasets.seed.nsw.gov.au/dataset/landsat-woody-extent-and-foliage-projective-cover-fpc-ver-2-1-25m-20087355d . This layer will be buffered by 2m to smooth out any imperfections, and will be visually checked for accuracy, and may be edited to appropriately align with aerial imagery. This step will ensure canopy mapping is compliant with 4.1.1 of the BAM.

2. The canopy cover layer from 1 (above) will be analysed using the 'Amalgamate' function in ArcMap, to identify those trees that are within a crown separation of 1 tree (a conservative approach, given the Final Determination and PCT Benchmarks indicate a 0.25 to 0.5 crown separation. A crown diameter of 12m will be used for this analysis.

3. All trees that are connected to each other using the function in 2 (above) will be connected by a single polygon, by editing the existing PCT map presented in the BDAR. This will form the woodland vegetation zones 'Moderate' and 'High' quality.

Areas of native vegetation outside of the woodland polygons will be mapped as derived native grassland, using the same nomenclature from the Valley of the Winds BDAR (ELA, 2022). This mapping methodology will comply with both the Final Determination for Box Gum Woodland, as well as the benchmarks for the relevant PCTs present. In areas where trees are separated by spaces larger than those identified above, the mapping will be unchanged.

ELA requests that this alternative methodology be reviewed and endorsed by BCS prior to any further assessment for the Project. We look forward to discussing this methodology further with you in person at the upcoming site inspection.

Regards,



Alex Pursche
Senior Ecologist, Northern NSW Ecology Lead

Department of Planning and Environment

Our ref: DOC22/1012000
Your ref: 22NEW3178

Jeremy Ellis
Senior Project Developer
ACEN Australia

Dear Jeremy,

Valley of the Winds Project - Woodland Mapping Approach

Thank you for your e-mail dated 21 October 2022 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment inviting comments on the Valley of the Winds Project – Woodland Mapping Approach.

In general, based on the method proposed and the associated site visit taken on November 2022, BCS is happy to accept the proposed approach in addressing comments related to the mapping of grassy woodland extent within the Valley of the Winds project site (Point 9 within BCS response dated 30 June 2022).

However, this method should represent a minimum standard for reducing the current gaps between canopy trees within the project site and should not be applied to further increase the separation of vegetation extent polygons.

Step 2 of the mapping method proposes a crown diameter of 12m will be used for the analysis. BCS has conducted an initial analysis of tree canopy diameter and have identified tree crowns greater than 12m within the project site. As such, it is recommended that a sub-sample of randomly selected tree canopies across the subject site should be used to determine average canopy width. The results of this analysis should be presented in conjunction with updated mapping.

This acceptance letter should not be considered as an accepted method applicable to all projects. As this method has been determined given the specific biophysical context of the Valley of the Winds project and the biodiversity values present within the site.

If you have any questions about this advice, please do not hesitate to contact me, via ben.ellis@environment.nsw.gov.au or (02) 8275 1838.

Yours sincerely



Ben Ellis
A/ Principal Project Manager, Planning North West
Biodiversity, Conservation and Science Directorate

16 November 2022

Appendix D Vegetation Floristic Plot Data

Provided as digital attachment

Appendix E Vegetation Integrity Plot Data

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Table 81 Vegetation integrity data

Plot	Pct	Condition class	Zone	Easting	Northing	Bearing	Comp Tree	Comp Shrub	compG rass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollowtree	Fun Litter Cover	Fun Len FallenLogs	Fun Tree Stem 5to9	Fun Tree Stem	Fun Tree Stem	Fun Tree Stem	funTreeSte m50to79	funTreeReg en	funHighThr eatExotic
Plot 001	479	SYBKER_Burnt	55	749123	6450428	280	1	6	8	12	1	1	2.0	10.9	12.1	18.2	3.0	0.1	0	0	8.2	18.0	1	0	1	1	0	1	0.2
Plot 002	483	SYBKER_Poor	55	749188	6450440	160	0	1	1	2	0	0	0.0	0.1	5.0	5.1	0.0	0.0	0	0	3.8	0.0	0	0	0	0	0	0	17.0
Plot 003	483	SYBKER_Poor	55	750599	6452633	45	0	0	2	7	0	0	0.0	0.0	4.0	1.2	0.0	0.0	0	0	2.6	0.0	0	0	0	0	0	0	1.1
Plot 004	483	SYBKER_Low	55	746175	6452633	275	0	0	3	3	0	0	0.0	0.0	2.6	2.2	0.0	0.0	0	0	1.4	0.0	0	0	0	0	0	0	0.1
Plot 005	483	SYBKER_Poor	55	745970	6451836	100	0	0	2	2	0	0	0.0	0.0	3.0	1.1	0.0	0.0	0	0	0.6	0.0	0	0	0	0	0	0	1.1
Plot 006	483	SYBKER_Mod	55	744708	6451469	200	1	2	3	16	1	2	8.0	0.3	2.1	9.8	0.1	0.2	1	1	1.2	0.0	0	0	0	0	1	0	0.6
Plot 007	483	SYBKER_Mod	55	743901	6450812	190	1	2	2	11	0	1	10.0	0.2	1.2	3.1	0.0	0.1	2	1	0.8	0.0	0	0	0	0	0	0	1.0
Plot 008	479	SYBKER Good	55	743824	6450070	40	2	5	10	21	1	0	20.1	1.8	3.9	21.8	1.0	0.0	2	0	9.0	94.0	0	1	1	1	1	1	0.0
Plot 009	483	BBSLIV_Poor	55	756567	6463552	90	0	0	2	5	0	0	0.0	0.0	3.0	1.0	0.0	0.0	0	0	2.8	0.0	0	0	0	0	0	0	0.1
Plot 010	483	BBSLIV_Mod	55	756736	6463938	190	1	0	2	5	0	0	5.0	0.0	1.1	2.7	0.0	0.0	0	0	1.2	0.0	0	0	0	0	0	0	3.0
Plot 011	483	BBSLIV_Mod	55	756736	6463938	280	1	1	1	6	0	1	20.0	0.1	0.1	4.4	0.0	0.1	2	1	2.0	0.0	0	0	0	0	0	0	1.0
Plot 012	483	BBSLIV_Mod	55	755737	6462184	290	0	0	4	7	0	1	0.0	0.0	8.2	3.3	0.0	0.1	0	0	0.4	0.0	0	0	0	0	0	0	5.1
Plot 013	483	BBSLIV_Mod	55	751224	6475451	290	1	0	0	6	0	0	8.0	0.0	0.0	2.6	0.0	0.0	0	1	0.2	0.0	0	0	0	1	0	0	0.5
Plot 014	483	BBSLIV_Mod	55	750799	6476225	290	1	1	0	6	0	0	10.0	0.1	0.0	2.5	0.0	0.0	1	1	1.2	14.0	0	0	0	0	1	0	2.2
Plot 015	483	BBSPIL_Mod	55	752959	6476078	80	1	1	1	6	0	1	25.0	0.5	2.0	1.4	0.0	0.1	1	1	1.6	0.0	0	1	1	1	1	0	0.2
Plot 016	483	BBSPIL_Mod	55	743643	6472254	350	4	1	4	15	1	0	21.1	0.1	1.3	10.9	0.1	0.0	0	1	14.4	69.0	0	1	1	1	0	1	0.2
Plot 017	483	BBSPIL_Mod	55	741871	6472429	220	2	0	2	6	0	1	25.1	0.0	0.6	4.5	0.0	0.1	0	1	28.0	8.0	1	1	1	1	0	1	0.2
Plot 018	483	BBSPIL_Mod	55	752140	6469738	15	1	1	1	5	0	0	15.0	0.1	0.1	3.3	0.0	0.0	2	1	3.2	6.0	0	0	0	0	1	0	0.1
Plot 019	479	NSSINL_Mod	55	746500	6453932	320	2	6	8	7	1	3	28.0	37.9	33.2	31.0	2.0	2.3	2	3	23.0	181.0	1	1	1	1	1	1	0.1
Plot 020	478	NSSINL Mod	55	746747	6454118	260	3	12	2	9	0	2	23.5	33.3	6.0	20.3	0.0	2.0	3	5	46.0	125.0	1	1	1	1	1	1	0.0
Plot 021	281	BBSPIL Good	55	758760	6452728	277	2	7	10	5	1	4	20.0	16.0	31.2	1.4	8.0	3.2	2	6	33.0	85.0	1	1	1	1	1	1	0.0
Plot 022	483	BBSPIL_Low	55	760364	6460007	190	0	0	6	6	0	1	0.0	0.0	44.0	1.0	0.0	0.2	0	0	37.0	0.0	0	0	0	0	0	0	0.1
Plot 023	483	BBSPIL_Good	55	760293	6459789	190	1	1	6	5	0	1	10.0	0.1	19.5	5.9	0.0	0.2	3	3	2.4	8.0	0	0	0	0	1	0	3.7
Plot 024	84	BBSPIL_Mod	55	754428	6466192	175	1	0	1	3	0	0	5.0	0.0	10.0	1.5	0.0	0.0	2	3	57.0	28.0	0	0	0	0	1	0	5.0
Plot 025	281	BBSLIV_Mod	55	757113	6463993	138	3	1	10	18	0	3	25.3	0.1	24.8	3.8	0.0	0.9	2	0	7.0	1.0	0	0	0	1	1	1	0.6
Plot 026	281	BBSPIL_Mod	55	755210	6465446	258	1	1	6	14	0	2	30.0	0.1	33.5	3.0	0.0	0.3	5	1	10.2	32.0	0	0	0	1	0	0	17.3
Plot 027	483	BBSPIL_Good	55	760278	6460068	235	1	0	10	10	0	1	40.0	0.0	57.5	1.7	0.0	0.1	1	1	34.0	8.0	0	0	0	1	1	1	0.5
Plot 028	483	BBSPIL_Low	55	760251	6459714	172	0	1	6	7	0	2	0.0	0.1	76.4	1.0	0.0	0.4	0	0	3.0	0.0	0	0	0	0	0	0	0.3
Plot 029	281	BBSPIL_Mod	55	754490	6466364	263	1	1	8	10	0	1	30.0	2.0	72.9	4.5	0.0	0.1	0	0	5.2	33.0	1	1	1	1	1	1	0.0
Plot 030	84	BBSPIL_Mod	55	754447	6466052	290	1	0	1	3	0	0	30.0	0.0	0.3	20.6	0.0	0.0	2	1	50.0	27.0	0	0	0	0	0	0	75.0
Plot 031	281	BBSLIV_Mod	55	757100	6464126	90	4	3	13	16	0	2	32.1	0.6	64.5	10.9	0.0	0.3	1	1	13.0	11.0	0	0	1	1	0	1	0.3
Plot 032	281	BBSPIL_Mod	55	754995	6465590	268	2	0	5	5	0	1	40.0	0.0	21.6	1.3	0.0	0.1	3	1	32.0	80.0	0	0	0	0	1	0	76.0
Plot 033	479	NSSINL_Reg	55	746779	6454186	58	0	10	1	5	0	0	0.0	124.8	10.0	5.5	0.0	0.0	0	0	45.2	0.0	0	0	0	0	0	1	0.0

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Plot	Pct	Condition class	Zone	Easting	Northing	Bearing	Comp Tree	Comp Shrub	compG rass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollowtree	Fun Litter Cover	Fun Len FallenLogs	Fun Tree Stem 5to9	Fun Tree Stem	Fun Tree Stem	Fun Tree Stem	funTreeSte m50to79	funTreeReg en	funHighThr eatExotic
Plot 034	479	NSSINL_Reg	55	747055	6454292	170	1	14	3	4	0	0	3.0	79.0	6.0	12.0	0.0	0.0	0	0	34.0	0.5	1	0	0	0	0	1	0.0
Plot 035	479	SYBKER_REG	55	748517	6454172	287	0	6	4	5	1	3	0.0	11.3	44.1	7.5	3.0	0.3	0	0	21.0	0.0	0	0	0	0	0	0	50.0
Plot 036	479	SYBKER_REG	55	748248	6454280	33	1	4	4	2	1	1	1.0	6.1	11.0	1.2	10.0	0.1	0	0	10.0	0.0	0	0	0	0	0	0	50.0
Plot 037	479	BBSPIL_Burnt	55	758631	6453612	165	1	6	4	6	1	1	5.0	63.8	7.0	21.2	5.0	1.0	0	0	88.0	12.0	1	0	0	0	0	1	0.0
Plot 038	281	BBSPIL Good	55	758556	6453783	30	2	8	3	7	1	2	15.0	60.1	4.1	5.0	1.0	0.2	0	2	66.0	22.0	1	1	1	1	0	1	0.1
Plot 039	281	BBSPIL Good	55	758584	6454352	0	2	4	7	10	1	2	30.1	8.1	22.2	9.2	2.0	1.1	1	2	68.0	12.0	0	1	1	1	1	1	1.0
Plot 040	479	BBSPIL_Mod	55	758754	6455131	175	2	0	8	10	1	1	12.0	0.0	46.2	9.4	1.0	0.5	0	0	58.0	30.0	0	0	1	1	0	1	0.0
Plot 041	479	BBSPIL_Mod	55	758721	6454939	180	2	4	10	11	1	1	17.0	4.3	34.2	8.4	1.0	0.1	0	0	79.0	35.0	0	0	1	1	0	1	2.0
Plot 042	267	SYBKER Mod	55	758372	6450835	230	2	3	7	8	0	0	25.0	2.3	20.2	5.9	0.0	0.0	2	5	54.0	3.5	0	0	1	1	1	1	1.0
Plot 043	267	SYBKER Low	55	758401	6450945	320	0	0	6	2	1	0	0.0	0.0	71.0	0.2	0.2	0.0	0	0	24.0	0.0	0	0	0	0	0	0	0.0
Plot 044	267	SYBKER Low	55	758572	6451534	20	0	0	2	1	0	0	0.0	0.0	43.0	0.1	0.0	0.0	0	0	33.0	0.0	0	0	0	0	0	0	4.6
Plot 045	281	SYBKER_Low	55	757843	6449645	295	0	0	3	0	0	0	0.0	0.0	15.2	0.0	0.0	0.0	0	0	42.0	0.0	0	0	0	0	0	0	60.1
Plot 046	483	BBSPIL_Mod	55	752787	6467204	270	1	1	3	5	1	2	5.0	1.0	5.2	3.4	1.0	0.2	0	0	63.0	6.0	0	0	0	1	0	0	1.1
Plot 047	479	BBSPIL_Mod	55	747112	6473815	40	3	5	6	17	0	0	25.0	5.3	3.5	11.3	0.0	0.0	1	1	51.0	45.0	0	1	1	1	1	1	0.3
Plot 048	478	NSSINL Good	55	746890	6454105	75	3	11	2	6	0	2	13.0	35.0	2.1	20.0	0.0	2.0	0	2	72.0	23.0	1	1	1	1	0	1	0.0
Plot 049	479	SYBKER_Burnt	55	748643	6454217	270	3	11	3	10	0	1	28.0	29.8	3.4	13.4	0.0	0.2	0	0	48.2	13.0	0	0	0	1	0	1	0.0
Plot 050	483	NSSINL_Low	55	744051	6453857	219	0	1	1	6	0	0	0.0	2.0	15.0	4.3	0.0	0.0	0	0	27.0	0.0	0	0	0	0	0	0	1.0
Plot 051	267	BBSPIL Mod	55	758760	6452034	345	1	0	2	8	0	0	25.0	0.0	12.0	17.0	0.0	0.0	0	0	54.0	9.0	1	1	1	1	0	1	5.0
Plot 052	267	SYBKER Low	55	757966	6450101	2	0	0	2	6	1	0	0.0	0.0	11.0	9.1	1.0	0.0	0	0	21.0	0.0	0	0	0	0	0	0	0.2
Plot 053	479	BBSPIL_Mod	55	752554	6468036	95	2	5	11	15	1	1	36.0	4.6	25.1	28.4	2.0	0.2	2	2	76.0	44.0	0	1	1	0	1	1	3.0
Plot 054	479	BBSPIL_Low	55	756556	6464947	205	0	0	3	4	0	0	0.0	0.0	14.0	3.2	0.0	0.0	0	0	26.0	0.0	0	0	0	0	0	0	10.1
Plot 055	479	BBSLIV Mod	55	756759	6464790	200	1	0	3	4	0	0	30.0	0.0	7.5	5.1	0.0	0.0	1	5	22.0	0.0	0	0	0	0	0	0	20.2
Plot 056	479	BBSLIV_Low	55	756787	6464726	120	0	0	3	2	0	0	0.0	0.0	6.1	4.0	0.0	0.0	0	0	28.0	0.0	0	0	0	0	0	0	20.0
Plot 057	479	BBSPIL_Low	55	756359	6464876	300	0	0	4	4	0	0	0.0	0.0	5.1	8.2	0.0	0.0	0	0	29.0	0.0	0	0	0	0	0	0	15.0
Plot 058	616	BBSLIV Mod	55	756691	6464024	5	1	1	4	10	1	1	40.0	0.1	5.2	9.5	2.0	0.1	1	0	31.0	32.0	1	1	0	0	0	1	0.0
Plot 059	483	SYBKER_Poor	55	748842	6450812	355	0	1	5	9	0	0	0.0	0.1	4.2	2.7	0.0	0.0	0	0	61.0	0.0	0	0	0	0	0	1	0.1
Plot 060	483	SYBKER_Low	55	750923	6450883	10	0	0	4	7	0	1	0.0	0.0	41.0	2.1	0.0	0.1	0	0	20.0	0.0	0	0	0	0	0	0	5.2
Plot 061	479	BBSPIL_Mod	55	746997	6473603	0	3	2	3	18	0	3	35.0	5.1	5.4	5.8	0.0	0.4	3	0	41.0	113.0	1	1	1	1	1	1	0.1
Plot 062	281	SYBKER_Low	55	751883	6448820	125	0	0	6	2	0	1	0.0	0.0	62.2	0.7	0.0	2.0	0	0	3.8	0.0	0	0	0	0	0	0	6.6
Plot 063	281	SYBKER_Low	55	752064	6449133	10	0	0	7	2	0	1	0.0	0.0	67.0	3.0	0.0	0.1	0	0	2.6	0.0	0	0	0	0	0	0	3.3
Plot 064	281	SYBKER_Low	55	752013	6449028	140	0	0	7	4	0	0	0.0	0.0	77.4	3.3	0.0	0.0	0	0	3.2	0.0	0	0	0	0	0	0	5.1
Plot 065	483	BBSPIL_Poor	55	744197	6473726	332	0	0	0	9	0	0	0.0	0.0	0.0	6.7	0.0	0.0	0	0	0.4	0.0	0	0	0	0	0	0	0.0
Plot 066	483	BBSPIL_Poor	55	743741	6473131	56	0	0	2	3	0	0	0.0	0.0	0.6	1.2	0.0	0.0	0	0	3.4	2.0	0	0	0	0	0	0	0.1
Plot 067	483	BBSPIL_Poor	55	749876	6472702	194	0	0	2	1	0	0	0.0	0.0	1.1	0.1	0.0	0.0	0	0	0.4	0.0	0	0	0	0	0	0	0.0

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Plot	Pct	Condition class	Zone	Easting	Northing	Bearing	Comp Tree	Comp Shrub	compG rass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollowtree	Fun Litter Cover	Fun Len FallenLogs	Fun Tree Stem 5to9	Fun Tree Stem	Fun Tree Stem	Fun Tree Stem	funTreeSte m50to79	funTreeReg en	funHighThr eatExotic
Plot 068	483	BBSPIL_Poor	55	749589	6472223	207	0	0	1	1	0	0	0.0	0.0	0.1	0.1	0.0	0.0	0	0	1.4	0.0	0	0	0	0	0	0	0.0
Plot 069	483	BBSPIL_Mod	55	751329	6472607	252	0	0	0	1	0	0	0.0	0.0	0.0	0.1	0.0	0.0	2	0	5.8	0.0	0	0	1	1	1	0	0.0
Plot 070	483	BBSPIL_Low	55	751247	6473524	273	0	0	2	2	0	0	0.0	0.0	100.1	0.2	0.0	0.0	0	0	1.0	0.0	0	0	0	0	0	0	0.0
Plot 071	483	BBSLIV_Low	55	754616	6460467	93	0	0	1	8	0	2	0.0	0.0	3.0	11.4	0.0	1.1	0	0	1.4	0.0	0	0	0	0	0	0	0.0
Plot 072	483	BBSLIV_Poor	55	755068	6462475	91	0	0	0	2	0	0	0.0	0.0	0.0	0.2	0.0	0.0	0	0	0.0	0.0	0	0	0	0	0	0	0.0
Plot 073	483	BBSLIV_Poor	55	754529	6461791	220	0	0	1	7	0	1	0.0	0.0	5.0	1.7	0.0	0.5	0	0	5.0	0.0	0	0	0	0	0	0	0.0
Plot 074	483	BBSLIV_Poor	55	754162	6459262	90	0	0	1	2	0	0	0.0	0.0	2.0	0.2	0.0	0.0	0	0	1.6	0.0	0	0	0	0	0	0	0.0
Plot 075	483	BBSLIV_Low	55	753872	6459044	327	0	0	2	6	0	1	0.0	0.0	20.1	0.6	0.0	0.1	0	0	3.6	0.0	0	0	0	0	0	0	0.0
Plot 076	483	SYBKER_Mod	55	751561	6450310	106	1	0	3	2	0	0	10.0	0.0	51.1	0.3	0.0	0.0	1	1	8.0	5.0	0	0	0	0	0	1	0.6
Plot 077	483	SYBKER_Poor	55	751449	6450402	62	0	0	3	3	0	0	0.0	0.0	2.2	4.2	0.0	0.0	0	0	12.0	0.0	0	0	0	0	0	0	90.0
Plot 078	281	SYBKER_Mod	55	751966	6449665	4	0	0	2	1	0	0	0.0	0.0	60.1	2.0	0.0	0.0	0	0	1.4	6.0	0	1	0	0	0	1	0.5
Plot 079	281	SYBKER_Mod	55	751946	6449586	215	0	0	2	1	0	0	0	0	85.1	0.2	0	0	0	0	2	15	0	0	0	0	0	0	0.1
Plot 080	281	SYBKER_Mod	55	751893	6448956	250	1	0	2	3	0	0	10	0	2.1	1.3	0	0	1	2	5	6	0	0	0	1	1	1	1
Plot 081	483	BBSPIL_Mod	55	749330	6466150	312	1	0	2	4	0	0	2	0	0.3	2.3	0	0	0	0	3.4	8	0	0	0	0	0	0	0.1
Plot 082	483	BBSPIL_Poor	55	749944	6466877	326	0	0	0	2	0	0	0	0	0	0.2	0	0	0	0	6.2	0	0	0	0	0	0	0	0
Plot 083	483	BBSPIL_Poor	55	751063	6467753	2	0	0	0	1	0	0	0	0	0	0.1	0	0	0	0	8	0	0	0	0	0	0	0	0
Plot 084	483	BBSPIL_Poor	55	751065	6468034	241	0	0	3	5	0	0	0	0	0.4	0.5	0	0	0	0	8	5	0	0	0	0	0	0	0.1
Plot 085	483	BBSPIL_Mod	55	751518	6468676	5	1	0	0	5	0	0	15	0	0	0.9	0	0	1	0	6	25	0	0	0	1	1	1	0
Plot 086	483	BBSPIL_Poor	55	749965	6469124	13	0	0	3	5	0	1	0	0	2.1	2.4	0	0.1	0	0	5	0	0	0	0	0	0	0	0.1
Plot 087	483	BBSPIL_Poor	55	748876	6468319	127	0	0	1	1	1	0	0	0	2	0.1	0.1	0	0	0	9	0	0	0	0	0	0	0	3.1
Plot 088	483	BBSPIL_Low	55	748327	6467749	234	0	0	3	4	0	1	0	0	25.1	0.5	0	0.2	0	0	8	0	0	0	0	0	0	0	0
Plot 089	483	BBSPIL_Low	55	747892	6467385	53	0	2	2	9	1	0	0	0.2	20.1	1	0.1	0	0	0	7.2	0	0	0	0	0	0	0	0.1
Plot 090	483	BBSPIL_Mod	55	747793	6466790	338	1	0	3	10	1	2	20	0	12.1	12.7	0.2	3.1	1	0	21	36	1	1	1	1	1	1	0
Plot 091	483	BBSPIL_Mod	55	751752	6470756	150	1	0	4	5	0	2	25	0	50.6	0.5	0	0.2	1	1	76	10	0	0	0	0	0	0	0
Plot 092	483	BBSPIL_Low	55	751540	6470334	202	0	0	3	4	0	2	0	0	62	0.4	0	0.2	0	0	56	0	0	0	0	0	0	0	0
Plot 093	483	BBSPIL_Low	55	753445	6469382	68	0	0	5	2	0	0	0	0	61.1	0.2	0	0	0	0	54	0	0	0	0	0	0	0	0
Plot 094	483	BBSPIL_Low	55	754659	6469808	0	0	0	5	3	0	0	0	0	61.3	2.2	0	0	0	0	44	0	0	0	0	0	0	0	0.1
Plot 095	483	BBSLIV_Low	55	758457	6462670	195	0	0	4	1	0	0	0	0	70	0.1	0	0	0	0	71	0	0	0	0	0	0	0	0.1
Plot 096	281	BBSLIV Low	55	756972	6464592	90	0	0	5	3	0	0	0	0	12.3	0.3	0	0	0	0	87	0	0	0	0	0	0	0	0
Plot 097	483	BBSLIV_Low	55	757280	6463396	305	0	0	4	6	0	0	0	0	10.3	0.6	0	0	0	0	46	0	0	0	0	0	0	0	0.1
Plot 098	483	BBSLIV_Low	55	757294	6463330	355	0	0	4	4	0	1	0	0	37.1	0.5	0	0.1	0	0	52	0	0	0	0	0	0	0	0
Plot 099	483	BBSLIV_Mod	55	757423	6461514	120	1	0	3	3	0	1	25	0	8	0.3	0	0.1	1	0	77	15	0	0	0	0	0	0	0
Plot 100	483	BBSPIL_Poor	55	747727	6472595	295	0	0	1	3	0	0	0	0	20	0.3	0	0	0	0	69	0	0	0	0	0	0	0	0.2
Plot 101	483	BBSPIL_Mod	55	744197	6473726	350	1	0	3	1	0	1	20	0	7	0.1	0	0.1	1	1	65	14	0	0	0	0	0	0	0

Plot	Pct	Condition class	Zone	Easting	Northing	Bearing	Comp Tree	Comp Shrub	compG rass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollowtree	Fun Litter Cover	Fun Len FallenLogs	Fun Tree Stem 5to9	Fun Tree Stem	Fun Tree Stem	Fun Tree Stem	funTreeSte m50to79	funTreeReg en	funHighThr eatExotic
Plot 102	483	BBSPIL_Mod	55	745138	6473853	350	1	0	2	2	0	1	20	0	6	0.2	0	0.1	1	1	59	12	0	0	0	0	0	0	0
Plot 103	483	BBSPIL_Poor	55	742150	6470052	210	0	0	2	4	0	1	0	0	1.1	10.3	0	2	0	0	63	0	0	0	0	0	0	0	0.1
Plot 104	483	BBSPIL_Poor	55	742520	6471571	55	0	0	3	4	0	0	0	0	15.2	0.4	0	0	0	0	69	0	0	0	0	0	0	0	0
Plot 105	281	NSSINL Good	55	740905	6454139	266	2	2	1	5	0	1	30.1	14	60	16.2	0	0.3	5	3	62	12	1	1	1	1	1	1	0.2
Plot 106	483	SYBKER_Low	55	749309	6453524	330	0	0	7	3	0	0	0	0	67	1.2	0	0	0	0	24	0	0	0	0	0	0	0	1
Plot 107	483	SYBKER_Low	55	749284	6453639	155	0	0	9	6	0	0	0	0	69.3	0.7	0	0	0	0	26	0	0	0	0	0	0	0	0.1
Plot 108	483	SYBKER_Mod	55	749256	6453815	230	1	2	7	15	0	3	20	0.2	50.3	2.9	0	0.3	1	0	17	0	0	0	0	0	1	1	0.1
Plot 109	483	SYBKER_Mod	55	749082	6453973	170	2	2	9	4	0	1	25.1	1.1	53.2	1.4	0	0.1	1	0	17	0	1	0	0	0	1	1	0
Plot 110	483	SYBKER_Low	55	746180	6451981	160	0	0	9	5	0	2	0	0	78.5	2.4	0	0.3	0	0	5.4	0	0	0	0	0	0	0	0
Plot 111	483	SYBKER_Low	55	746182	6452164	222	0	0	1	4	0	0	0	0	60	0.4	0	0	0	0	14	0	0	0	0	0	0	0	0.4
Plot 112	281	SYBKER_Mod	55	751849	6448703	175	2	0	7	2	0	0	6	0	29.1	0.2	0	0	0	0	29	8	1	1	1	1	0	1	20
Plot 113	281	SYBKER_Mod	55	751820	6448705	170	1	1	6	5	0	2	30	1	53.5	0.5	0	0.2	2	2	74	6	1	1	1	1	1	1	0
Plot 114	483	BBSPIL_Mod	55	744567	6471972	240	1	1	2	4	0	1	1	1	2	4	0	1	2	0	81	16	0	0	0	0	0	0	0
Plot 115	483	BBSPIL_Poor	55	745960	6471700	190	0	0	2	0	0	0	0	0	8	0	0	0	0	0	68	0	0	0	0	0	0	0	1
Plot 116	483	BBSPIL_Poor	55	746273	6472922	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0.1
Plot 117	483	BBSPIL_Poor	55	755777	6465317	90	0	0	2	0	0	0	0	0	0.3	0	0	0	0	0	32	0	0	0	0	0	0	0	0.3
Plot 118	483	BBSPIL_Poor	55	755327	6465614	85	0	0	1	1	0	0	0	0	0.2	0.1	0	0	0	0	9.4	0	0	0	0	0	0	0	0
Plot 119	483	NSSINL_Low	55	746183	6453994	195	0	0	11	14	0	1	0	0	103.9	3.4	0	1	0	0	33	0	0	0	0	0	0	1	1.2
Plot 120	483	SYBKER_Low	55	745585	6453654	260	0	0	7	5	0	1	0	0	33.7	4.1	0	0.2	0	0	96	0	0	0	0	0	0	0	10
Plot 121	479	NSSINL_Mod	55	746604	6454158	260	3	15	7	9	0	0	20.6	17.1	2.4	9.1	0	0	0	0	14	138	1	1	1	1	0	1	0
Plot 122	483	SYBKER_Low	55	746366	6453838	330	0	0	6	3	0	1	0	0	58.3	1.4	0	0.2	0	0	64	0	0	0	0	0	0	0	5
Plot 123	483	NSSINL_Low	55	745861	6454207	125	0	1	7	8	0	1	0	0.3	30.8	7.1	0	0.2	0	0	63	0	0	0	0	0	0	0	0
Plot 124	483	NSSINL_Low	55	744220	6453858	260	0	0	7	7	0	2	0	0	70.6	6.3	0	3.2	0	0	81	0	0	0	0	0	0	0	0.1
Plot 125	483	NSSINL_Mod	55	744403	6453862	295	1	0	6	2	0	2	5	0	33.3	0.8	0	0.7	1	0	83	0	0	0	0	0	1	0	0
Plot 126	483	NSSINL_Low	55	744650	6453751	15	0	0	6	6	0	1	0	0	48.5	20.4	0	0.5	0	0	93	0	0	0	0	0	0	0	3
Plot 127	483	NSSINL_Low	55	744683	6453963	190	0	0	8	7	0	0	0	0	75.6	6	0	0	0	0	30	0	0	0	0	0	0	0	0
Plot 128	483	NSSINL_Low	55	743768	6453225	250	0	0	14	8	0	1	0	0	47.4	9.8	0	0.5	0	0	33	0	0	0	0	0	0	0	2
Plot 129	483	NSSINL_Low	55	744729	6454236	45	0	0	7	12	0	3	0	0	93.8	7.6	0	0.9	0	0	80	0	0	0	0	0	0	0	15.2
Plot 130	483	NSSINL_Low	55	745210	6454269	200	0	0	8	13	1	1	0	0	85.5	8.3	0.1	0.2	0	0	39	0	0	0	0	0	0	0	0.5
Plot 131	483	BBSLIV_Good	55	760532	6463565	165	1	0	5	8	0	0	5	0	20.7	2.3	0	0	1	3	3	5	0	0	0	1	1	0	0.4
Plot 132	483	BBSLIV_Poor	55	760518	6462052	135	0	0	4	6	0	1	0	0	24.2	2.5	0	0.1	0	0	12	0	0	0	0	0	0	0	0.5
Plot 133	483	BBSPIL_Poor	55	760665	6460466	195	0	0	3	4	0	0	0	0	13	1.1	0	0	0	0	17	0	0	0	0	0	0	0	0
Plot 134	483	BBSPIL_Poor	55	760414	6459378	260	0	0	4	7	1	0	0	0	13.2	2.1	0.5	0	0	0	3.8	0	0	0	0	0	0	0	0.1
Plot 135	483	BBSLIV_Poor	55	759178	6459249	150	0	0	6	5	0	0	0	0	21.4	2.7	0	0	0	0	10.6	0	0	0	0	0	0	0	3

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Plot	Pct	Condition class	Zone	Easting	Northing	Bearing	Comp Tree	Comp Shrub	compG rass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollowtree	Fun Litter Cover	Fun Len FallenLogs	Fun Tree Stem 5to9	Fun Tree Stem	Fun Tree Stem	Fun Tree Stem	funTreeSte m50to79	funTreeReg en	funHighThr eatExotic
Plot 136	483	BBSLIV_Poor	55	759595	6458797	20	0	0	3	1	0	0	0	0	2.1	0.3	0	0	0	0	5.4	0	0	0	0	0	0	0	0.1
Plot 137	483	BBSLIV_Mod	55	755624	6460510	200	1	0	5	8	0	0	5	0	43	3.3	0	0	0	0	22	5	0	0	1	1	0	1	0.5
Plot 138	483	BBSLIV_Poor	55	757430	6461032	285	0	0	3	5	0	0	0	0	0.6	0.6	0	0	0	0	8.2	0	0	0	0	0	0	0	0
Plot 139	483	BBSLIV_Poor	55	757531	6460029	5	0	0	3	4	0	0	0	0	45	0.6	0	0	0	0	50	0	0	0	0	0	0	0	0.4
Plot 140	483	BBSLIV_Poor	55	758975	6456656	30	0	0	1	2	0	0	0	0	0.4	0.2	0	0	0	0	2.2	0	0	0	0	0	0	0	0
Plot 141	281	BBSLIV_Good	55	759081	6457098	10	1	0	4	3	0	0	10	0	21.1	0.6	0	0	2	2	49	8	0	0	0	0	0	0	0.1
Plot 142	483	BBSPIL_Poor	55	759894	6458120	45	0	0	3	3	0	0	0	0	18	0.8	0	0	0	0	18.4	0	0	0	0	0	0	0	0.1
Plot 143	483	BBSLIV_Mod	55	751890	6475814	290	1	0	2	5	0	0	5	0	15	0.6	0	0	2	1	6.4	20	0	0	0	0	0	0	0.1
Plot 144	281	BBSLIV_Mod	55	751635	6475159	5	1	0	3	6	0	0	3	0	0.4	1.8	0	0	0	1	1.4	5	0	0	0	1	1	0	0
Plot 145	483	BBSPIL_Mod	55	750567	6473825	75	1	0	1	4	0	0	3	0	1	0.7	0	0	1	0	1.8	6	0	0	0	0	1	0	0
Plot 146	483	BBSLIV_Low	55	750703	6475559	80	0	0	7	3	0	0	0	0	17.1	0.9	0	0	0	0	2.6	0	0	0	0	0	0	0	0.2
Plot 147	483	BBSLIV_Mod	55	750842	6475625	170	1	0	6	7	0	0	5	0	12.1	3.2	0	0	1	0	5	13	0	0	0	0	0	0	0.1
Plot 148	483	BBSPIL_Mod	55	745176	6475029	0	1	0	2	8	0	0	10	0	1	4.2	0	0	1	0	25	20	0	0	0	0	1	0	0
Plot 149	267	BBSPIL_Low	55	758601	6451705	174	1	0	12	4	1	0	0.2	0	65.4	0.5	0.2	0	0	0	20	0	0	0	0	0	0	1	1.2
Plot 150	267	BBSPIL_Low	55	758659	6452062	350	0	0	7	2	0	0	0	0	30.8	0.2	0	0	0	0	47	0	0	0	0	0	0	0	1
Plot 151	479	BBSPIL_Burnt	55	758714	6453385	136	3	9	10	8	1	3	11	68.2	6.4	4.8	0.2	0.6	0	0	79	12	1	1	1	0	0	1	0
Plot 152	479	BBSPIL_Burnt	55	758771	6453200	164	2	9	9	13	1	1	15	33	20.6	4.1	0.5	0.2	0	0	36	24	1	1	1	0	0	1	0

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Appendix F Plant Community Type Profiles

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Table 82: Zone 1 PCT 42 Moderate Condition

42 - River Red Gum / River Oak riparian woodland wetland in the Hunter Valley				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	Occurs as a narrow band of vegetation fringing creeks on lower alluvial plains where there is an accumulation of black alluvial soils. Dominated by *Eucalyptus camaldulensis* with occasional *Casuarina cunninghamii. Eucalyptus melliodora* (Yellow Box) may also occur on elevated sites. The shrub layer is very sparse and there is a high proportion of exotic species in the ground layer, likely due to high disturbance from flood events, grazing and recruitment from adjacent cropped areas.			
Characteristic canopy trees	Eucalyptus camaldulensis			
Characteristic mid-storey	Casuarina cunninghamii			
Characteristic groundcovers	--			
Exotic species	Lolium perenne, Medicago sp., Hydrochaeris radicata, Conyza sp.			
Condition	Moderate			
Variation and disturbance	Periodic physical disturbance from flood events. Likely to be prone to short-term variation in ground layer species in response to seasonal conditions. Located adjacent to cultivated areas with incursions of exotic species.			
No. sites sampled	0			
Fauna habitats	Potential for hollow bearing trees.			



Table 83: Zone 2PCT 85 Moderate Condition

85 - River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	Occurs as a narrow band of vegetation fringing creeks on lower alluvial plains where there is an accumulation of black alluvial soils but may also occur on sandy or rocky sites. These sites may be occupied by *Casuarina cunninghamii* (River Oak) due to the water table conditions, frequent waterlogging of soils, and periodic physical disturbance through flooding (Charmers et al. 2012; Erskine et al. 2013). *Eucalyptus melliodora* (Yellow Box) may also occur on slightly elevated sites. The shrub layer is very sparse and there is a high proportion of exotic species in the ground layer due to high disturbance from flood events, grazing and recruitment from adjacent cropped areas.			
Characteristic canopy trees	Casuarina cunninghamii, Eucalyptus melliodora			
Characteristic mid-storey	Generally absent			
Characteristic groundcovers	Einadia hastata, Urtica incisa, Paspalidium distans			
Exotic species	Lolium perenne, Amaranthus powellii, Chenopodium album, Hirschfeldia incana, Hydrochaeris radicata, Conyza sp., Malva parviflora, Polygonum arenastrum, Silybum marianum, Solanum nigrum, Sonchus oleraceus, Xanthium spinosum, Datura stramonium			
Condition	Moderate			
Variation and disturbance	Periodic physical disturbance from flood events. Likely to be prone to short-term variation in ground layer species in response to seasonal conditions. May be grazed by livestock, native and feral fauna. Located adjacent to cultivated areas with incursions of exotic species.			
No. sites sampled	2			
Fauna habitats	Amphibian habitat in streams. Potential for small hollow bearing trees.			



Table 84: Zone 3 PCT 272 Moderate condition

272 - White Box - Black Cypress Pine - red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes				
Conservation status	NSW BC Act	Endangered	EPBC Act	Endangered
Description	This community occurs primarily on sandstone derived soils on lower slopes at the southern end of the study area. It is dominated by *Eucalyptus microcarpa* (Inland Grey Box) with Eucalyptus crebra (Narrow-leaved Ironbark) occurring less frequently. A sparse shrub layer is maintained in a low-moderate condition by sheep grazing and includes *Cassinia sifton* (Sifton Bush) and *Bursaria spinosa* (Sweet Bursaria). The ground layer includes species typical of a disturbed grassy understorey including *Austrostipa scabra* subsp. *scabra* (Spear Grass), *Calotis cuneifolia* (Purple Burr-daisy), *Eragrostis brownii* (Brown's Lovegrass), *Sporobolus elongatus* (Slender Rat's Tail Grass), *Echinopogon caespitosus* var. *caespitosus* (Bushy Hedgehog-grass), *Aristida ramosa* (Purple Wiregrass), *Hypochaeris radicata* (Catsear) and *Sorghum halepense* (Johnson Grass).			
Characteristic canopy trees	Eucalyptus microcarpa, Eucalyptus crebra			
Characteristic mid-storey	Cassinia sifton, Epacris sp., Bursaria spinosa subsp. spinosa, Hibbertia obtusifolia			
Characteristic groundcovers	Aristida ramosa, Austrostipa scabra, Calotis cuneifolia, Cymbonotus lawsonianus, Cynodon dactylon, Echinopogon caespitosus, Einadia hastata, Einadia nutans, Eragrostis brownii, Goodenia hederacea, Laxmannia gracilis, Lomandra multiflora, Sporobolus elongatus, Wahlenbergia communis			
Exotic species	Sorghum halepense, Hypochaeris radicata, Lysimachia arvense, Soliva sessilis, Paronychia brasiliana			
Condition	Moderate			
Variation and disturbance	Heavy grazing by sheep maintains low cover in shrub and ground layers. Likely to be some minor variation in canopy species across the entire community.			
No. sites sampled	2			
Fauna habitats	Potential for small hollow bearing trees.			



Table 85: Zone 4 PCT 272 Low condition – Derived native grassland

272 - White Box - Black Cypress Pine - red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes				
Conservation status	NSW BC Act	Endangered	EPBC Act	Endangered
Description	This community occurs primarily on sandstone derived soils on lower slopes at the southern end of the study area on the Goodman property. It occurs adjacent to 272 Moderate but lacks tree cover presumably due to clearing for sheep grazing. The canopy and mid-storey layers are absent, however *Cassinia sifton* may occur particularly where grazing is excluded. The ground layer is variable but is often dominated by *Cynodon dactylon* (Couch), *Eragrostis brownii* (Brown's Lovegrass), *Sporobolus elongatus* (Slender Rat's Tail Grass) and exotic species including *Eragrostis cilianensis* (Stinkgrass), *Eragrostis curvula* (African Lovegrass), *Agrostis capillaris* (Browntop Bent), *Lolium perenne* (Perennial Ryegrass)			
Characteristic canopy trees	Absent			
Characteristic mid-storey	Absent from sites surveyed but scattered *Cassinia sifton* may occur in low numbers across the community particularly where grazing is excluded			
Characteristic groundcovers	Cynodon dactylon, Eragrostis brownii, Sporobolus elongatus, Juncus subsecundus, Lomandra confertifolia, Rytidosperma fulvum, Calotis lappulacea, Cheilanthes sieberi, Cymbonotus lawsonianus, Dichondra repens			
Exotic species	Eragrostis cilianensis, Eragrostis curvula, Agrostis capillaris, Lolium perenne, Trifolium repens, Agrostis capillaris, Dactylis glomerata, Acetosella vulgaris, Soliva sessilis, Gamochaeta calviceps, Xanthium spinosum			
Condition	Low - Derived native grassland			
Variation and disturbance	Grazed by sheep. Likely to be variation in grass, forb, shrub and other species composition and cover across the entire community depending on grazing history and current regime, microtopography and seasonality.			
No. sites sampled	3			
Fauna habitats				



Table 86: Zone 5 PCT 281 Good condition

281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion				
Conservation status	NSW BC Act	Critically Endangered	EPBC Act	Critically Endangered
Description	This community typically occurs on the banks of creeks where there is an accumulation of recently deposited black alluvial and colluvial sediments derived from basalt and sandstone parent materials producing high to moderate soil fertility and high to moderate water holding capabilities. Small patches of remnant vegetation exist primarily on the creek banks with communities dominated by Eucalyptus melliodora (Yellow Box), Angophora floribunda (Rough-barked Apple), Eucalyptus blakelyi (Blakely's Red Gum). The land use history is a major determinate of vegetation condition and composition in this community, and the shrub layer is typically very sparse with occasional Acacia species and Brachychiton populneus (Kurrajong).			
Characteristic canopy trees	Angophora floribunda, Eucalyptus melliodora, Eucalyptus blakelyi			
Characteristic mid-storey	Brachychiton populneus, Leptospermum polygalifolium, Persoonia linearis, Acacia species, Hibbertia obtusifolia			
Characteristic groundcovers	Lomandra longifolia, Cynodon dactylon, Cheilanthes sieberi subsp. sieberi, Pomax umbellata, Lomandra multiflora subsp. multiflora, Wahlenbergia communis, Cyperus gracilis, Macrozamia spiralis			
Exotic species	Hypochaeris radicata			
Condition	Good			
Variation and disturbance				
No. sites sampled	3			
Fauna habitats	Potential for small hollow bearing trees.			



Table 87: Zone 6 PCT 281 Moderate condition

281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion				
Conservation status	NSW BC Act	Critically Endangered	EPBC Act	Critically Endangered
Description	This community typically occurs on the banks of creeks where there is an accumulation of recently deposited black alluvial and colluvial sediments derived from basalt and sandstone parent materials producing high to moderate soil fertility and high to moderate water holding capabilities. Small patches of remnant vegetation exist primarily on the creek banks with communities dominated by Eucalyptus melliodora (Yellow Box), Angophora floribunda (Rough-barked Apple), Eucalyptus blakelyi (Blakely's Red Gum). The land use history is a major determinate of vegetation condition and composition in this community, and the shrub layer is typically very sparse with occasional Acacia species and Brachychiton populneus (Kurrajong).			
Characteristic canopy trees	Eucalyptus melliodora, Angophora floribunda, Eucalyptus blakelyi, Eucalyptus 'albemol'			
Characteristic mid-storey	Brachychiton populneus, Solanum cinereum, Acacia species			
Characteristic groundcovers	Austrostipa verticillata, Chloris truncata, Austrostipa scabra subsp. scabra, Einadia hastata, Aristida ramosa, Bothriochloa macra, Microlaena stipoides var. stipoides, Einadia nutans subsp. linifolia, Sigesbeckia australiensis, Urtica incisa			
Exotic species	Paspalum dilatatum, Lolium perenne, Cyperus Eragrostis, Hordeum spp., Malva parviflora, Plantago lanceolata, Medicago spp., Brassica juncea, Marrubium vulgare, Rosa rubiginosa, Salvia verbenaca, Solanum nigrum, Amaranthus powellii, Bidens subalternans, Conyza spp., Lepidium africanum, Schinus spp., Sonchus oleraceus, Vicia sativa subsp. sativa			
Condition	Moderate			
Variation and disturbance	Grazed by sheep and cattle. Likely to be variation in grass, forb, shrub and other species composition and cover across the entire community depending on grazing history and current regime, microtopography and seasonality.			
No. sites sampled	5			
Fauna habitats	Potential for small hollow bearing trees.			



Table 88: Zone 7 PCT 281 Low condition – Derived native grassland

281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion				
Conservation status	NSW BC Act	Critically Endangered	EPBC Act	Critically Endangered
Description	This community typically occurs on the banks of creeks where there is an accumulation of recently deposited black alluvial and colluvial sediments derived from basalt and sandstone parent materials producing high to moderate soil fertility and high to moderate water holding capabilities. Small patches of remnant vegetation exist primarily on the creek banks with communities dominated by Eucalyptus melliodora (Yellow Box), Angophora floribunda (Rough-barked Apple), Eucalyptus blakelyi (Blakely's Red Gum). This community is mapped between those vegetated patches, where there is no canopy or mid storeys and the ground layer is dominated by exotic or native grasses.			
Characteristic canopy trees	Absent			
Characteristic mid-storey	Generally absent. Scattered immature *Brachychiton populneus, Acacia* species may be present			
Characteristic groundcovers	Austrostipa verticillata, Chloris truncata, Austrostipa scabra subsp. scabra, Einadia hastata, Aristida ramosa, Bothriochloa macra, Microlaena stipoides var. stipoides, Einadia nutans subsp. linifolia, Sigesbeckia australiensis, Urtica incisa			
Exotic species	Paspalum dilatatum, Lolium perenne, Cyperus Eragrostis, Hordeum spp., Malva parviflora, Plantago lanceolata, Medicago spp., Brassica juncea, Marrubium vulgare, Rosa rubiginosa, Salvia verbenaca, Solanum nigrum, Amaranthus powellii, Bidens subalternans, Conyza spp., Lepidium africanum, Schinus spp., Sonchus oleraceus, Vicia sativa subsp. sativa			
Condition	Low – derived native grassland			
Variation and disturbance	Grazed by sheep and cattle. There is variation in native grass and forb species composition and cover, and proportion of exotic species across the community depending on grazing history and current regime, microtopography and seasonality.			
No. sites sampled	3			
Fauna habitats				



Table 89: Zone 8 PCT 461 Burnt condition

461 - Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	The soil is rocky and shallow which is characteristic habitat for Eucalyptus dealbata (Tumbledown Red Gum). Eucalyptus dealbata (Tumbledown Red Gum) is the dominant canopy tree in this community with Eucalyptus macrorhyncha (Red Stringybark) also occurring. The understorey is very sparse due to heavy sheep grazing.			
Characteristic canopy trees	Eucalyptus dealbata, Eucalyptus macrorhyncha			
Characteristic mid-storey	*Callitris endlicheri* (Black Cypress), *Brachychiton populneus* (Kurrajong) and *Acacia* species make up a very sparse mid-layer			
Characteristic groundcovers	Goodenia heterophylla, Calotis lappulacea, Dichondra repens, Wurmbea dioica, Gonocarpus teucrioides			
Exotic species	Conyza species, Hypochaeris radicata, Petrorhagia dubia, Arctotheca calendula			
Condition	Burnt			
Variation and disturbance	Heavily grazed by sheep and cattle			
No. sites sampled	0			
Fauna habitats	Potential for small hollow bearing trees			



Table 90: Zone 9 PCT 461 Moderate condition

461 - Tumbledown Gum woodland on hills in the northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	The soil is rocky and shallow which is characteristic habitat for Eucalyptus dealbata (Tumbledown Red Gum). Eucalyptus dealbata (Tumbledown Red Gum) is the dominant canopy tree in this community with Eucalyptus macrorhyncha (Red Stringybark) and Angophora floribunda (Rough-barked Apple) also occurring. The understorey is very sparse and weedy, being located nearby to the Golden Highway.			
Characteristic canopy trees	Eucalyptus dealbata, Eucalyptus macrorhyncha, Angophora floribunday			
Characteristic mid-storey	*Callitris endlicheri* (Black Cypress), *Brachychiton populneus* (Kurrajong) and *Acacia* species make up a very sparse mid-layer			
Characteristic groundcovers				
Exotic species	Conyza species, Hypochaeris radicata, Hyparrhenia hirta, Eragrostis curvula			
Condition	Moderate			
Variation and disturbance	Weedy understorey nearby to rest area			
No. sites sampled	0			
Fauna habitats	Potential for small hollow bearing trees			



Table 91: Zone 10 PCT 478 Good condition

478 - Red Ironbark - Black Cypress Pine - stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong - Mendooran region, southern Brigalow Belt South Bioregion				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	Occurs in small areas generally on slopes adjacent to 479 where it has been excluded from fire or burnt at low intensity. The canopy is unburnt or showing strong recovery.			
Characteristic canopy trees	Eucalyptus rossii, Eucalyptus sparsifolia, occasional Angophora floribunda and Eucalyptus blakelyi			
Characteristic mid-storey	Acacia buxifolia subsp. buxifolia, Persoonia linearis, Podolobium ilicifolium, Acacia falciformis, Acacia ixodes Cassinia quinquefaria, Dampiera lanceolata, Hovea sp., Acacia gladiiformis, Dodonaea viscosa subsp. cuneata, Allocasuarina sp., Xanthorrhoea sp.			
Characteristic groundcovers	Stypandra glauca, Lomandra species, Phyllanthus hirtellus, Pomax umbellata, Wahlenbergia communis, Poranthera microphylla, Podolobium ilicifolium, Hardenbergia violacea, Goodenia hederacea, Einadia nutans, Calotis cuneifolia			
Exotic species	None recorded			
Condition	Good			
Variation and disturbance	A low amount of variation in understorey species and minor, small-scale patchiness of vegetation that is unburnt or burnt at low intensity			
No. sites sampled	2			
Fauna habitats	Potential for small hollow bearing trees			



Table 92: Zone 11 PCT 479 Burnt condition

479 - Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	The sandstone derived soils on undulating slopes are largely unutilised by grazing or cropping and contain intact remnant vegetation. This community was severely impacted by high intensity fire in 2017 and is still in relatively early stages of recovery.			
Characteristic canopy trees	Eucalyptus crebra, Eucalyptus rossii			
Characteristic mid-storey	Acacia decora, Acacia gladiiformis, Acacia caroleae, Dampiera lanceolata			
Characteristic groundcovers	Aristida vagans, Chrysocephalum apiculatum, Gonocarpus elatus, , Stypandra glauca, Allocasuarina sp., Poranthera microphylla, Cheilanthes sieberi, Digitaria ramularis, Persoonia linearis, Pomax umbellata, Wahlenbergia communis, Cynodon dactylon, Dichondra repens, Eragrostis brownii, Geranium solanderi, Sporobolus creber			
Exotic species	Lysimachia arvensis, Trifolium arvense			
Condition	Burnt with poor regeneration			
Variation and disturbance	Regeneration is variable but mostly consists of Acacia shrubland with remnant canopy trees showing low levels of post-fire epicormic regrowth			
No. sites sampled	4			
Fauna habitats	Dense low vegetation for small birds. Acacia blossom provides forage resource for birds and invertebrates			



Table 93: Zone 12 PCT 479 Moderate condition

Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	Eucalyptus crebra dominated forest with sparse degraded shrubby regrowth in the midstorey, or midstorey may be absent. Occurs on sandy soils derived from sandstone and many areas are actively grazed by sheep and cattle			
Characteristic canopy trees	Eucalyptus crebra, occasionally Angophora floribunda			
Characteristic mid-storey	Generally absent			
Characteristic groundcovers	Aristida spp., Dichondra repens, Austrostipa aristiglumis, Calotis lappulacea, Cotula australis, Juncus filicaulis, Einadia nutans subsp. linifolia			
Exotic species	Lolium spp., Acetosella vulgaris, Trifolium spp., Hypochaeris radicata, Trifolium angustifolium, Conyza spp., Erodium moschatum, Hypericum perforatum, Verbena bonariensis			
Condition	Moderate			
Variation and disturbance	Midstorey may be degraded shrubby regrowth, or midstorey may be absent. Grazed by sheep and cattle.			
No. sites sampled	7			
Fauna habitats				



Table 94: Zone 13 PCT 479 Post-fire Regeneration

479 - Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	The sandstone derived soils on undulating slopes are largely unutilised by grazing or cropping and contain intact remnant vegetation. This community was severely impacted by high intensity fire in 2017 and shows a high amount of post-fire regeneration compared to the 'burnt' condition community.			
Characteristic canopy trees	Eucalyptus spp. seedlings			
Characteristic mid-storey	Acacia gladiiformis, Cassinia spp., Brachyloma daphnoides subsp. daphnoides, Stypandra glauca, Dodonaea viscosa subsp. cuneata, Dillwynia hispida, Acacia spp., Persoonia linearis, Casuarina spp., Lomatia silaifolia, Acacia ulicifolia			
Characteristic groundcovers	Aristida ramosa, Cheilanthes sieberi subsp. sieberi, Eragrostis brownii, Gonocarpus elatus, Panicum spp., Goodenia paniculata, Gahnia aspera, Lomandra multiflora subsp. multiflora			
Exotic species	Absent			
Condition	Regenerating			
Variation and disturbance	Moderate. Generally dominated by dense regrowth of *Acacia* species with variable shrubby regeneration			
No. sites sampled	4			
Fauna habitats	Dense low vegetation for small birds. Acacia blossom provides forage resource for birds and invertebrates			



Table 95: Zone 14 PCT 483 Good condition

483 - Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley				
Conservation status	NSW BC Act	Critically Endangered	EPBC Act	Critically Endangered
Description	Good condition Eucalyptus 'albemol' woodland with a higher proportion of native grasses and forbs in the ground layer comparted to the equivalent 'moderate' condition.			
Characteristic canopy trees	Eucalyptus 'albemol', Brachychiton populneus			
Characteristic mid-storey	Generally absent			
Characteristic groundcovers	Dichanthium sericeum, Aristida species, Austrostipa aristiglumis, Austrostipa scabra, Microlaena stipoides var. stipoides, Bothriochloa macra, Calotis lappulacea, Oxalis perennans, Dichondra repens, Erodium crinitum			
Exotic species	Medicago polymorpha, Silybum marianum, Marrubium vulgare, Xanthium spinosum, Tagetes minuta, Malva parviflora			
Condition	Good			
Variation and disturbance	Ground layer varies depending on site microtopography, grazing management, fire history and seasonality. Ground layer directly under trees is generally poorer condition due to livestock camping and increased sheltered favouring annual exotic species.			
No. sites sampled	2			
Fauna habitats	Potential for small-medium sized hollows (5-15 cm). Large hollows (>20cm) generally absent.			



Table 96: Zone 15 483 Moderate condition

483 - Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley				
Conservation status	NSW BC Act	Critically Endangered	EPBC Act	Critically Endangered
Description	Moderate condition *Eucalyptus* 'albemol' woodland with a high proportion of exotic species as well as some native grasses and forbs in the ground layer			
Characteristic canopy trees	Eucalyptus 'albemol', occasionally Angophora floribunda			
Characteristic mid-storey	Generally absent			
Characteristic groundcovers	Dichelachne micrantha, Erodium crinitum, Austrostipa verticillata, Oxalis perennans, Cotula australis, Dichondra spp., Calotis lappulacea, Einadia nutans subsp. nutans, Chenopodium glaucum, Geranium solanderi var. solanderi, Calotis cuneifolia, Rumex brownii, Geranium retrorsum, Geranium spp.			
Exotic species	Silybum marianum, Medicago minim, Trifolium spp., Lolium spp., Hordeum spp., Echium plantagineum, Medicago polymorpha, Lysimachia arvensis, Torilis nodosa, Erodium cicutarium, Carthamus lanatus, Urtica urens, Malva parviflora, Brassica juncea, Brassica rapa subsp. campestris, Bidens spp., Capsella bursa-pastoris, Stellaria media, Erodium moschatum, Rorippa palustris, Agrostis capillaris, Cirsium spp., Marrubium vulgare			
Condition	Moderate			
Variation and disturbance	Canopy species may vary depending on clearing history of site e.g. where only *Brachychiton populneus* remains in an otherwise cleared paddock. Ground layer varies significantly depending on site microtopography, grazing management, fire history and seasonality but is generally weedy			
No. sites sampled	12			
Fauna habitats	Potential for small-medium sized hollows (5-15 cm). Large hollows (>20cm) generally absent.			



Table 97: Zone 16 Low Condition – Derived Native Grasslands

483 - Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley				
Conservation status	NSW BC Act	Critically Endangered	EPBC Act	Critically Endangered
Description	Derived native grassland on basalt derived soils, generally adjacent to *Eucalyptus 'albemol'* woodland which likely occurred pre-clearing.			
Characteristic canopy trees	Not recorded			
Characteristic mid-storey	Generally absent			
Characteristic groundcovers	Erodium crinitum, Einadia nutans subsp. nutans, Salvia spp., Dichelachne micrantha, Rumex brownii, Austrostipa verticillata, Crassula sieberiana, Vittadinia sulcata, Lomandra spp., Calotis lappulacea, Oxalis perennans, Aristida ramosa, Rytidosperma spp., Solanum cinereum, Dichondra spp., Einadia hastata, Dichondra repens			
Exotic species	Trifolium subterraneum, Echium plantagineum, Cirsium spp., Eragrostis cilianensis, Erodium cicutarium, Silybum marianum, Carthamus lanatus, Medicago minima, Lolium spp., Capsella bursa-pastoris, Agrostis capillaris, Lepidium africanum, Sonchus oleraceus, Trifolium spp., Medicago polymorpha, Lysimachia arvensis, Brassica juncea, Arctotheca calendula, Brassica rapa subsp. campestris, Hordeum spp., Trifolium arvense			
Condition	Low – derived native grassland			
Variation and disturbance	Ground layer varies significantly depending on site microtopography, grazing management, fire history and seasonality			
No. sites sampled	5			
Fauna habitats				



Table 98: Zone 17 PCT 616 Moderate condition

616 - Grey Myrtle - Rusty Fig dry rainforest in sandstone gorges of the upper Hunter Valley				
Conservation status	NSW BC Act	Not listed	EPBC Act	Not listed
Description	On sites sheltered by steep slopes or rocky outcrops, small, restricted pockets of dry rainforest vegetation occur dominated by *Ficus rubiginosa* (Rusty Fig) with *Angophora floribunda* (Rough-leaved Apple) and *Brachychiton populneus*. This community is mapped in small areas on the Belang, Orana, Alambi, Red Hilll and Bald Ridge properties. Sheep and cattle graze the understorey, maintaining it in a low-moderate condition.			
Characteristic canopy trees	Ficus rubiginosa, Brachychiton populneus			
Characteristic mid-storey	Generally absent, may include low cover of *Acacia* species or juvenile *Brachychiton populneus*.			
Characteristic groundcovers	Calotis lappulacea, Microlaena stipoides var. stipoides, Cheilanthes sieberi subsp. sieberi, Austrostipa scabra subsp. scabra, Cotula australis, Dichondra repens, Sigesbeckia australiensis, Sporobolus creber, Crassula sieberiana, Vittadinia spp., Cymbopogon refractus, Wahlenbergia communis, Arthropodium milleflorum, Desmodium varians, Einadia hastata, Solanum cinereum, Veronica plebeia			
Exotic species	Arctotheca calendula, Anagallis spp., Sonchus oleraceus, Lepidium didymum, Solanum nigrum			
Condition	Moderate			
Variation and disturbance	Condition is generally consistent across the study area. Understorey is grazed by sheep, cattle, and native herbivores.			
No. sites sampled	1			
Fauna habitats	Potential for small hollows. Sheltered rocky areas.			



Appendix G EPBC Act Box Gum Woodland assessment

Table 99 EPBC Act Box Gum Woodland assessment

Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
Plot 1	479	Burnt	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 2	483	Mod	YES	5%	NO	N/A	N/A	N/A	N/A	NO
Plot 3	483	Mod	YES	9%	NO	N/A	N/A	N/A	N/A	NO
Plot 4	483	Mod	YES	15%	NO	N/A	N/A	N/A	N/A	NO
Plot 5	483	Moderate	YES	5%	NO	N/A	N/A	N/A	N/A	NO
Plot 6	483	Moderate	YES	2%	NO	N/A	N/A	N/A	N/A	NO
Plot 7	483	Moderate	YES	5%	NO	N/A	N/A	N/A	N/A	NO
Plot 8	479	Burnt	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 9	483	Moderate	YES	29%	NO	N/A	N/A	N/A	N/A	NO
Plot 10	483	Moderate	YES	11%	NO	N/A	N/A	N/A	N/A	NO
Plot 11	483	Moderate	YES	3%	NO	N/A	N/A	N/A	N/A	NO
Plot 12	483	Low	YES	13%	NO	N/A	N/A	N/A	N/A	NO
Plot 13	281	Good	YES	96.17%	YES	19	Glycine clandestina, Glycine tabacina	YES	YES Regen	YES
Plot 14	483	Poor	YES	80%	YES	7	N/A	N/A	NO	NO
Plot 15	483	Moderate	YES	64%	YES	8	N/A	N/A	NO	NO
Plot 16	281	Moderate	YES	92.70%	YES	19	Calotis lappulacea	YES	YES Regen	YES

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Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
Plot 17	281	Moderate	YES	75.63%	YES	17	Desmodium varians	YES	NO Regen	YES
Plot 18	483	Moderate	YES	98.02%	YES	21	Calotis lappulacea, Desmodium varians, Sida corrugata	YES	YES Regen	YES
Plot 19	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 20	478	Good	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 21	483	Poor	YES	98%	YES	11	Desmodium varians	N/A	NO	NO
Plot 22	281	Moderate	YES	99.38%	YES	12	Calotis lappulacea, Desmodium varians, Sida corrugata	YES	YES Regen	YES
Plot 23	483	Low	YES	16%	NO	N/A	N/A	N/A	NO	NO
Plot 24	84	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 25	281	Moderate	YES	91.97%	YES	21	Calotis lappulacea	YES	YES Regen	YES
Plot 26	281	Moderate	YES	23%	NO	N/A	N/A	N/A	NO	NO
Plot 27	281	Good	YES	99.42%	YES	18	Hibbertia obtusifolia, Poranthera microphylla	YES	YES Regen	YES
Plot 28	281	Good	YES	94.96%	YES	18	Calotis lappulacea,	YES	YES Regen	YES

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Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
							Hardenbergia violacea, Hibbertia obtusifolia, Poranthera microphylla			
Plot 29	483	Poor	YES	44%	NO	N/A	N/A	N/A	N/A	NO
Plot 30	84	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 31	281	Poor	YES	19%	NO	N/A	N/A	N/A	N/A	NO
Plot 32	483	Moderate	YES	40%	NO	N/A	N/A	N/A	N/A	NO
Plot 33	479	Regen	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 34	479	Regen	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 35	479	Regen	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 36	479	Regen	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 37	479	Burnt	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 38	483	Poor	YES	19%	NO	N/A	N/A	N/A	N/A	NO
Plot 39	483	Low	YES	24%	NO	N/A	N/A	N/A	N/A	NO
Plot 40	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 41	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 42	267	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 43	267	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 44	267	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 45	483	Low	YES	23%	NO	N/A	N/A	N/A	N/A	NO
Plot 46	483	Moderate	YES	41%	NO	N/A	N/A	N/A	N/A	NO

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Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
Plot 47	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 48	478	Good	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 49	479	Burnt	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 50	483	Low	YES	77.80%	YES	9	N/A	N/A	N/A	NO
Plot 51	267	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 52	267	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 53	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 54	479	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 55	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 56	479	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 57	479	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 58	616	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 59	483	Moderate	YES	14%	NO	N/A	N/A	N/A	N/A	NO
Plot 60	483	Poor	YES	9%	NO	N/A	N/A	N/A	N/A	NO
Plot 61	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 65	483	Poor	YES	6.7%	NO	9	1	N/A	N/A	NO
Plot 66	483	Poor	YES	2.7%	NO	3	0	N/A	N/A	NO
Plot 67	483	Poor	YES	5.9%	NO	1	0	N/A	N/A	NO
Plot 68	483	Poor	YES	0.2%	NO	1	0	N/A	N/A	NO
Plot 69	483	Moderate	YES	0.2%	NO	1	0	N/A	N/A	NO
Plot 70	483	Low	YES	57.8%	YES	2	0	N/A	N/A	NO
Plot 71	483	Low	YES	68.4%	YES	10	1	N/A	N/A	NO

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Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
Plot 72	483	Poor	YES	0.2%	NO	2	0	N/A	N/A	NO
Plot 73	483	Poor	YES	48.9%	NO	8	1	N/A	N/A	NO
Plot 74	483	Poor	YES	8.3%	NO	2	0	N/A	N/A	NO
Plot 75	483	Low	YES	66.3%	YES	7	1	N/A	N/A	NO
Plot 76	483	Moderate	YES	94.0%	YES	2	0	N/A	N/A	NO
Plot 77	483	Poor	YES	6.5%	NO	3	1	N/A	N/A	NO
Plot 78	281	Moderate	YES	74.2%	YES	1	0	N/A	N/A	NO
Plot 79	281	Moderate	YES	92.2%	YES	1	0	N/A	N/A	NO
Plot 80	281	Moderate	YES	52.3%	YES	3	0	N/A	N/A	NO
Plot 81	483	Moderate	YES	14.4%	NO	4	0	N/A	N/A	NO
Plot 82	483	Poor	YES	0.4%	NO	2	0	N/A	N/A	NO
Plot 83	483	Poor	YES	0.2%	NO	1	0	N/A	N/A	NO
Plot 84	483	Poor	YES	5.4%	NO	5	0	N/A	N/A	NO
Plot 85	483	Moderate	YES	17.3%	NO	5	0	N/A	N/A	NO
Plot 86	483	Poor	YES	14.9%	NO	6	0	N/A	N/A	NO
Plot 87	483	Poor	YES	13.9%	NO	2	0	N/A	N/A	NO
Plot 88	483	Low	YES	98.5%	YES	4	0	N/A	N/A	NO
Plot 89	483	Low	YES	79.6%	YES	12	0	N/A	N/A	NO
Plot 90	483	Moderate	YES	65.8%	YES	12	1	YES	Yes (Regen)	YES
Plot 91	483	Moderate	YES	97.7%	YES	7	1	N/A	N/A	NO
Plot 92	483	Low	YES	98.6%	YES	6	1	N/A	N/A	NO
Plot 93	483	Low	YES	99.0%	YES	2	0	N/A	N/A	NO

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Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
Plot 94	483	Low	YES	99.7%	YES	3	1	N/A	N/A	NO
Plot 95	483	Low	YES	99.4%	YES	1	0	N/A	N/A	NO
Plot 96	281	Low	YES	96.2%	YES	3	0	N/A	N/A	NO
Plot 97	483	Low	YES	99.1%	YES	6	1	N/A	N/A	NO
Plot 98	483	Low	YES	99.5%	YES	5	1	N/A	N/A	NO
Plot 99	483	Moderate	YES	95.5%	YES	4	1	N/A	N/A	NO
Plot 100	483	Poor	YES	79.9%	YES	3	0	N/A	N/A	NO
Plot 101	483	Moderate	YES	58.2%	YES	2	0	N/A	N/A	NO
Plot 102	483	Moderate	YES	53.4%	YES	3	0	N/A	N/A	NO
Plot 103	483	Poor	YES	50.6%	YES	5	1	N/A	N/A	NO
Plot 104	483	Poor	YES	50.3%	YES	4	1	N/A	N/A	NO
Plot 105	281	Good	YES	98.9%	YES	8	1	N/A	N/A	NO
Plot 106	483	Low	YES	97.4%	YES	3	0	N/A	N/A	NO
Plot 107	483	Low	YES	99.4%	YES	6	1	N/A	N/A	NO
Plot 108	483	Moderate	YES	77.1%	YES	20	1	YES	Yes (Regen)	YES
Plot 109	483	Moderate	YES	99.8%	YES	7	1	N/A	N/A	NO
Plot 110	483	Low	YES	99.1%	YES	7	1	N/A	N/A	NO
Plot 111	483	Low	YES	98.4%	YES	4	0	N/A	N/A	NO
Plot 112	281	Moderate	YES	41.5%	NO	2	0	N/A	N/A	NO
Plot 113	281	Moderate	YES	83.5%	YES	8	1	N/A	N/A	NO
Plot 114	483	Moderate	YES	80.2%	YES	6	0	N/A	N/A	NO
Plot 115	483	Poor	YES	15.1%	NO	0	0	N/A	N/A	NO

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Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
Plot 116	483	Poor	YES	0.0%	NO	0	0	N/A	N/A	NO
Plot 117	483	Poor	YES	60.0%	YES	0	0	N/A	N/A	NO
Plot 118	483	Poor	YES	60.0%	YES	1	0	N/A	N/A	NO
Plot 119	483	Low	YES	97.0%	YES	15	1	YES	Yes (Regen)	YES
Plot 120	483	Low	YES	64.5%	YES	6	1	N/A	N/A	NO
Plot 121	479	Moderate	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 122	483	Low	YES	82.7%	YES	4	0	N/A	N/A	NO
Plot 123	483	Low	YES	95.0%	YES	10	1	N/A	N/A	NO
Plot 124	483	Low	YES	81.4%	YES	9	1	N/A	N/A	NO
Plot 125	483	Moderate	YES	51.8%	YES	4	1	N/A	N/A	NO
Plot 126	483	Low	YES	59.0%	YES	7	1	N/A	N/A	NO
Plot 127	483	Low	YES	97.8%	YES	7	1	N/A	N/A	NO
Plot 128	483	Low	YES	34.0%	NO	9	1	N/A	N/A	NO
Plot 129	483	Low	YES	85.5%	YES	14	1	YES	NO	NO
Plot 130	483	Low	YES	98.2%	YES	15	1	YES	NO	NO
Plot 131	483	Good	YES	93%	YES	8	2	N/A		NO
Plot 132	483	Poor	YES	39%	N/A	7	1	N/A		NO
Plot 133	483	Poor	YES	46%	N/A	4	0	N/A		NO
Plot 134	483	Poor	YES	70%	YES	8	1	N/A		NO
Plot 135	483	Poor	YES	54%	YES	5	0	N/A		NO
Plot 136	483	Poor	YES	4%	N/A	1	0	N/A		NO
Plot 137	483	Moderate	YES	85%	YES	8	1	N/A		NO

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Plot	PCT Code	Condition	Correct overstorey species?	>50% perennial groundcover	Patch > 0.1 ha	>12 non-grass native	Important species present	Patch >2 ha	20+ trees per ha OR natural regen	EPBC BGGW
Plot 138	483	Poor	YES	88%	YES	4	0	N/A		NO
Plot 139	483	Poor	YES	2%	N/A	2	0	N/A		NO
Plot 140	483	Poor	YES	93%	YES	5	0	N/A		NO
Plot 141	281	Good	YES	77%	YES	3	0	N/A		NO
Plot 142	483	Poor	YES	57%	YES	3	0	N/A		NO
Plot 143	483	Moderate	YES	37%	N/A	5	0	N/A		NO
Plot 144	281	Moderate	YES	73%	YES	6	0	N/A		NO
Plot 145	483	Moderate	YES	8%	N/A	4	0	N/A		NO
Plot 146	483	Low	YES	49%	N/A	3	0	N/A		NO
Plot 147	483	Moderate	YES	33%	N/A	7	0	N/A		NO
Plot 148	483	Moderate	YES	21%	N/A	8	0	N/A		NO
Plot 149	267	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 150	267	Low	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 151	479	Burnt	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO
Plot 152	479	Burnt	NO	N/A	N/A	N/A	N/A	N/A	N/A	NO

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Appendix H Predicted species reports

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BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00040557	GR Access Alt - Pilliga	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
2		27/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Black Falcon	Falco subniger	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
Diamond Firetail	Stagonopleura guttata	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
Flame Robin	Petroica phoenicea	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Gilbert's Whistler	Pachycephala inornata	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Little Lorikeet	Glossopsitta pusilla	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Little Pied Bat	Chalinolobus picatus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Regent Honeyeater	Anthochaera phrygia	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Scarlet Robin	Petroica boodang	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Superb Parrot	Polytelis swainsonii	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Varied Sittella	Daphoenositta chrysoptera	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White-bellied Sea-Eagle	Haliaeetus leucogaster	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00040556	GR Access Moorfield - Kerrabee	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	13/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
0		13/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black Falcon	Falco subniger	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Gang-gang Cockatoo	Callocephalon fimbriatum	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Painted Honeyeater	Grantiella picta	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Rosenberg's Goanna	Varanus rosenbergi	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Scarlet Robin	Petroica boodang	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Turquoise Parrot	Neophema pulchella	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/20/00021962	GR Access Moorfield - BBSLIV	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
7		27/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Black Falcon	Falco subniger	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Diamond Firetail	Stagonopleura guttata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Little Lorikeet	Glossopsitta pusilla	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Little Pied Bat	Chalinolobus picatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Scarlet Robin	Petroica boodang	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Speckled Warbler	Chthonicola sagittata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Superb Parrot	Polytelis swainsonii	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Varied Sittella	Daphoenositta chrysoptera	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00040560	GR Access Alt - Kerrabee	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
3		27/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black Falcon	Falco subniger	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
Diamond Firetail	Stagonopleura guttata	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Flame Robin	Petroica phoenicea	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Gang-gang Cockatoo	Callocephalon fimbriatum	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Gang-gang Cockatoo	Callocephalon fimbriatum	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Little Lorikeet	Glossopsitta pusilla	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Rosenberg's Goanna	Varanus rosenbergi	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Scarlet Robin	Petroica boodang	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Swift Parrot	Lathamus discolor	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Turquoise Parrot	Neophema pulchella	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

White-throated Needletail	Hirundapus caudacutus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00039289	GR Cluster - Liverpool Range	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
2		27/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Black Falcon	Falco subniger	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Diamond Firetail	Stagonopleura guttata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Little Lorikeet	Glossopsitta pusilla	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Masked Owl	Tyto novaehollandiae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Scarlet Robin	Petroica boodang	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Varied Sittella	Daphoenositta chrysoptera	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White-throated Needletail	Hirundapus caudacutus	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00040564	GR Cluster - BBSPIL	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
1		27/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Black Falcon	Falco subniger	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Black-breasted Buzzard	Hamirostra melanosternon	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
Diamond Firetail	Stagonopleura guttata	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey Falcon	Falco hypoleucos	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Little Lorikeet	Glossopsitta pusilla	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Little Pied Bat	Chalinolobus picatus	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Major Mitchell's Cockatoo	Lophochroa leadbeateri	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
Masked Owl	Tyto novaehollandiae	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

Painted Honeyeater	Grantiella picta	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Powerful Owl	Ninox strenua	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Scarlet Robin	Petroica boodang	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion

Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Superb Parrot	Polytelis swainsonii	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion

Turquoise Parrot	Neophema pulchella	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Varied Sittella	Daphoenositta chrysoptera	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/20/00021961	Inland Slopes - LV Cluster	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	13/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
3		13/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Dusky Woodswallow	Artamus cyanopterus cyanopterus	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
Little Lorikeet	Glossopsitta pusilla	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Painted Honeyeater	Grantiella picta	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Regent Honeyeater	Anthochaera phrygia	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Swift Parrot	Lathamus discolor	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
White-throated Needletail	Hirundapus caudacutus	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/20/00021960	LV Cluster - SYBKER	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
7		27/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Black Falcon	Falco subniger	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Diamond Firetail	Stagonopleura guttata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Gang-gang Cockatoo	Callocephalon fimbriatum	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Little Lorikeet	Glossopsitta pusilla	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Masked Owl	Tyto novaehollandiae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Rosenberg's Goanna	Varanus rosenbergi	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Scarlet Robin	Petroica boodang	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Varied Sittella	Daphoenositta chrysoptera	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00040567	MH Cluster - Liverpool Range	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	13/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
2		13/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Black Falcon	Falco subniger	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Masked Owl	Tyto novaehollandiae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Painted Honeyeater	Grantiella picta	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Scarlet Robin	Petroica boodang	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Varied Sittella	Daphoenositta chrysoptera	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00040568	MH Cluster - Pilliga	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
2		27/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Black Falcon	Falco subniger	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Diamond Firetail	Stagonopleura guttata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Little Lorikeet	Glossopsitta pusilla	479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Little Pied Bat	Chalinolobus picatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Powerful Owl	Ninox strenua	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Regent Honeyeater	Anthochaera phrygia	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Scarlet Robin	Petroica boodang	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Speckled Warbler	Chthonicola sagittata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Square-tailed Kite	Lophoictinia isura	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Superb Parrot	Polytelis swainsonii	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Varied Sittella	Daphoenositta chrysoptera	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White-throated Needletail	Hirundapus caudacutus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
		483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/23/00040555	Workers Camp - Pilliga	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	13/10/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17021	Major Projects	Finalised
Assessment Revision		Date Finalised
0		13/10/2023

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Little Lorikeet	Glossopsitta pusilla	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Painted Honeyeater	Grantiella picta	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Regent Honeyeater	Anthochaera phrygia	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Swift Parrot	Lathamus discolor	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Turquoise Parrot	Neophema pulchella	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
White-throated Needletail	Hirundapus caudacutus	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

BAM Predicted Species Report

Common Name	Scientific Name	Justification in the BAM-C

Appendix I Candidate species reports

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BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00040557	Proposal Name GR Access Alt - Pilliga	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 27/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 2	Date Finalised 27/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Commersonia procumbens Commersonia procumbens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dichanthium setosum Bluegrass	No (surveyed)	☑ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Diuris tricolor Pine Donkey Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Indigofera efoliata Leafless Indigo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Lophoictinia isura Square-tailed Kite	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Monotaxis macrophylla Large-leafed Monotaxis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Polytelis swainsonii Superb Parrot	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Swainsona sericea Silky Swainson-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tylophora linearis Tylophora linearis	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

BAM Candidate Species Report

Common name	Scientific name	Justification in the BAM-C
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat constraints
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00040556	Proposal Name GR Access Moorfield - Kerrabee	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 13/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 0	Date Finalised 13/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callocephalon fimbriatum Gang-gang Cockatoo	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pomaderris cotoneaster Cotoneaster Pomaderris	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Prasophyllum petilum Tarengo Leek Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Habitat constraints
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat constraints
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Refer to BAR
Masked Owl	Tyto novaehollandiae	Habitat constraints
Pink-tailed Legless Lizard	Aprasia parapulchella	Habitat constraints Geographic limitations
Powerful Owl	Ninox strenua	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Refer to BAR
Square-tailed Kite	Lophoictinia isura	Refer to BAR
Swift Parrot	Lathamus discolor	Refer to BAR

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/20/00021962	Proposal Name GR Access Moorfield - BBSLIV	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 27/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 7	Date Finalised 27/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Commersonia procumbens Commersonia procumbens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dichanthium setosum Bluegrass	No (surveyed)	☑ Jan ☑ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Monotaxis macrophylla Large-leafed Monotaxis	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Petrogale penicillata Brush-tailed Rock-wallaby	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Polytelis swainsonii Superb Parrot	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Swainsona sericea Silky Swainson-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tylophora linearis Tylophora linearis	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Tyto novaehollandiae Masked Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Refer to BAR
Pink-tailed Legless Lizard	Aprasia parapulchella	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Square-tailed Kite	Lophoictinia isura	Refer to BAR
Swift Parrot	Lathamus discolor	Refer to BAR
White-bellied Sea-Eagle	Haliaeetus leucogaster	Refer to BAR

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00040560	Proposal Name GR Access Alt - Kerrabee	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 27/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 3	Date Finalised 27/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Callocephalon fimbriatum Gang-gang Cockatoo	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Commersonia procumbens Commersonia procumbens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Diuris tricolor Pine Donkey Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Monotaxis macrophylla Large-leafed Monotaxis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Ninox connivens Barking Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum petilum Tarengo Leek Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tylophora linearis Tylophora linearis	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

BAM Candidate Species Report

Common name	Scientific name	Justification in the BAM-C
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat constraints
Cotoneaster Pomaderris	Pomaderris cotoneaster	Refer to BAR
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Masked Owl	Tyto novaehollandiae	Habitat constraints
Powerful Owl	Ninox strenua	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Squirrel Glider	Petaurus norfolcensis	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00039289	Proposal Name GR Cluster - Liverpool Range	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 27/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 2	Date Finalised 27/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Dichanthium setosum Bluegrass	No (surveyed)	☑ Jan ☑ Feb ☑ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Petrogale penicillata Brush-tailed Rock-wallaby	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Striped Legless Lizard	Delma impar	Refer to BAR

Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00040564	Proposal Name GR Cluster - BBSPIL	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 27/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 1	Date Finalised 27/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Commersonia procumbens Commersonia procumbens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dichanthium setosum Bluegrass	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hamirostra melanosternon Black-breasted Buzzard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hoplocephalus bitorquatus Pale-headed Snake	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Lophochroa leadbeateri Major Mitchell's Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Monotaxis macrophylla Large-leafed Monotaxis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Polytelis swainsonii Superb Parrot	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Pomaderris queenslandica Scant Pomaderris	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Swainsona sericea Silky Swainson-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tylophora linearis Tylophora linearis	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Vespadelus troughtoni Eastern Cave Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Square-tailed Kite	Lophoictinia isura	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/20/00021961	Proposal Name Inland Slopes - LV Cluster	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 13/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 3	Date Finalised 13/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Dichanthium setosum Bluegrass	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Persoonia marginata Clandulla Geebung	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Tylophora linearis Tylophora linearis	No (surveyed)	☐ Jan ☑ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Pink-tailed Legless Lizard	Aprasia parapulchella	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Striped Legless Lizard	Delma impar	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/20/00021960	Proposal Name LV Cluster - SYBKER	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 27/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 7	Date Finalised 27/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Callocephalon fimbriatum Gang-gang Cockatoo	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Commersonia procumbens Commersonia procumbens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Monotaxis macrophylla Large-leafed Monotaxis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petrogale penicillata Brush-tailed Rock-wallaby	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum petilum Tarengo Leek Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tylophora linearis Tylophora linearis	No (surveyed)	☑ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Cotoneaster Pomaderris	Pomaderris cotoneaster	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints

Square-tailed Kite	Lophoictinia isura	Refer to BAR
Striped Legless Lizard	Delma impar	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00040567	Proposal Name MH Cluster - Liverpool Range	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 13/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 2	Date Finalised 13/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Chalinolobus dwyeri Large-eared Pied Bat	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Dichanthium setosum Bluegrass	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petrogale penicillata Brush-tailed Rock-wallaby	No (surveyed)	☐ Jan ☐ Feb ☑ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Striped Legless Lizard	Delma impar	Species is vagrant
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00040568	Proposal Name MH Cluster - Pilliga	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 27/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 2	Date Finalised 27/10/2023	

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List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Burhinus grallarius Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Chalinolobus dwyeri Large-eared Pied Bat	Yes (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Commersonia procumbens Commersonia procumbens	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dichanthium setosum Bluegrass	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Monotaxis macrophylla Large-leafed Monotaxis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ninox connivens Barking Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Ninox strenua Powerful Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petrogale penicillata Brush-tailed Rock-wallaby	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Polytelis swainsonii Superb Parrot	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Swainsona sericea Silky Swainson-pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tylophora linearis Tylophora linearis	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☑ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tyto novaehollandiae Masked Owl	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints

Square-tailed Kite	Lophoictinia isura	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Candidate Species Report

Proposal Details

Assessment Id 00021959/BAAS17021/23/00040555	Proposal Name Workers Camp - Pilliga	BAM data last updated * 22/06/2023
Assessor Name Alexander Pursche	Report Created 13/10/2023	BAM Data version * 61
Assessor Number BAAS17021	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 0	Date Finalised 13/10/2023	

* 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Dichanthium setosum Bluegrass	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Monotaxis macrophylla Large-leafed Monotaxis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

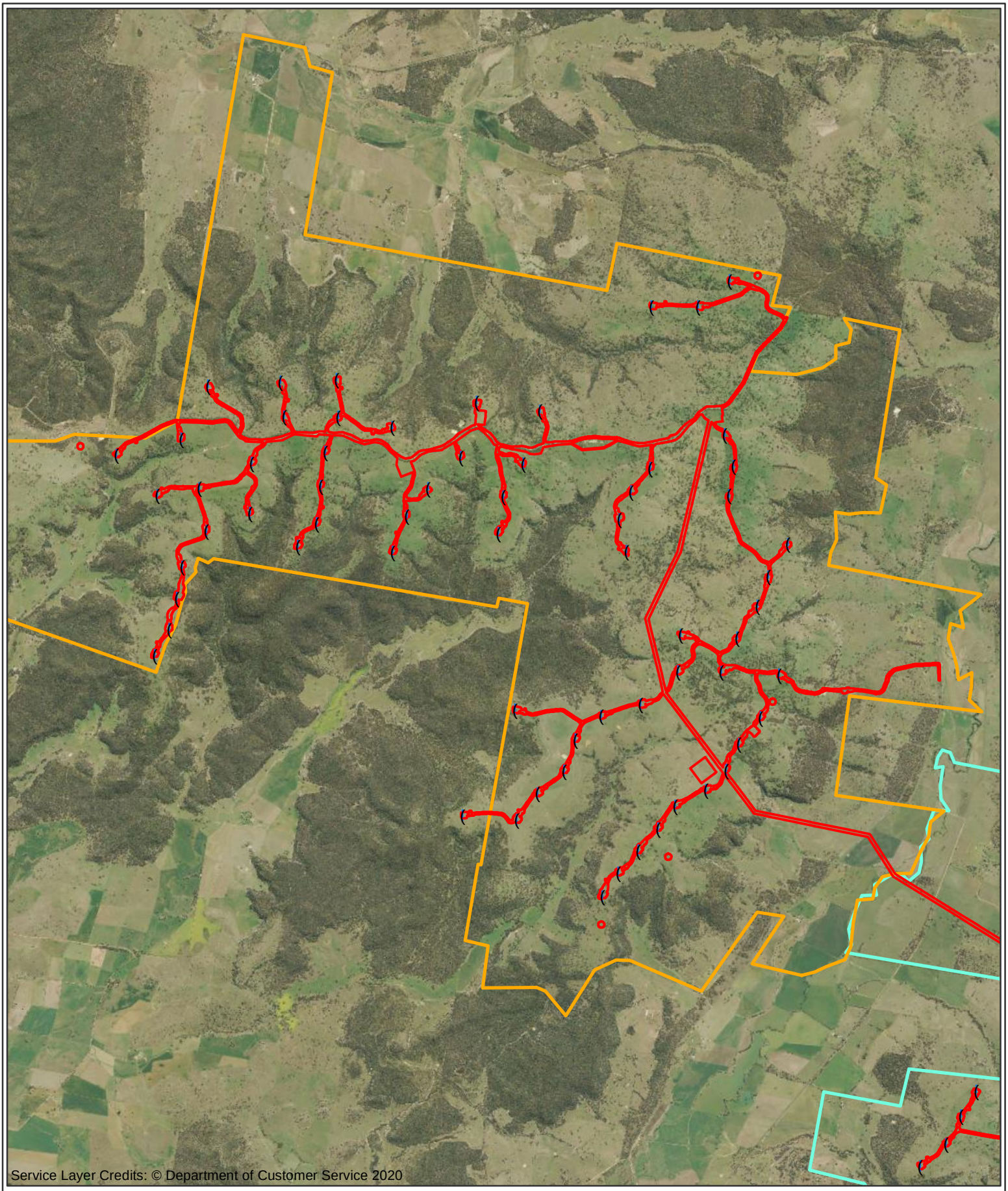
Refer to BAR for detailed justification

BAM Candidate Species Report

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Habitat constraints
Koala	Phascolarctos cinereus	Habitat constraints
Pink-tailed Legless Lizard	Aprasia parapulchella	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Refer to BAR
Swift Parrot	Lathamus discolor	Refer to BAR

Appendix J Detailed maps

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Development Site

Development site - wind farm (677 ha)

Wind Turbine Generator (131)

Cluster boundaries

Girragulang Road (45 WTG)

Leadville (21 WTG)

Mount Hope (64 WTG)

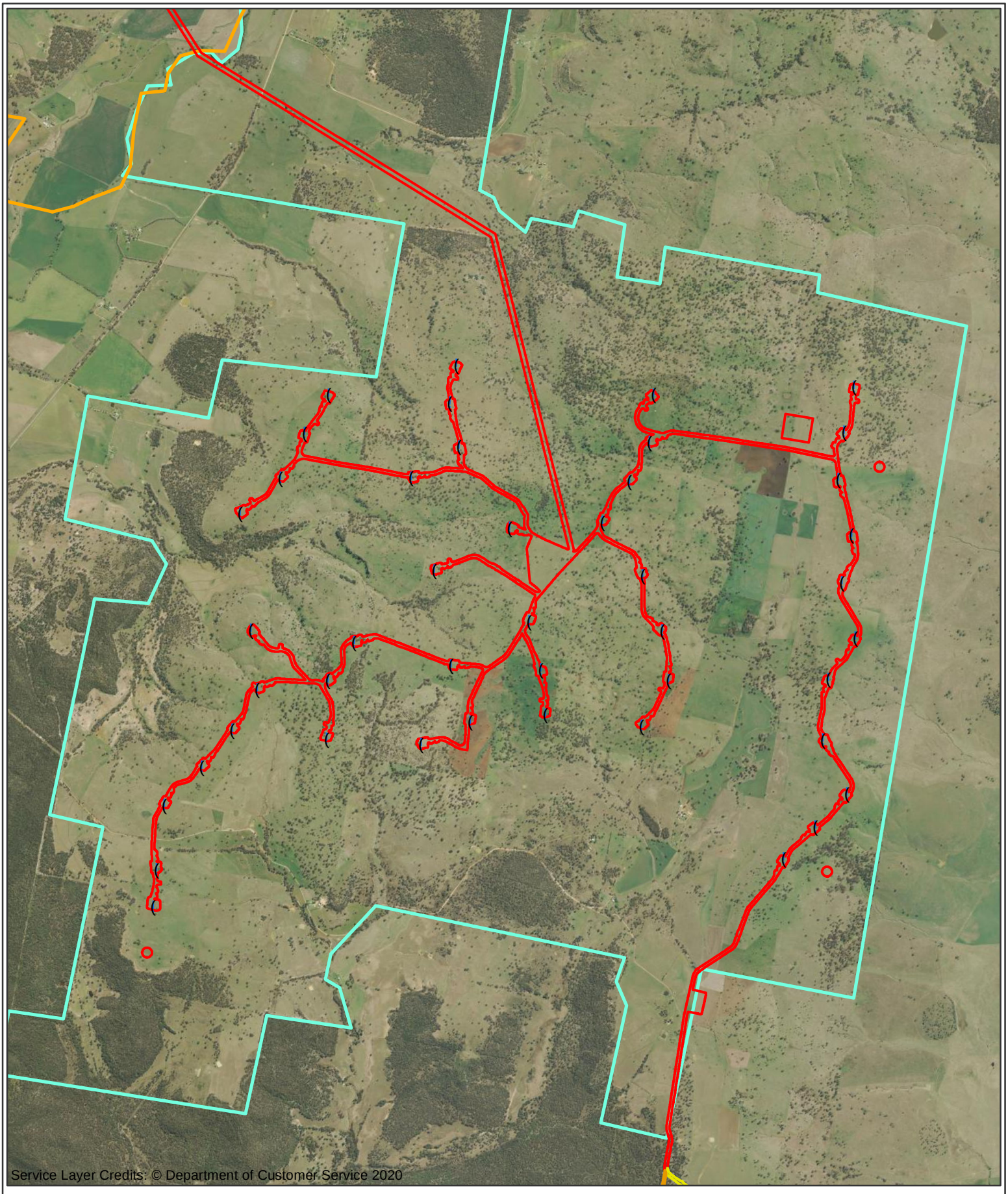
0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Development Site

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- (Wind Turbine Generator (131)

Cluster boundaries

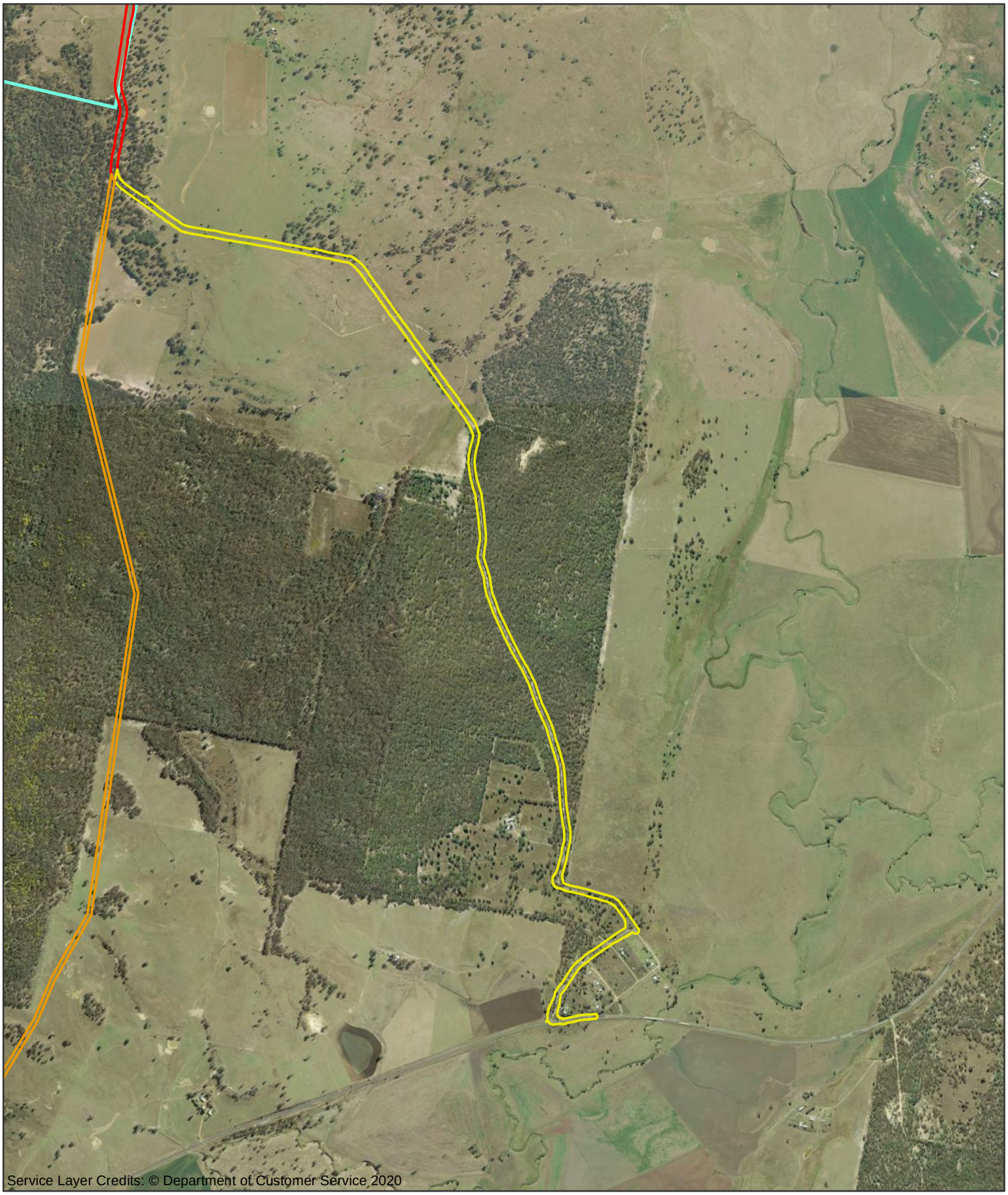
- Girragulang Road (45 WTG)
- Leadville (21 WTG)
- Mount Hope (64 WTG)

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Development Site

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- Development site - alternative GR access (11 ha)
- (Wind Turbine Generator (131)

Cluster boundaries

- Girragulang Road (45 WTG)
- Leadville (21 WTG)
- Mount Hope (64 WTG)

0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Development Site

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Cluster boundaries

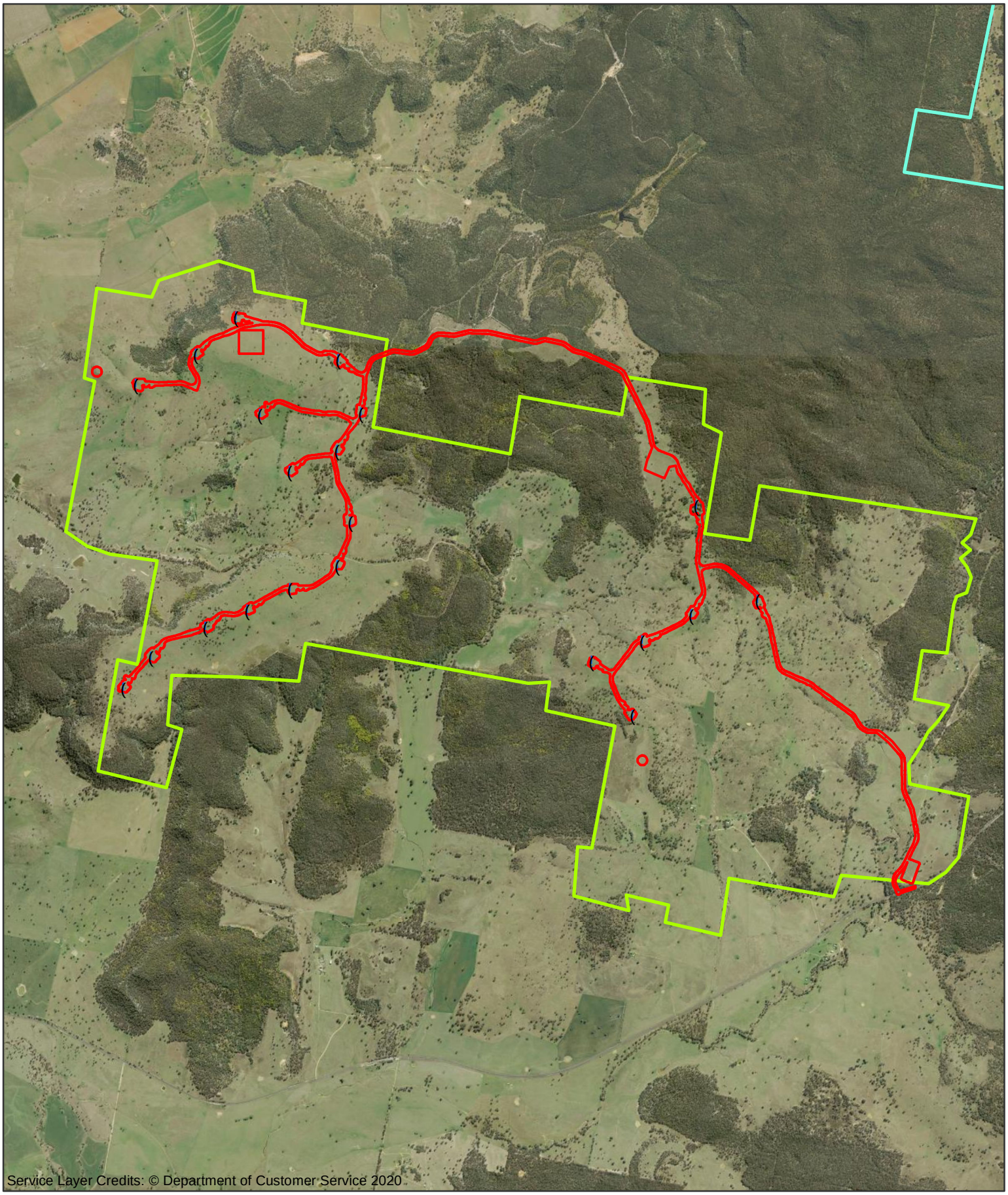
- Girragulang Road (45 WTG)
- Leadville (21 WTG)
- Mount Hope (64 WTG)

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Development Site

Development site - wind farm (677 ha)

Wind Turbine Generator (131)

Cluster boundaries

Girragulang Road (45 WTG)

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Mount Hope (64 WTG)

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Development Site

Development site - wind farm (677 ha)

Wind Turbine Generator (131)

Cluster boundaries

Girragulang Road (45 WTG)

Leadville (21 WTG)

Mount Hope (64 WTG)

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Development Site

Development site - wind farm (677 ha)

(Wind Turbine Generator (131)

Cluster boundaries

Girragulang Road (45 WTG)

Leadville (21 WTG)

Mount Hope (64 WTG)

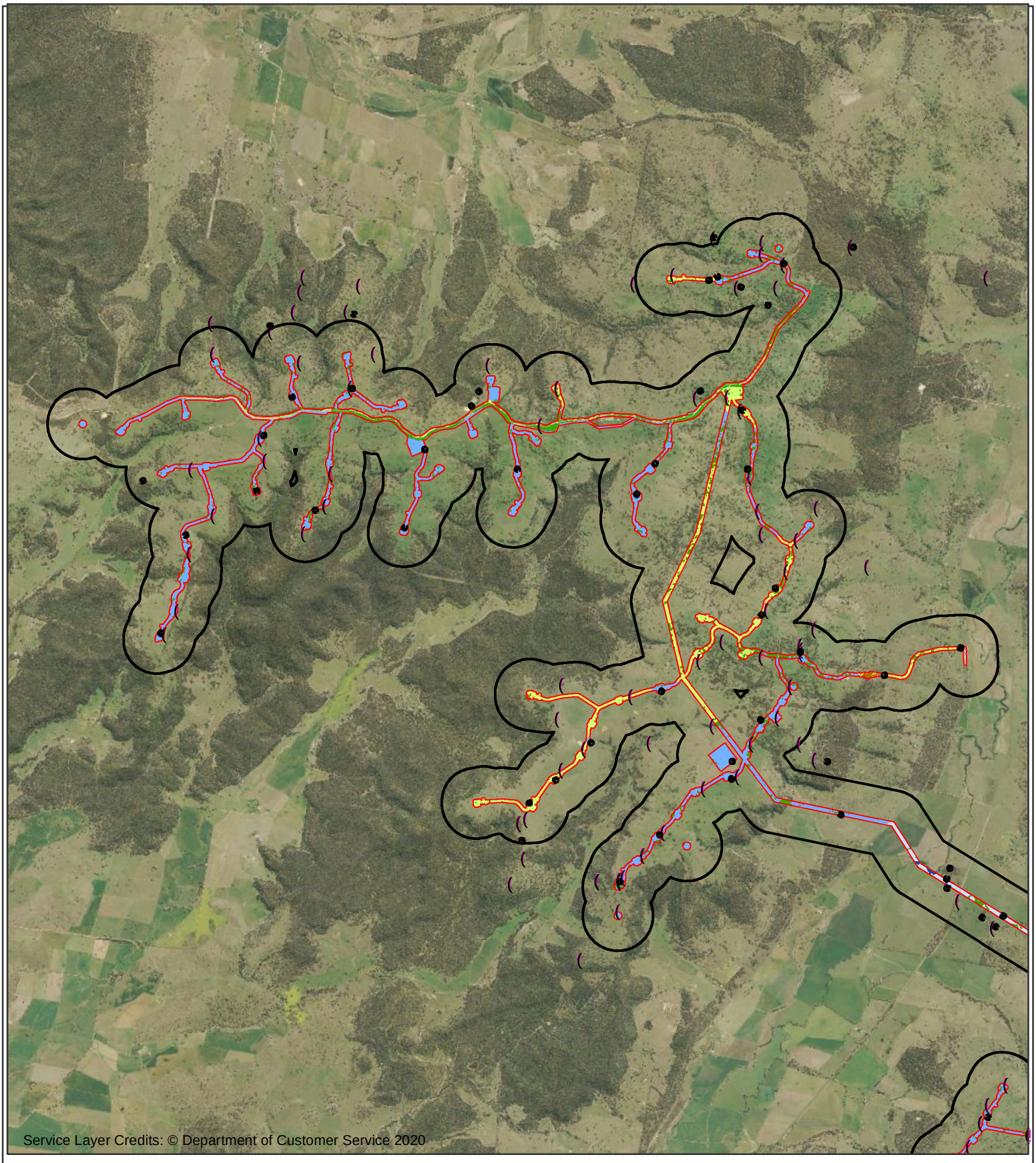
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Native Vegetation

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Rapid Data Points

Vegetation Formation

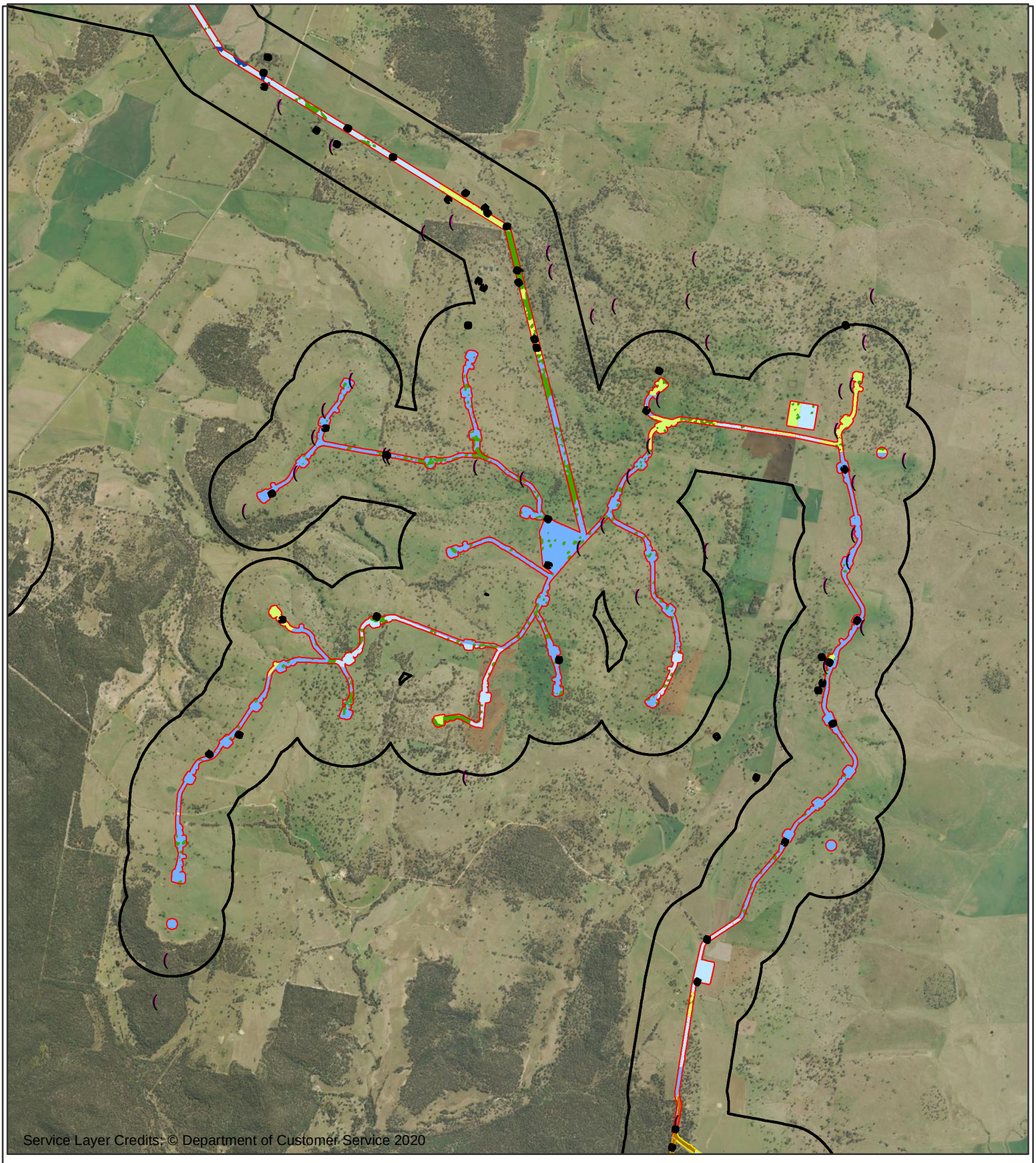
- DSF (Shrubby)
- Forested Wetlands
- Grassy Woodland
- LCN Grassland
- Exotic dominated grassland
- Cleared

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Native Vegetation

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Vegetation Formation

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0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Native Vegetation

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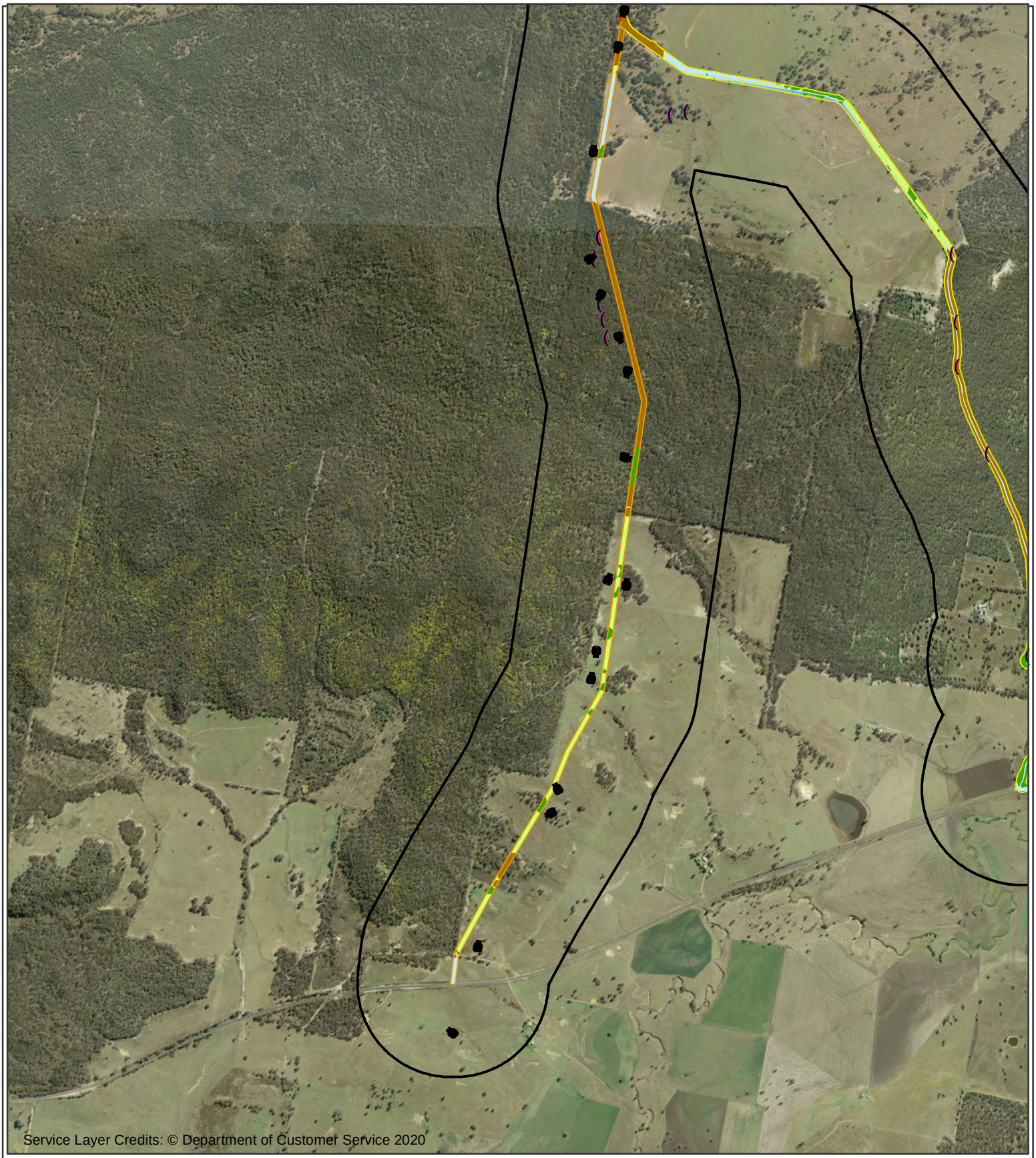
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Native Vegetation

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Vegetation Formation

- DSF (Shrubby)
- Grassy Woodland
- LCN Grassland
- Exotic dominated grassland
- Cleared

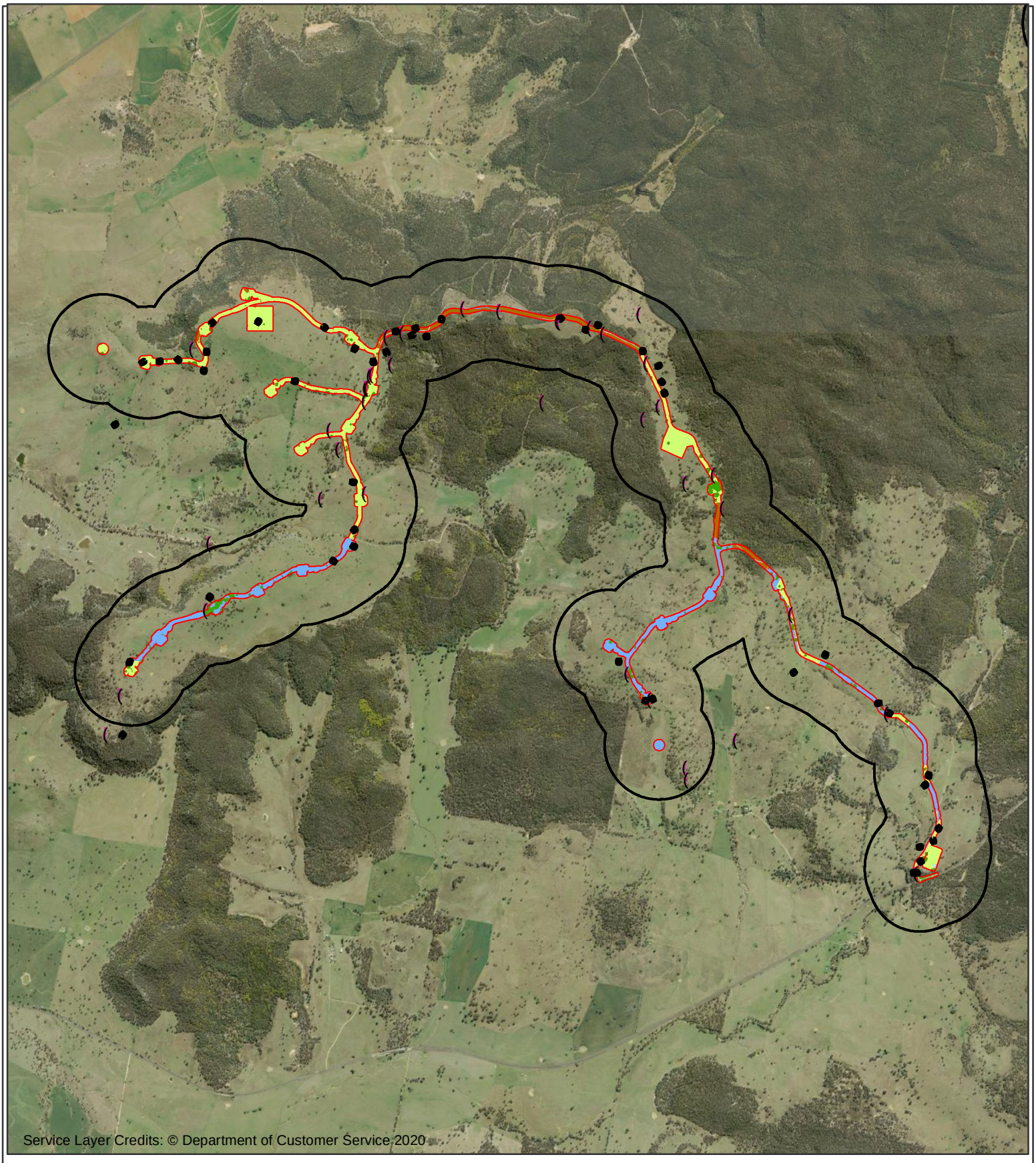
0 0.275 0.55 1.1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Native Vegetation

Development site - wind farm (677 ha)
Study Area (14,001 ha)
BAM Plots
Rapid Data Points

Vegetation Formation

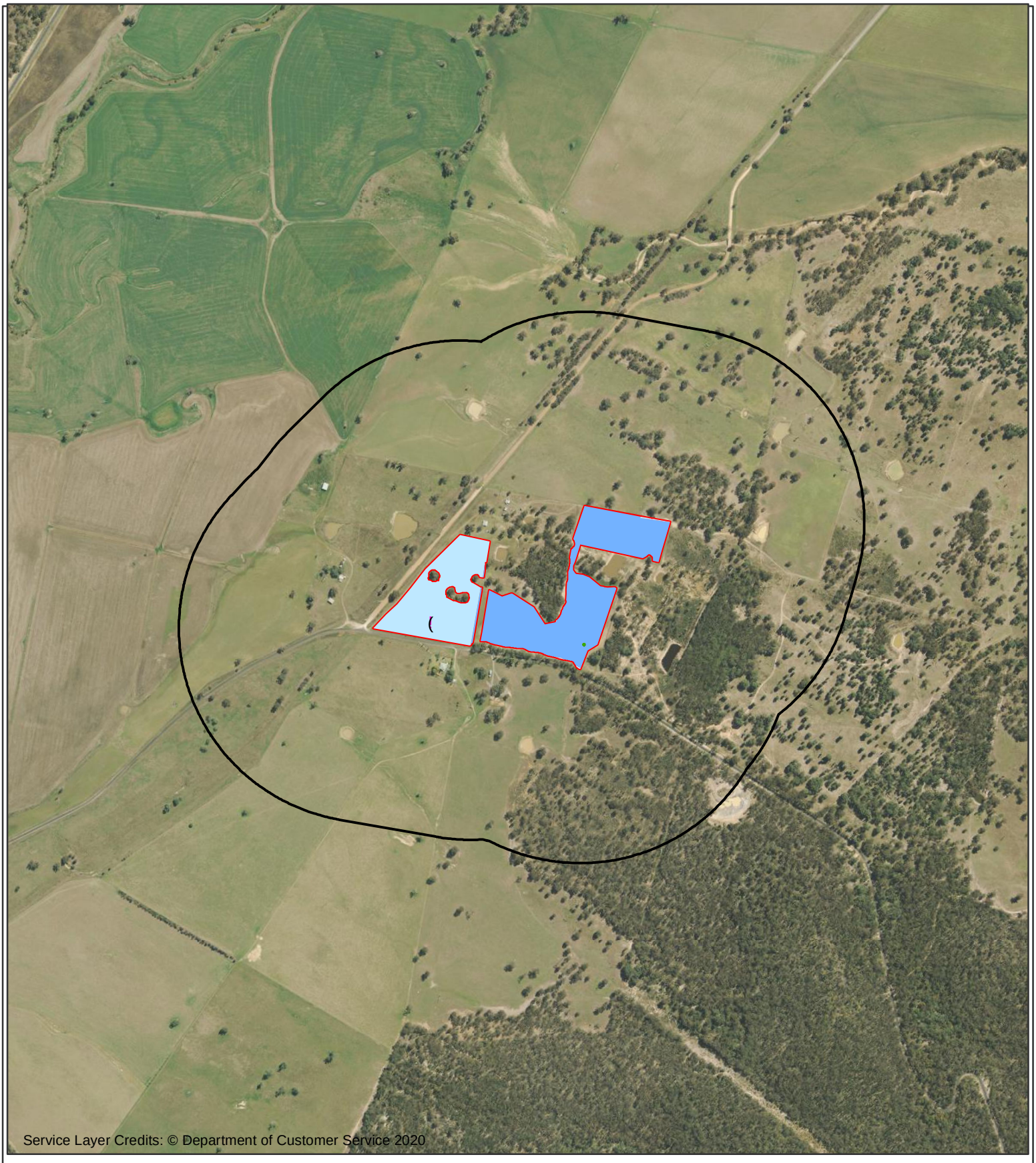
DSF (Shrubby)
Grassy Woodland
LCN Grassland
Exotic dominated grassland
Cleared

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Native Vegetation

Development site - wind farm (677 ha)
Study Area (14,001 ha)
BAM Plots
Rapid Data Points

Vegetation Formation

Grassy Woodland
Exotic dominated grassland
Cleared

0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Native Vegetation

Development site - wind farm (677 ha)
Study Area (14,001 ha)
BAM Plots
Rapid Data Points

Vegetation Formation

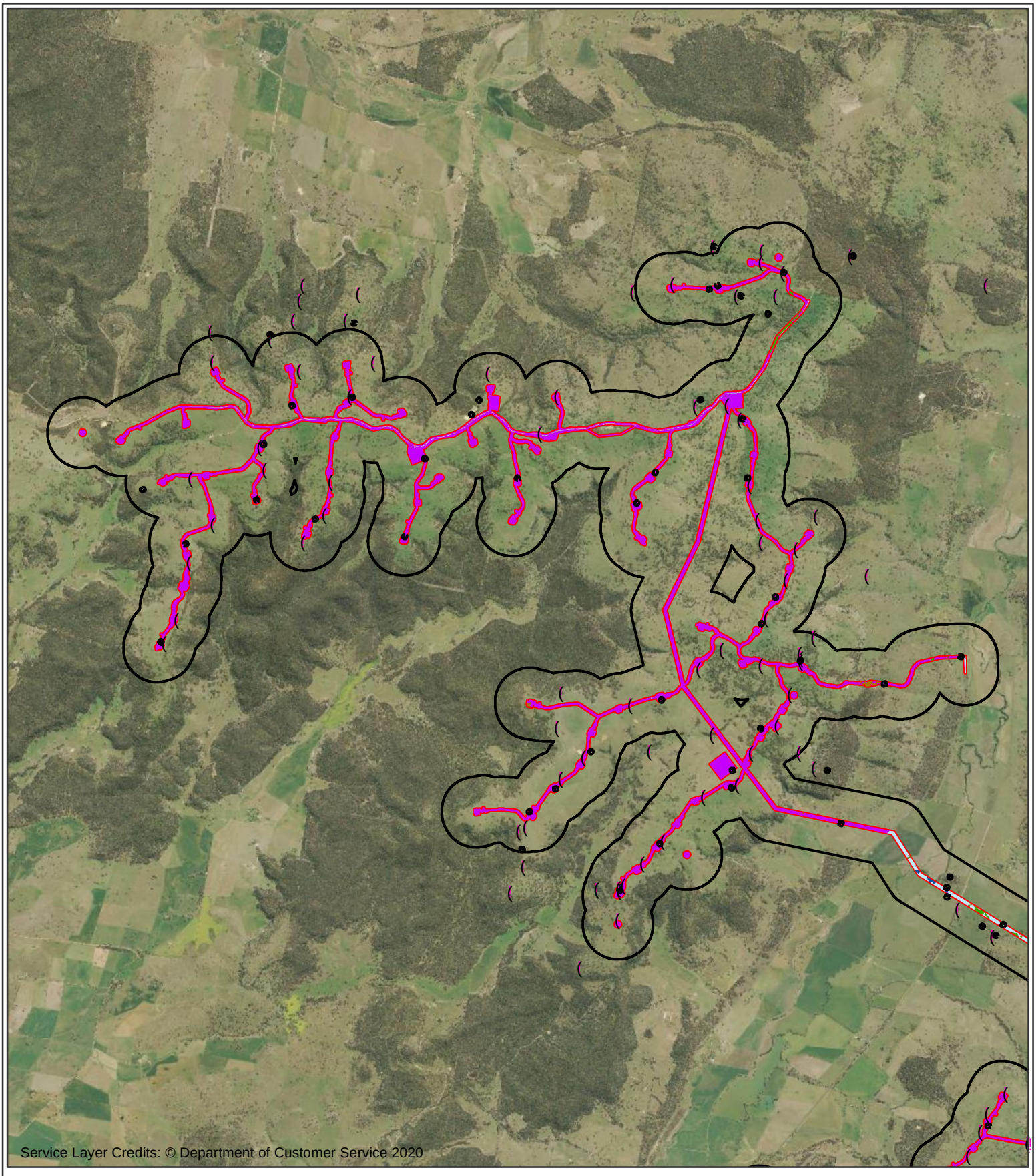
Grassy Woodland
Cleared

0 0.1 0.2 0.4
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Plant Community Types

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Rapid Data Points

Plant Community Types

- 84
- 281
- 479
- 483
- Cleared/Exotic

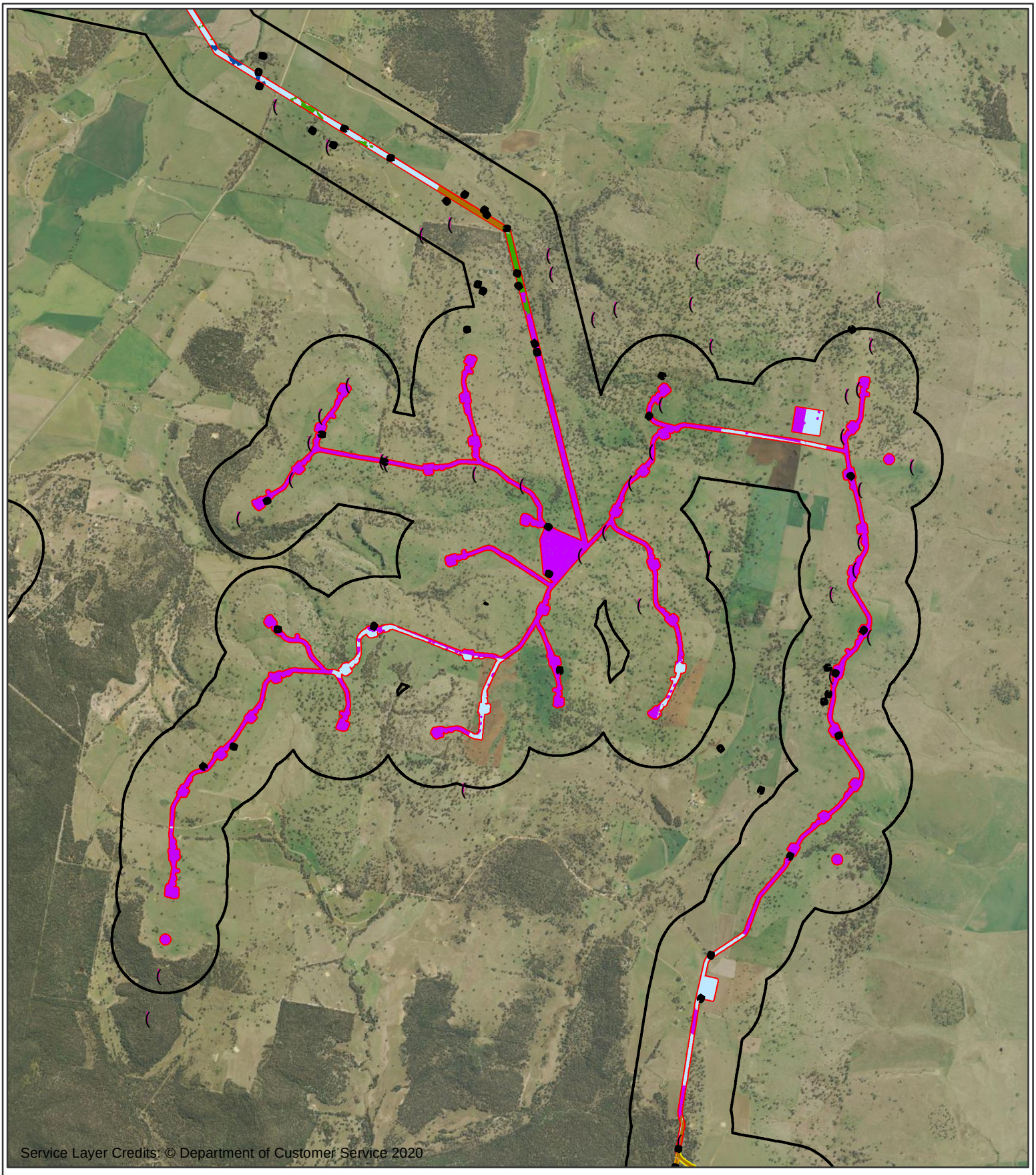
0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Plant Community Types

- Development site - wind farm (677 ha)
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- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
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- Rapid Data Points

Plant Community Types

- 84
- 281
- 479
- 483
- Cleared/Exotic

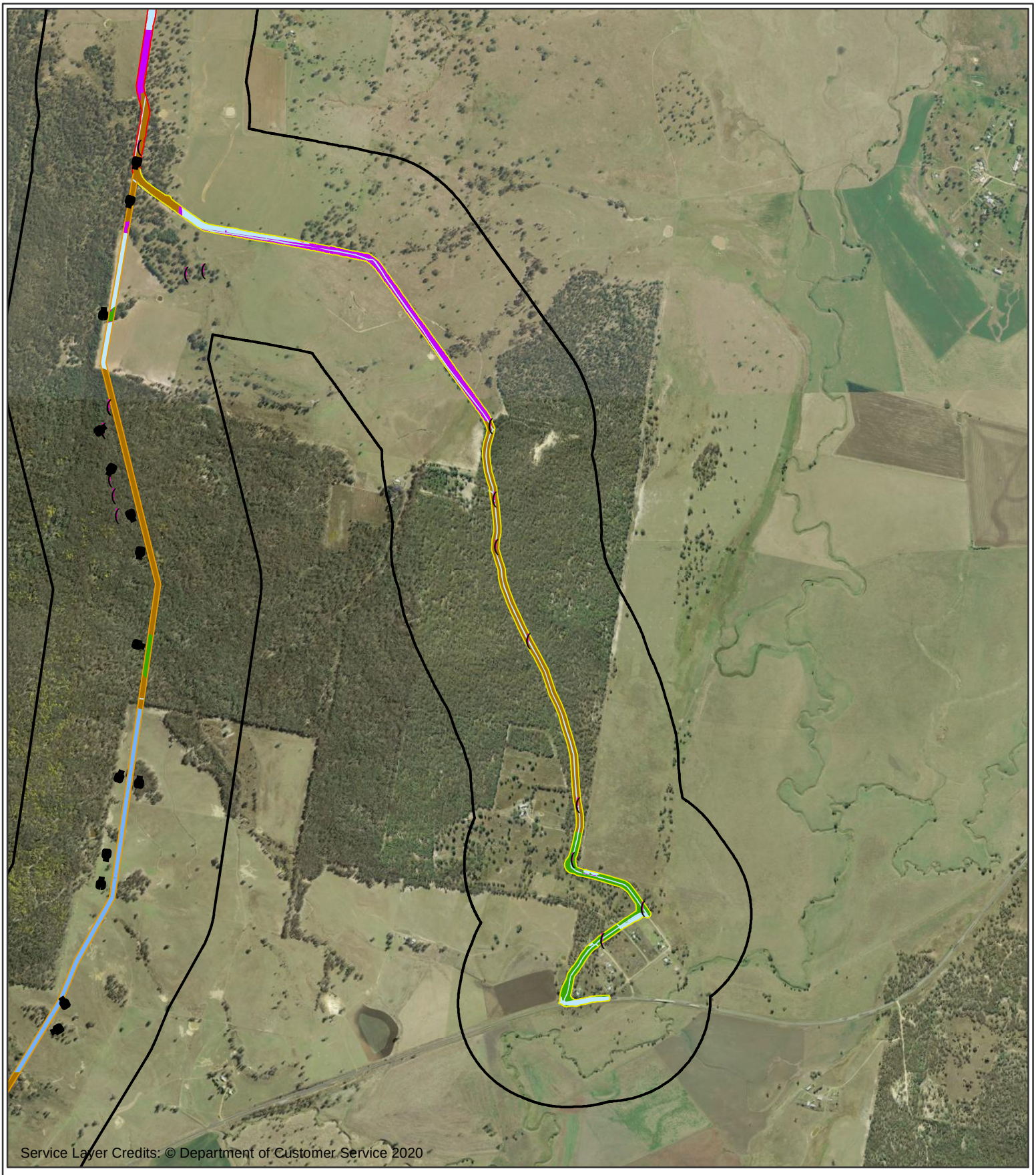
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Plant Community Types

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Plant Community Types

- 267
- 281
- 479
- 483
- Cleared/Exotic

0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Plant Community Types

- Development site - wind farm (677 ha)
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- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
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- Rapid Data Points

Plant Community Types

- 267
- 281
- 479
- 483
- Cleared/Exotic

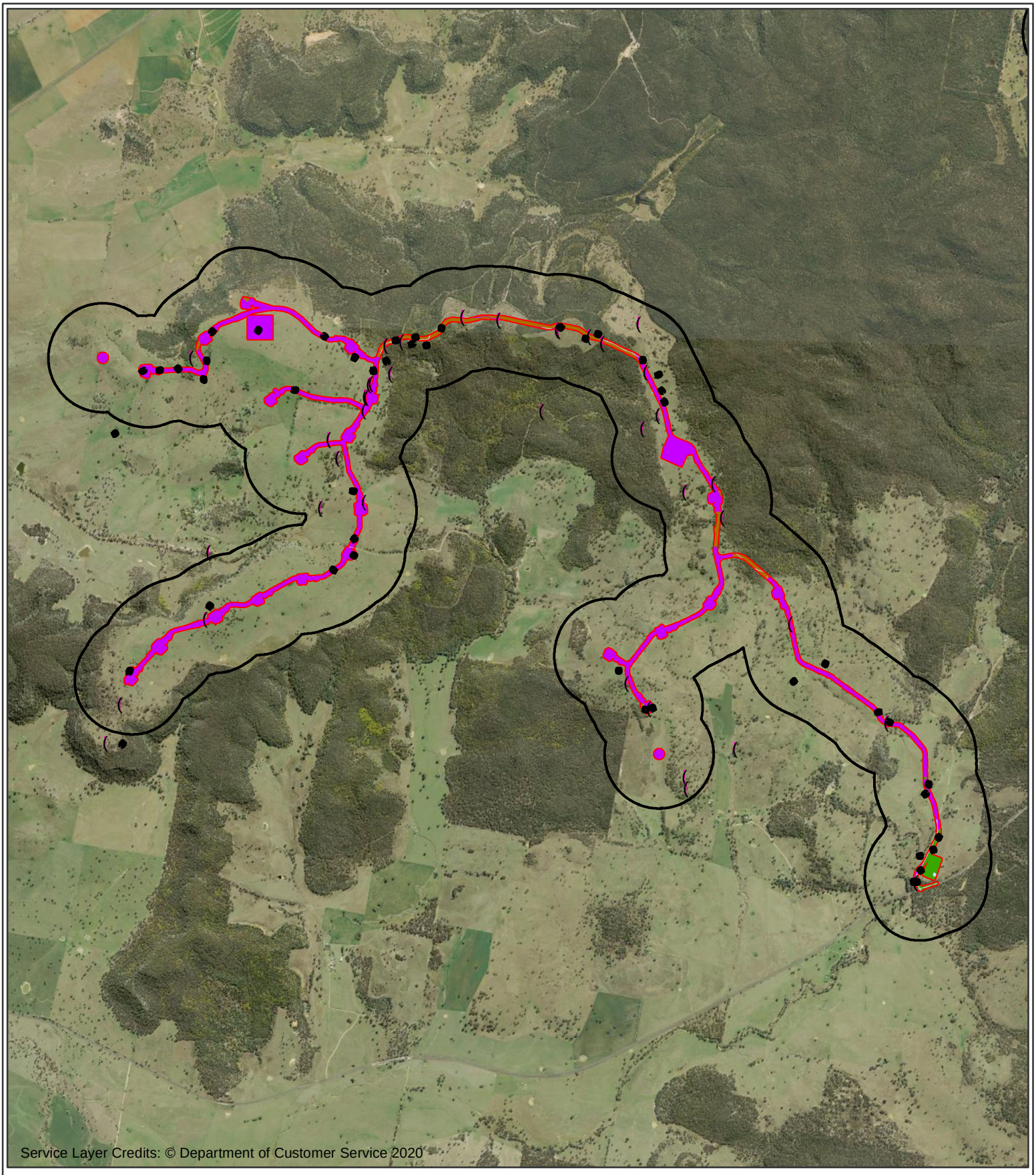
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Plant Community Types

Development site - wind farm (677 ha)
Study Area (14,001 ha)
BAM Plots
Rapid Data Points

Cleared/Exotic

Plant Community Types

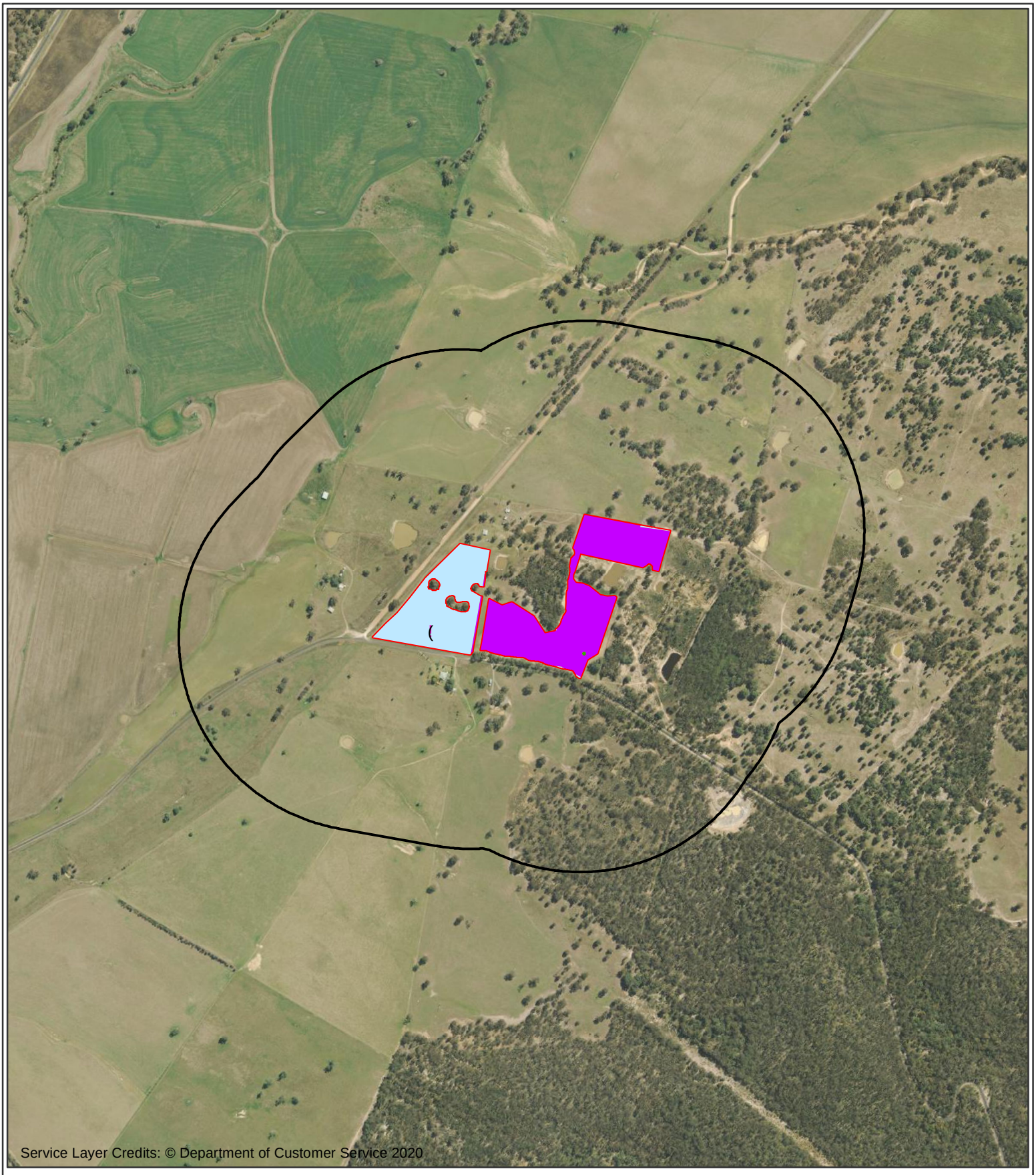
281
479
483

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Plant Community Types

- Development site - wind farm (677 ha)
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- Rapid Data Points

Plant Community Types

- 281
- 483
- Cleared/Exotic

0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Plant Community Types

Development site - wind farm (677 ha)
Study Area (14,001 ha)
BAM Plots
Rapid Data Points

Plant Community Types

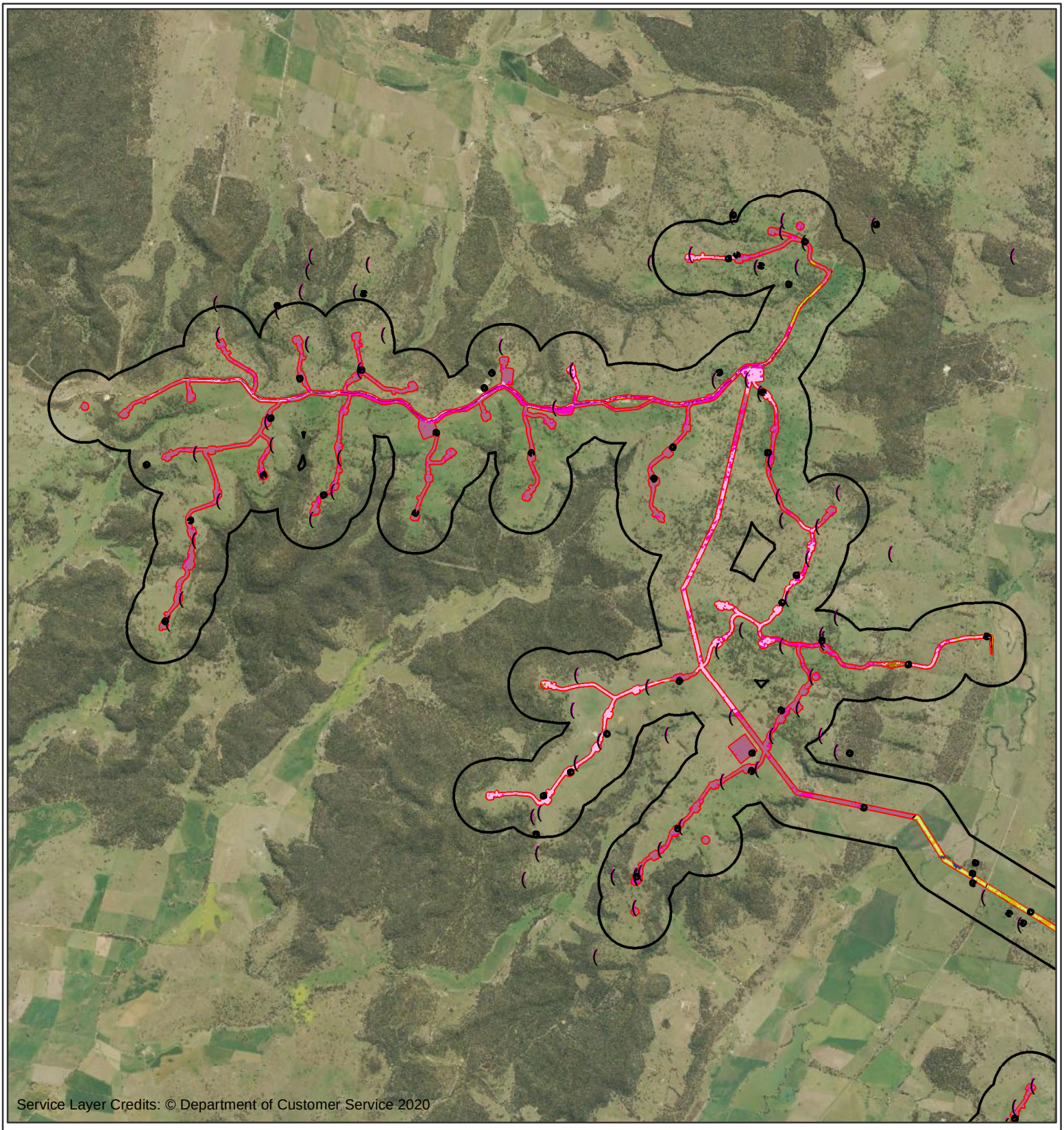
281
461
Cleared/Exotic

0 0.1 0.2 0.4
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Vegetation Zone

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Rapid Data Points
- 01 84 M
- 05 281 M
- 11 479 M
- 15 483 M
- 16 483 L
- 17 483 P
- X1 Crop
- X4 Residen
- X5 Road

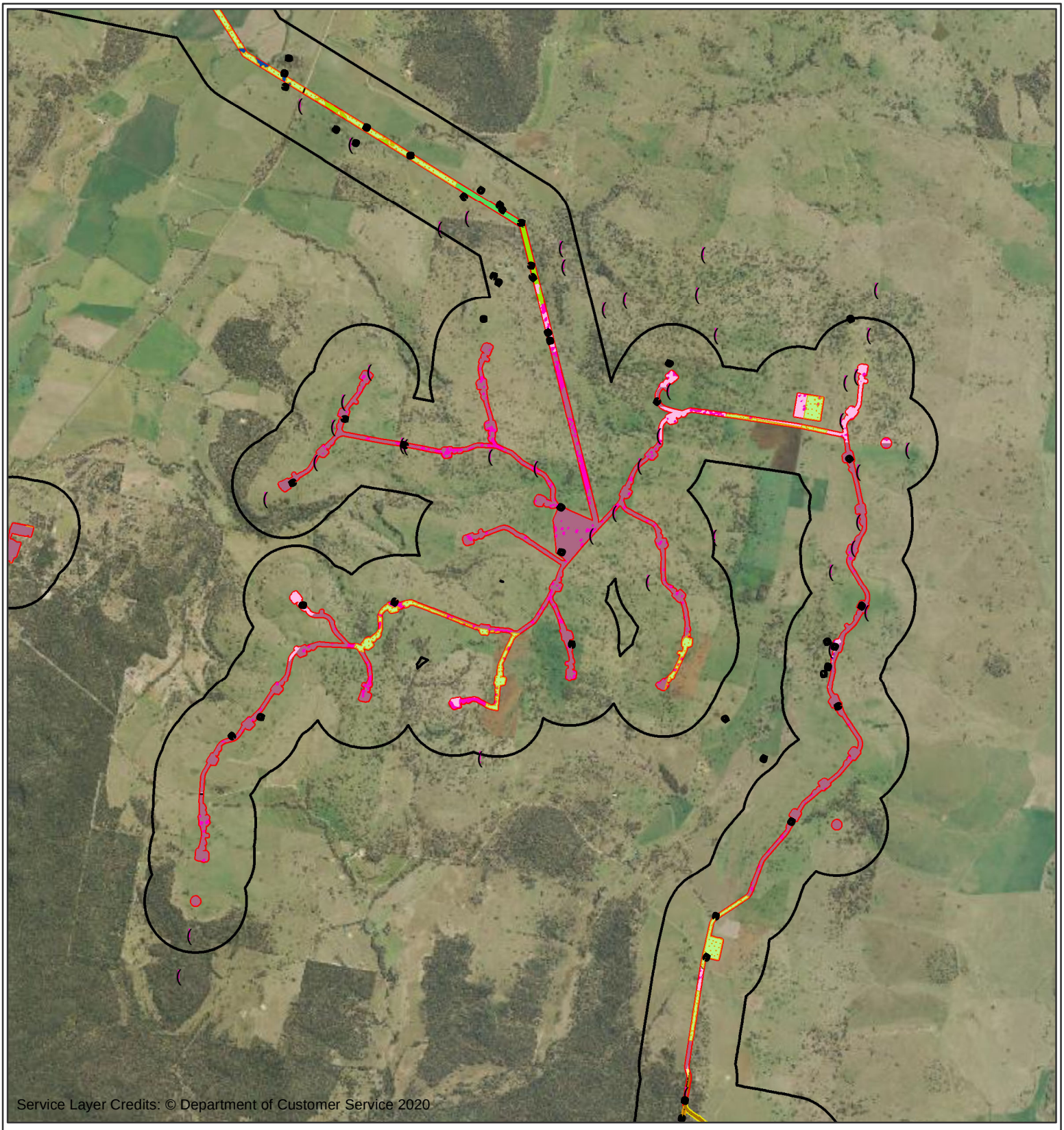
0 0.75 1.5 3

Kilometers

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- 01 84 M
- 04 281 G
- 05 281 M
- 10 479 B
- 11 479 M
- 13 479 L
- 14 483 G
- 15 483 M
- 16 483 L
- 17 483 P
- X1 Crop
- X5 Road

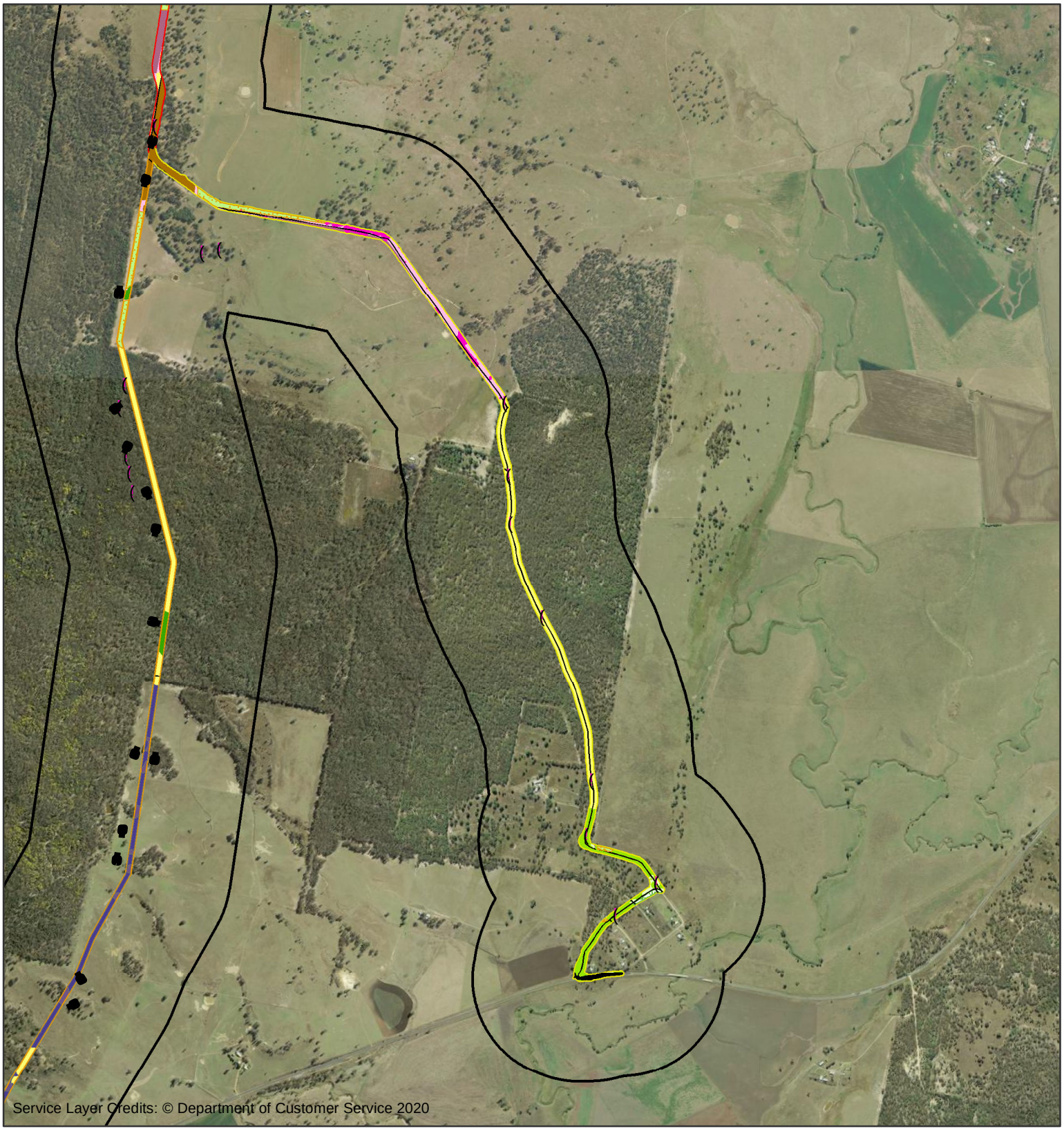
0 0.5 1 2

Kilometers

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- Rapid Data Points
- 02 267 M
- 03 267 L
- 04 281 G
- 05 281 M
- 06 281 L
- 10 479 B
- 11 479 M
- 15 483 M
- 16 483 L
- 17 483 P
- X1 Crop
- X3 Exotic
- X4 Residen
- X5 Road

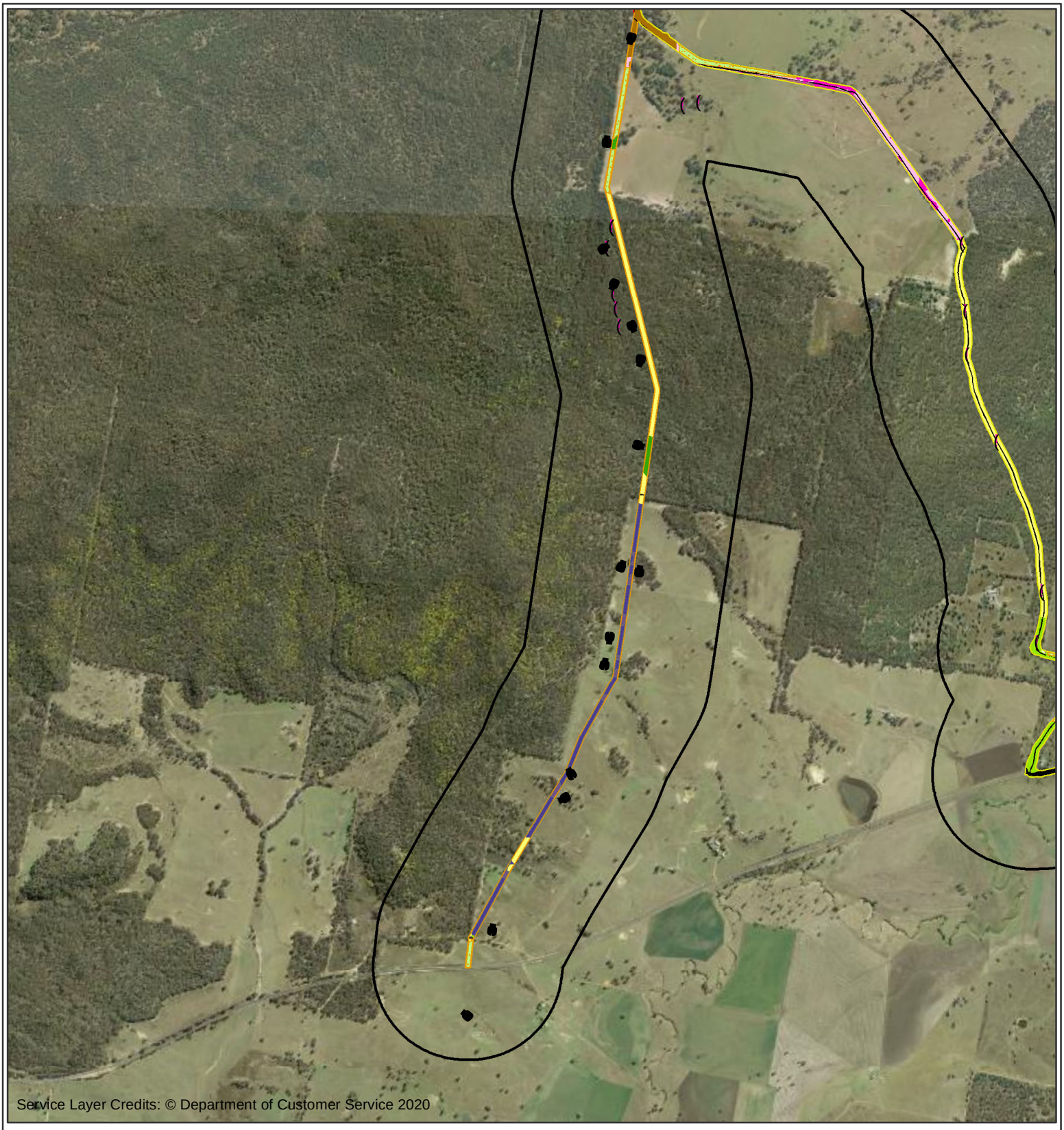
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Vegetation Zone

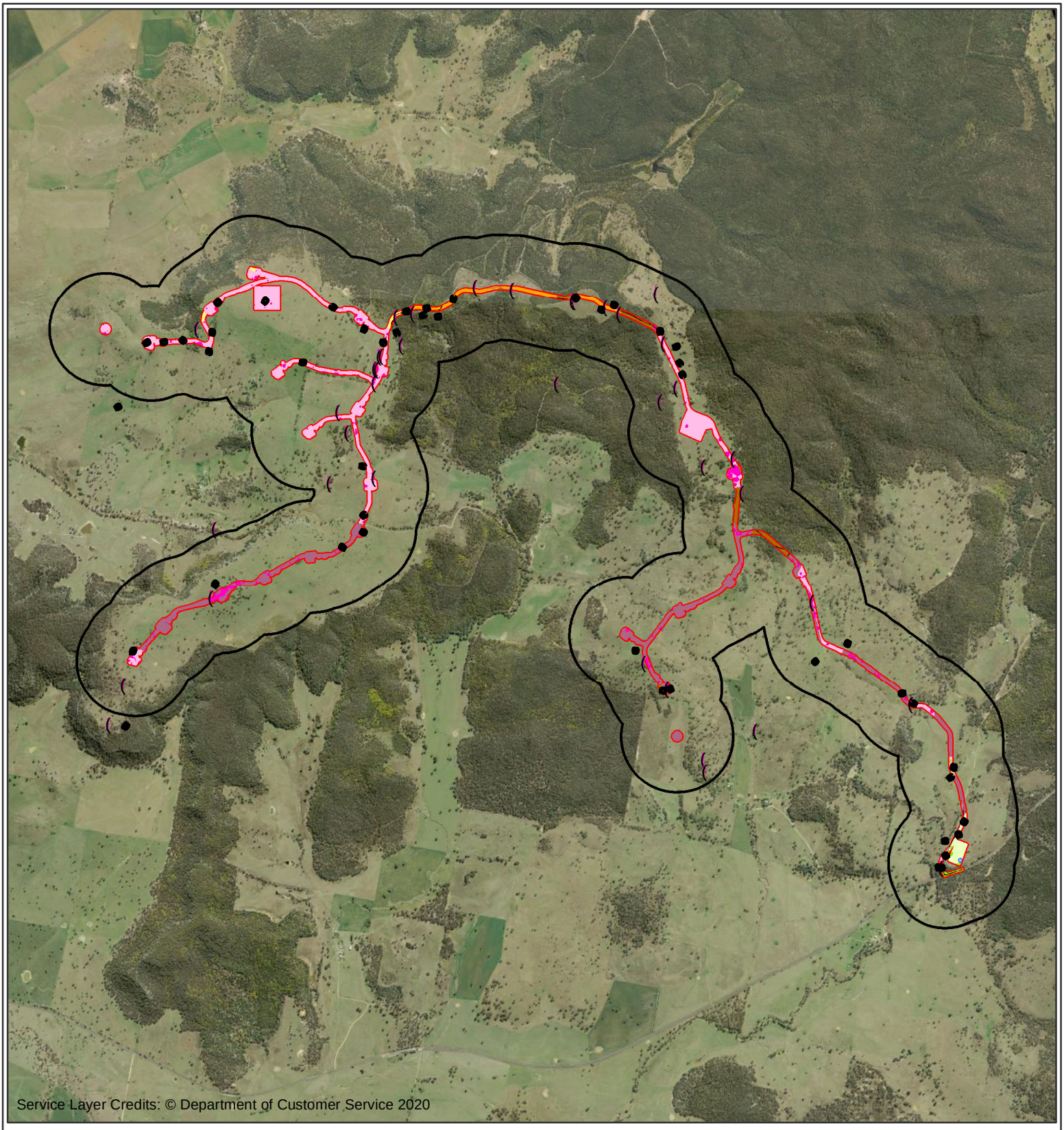
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- BAM Plots
- Rapid Data Points
- 02 267 M
- 03 267 L
- 04 281 G
- 05 281 M
- 06 281 L
- 10 479 B
- 11 479 M
- 15 483 M
- 16 483 L
- 17 483 P
- X1 Crop
- X4 Residen
- X5 Road

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Vegetation Zone

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Rapid Data Points
- 05 281 M
- 06 281 L
- 10 479 B
- 11 479 M
- 12 479 Reg
- 15 483 M
- 16 483 L
- 17 483 P
- X2 Dam
- X5 Road

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Vegetation Zone

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Rapid Data Points
- 05 281 M
- 17 483 P
- X1 Crop

0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Vegetation Zone

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Rapid Data Points
- 05 281 M
- 08 461 M
- X1 Crop
- X4 Residen
- X5 Road

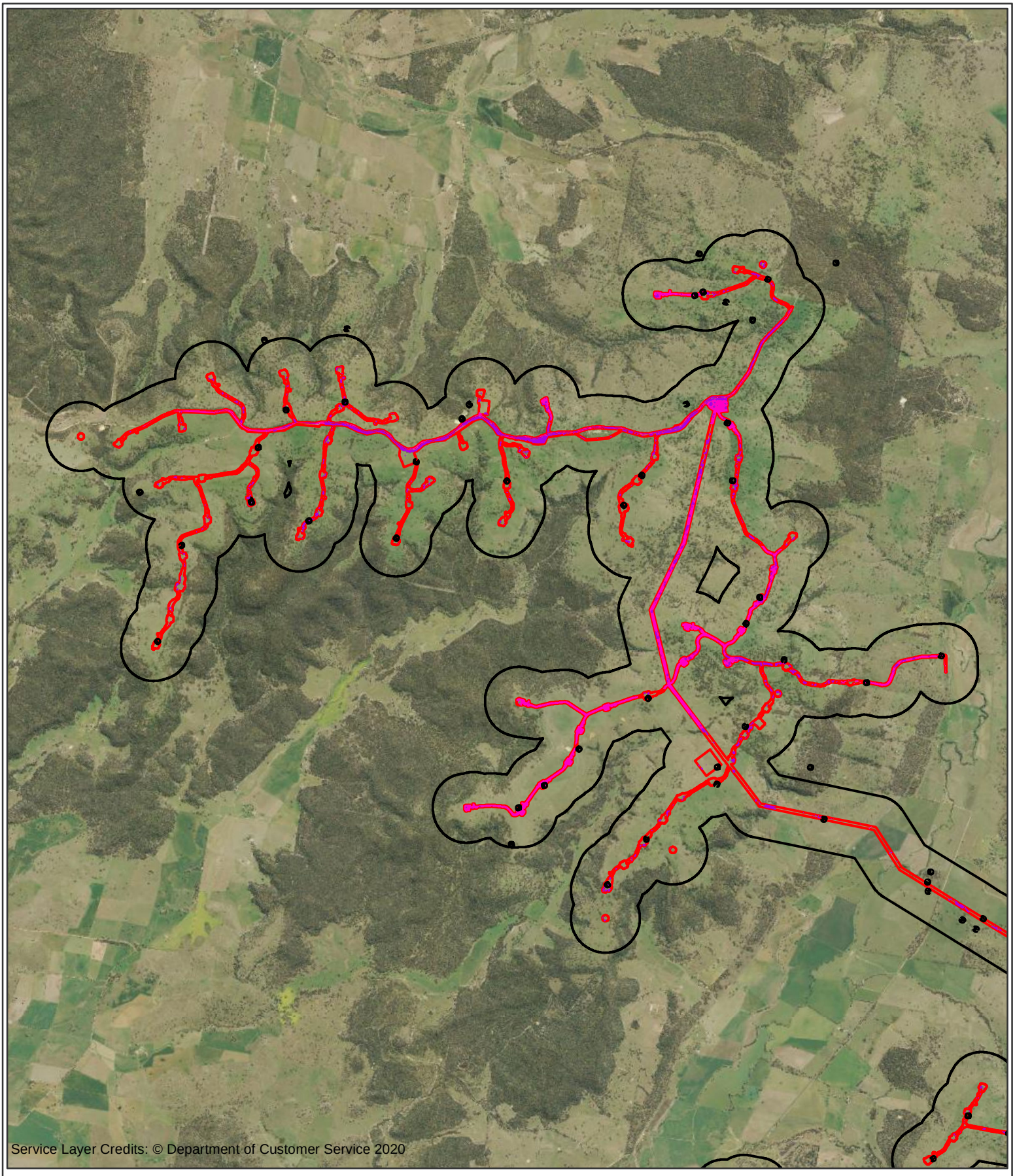
0 0.1 0.2 0.4

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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BC Act Threatened Ecological Communities

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Box Gum Woodland (CEEC)
- Box Gum Woodland - Derived Grassland (CEEC)

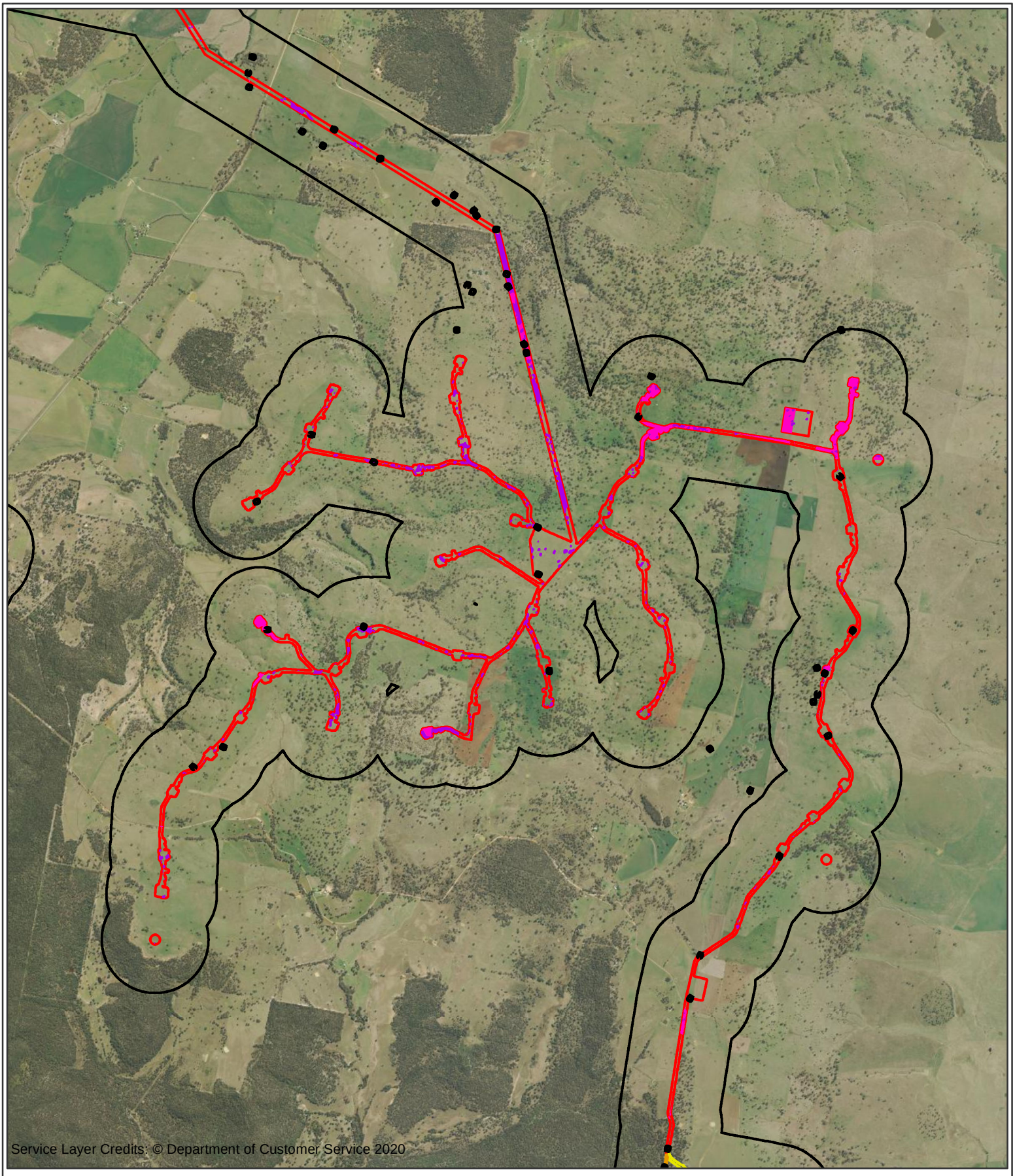
0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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BC Act Threatened Ecological Communities

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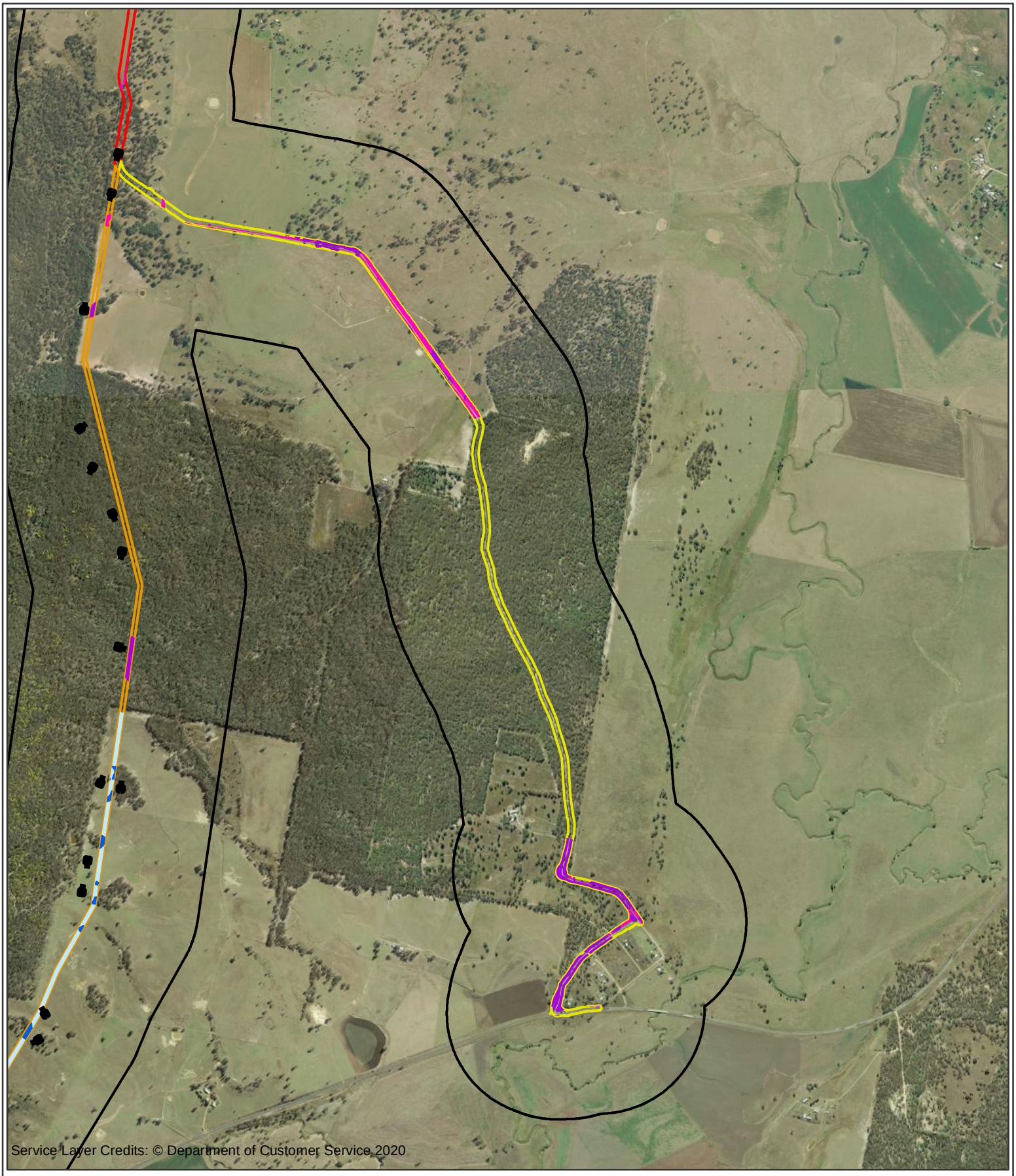
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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BC Act Threatened Ecological Communities

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- Study Area (14,001 ha)
- BAM Plots
- Inland Grey Box Woodland (EEC)
- Inland Grey Box Woodland - Derived Grassland (EEC)
- Box Gum Woodland (CEEC)
- Box Gum Woodland - Derived Grassland (CEEC)

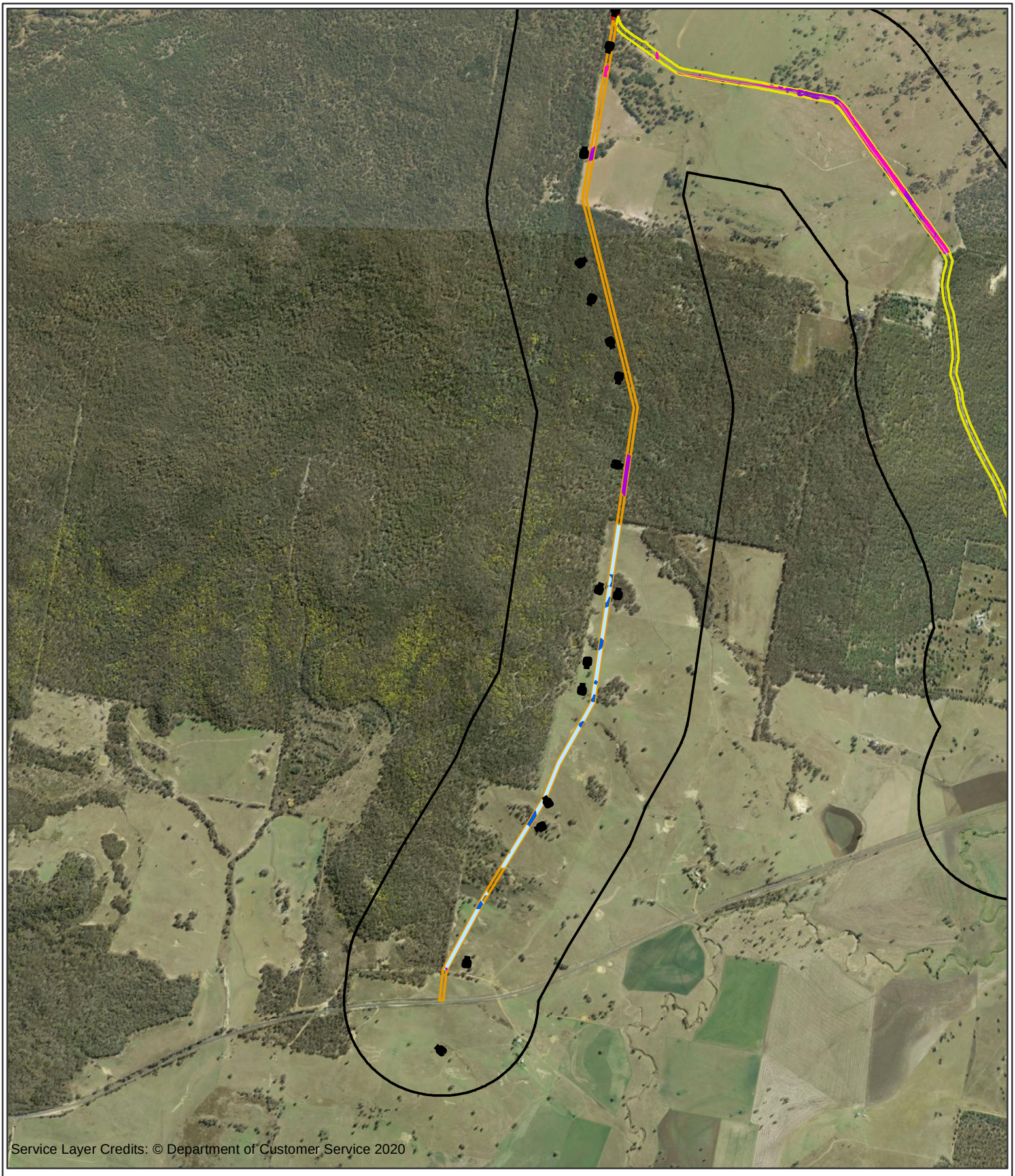
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Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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BC Act Threatened Ecological Communities

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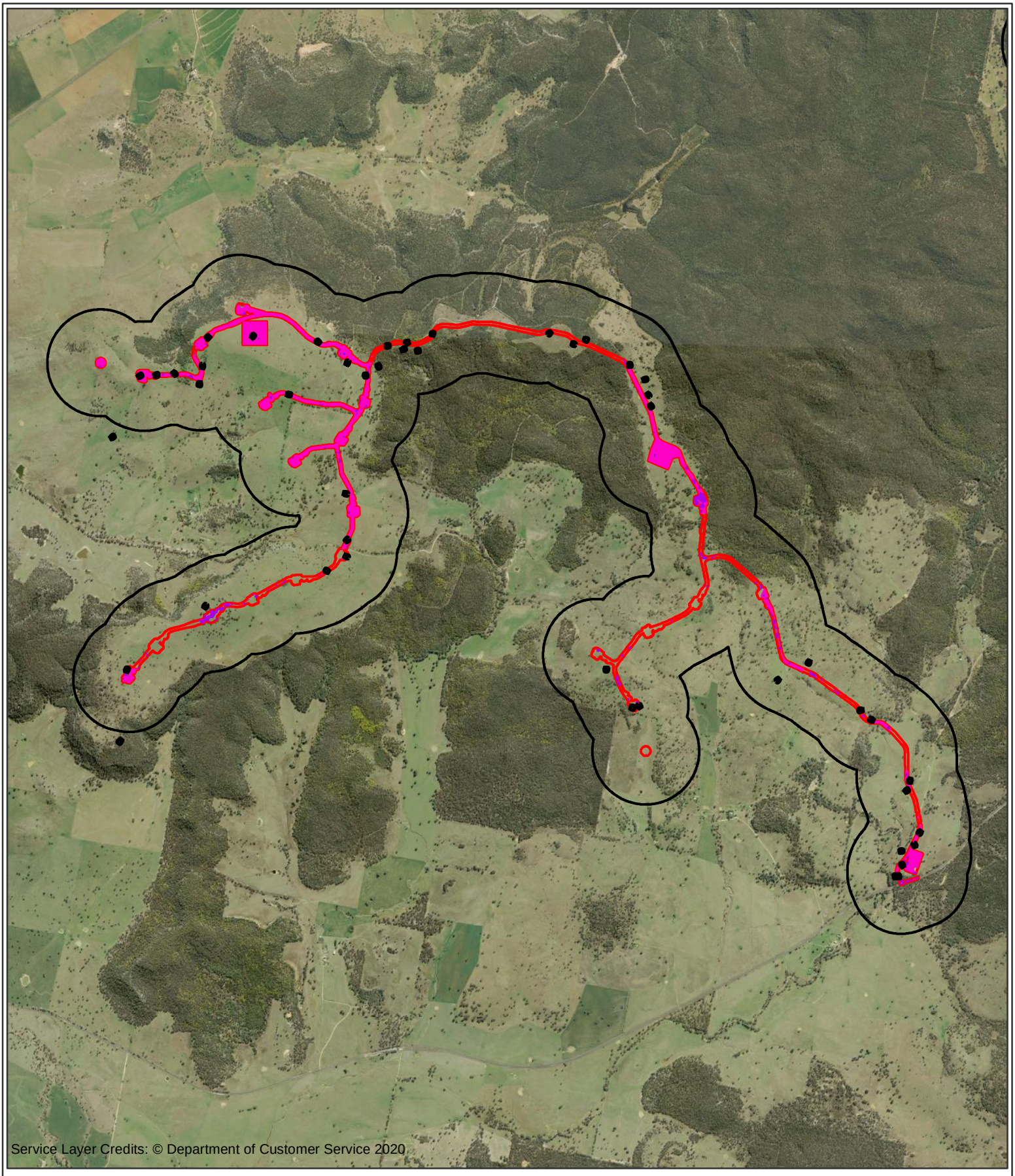
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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BC Act Threatened Ecological Communities

- Development site - wind farm (677 ha)
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- Box Gum Woodland - Derived Grassland (CEEC)

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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BC Act Threatened Ecological Communities

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0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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BC Act Threatened Ecological Communities

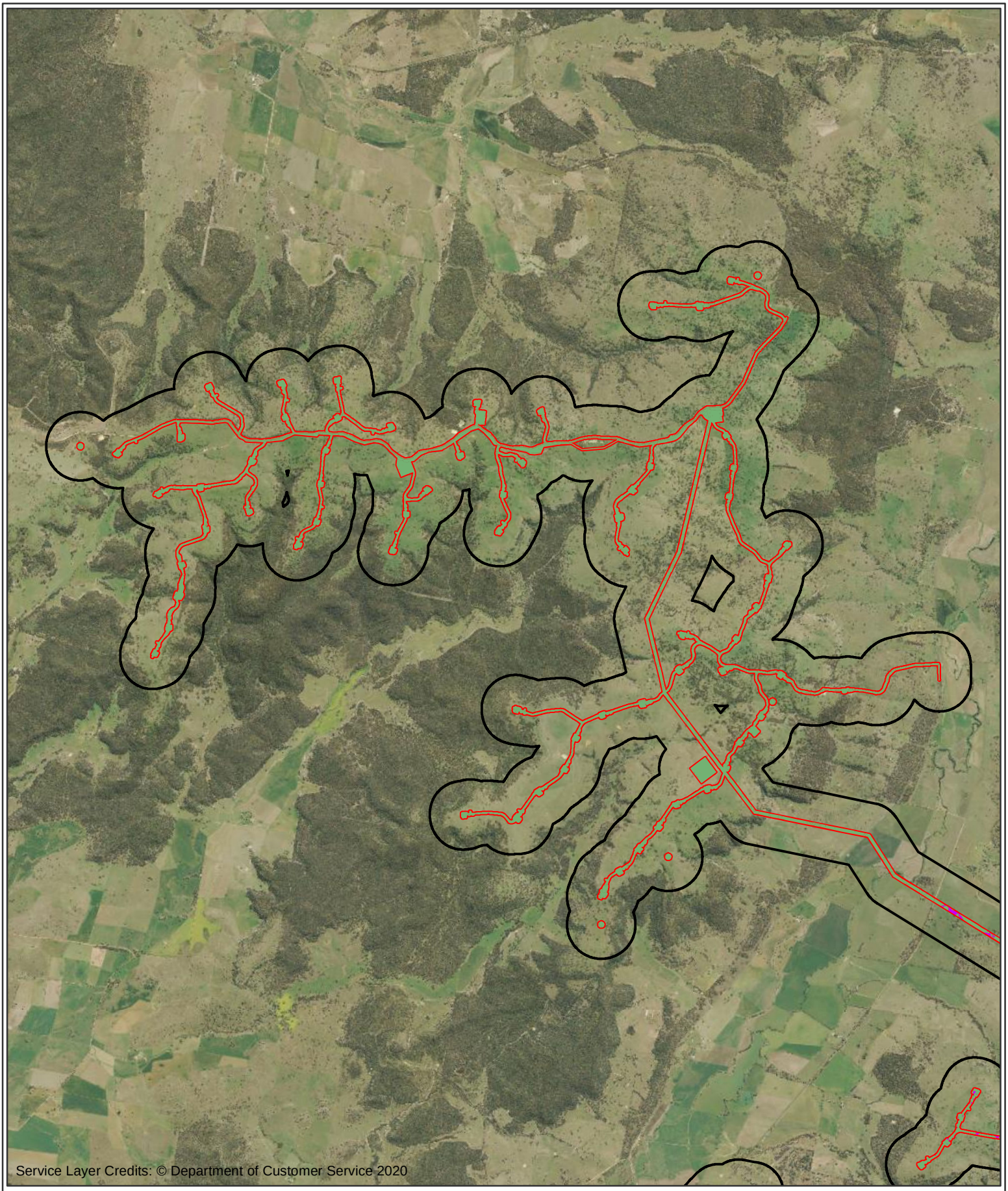
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- BAM Plots
- Box Gum Woodland (CEEC)

0 0.1 0.2 0.4
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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EPBC Act Threatened Ecological Communities

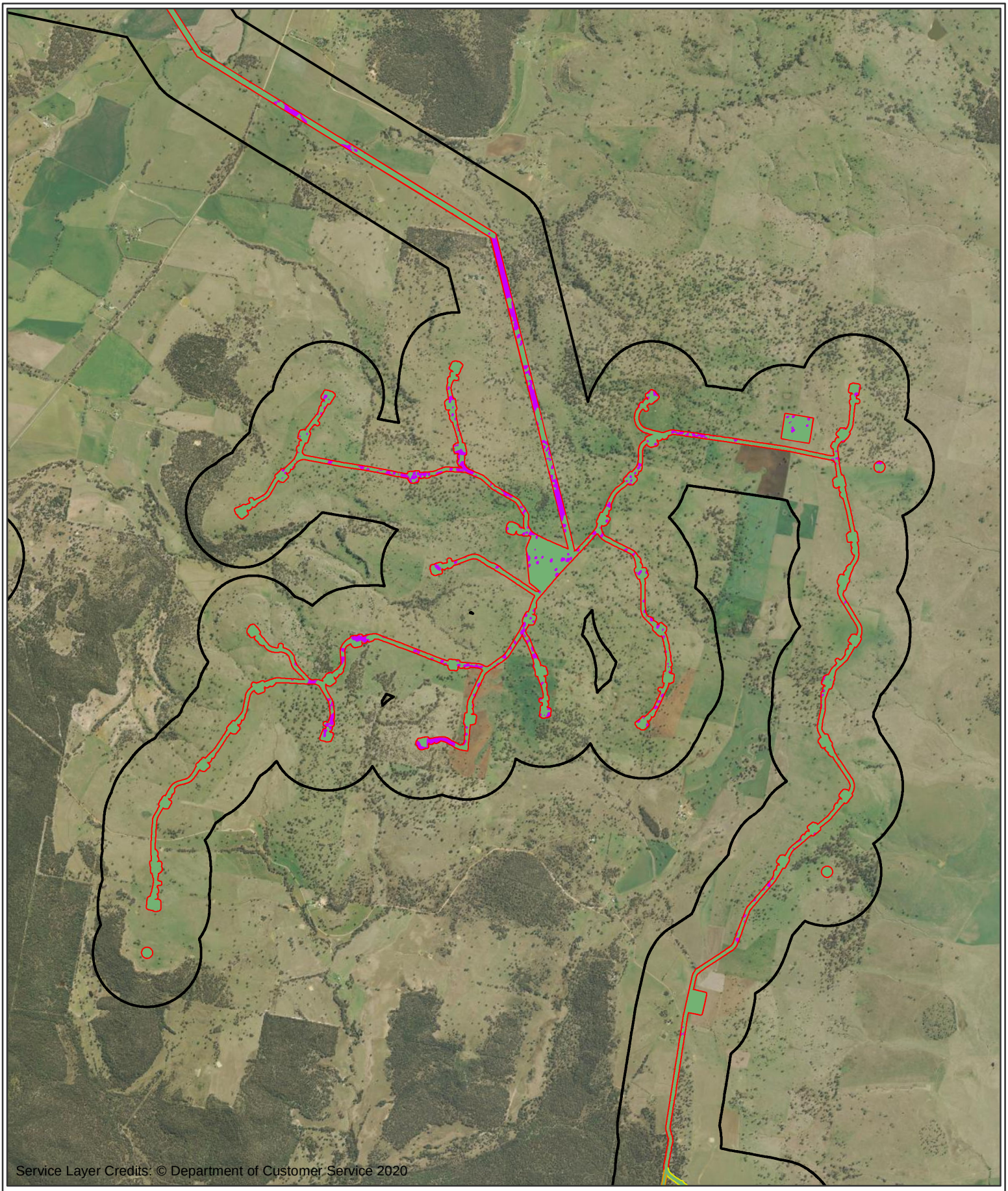
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Box Gum Grassy Woodland (CEEC)
- Not listed under the EPBC Act

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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EPBC Act Threatened Ecological Communities

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0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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EPBC Act Threatened Ecological Communities

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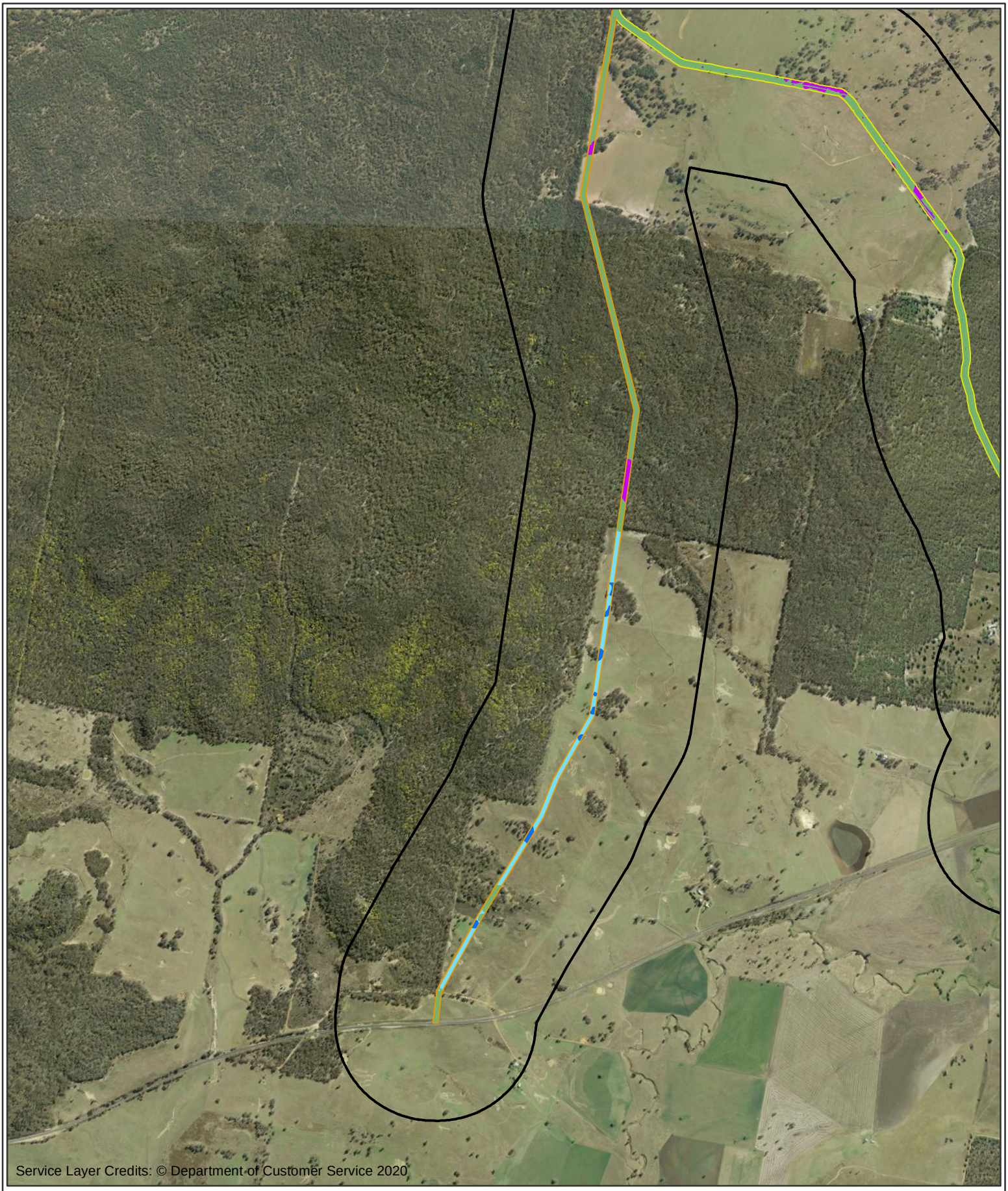
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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EPBC Act Threatened Ecological Communities

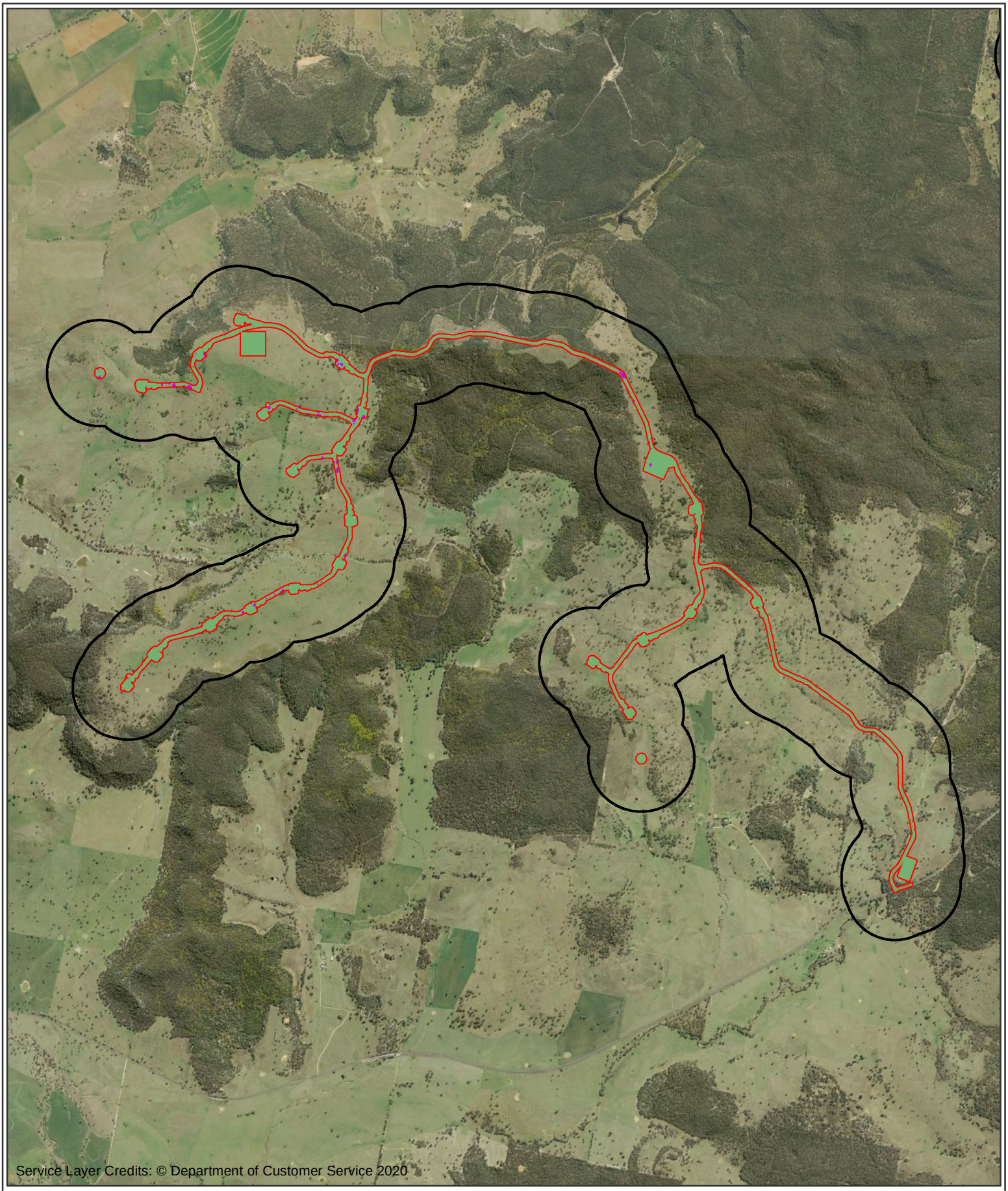
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- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
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0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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EPBC Act Threatened Ecological Communities

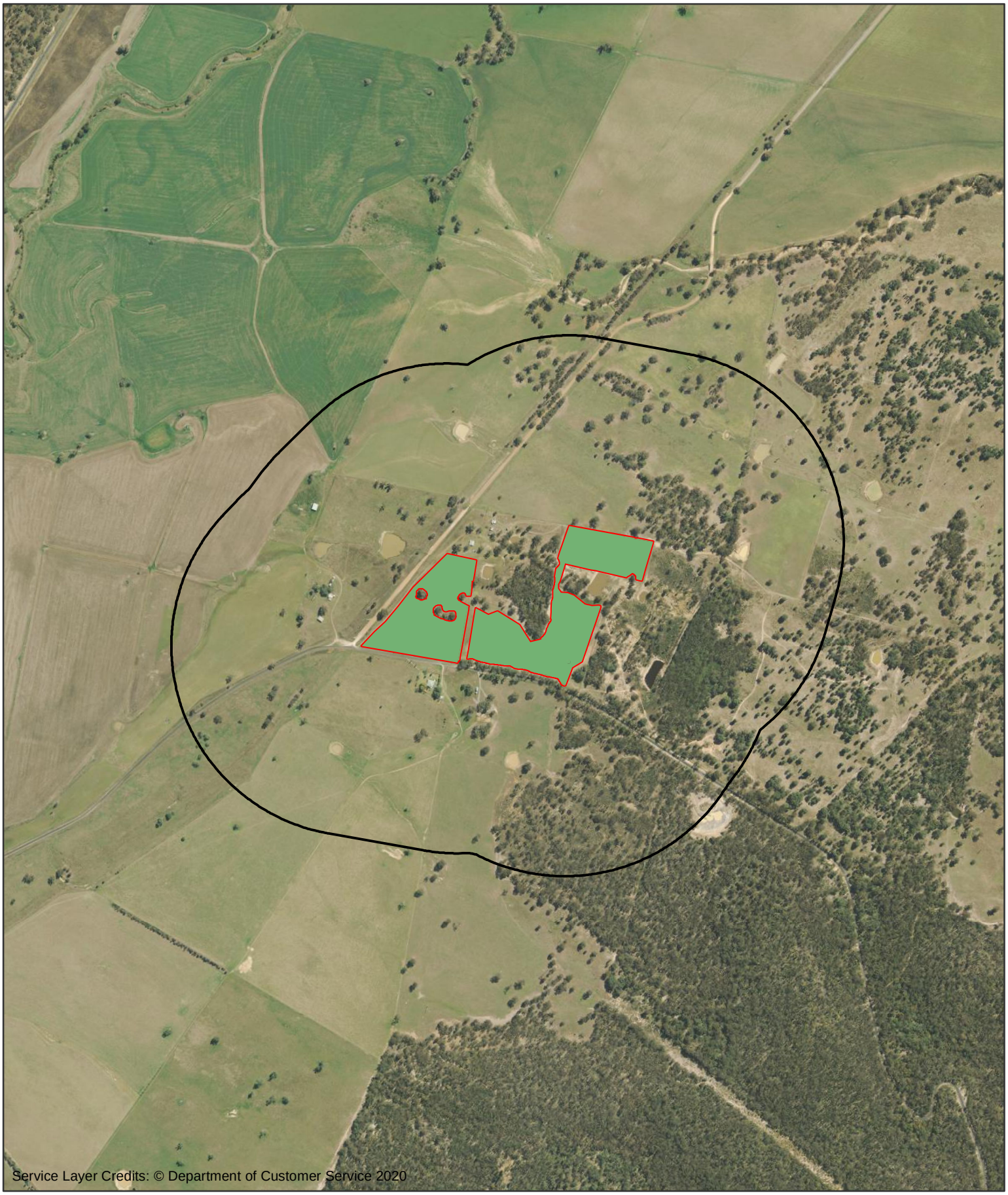
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Box Gum Grassy Woodland (CEEC)
- Not listed under the EPBC Act

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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EPBC Act Threatened Ecological Communities

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Not listed under the EPBC Act

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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EPBC Act Threatened Ecological Communities

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Not listed under the EPBC Act

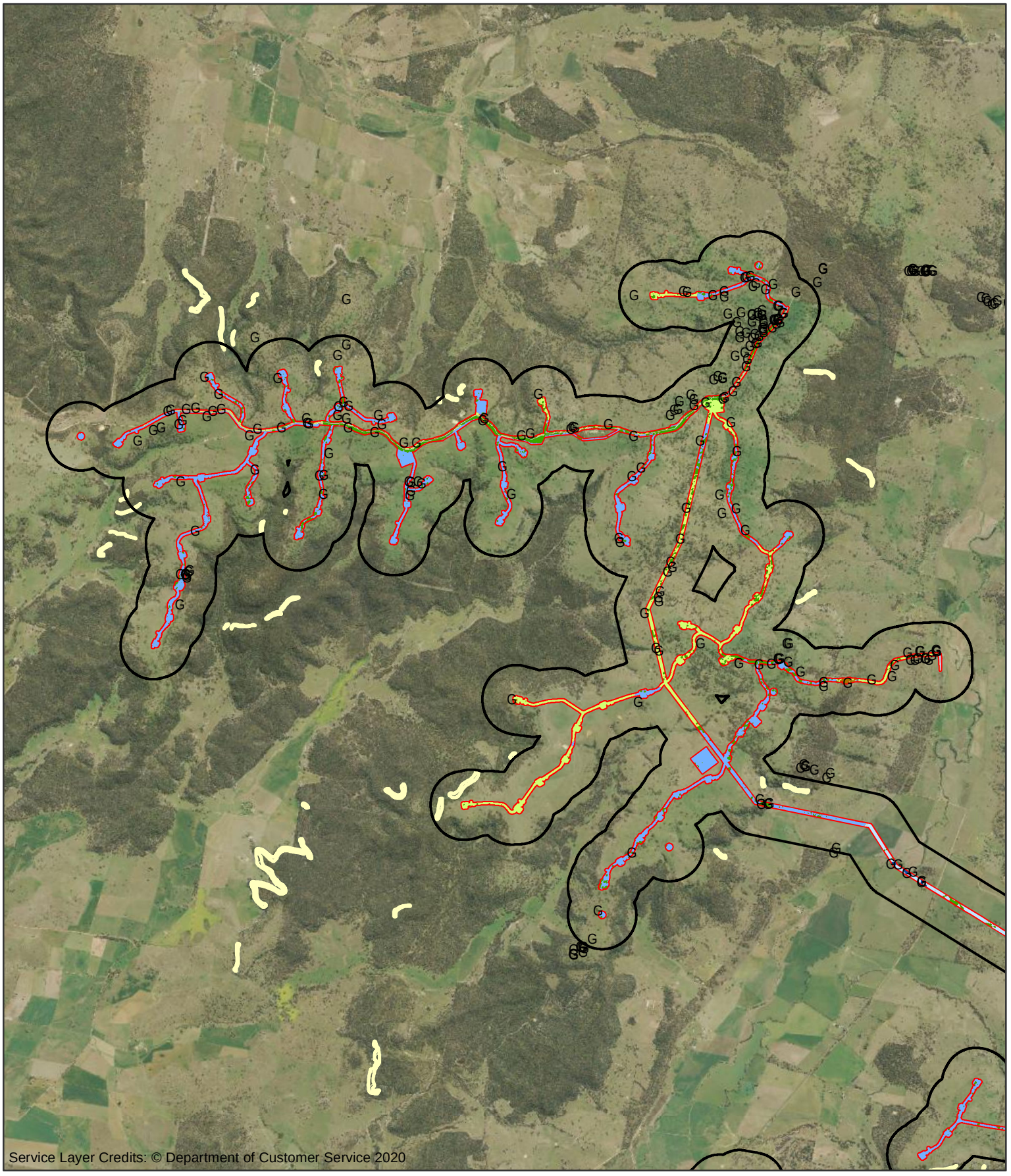
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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Fauna Habitats

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Clifflines
- G Hollow-bearing Trees

Vegetation Formation

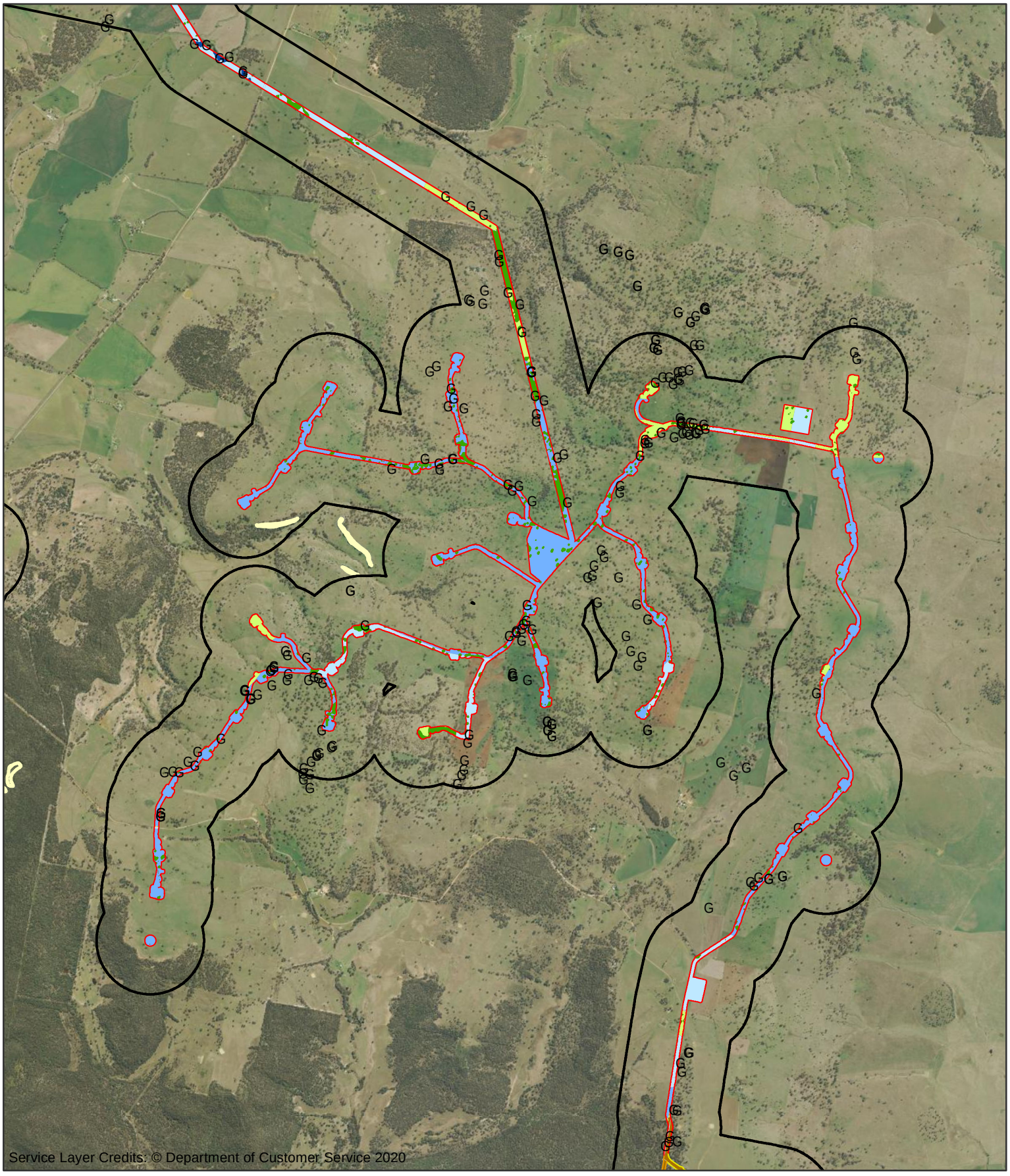
- DSF (Shrubby)
- Forested Wetlands
- Grassy Woodland
- LCN Grassland
- Exotic dominated grassland
- Cleared

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Habitats

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Clifflines
- G Hollow-bearing Trees

Vegetation Formation

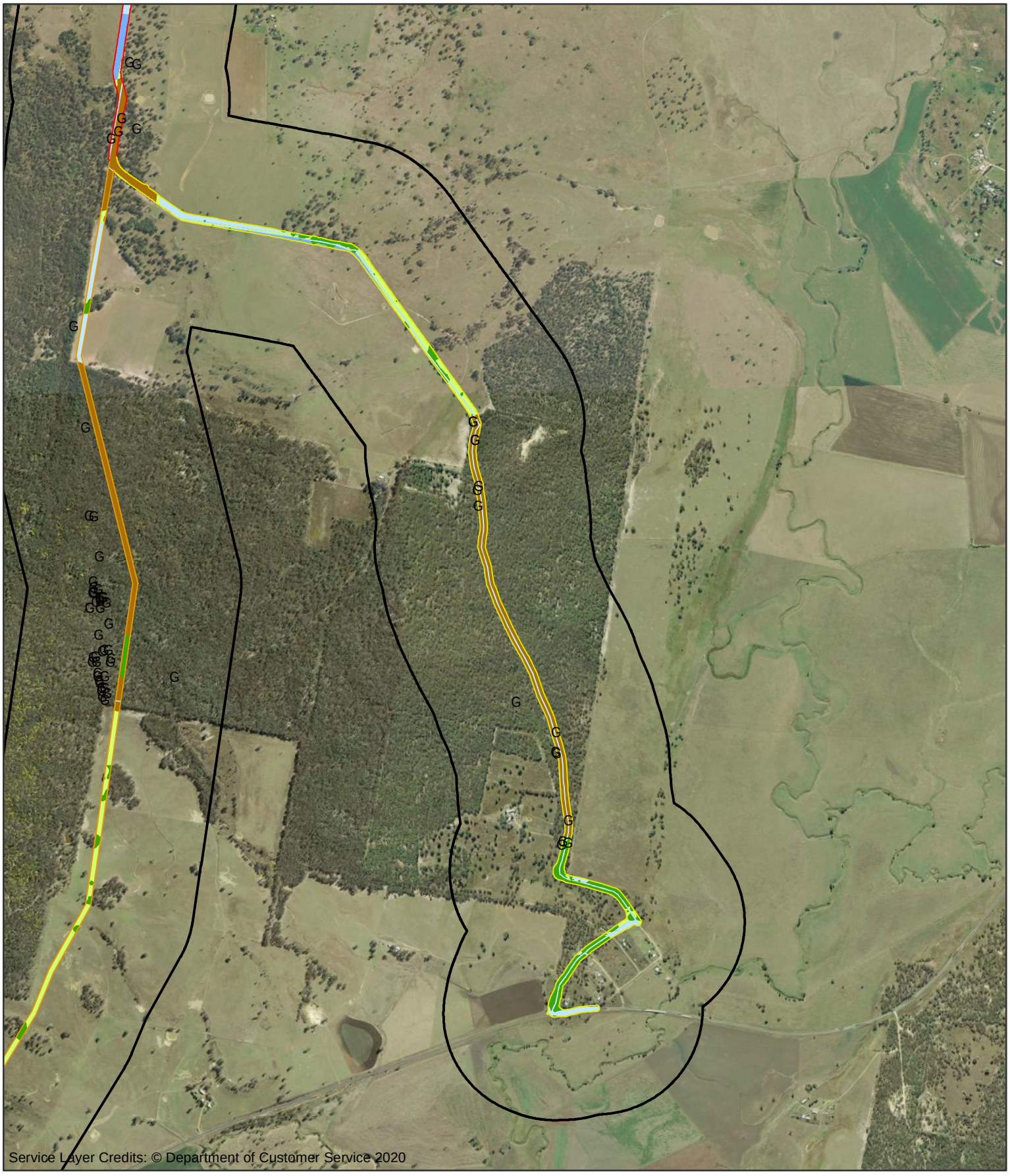
- DSF (Shrubby)
- Forested Wetlands
- Grassy Woodland
- LCN Grassland
- Exotic dominated grassland
- Cleared

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Habitats

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- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- G Hollow-bearing Trees

Vegetation Formation

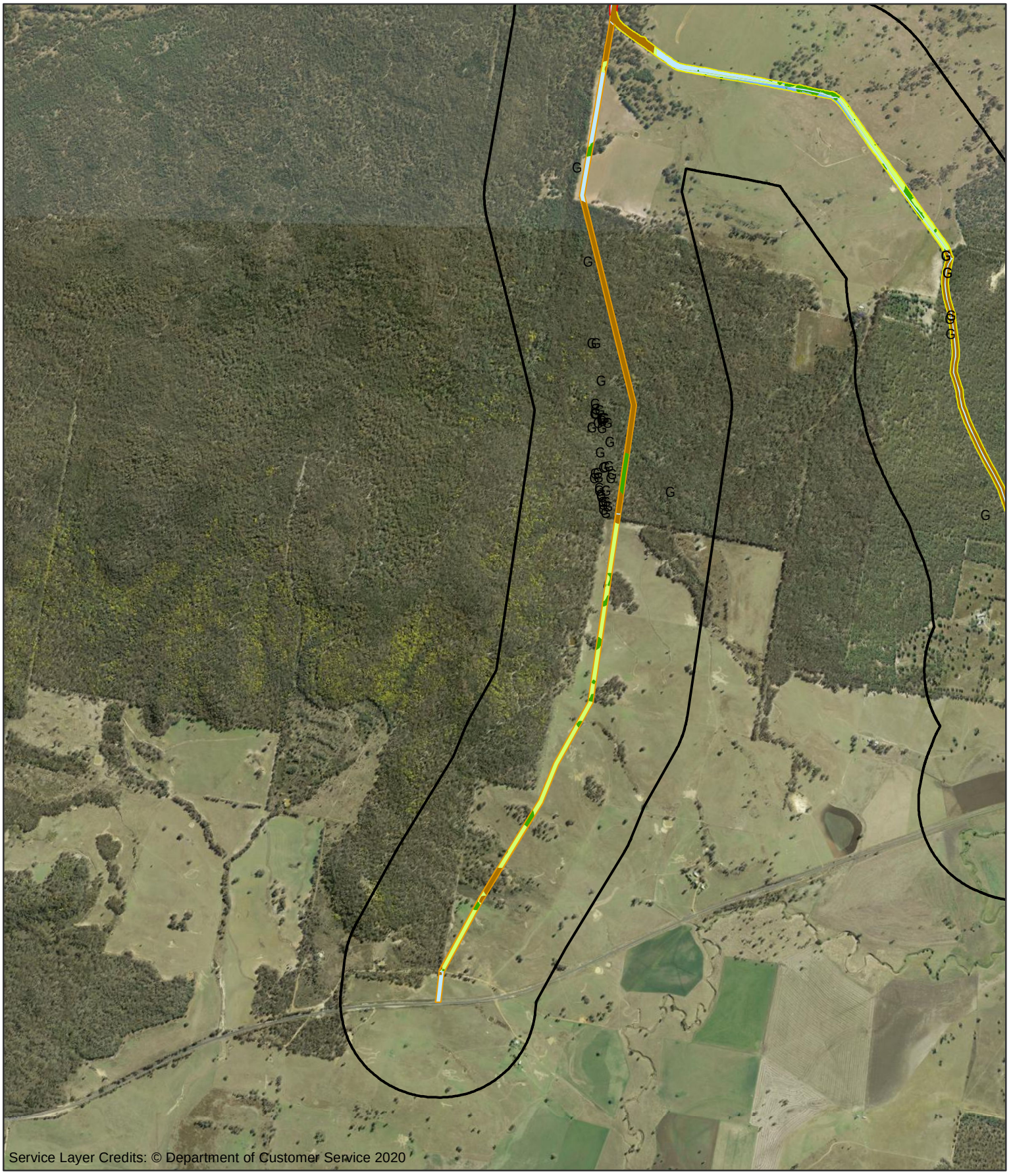
- DSF (Shrubby)
- Grassy Woodland
- LCN Grassland
- Exotic dominated grassland
- Cleared

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Habitats

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
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Vegetation Formation

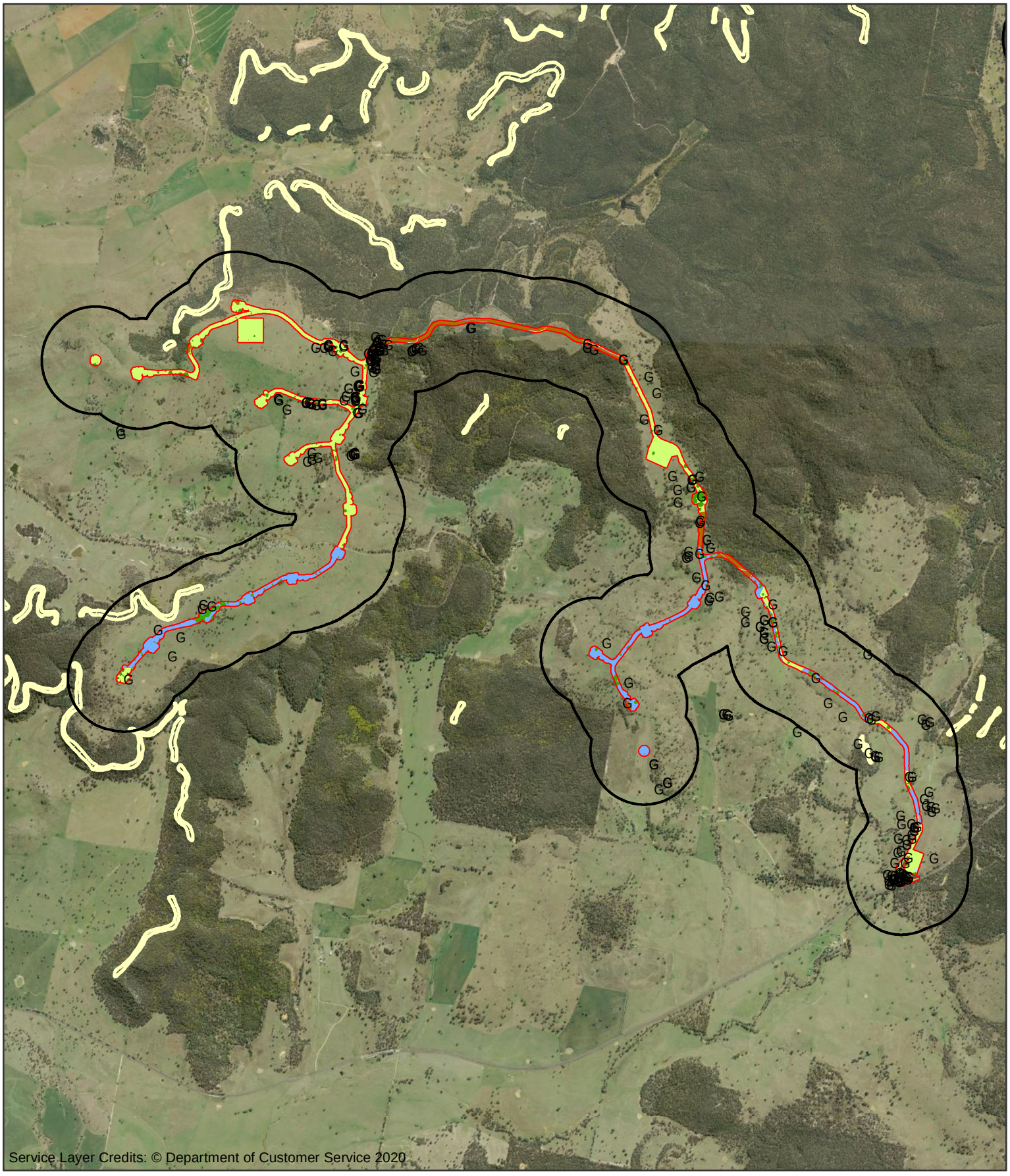
- DSF (Shrubby)
- Grassy Woodland
- LCN Grassland
- Exotic dominated grassland
- Cleared

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Habitats

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Clifflines
- G Hollow-bearing Trees

Vegetation Formation

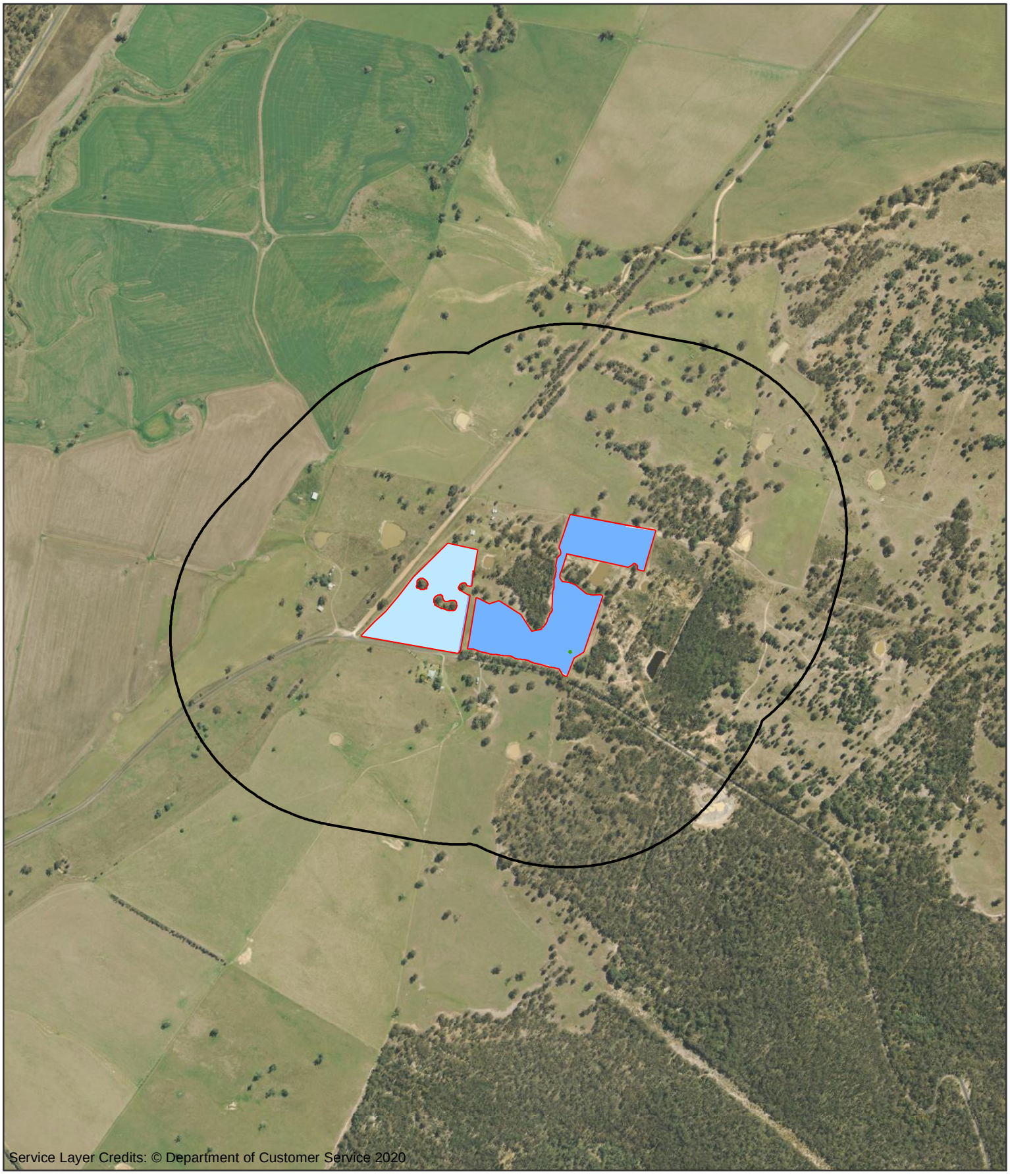
- DSF (Shrubby)
- Grassy Woodland
- LCN Grassland
- Exotic dominated grassland
- Cleared

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Habitats

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Vegetation Formation

Grassy Woodland

Exotic dominated grassland

Cleared

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Habitats

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Vegetation Formation

Grassy Woodland

Cleared

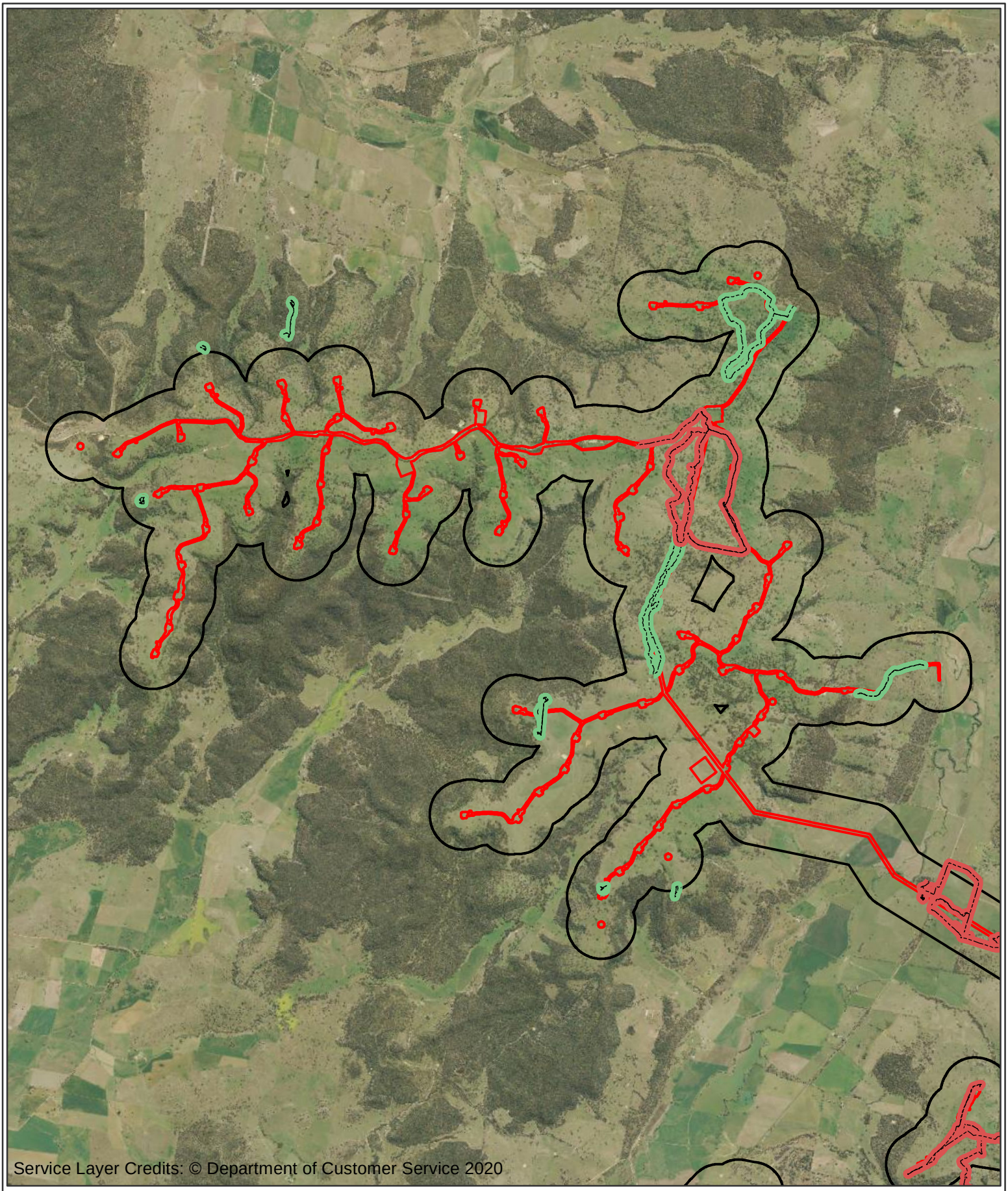
0 0.1 0.2 0.4

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search Summer/Autumn

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

February 2021

April 2021

May 2021

0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search Summer/Autumn

- Development site - wind farm (677 ha)
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- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

Threatened flora effort

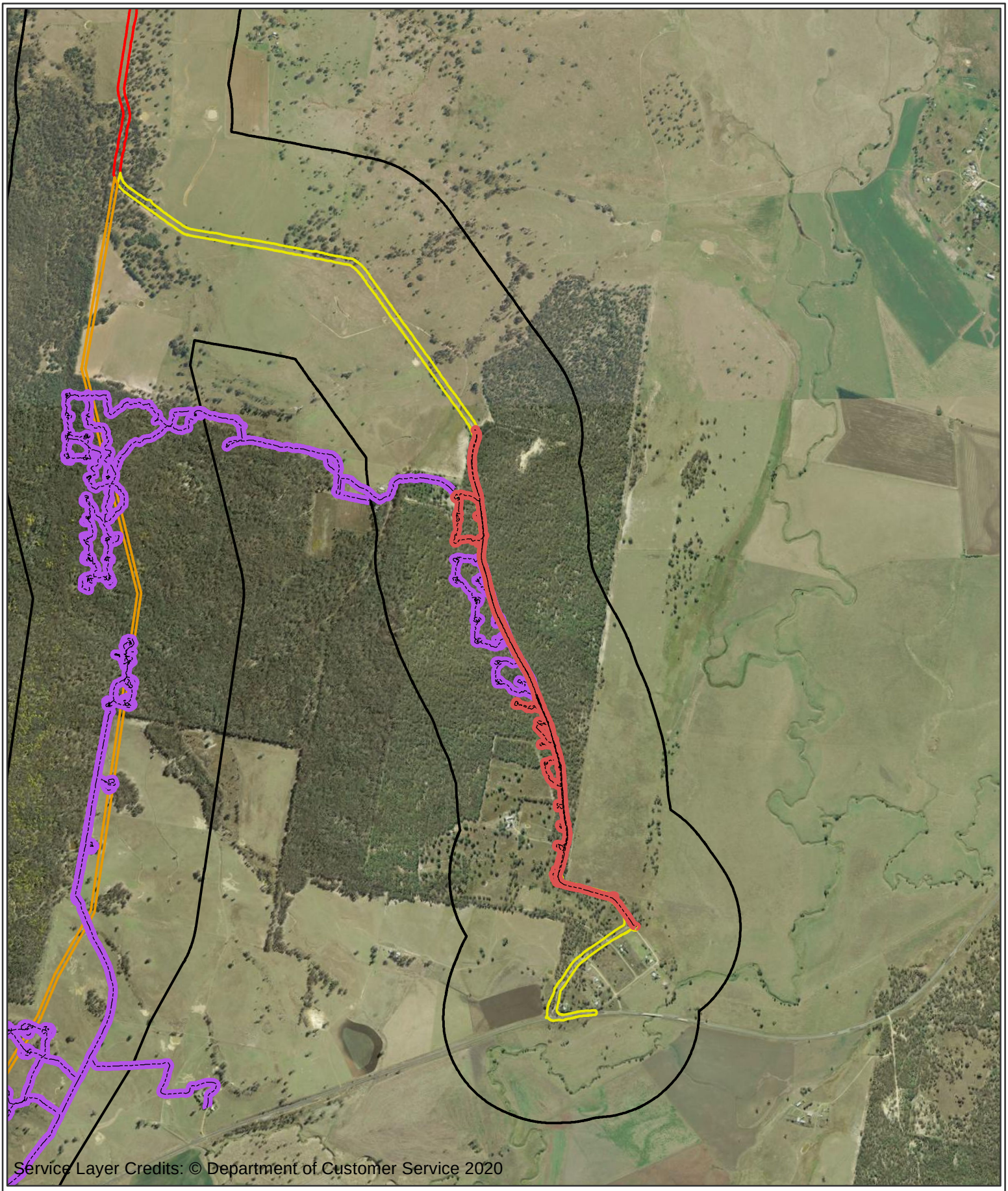
- February 2021
- April 2021
- May 2021

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search Summer/Autumn

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- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

Threatened flora effort

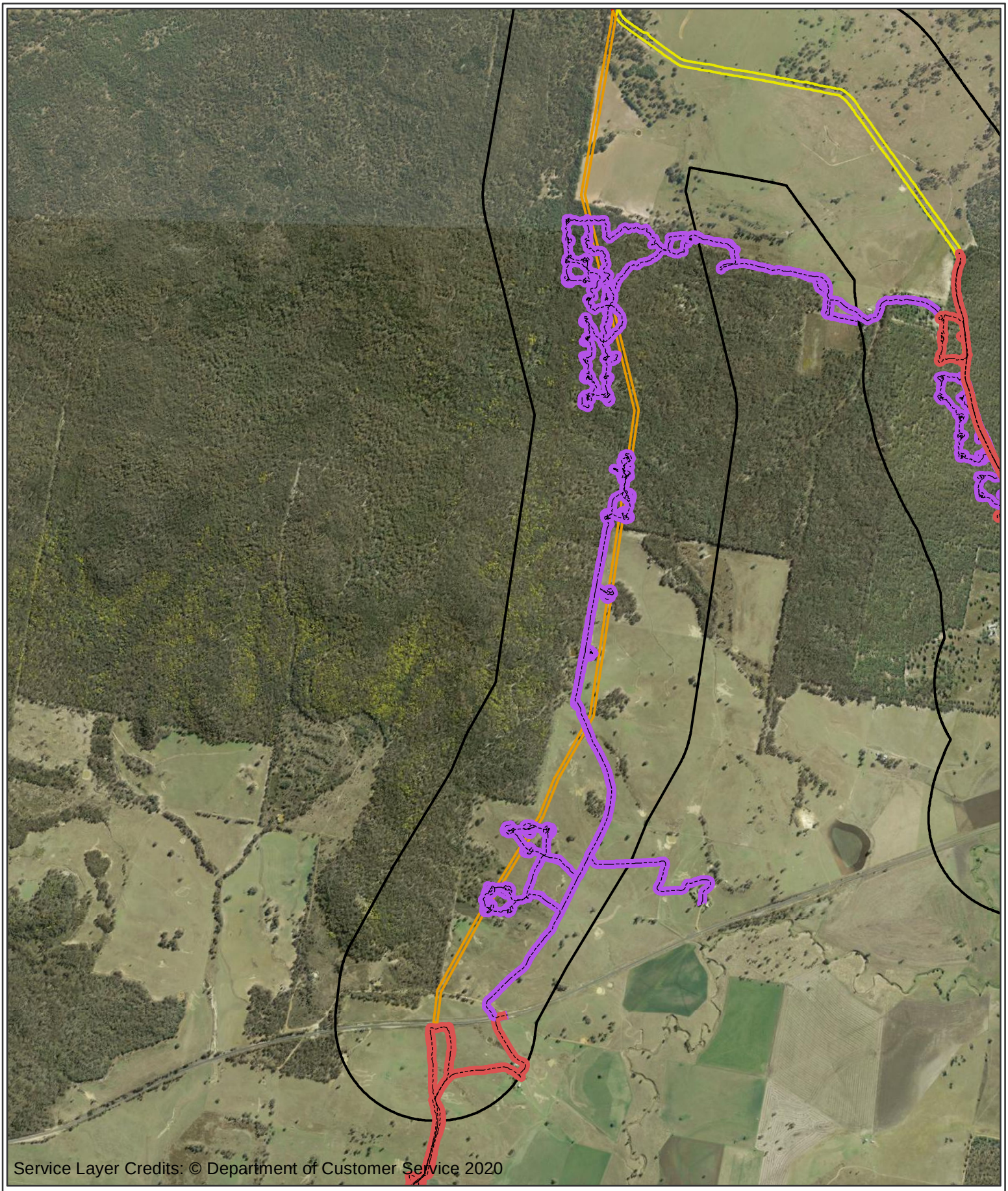
- February 2021
- April 2021
- May 2021

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search Summer/Autumn

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- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

Threatened flora effort

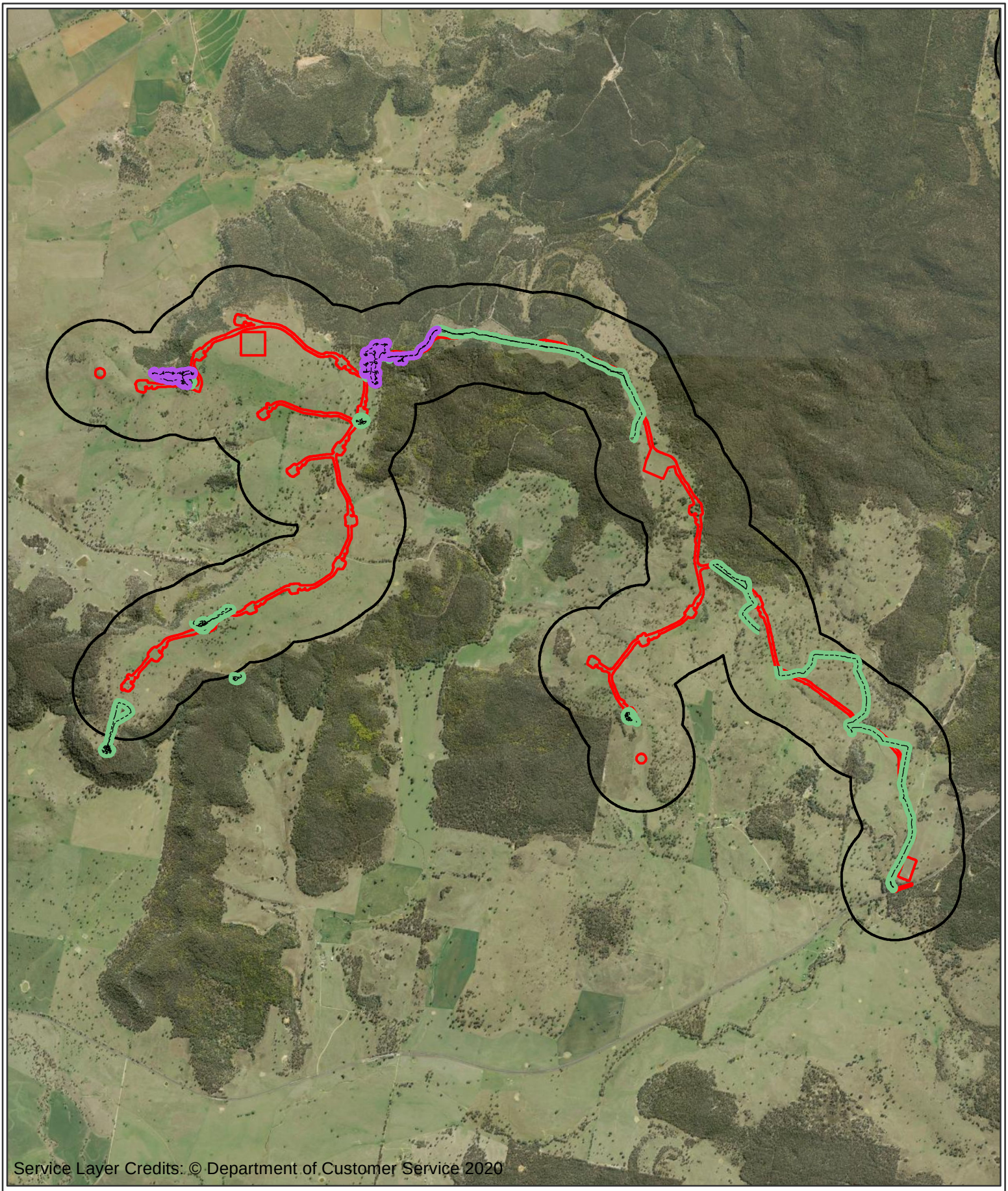
- February 2021
- April 2021
- May 2021

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search Summer/Autumn

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

February 2021

April 2021

May 2021

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search Summer/Autumn

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

February 2021

April 2021

May 2021

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search Summer/Autumn

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

February 2021

April 2021

May 2021

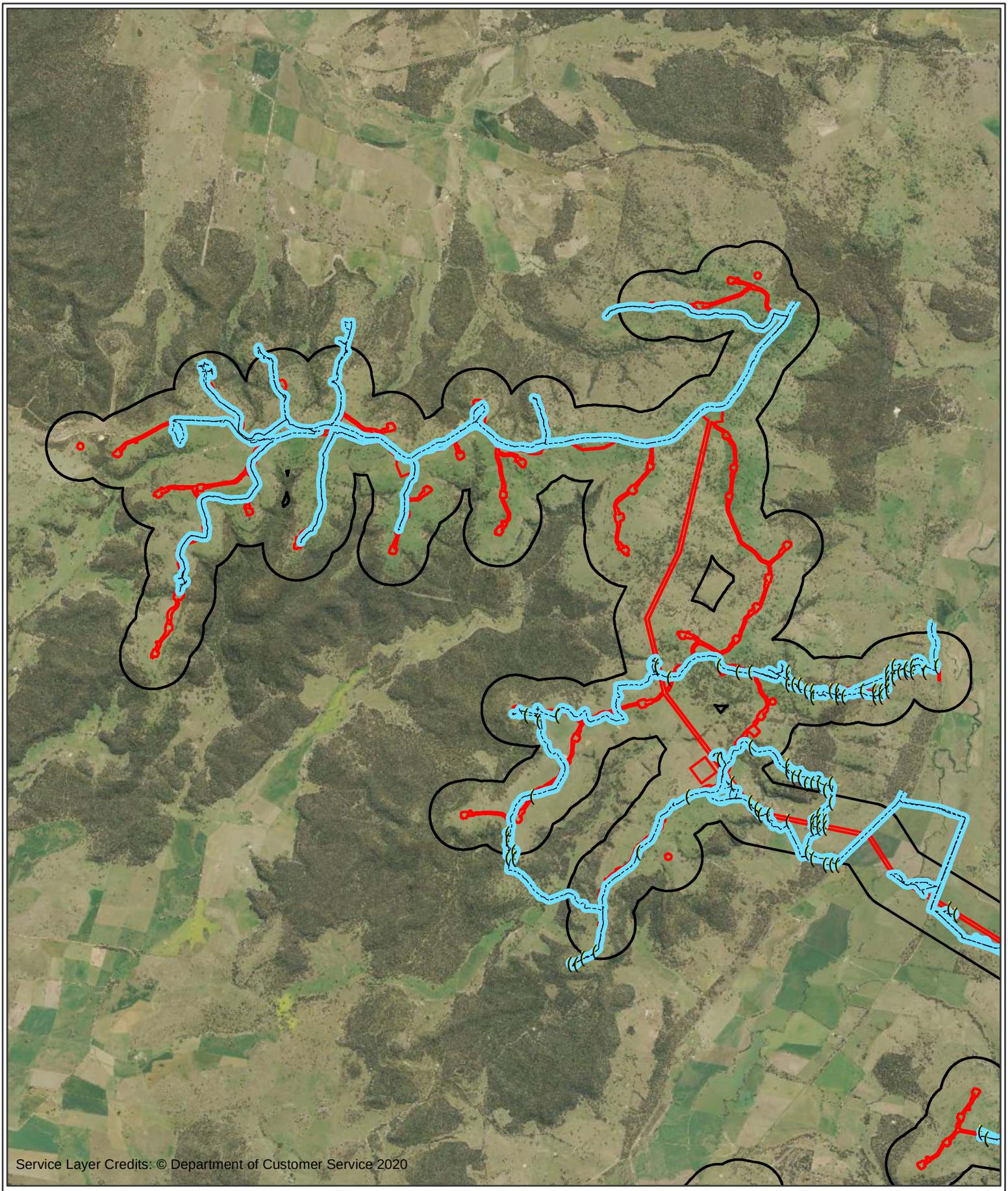
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search (Spring)

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

September 2021

(Threatened flora survey point (303)

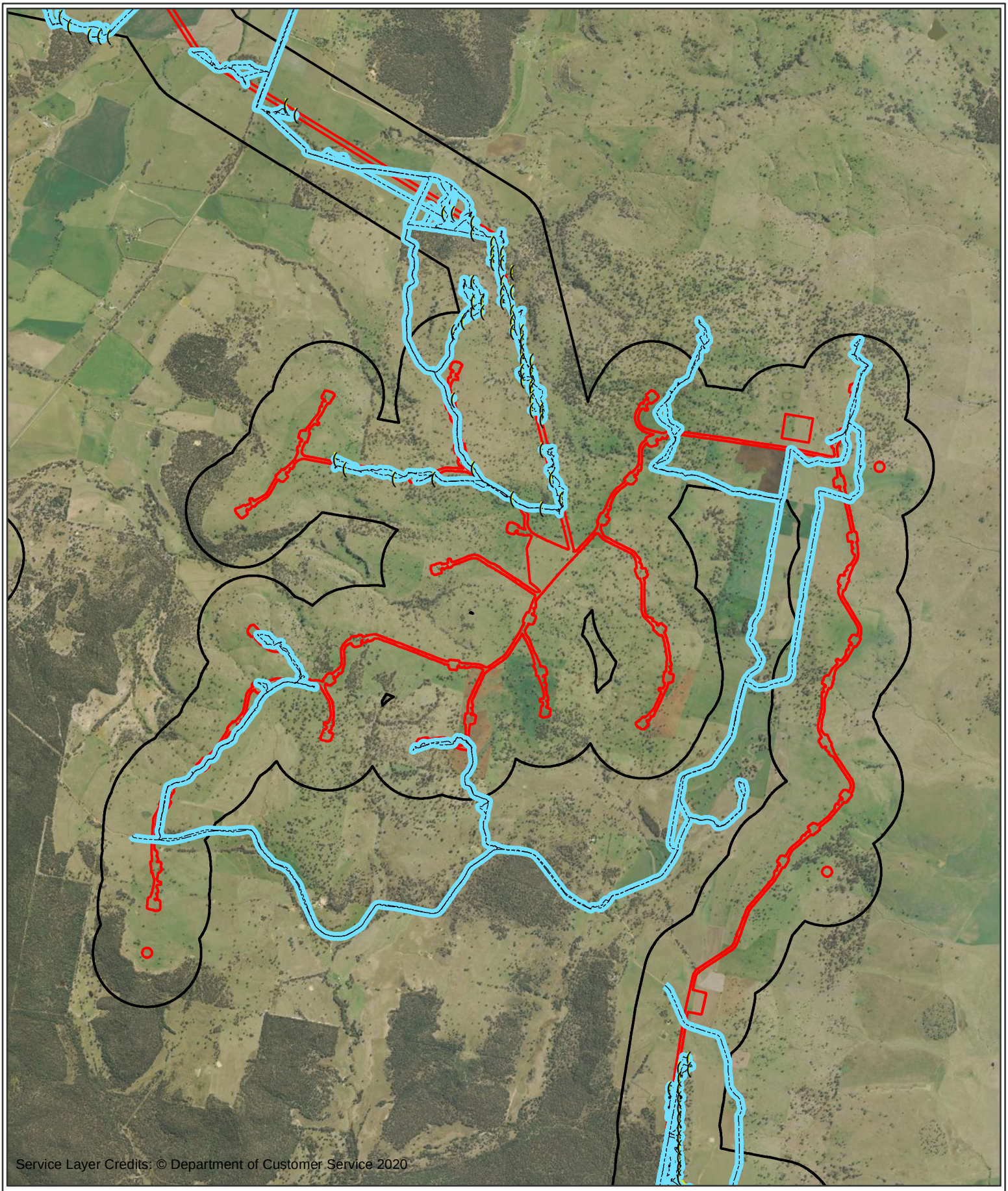
0 0.75 1.5 3

Kilometers

Datum/Projection:
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Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search (Spring)

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

Threatened flora effort

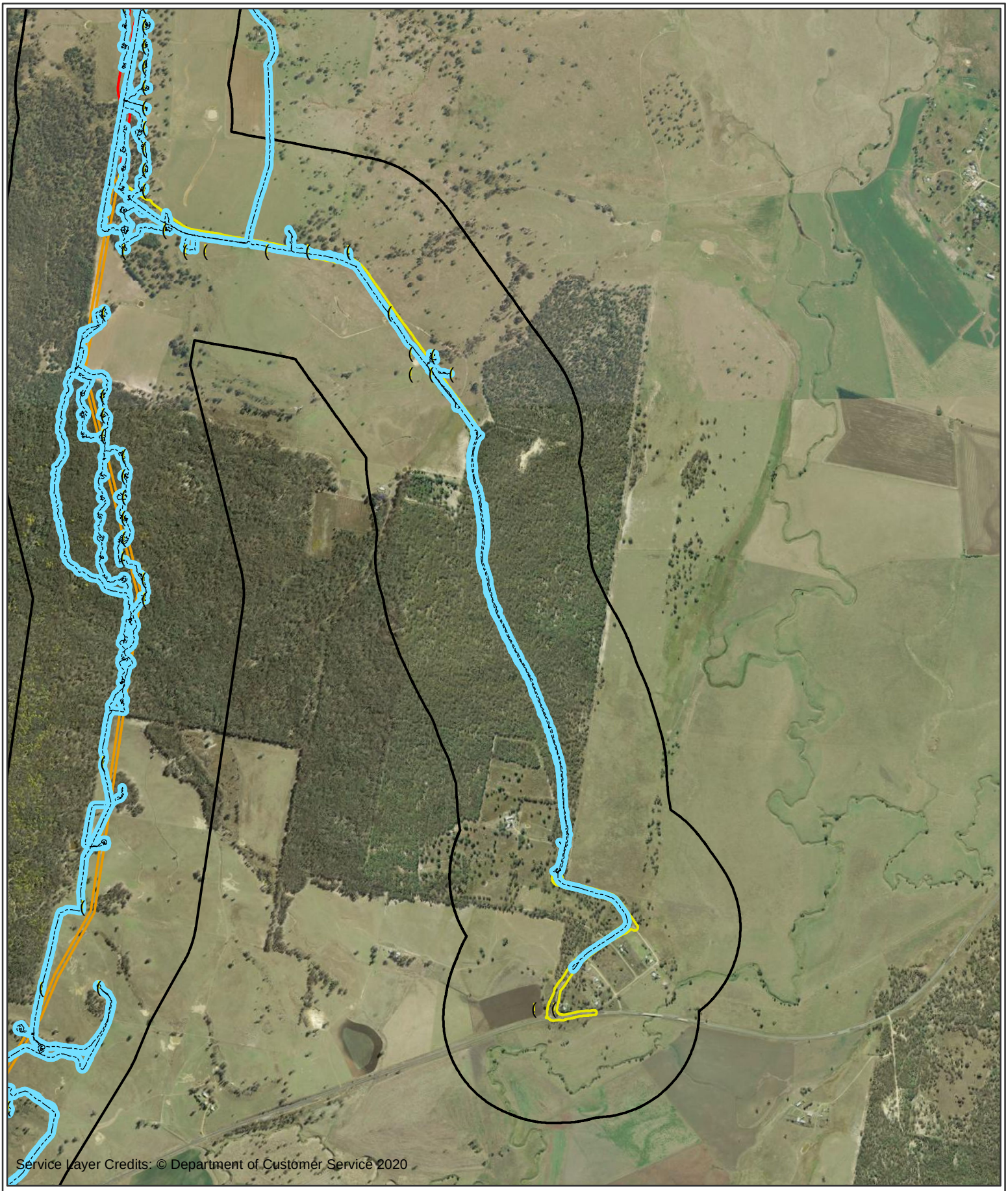
- September 2021
- (Threatened flora survey point (303)

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search (Spring)

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

Threatened flora effort

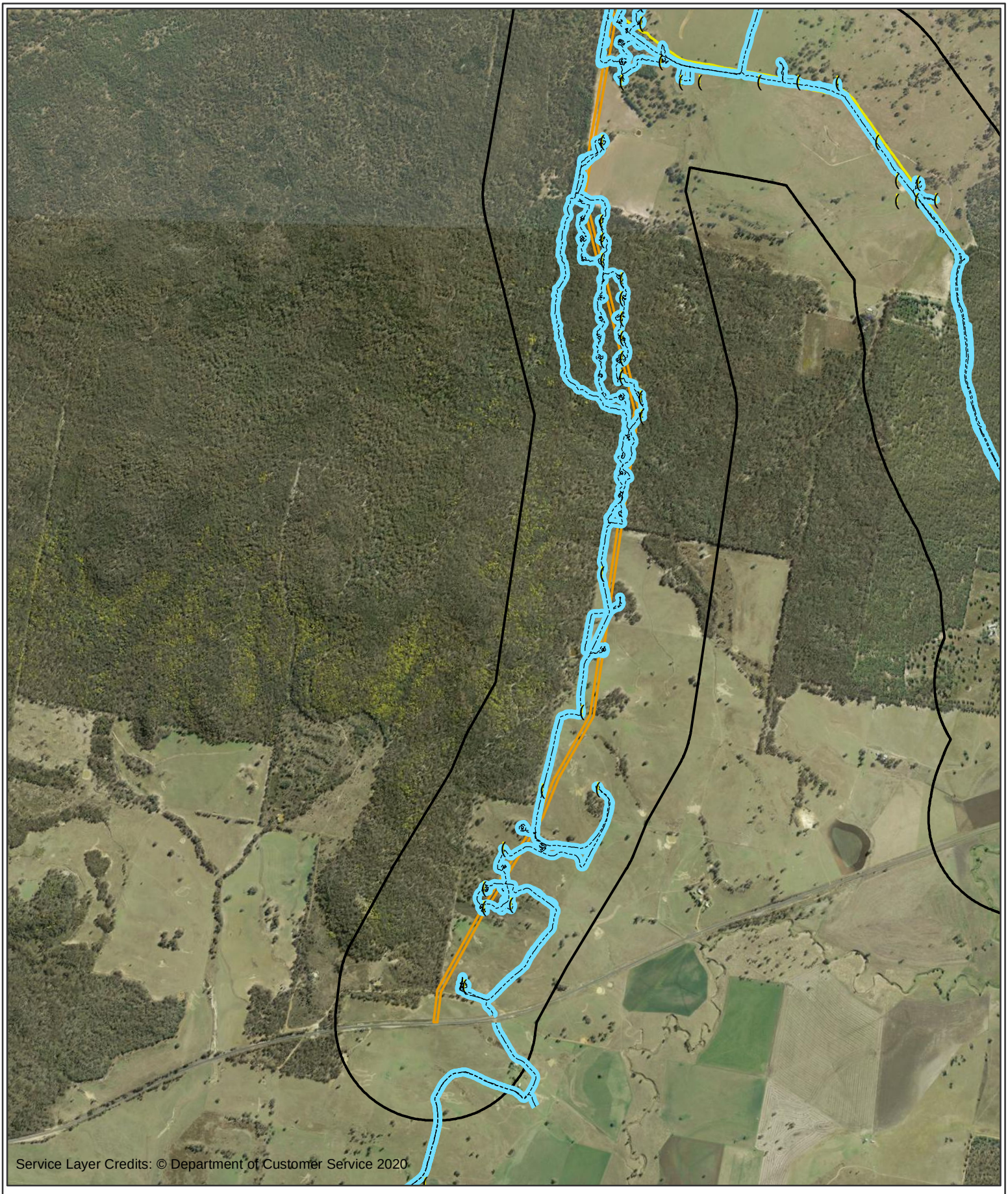
- September 2021
- (Threatened flora survey point (303)

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search (Spring)

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

Threatened flora effort

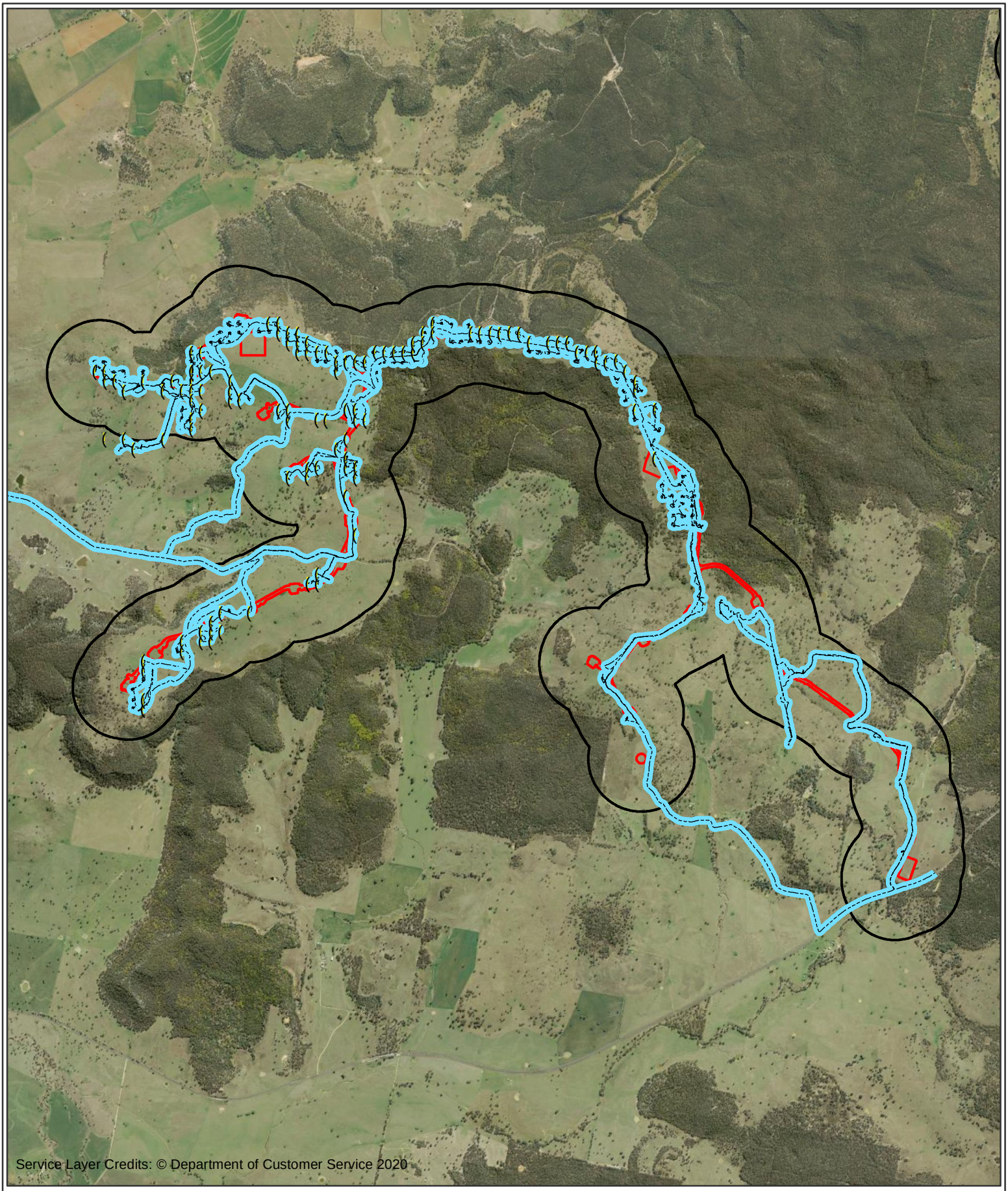
- September 2021
- (Threatened flora survey point (303)

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search (Spring)

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

September 2021

Threatened flora survey point (303)

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search (Spring)

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

September 2021

Threatened flora survey point (303)

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Flora Search (Spring)

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Threatened flora effort

September 2021

Threatened flora survey point (303)

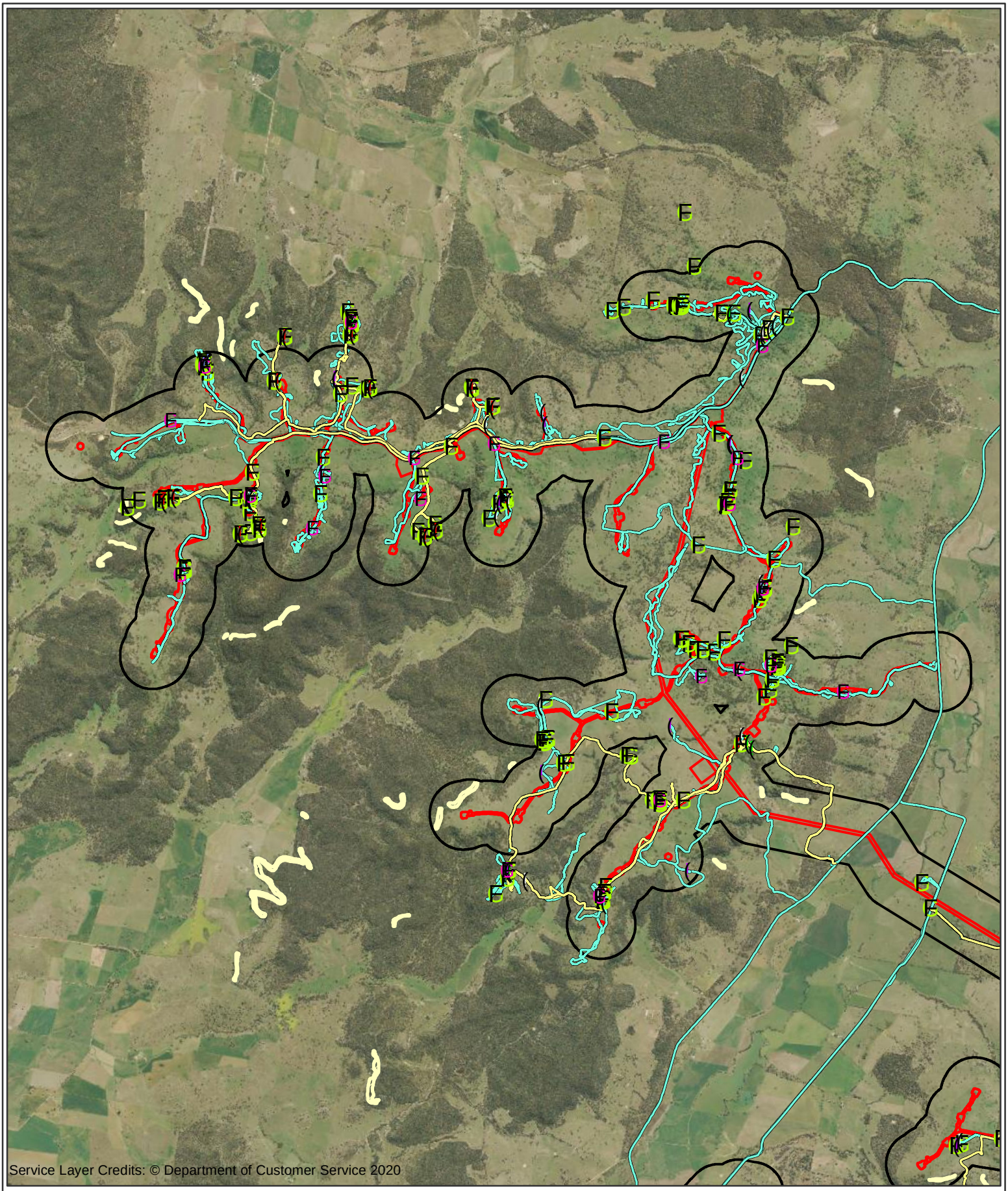
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Survey

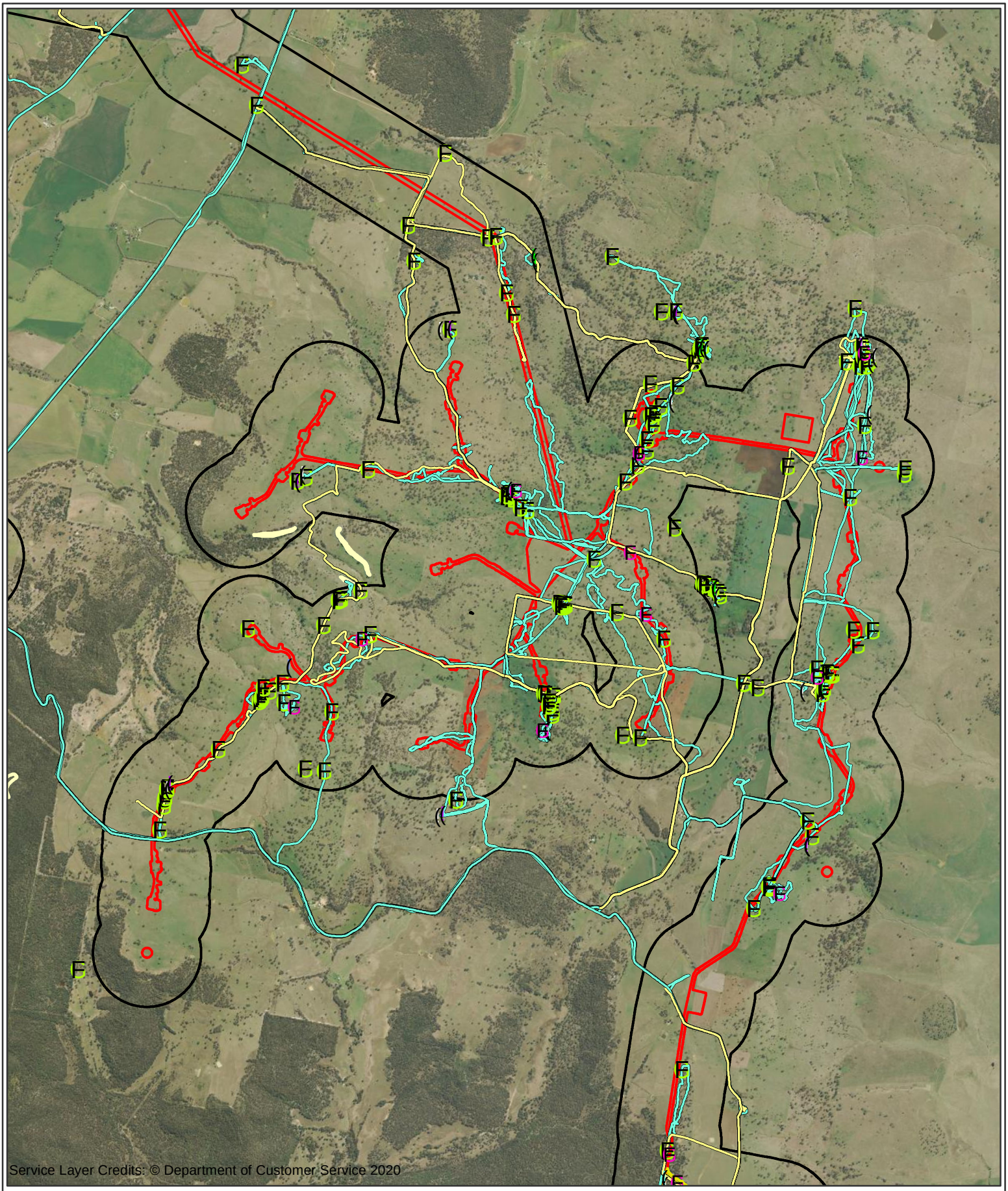
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Reptile survey (10 locations)
- Call playback (17 locations, twice each)
- Songmeter (Audio - 167 nights)
- Harp trap (64 trap nights)
- Songmeter (Ultrasonic - 466 unit nights)
- Koala SAT (47 locations)
- Remote camera (1,318 days)
- Avifauna survey (486 surveys)
- Diurnal tracks
- Spotlighting
- Clifflines

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Survey

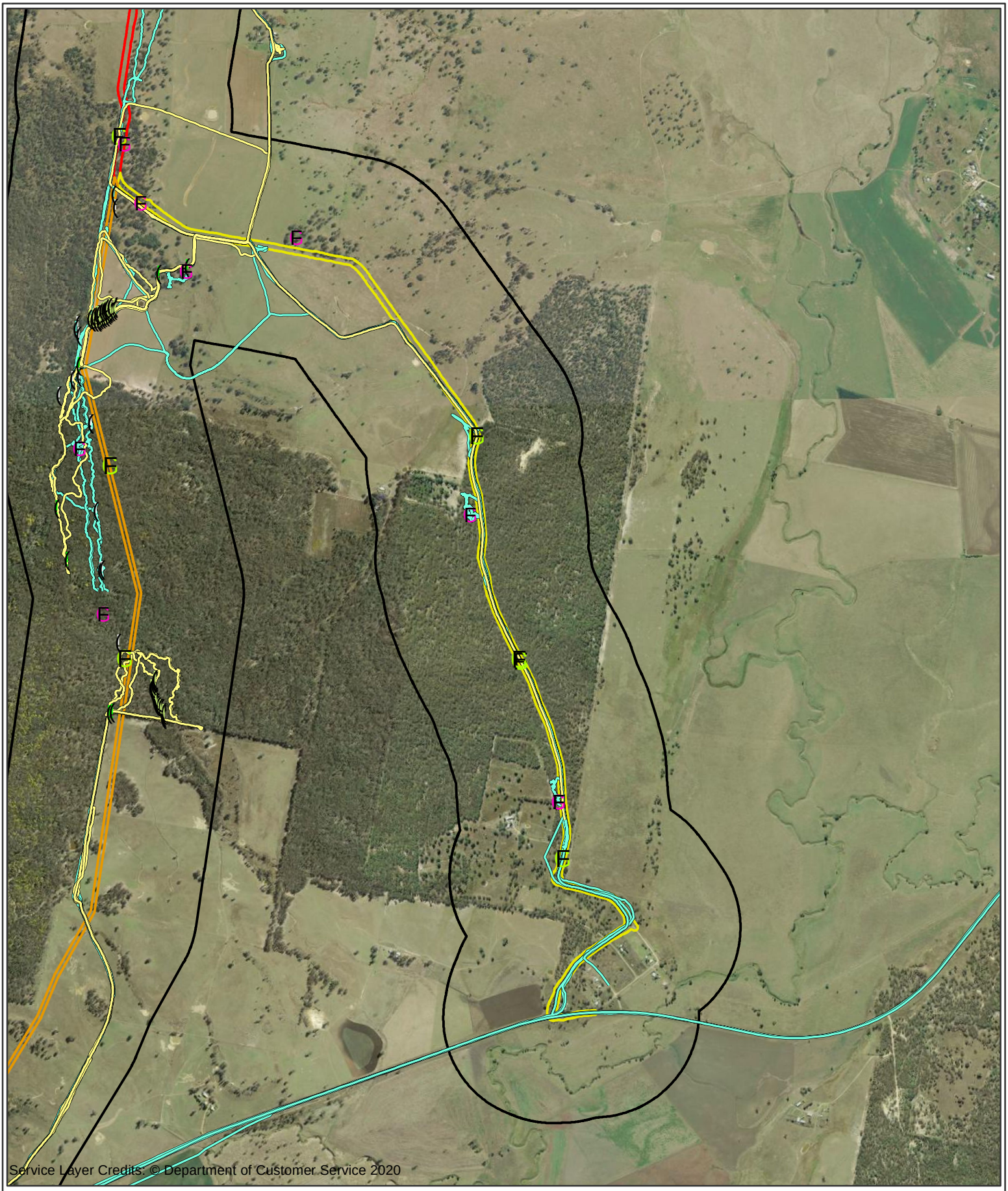
- Development site - wind farm (677 ha)
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0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

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Fauna Survey

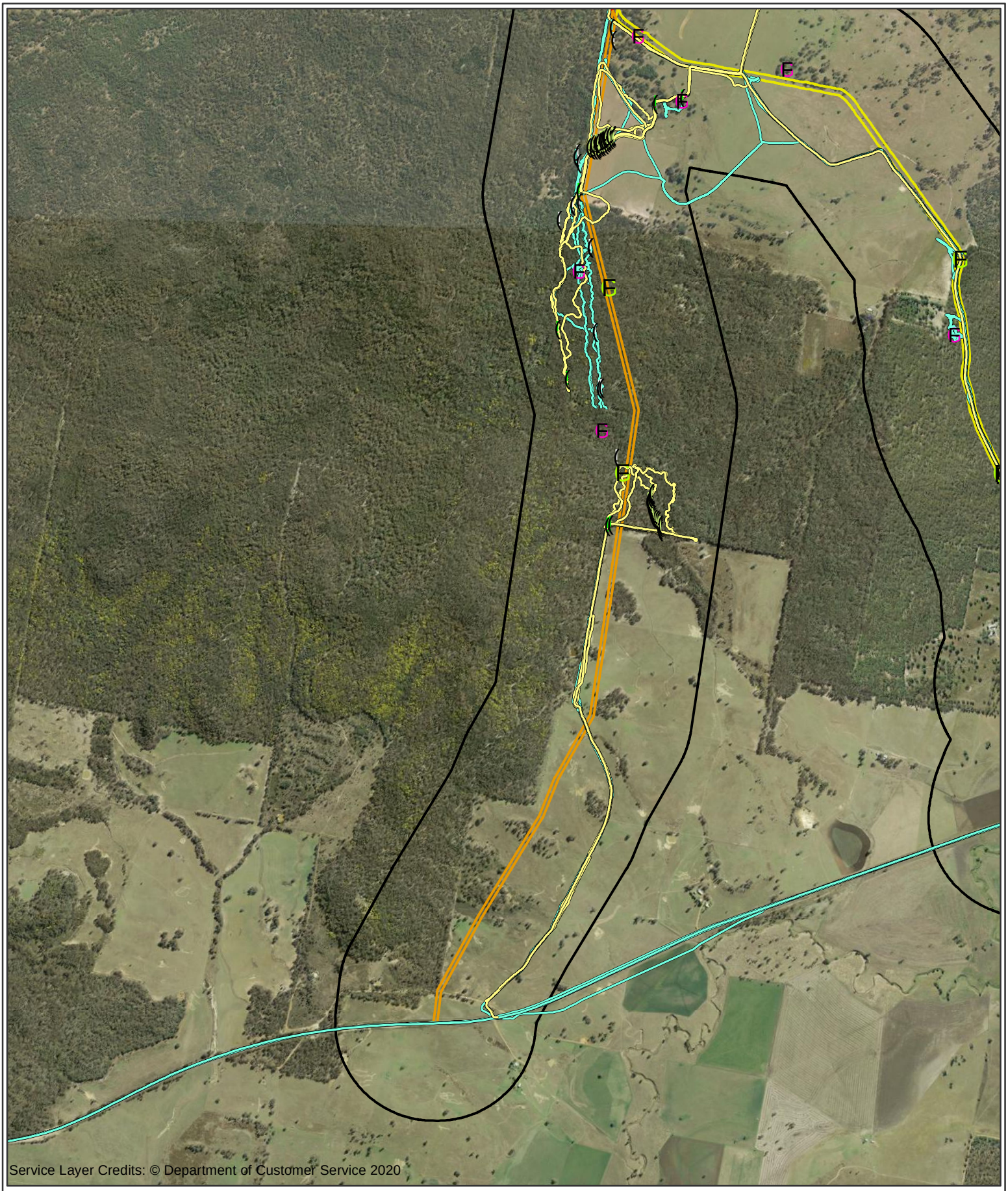
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Call playback (17 locations, twice each)
- Songmeter (Audio - 167 nights)
- Koala SAT (47 locations)
- Remote camera (1,318 days)
- Avifauna survey (486 surveys)
- ElliotTrap
- Diurnal tracks
- Spotlighting

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Survey

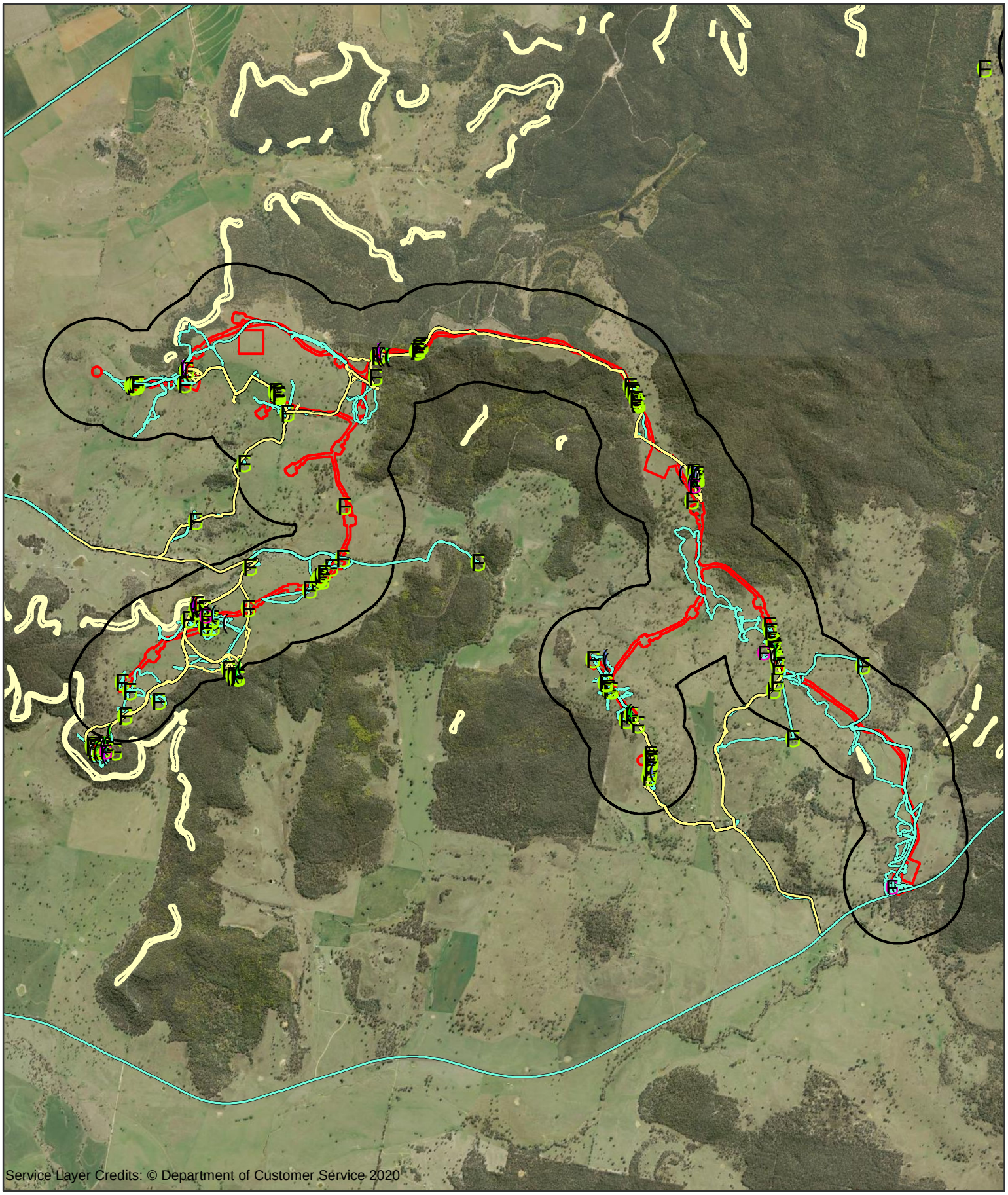
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Call playback (17 locations, twice each)
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- Diurnal tracks
- Spotlighting

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Survey

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Reptile survey (10 locations)
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- Songmeter (Audio - 167 nights)
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- Clifflines

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Survey

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Diurnal tracks

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Fauna Survey

Development site - wind farm (677 ha)

Study Area (14,001 ha)

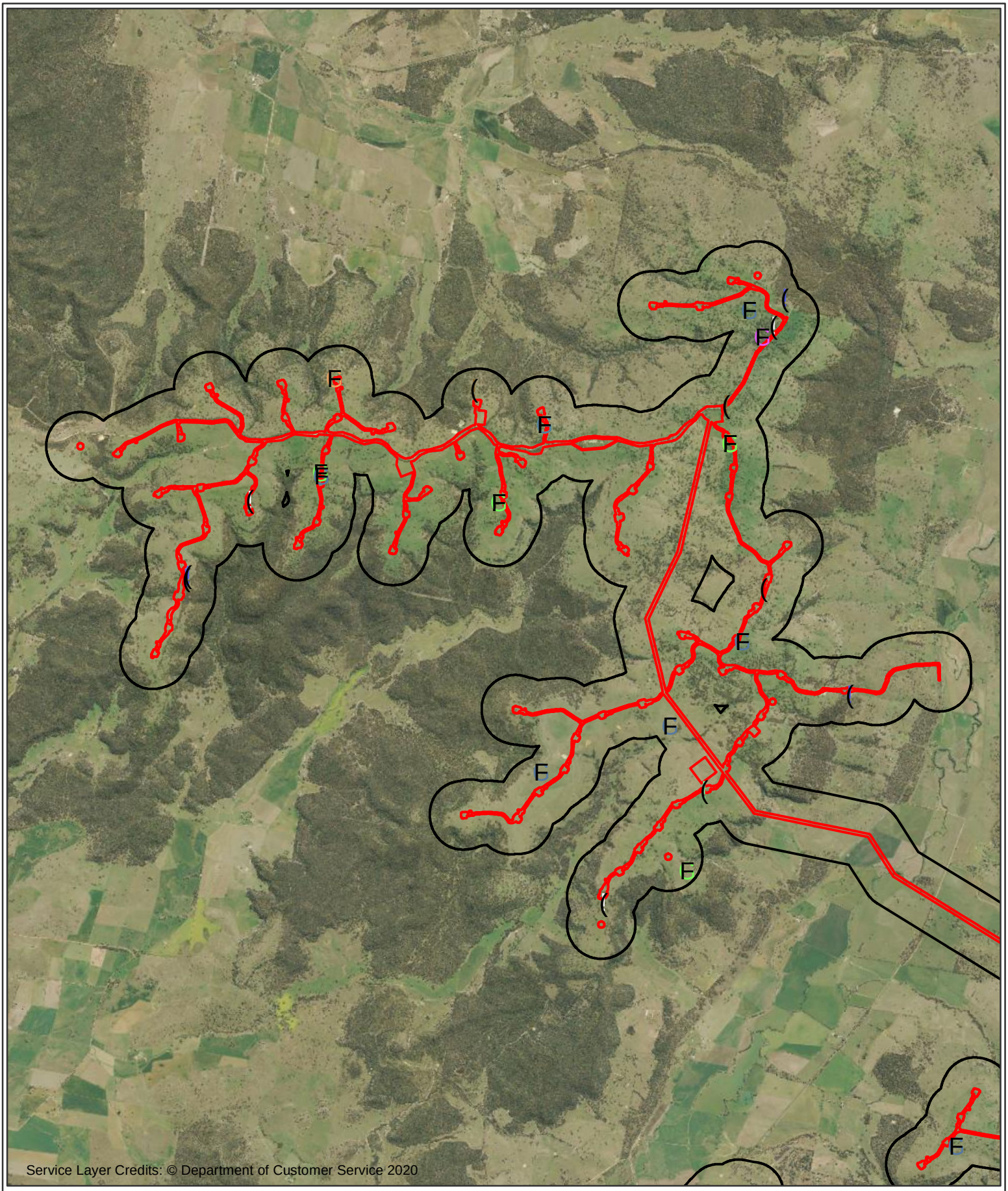
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Fauna

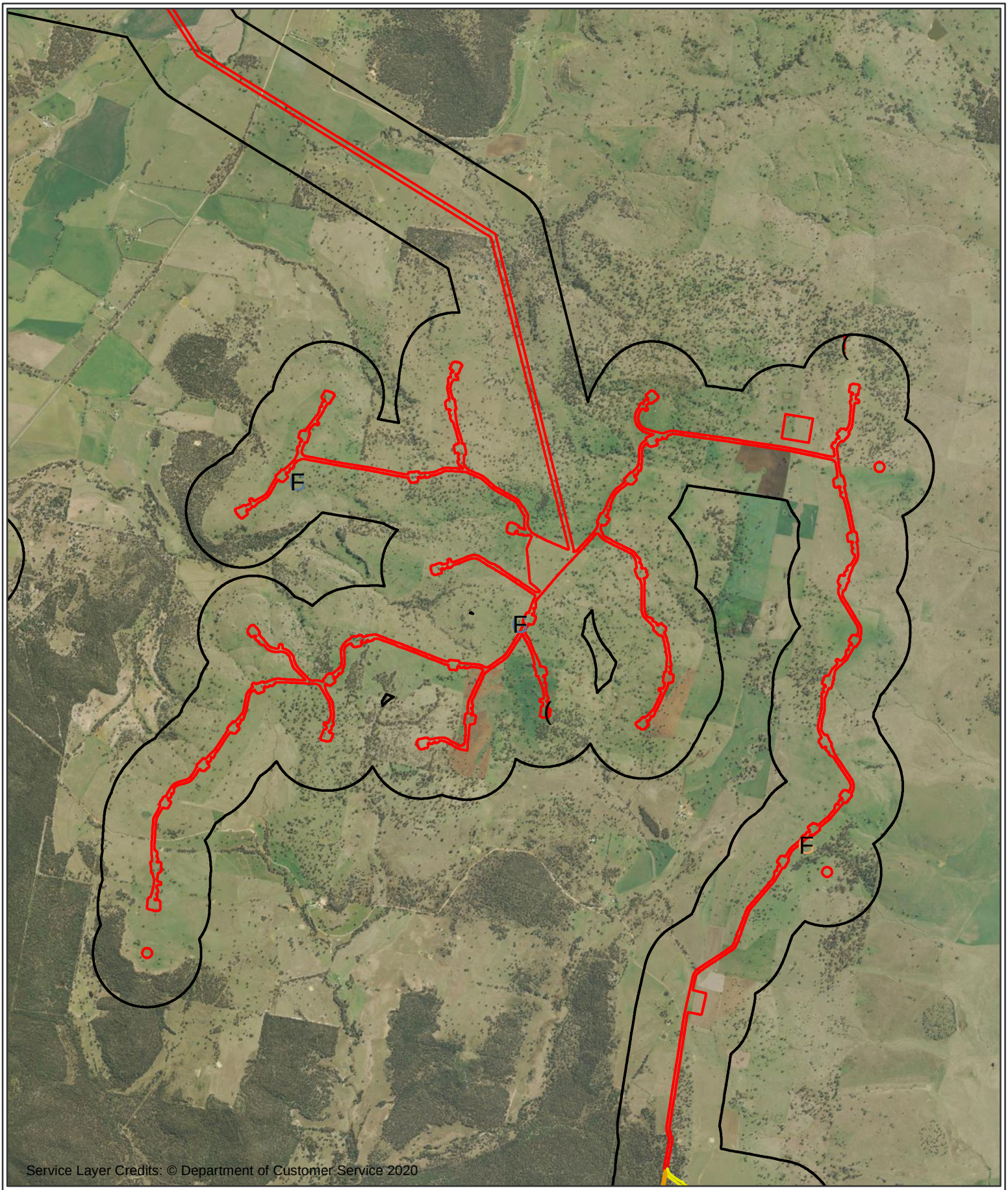
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Barking Owl
- Dusky Woodswallow
- Little Lorikeet
- Spotted Harrier
- White-throated Needletail
- Large Bentwing-bat
- Large-eared Pied Bat
- Squirrel Glider
- Yellow-bellied Sheathtail Bat

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Fauna

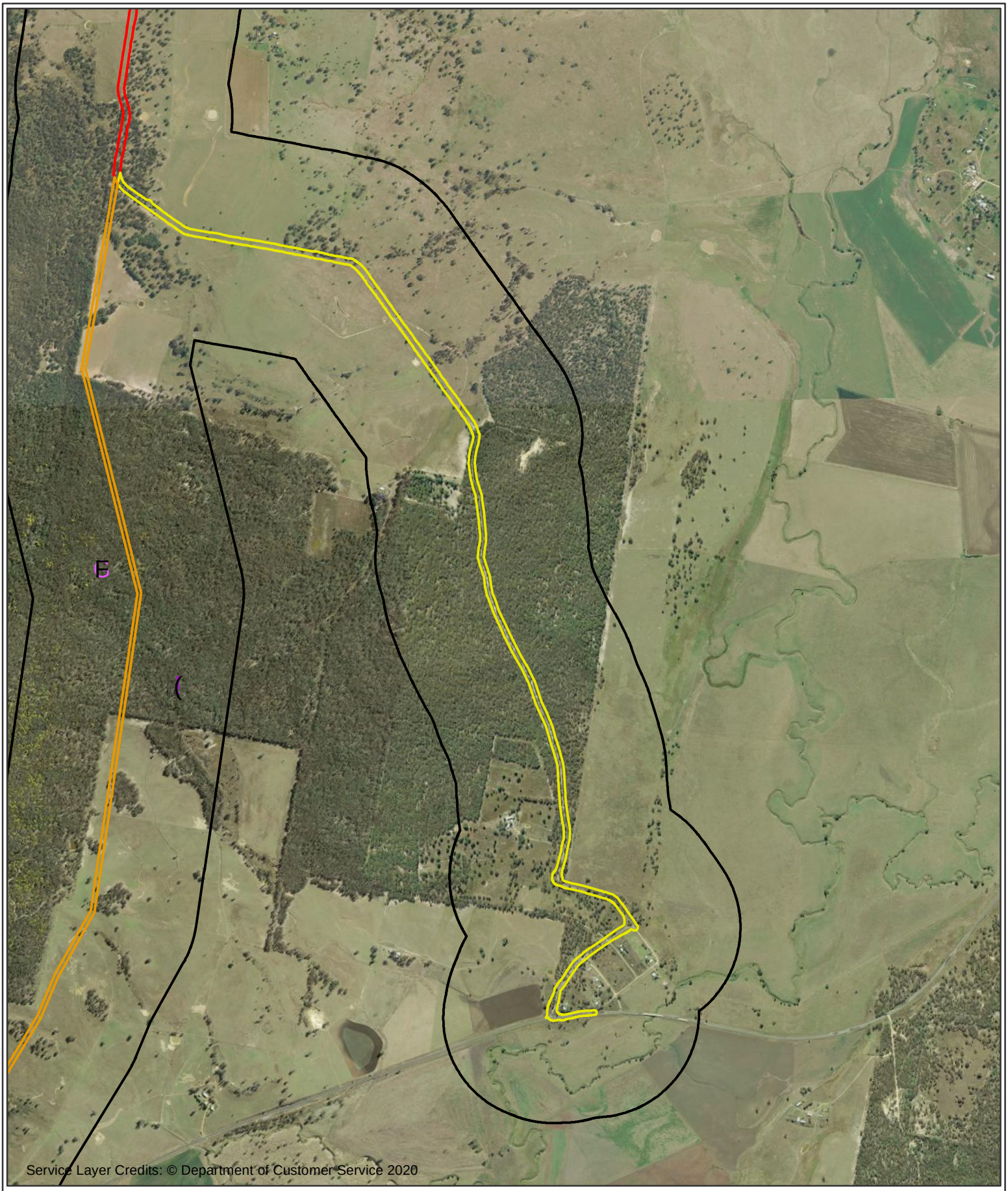
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- (Little Lorikeet
- F Large Bentwing-bat
- F Yellow-bellied Sheathtail Bat

0 0.5 1 2
Kilometers

Datum/Projection:
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Project: 3178-AW Date: 13/10/2023

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Threatened Fauna

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Masked Owl
- Squirrel Glider

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Fauna

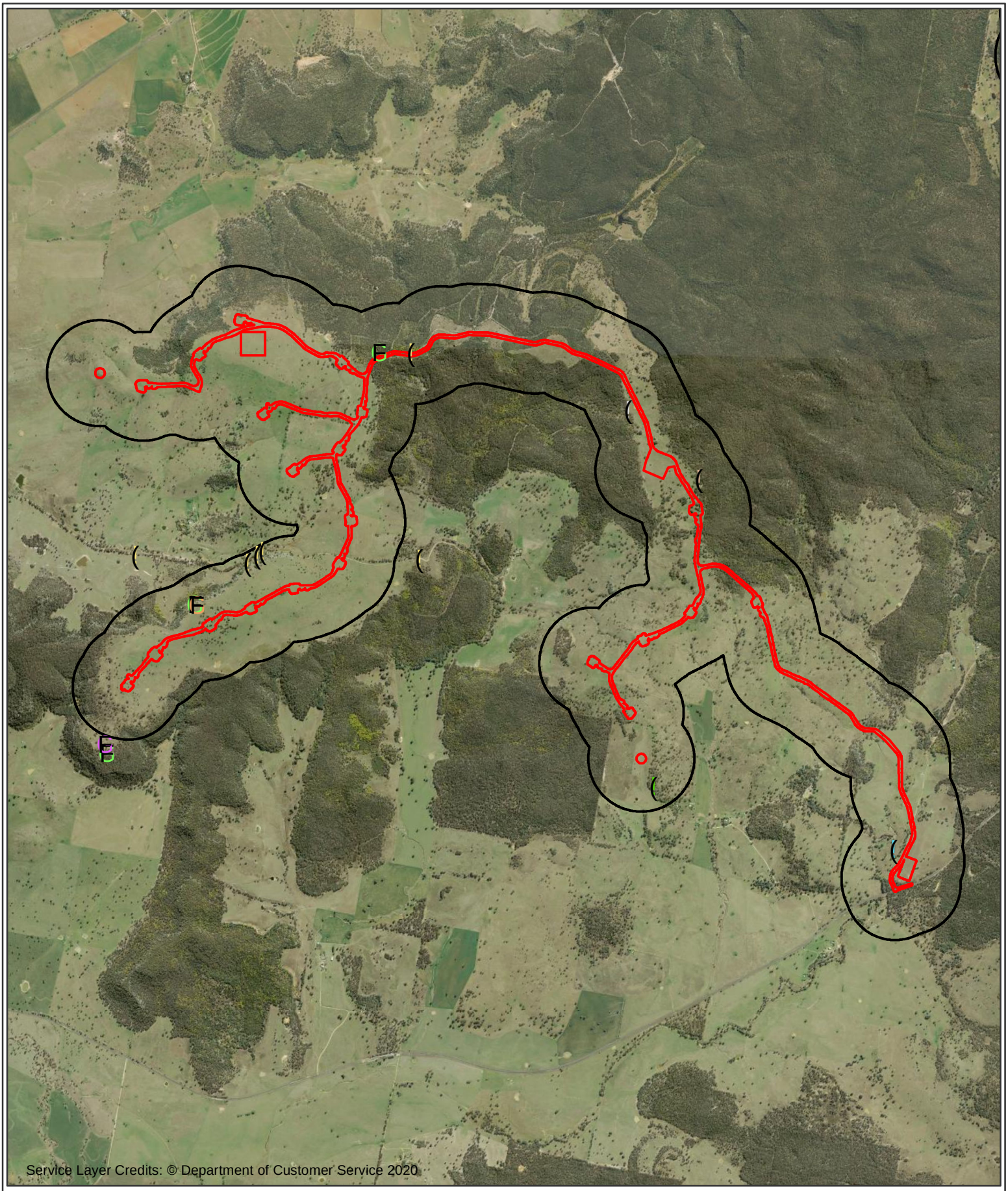
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Masked Owl
- Squirrel Glider

0 0.25 0.5 1
Kilometers

Datum/Projection:
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Project: 3178-AW Date: 13/10/2023

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Threatened Fauna

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Black Falcon
- Black-chinned Honeyeater
- Grey-crowned Babbler
- Speckled Warbler
- Varied Sittella
- Large-eared Pied Bat
- Squirrel Glider
- Yellow-bellied Sheathtail Bat

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Fauna

Development site - wind farm (677 ha)

Study Area (14,001 ha)

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Threatened Fauna

Development site - wind farm (677 ha)

Study Area (14,001 ha)

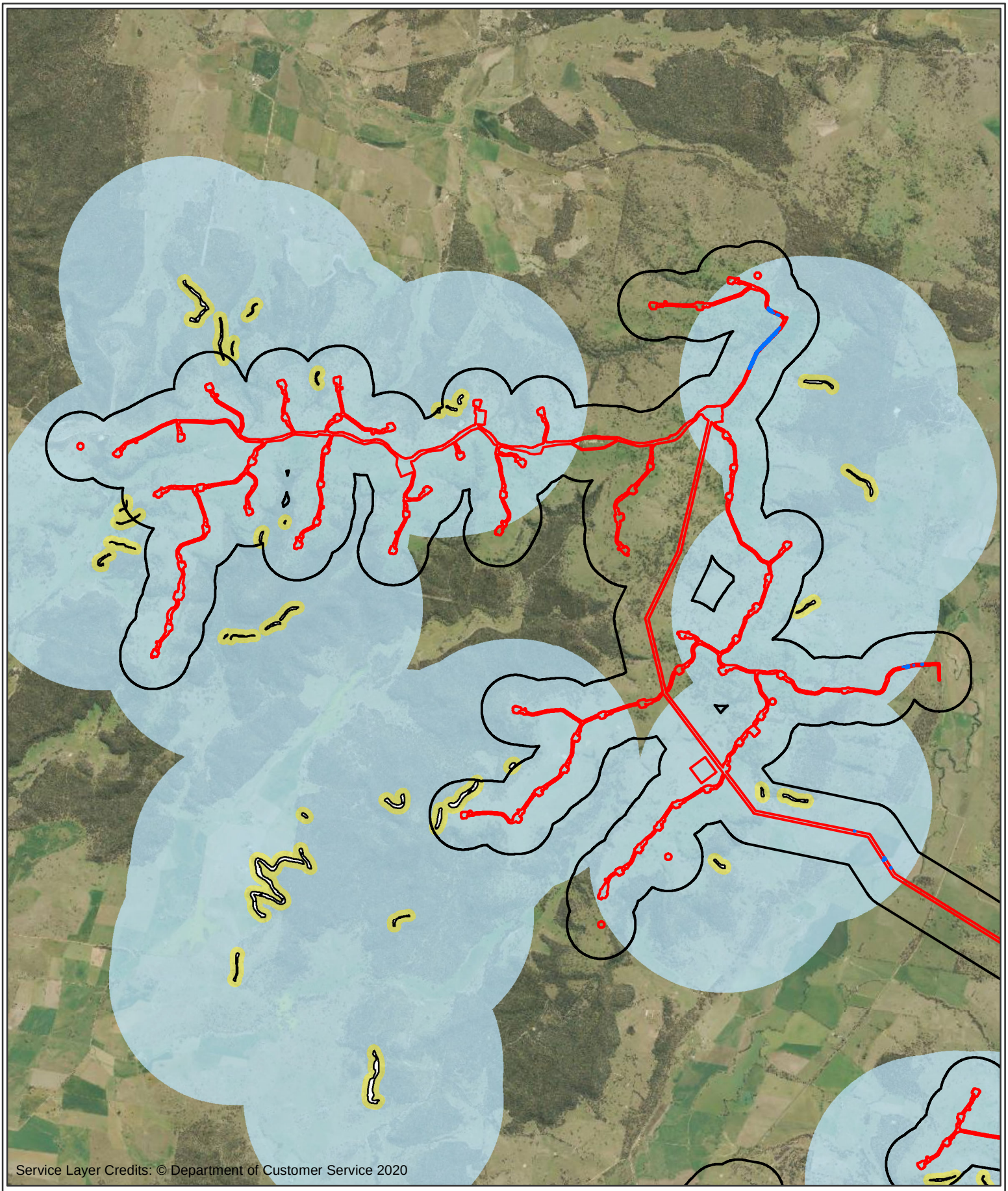
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Large-eared Pied Bat

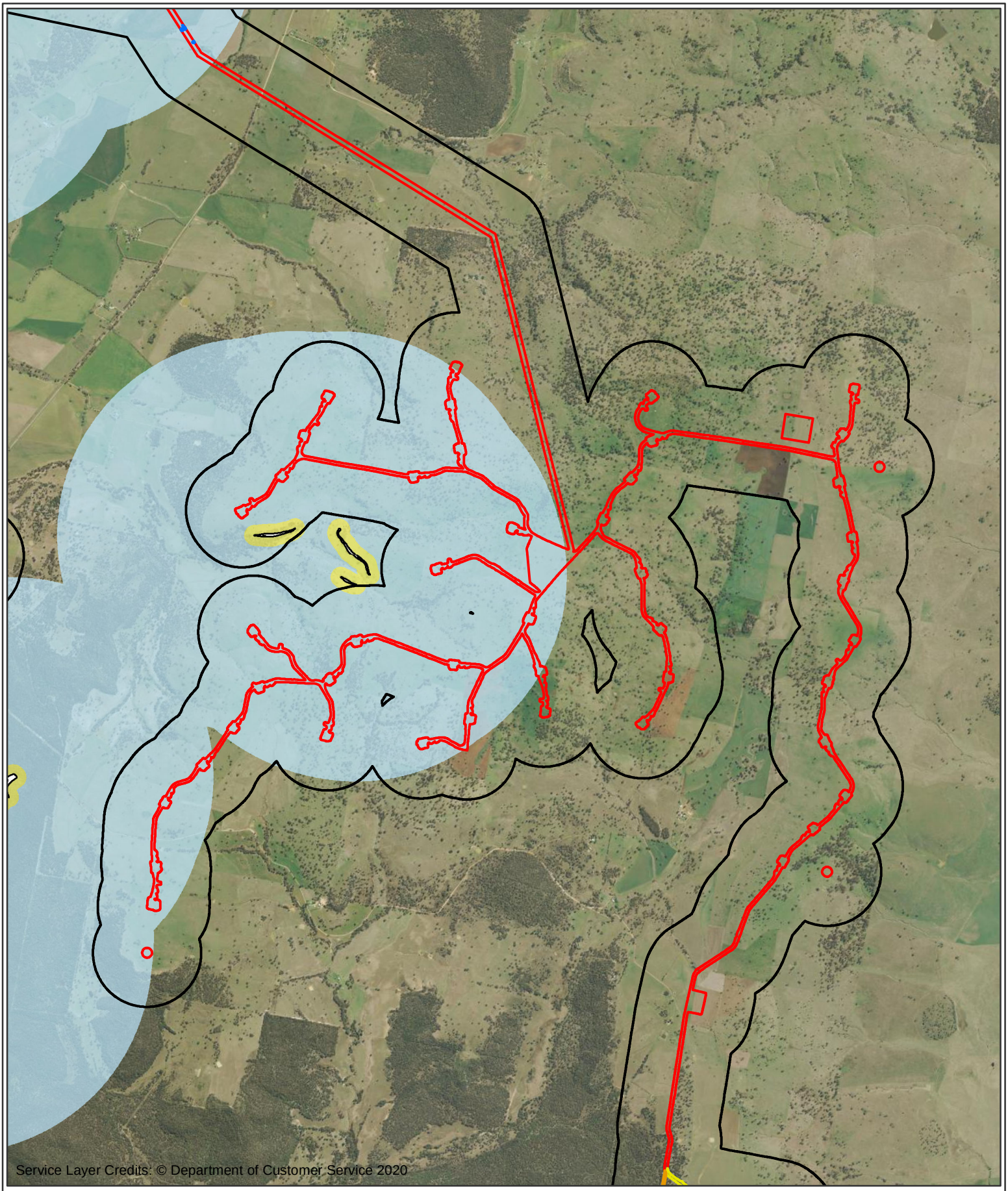
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Clifflines
- Potential breeding habitat (100m buffer - SAII)
- Foraging habitat (2,000m buffer - not SAII)
- Large-eared Pied Bat species polygon

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Large-eared Pied Bat

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
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- Study Area (14,001 ha)
- Clifflines
- Potential breeding habitat (100m buffer - SAII)
- Foraging habitat (2,000m buffer - not SAII)
- Large-eared Pied Bat species polygon

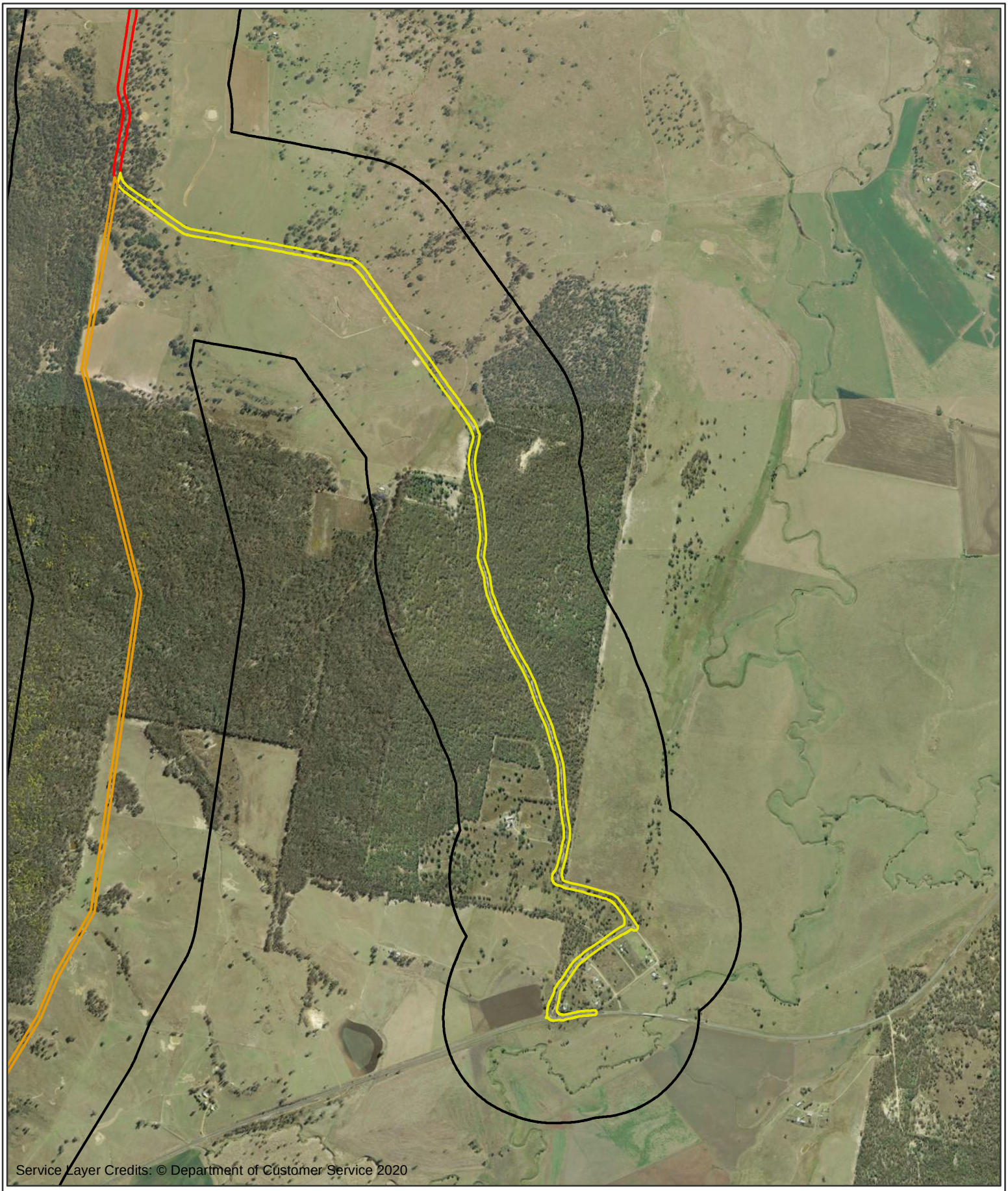
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Large-eared Pied Bat

- Development site - wind farm (677 ha)
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- Study Area (14,001 ha)
- Clifflines
- Potential breeding habitat (100m buffer - SAII)
- Foraging habitat (2,000m buffer - not SAII)
- Large-eared Pied Bat species polygon

0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Large-eared Pied Bat

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Clifflines
- Potential breeding habitat (100m buffer - SAII)
- Foraging habitat (2,000m buffer - not SAII)
- Large-eared Pied Bat species polygon

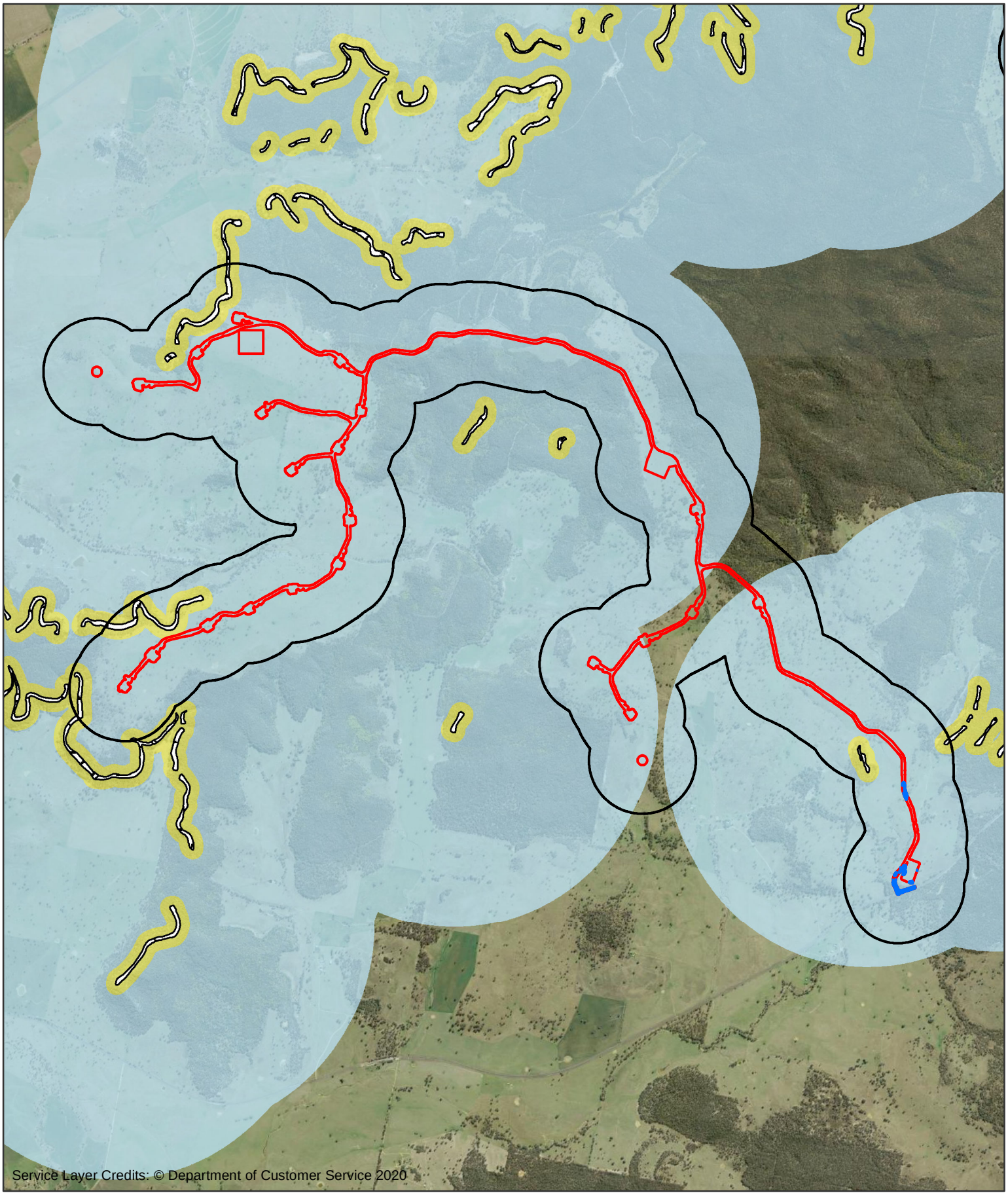
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Large-eared Pied Bat

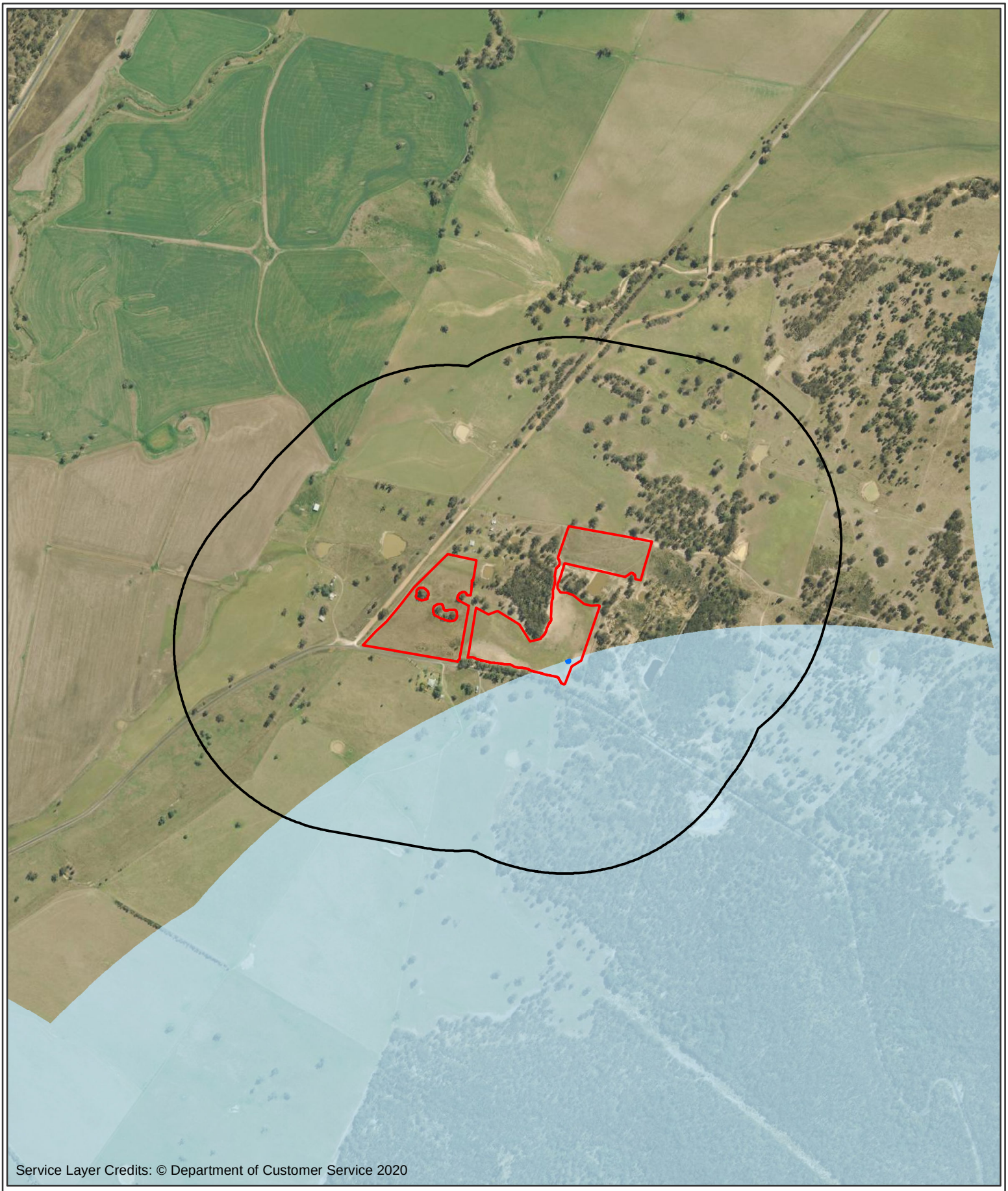
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Clifflines
- Potential breeding habitat (100m buffer - SAII)
- Foraging habitat (2,000m buffer - not SAII)
- Large-eared Pied Bat species polygon

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Large-eared Pied Bat

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Clifflines
- Potential breeding habitat (100m buffer - SAII)
- Foraging habitat (2,000m buffer - not SAII)
- Large-eared Pied Bat species polygon

0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

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Large-eared Pied Bat

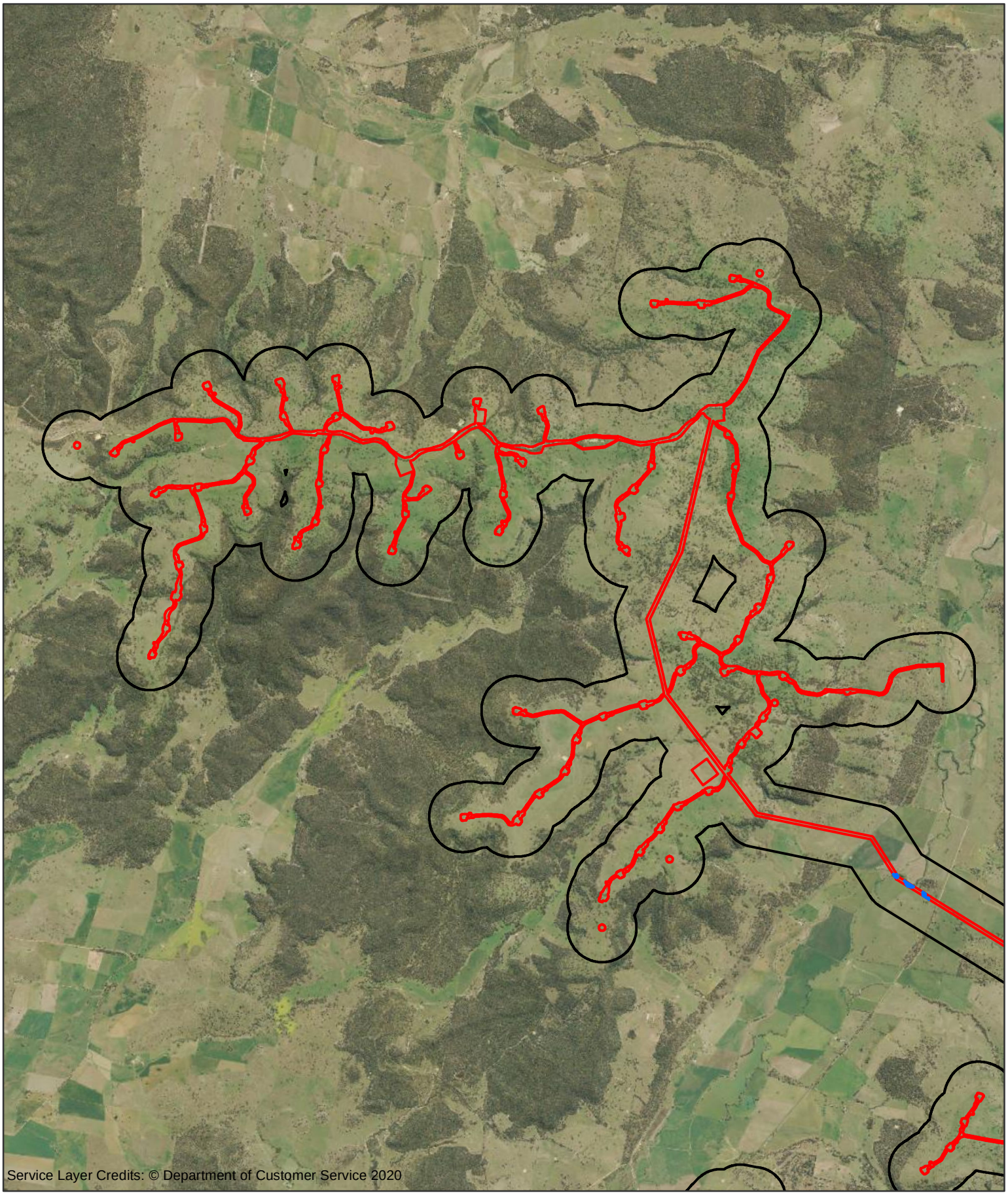
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Clifflines
- Potential breeding habitat (100m buffer - SAII)
- Foraging habitat (2,000m buffer - not SAII)
- Large-eared Pied Bat species polygon

0 0.1 0.2 0.4
Kilometers

Datum/Projection:
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Pale-headed Snake

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Pale-headed Snake species polygon

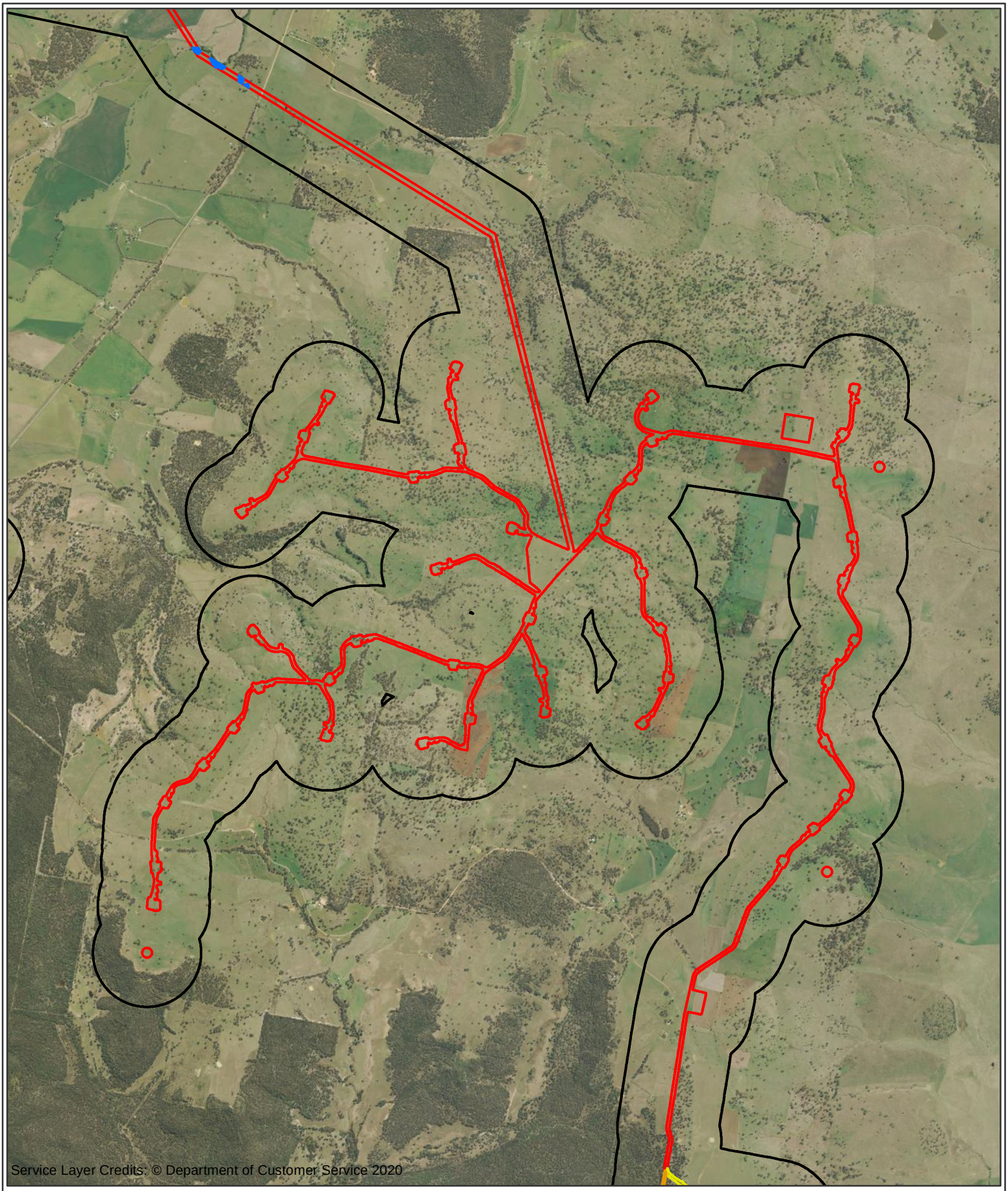
0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Pale-headed Snake

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Pale-headed Snake species polygon

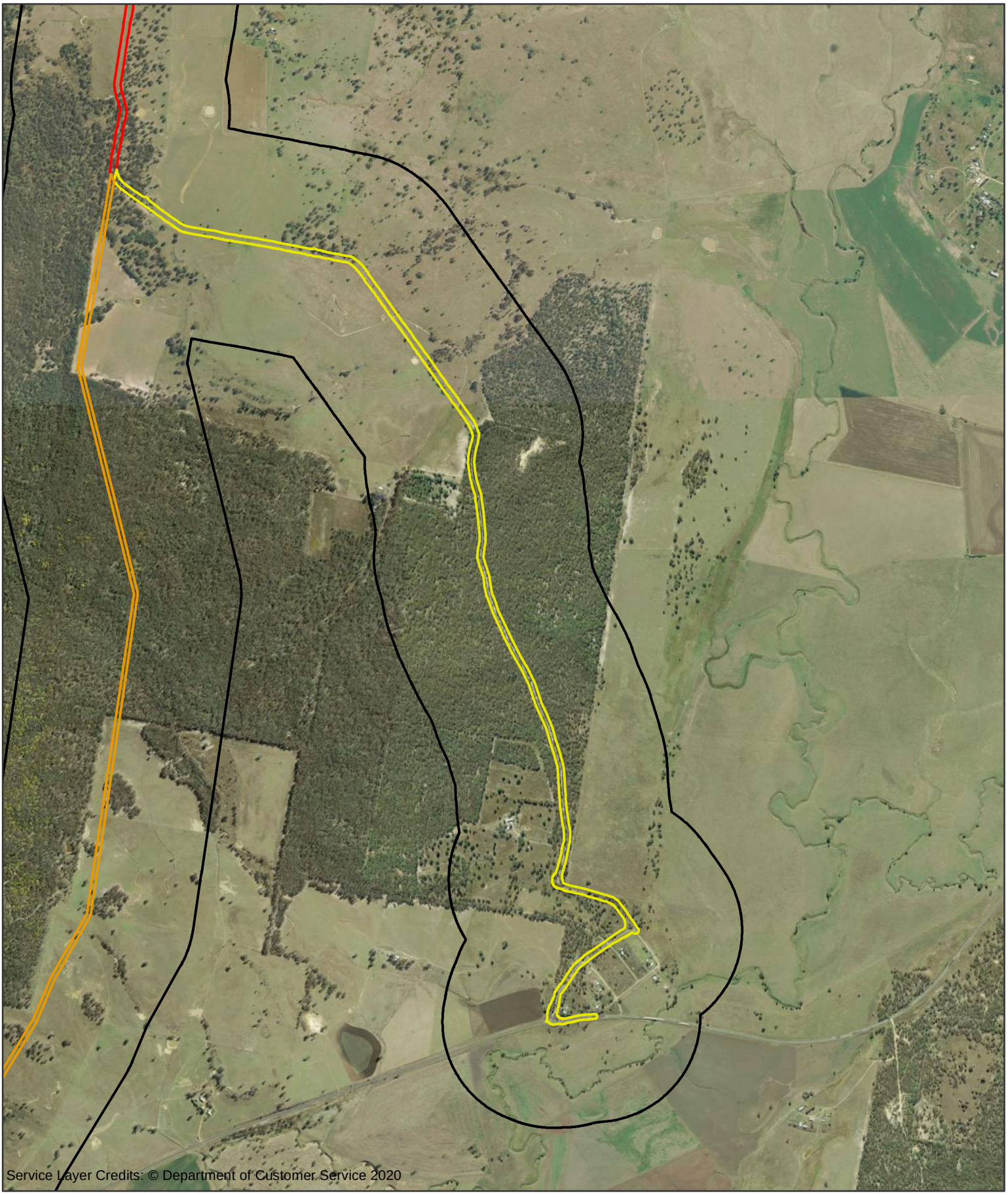
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Pale-headed Snake

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Pale-headed Snake

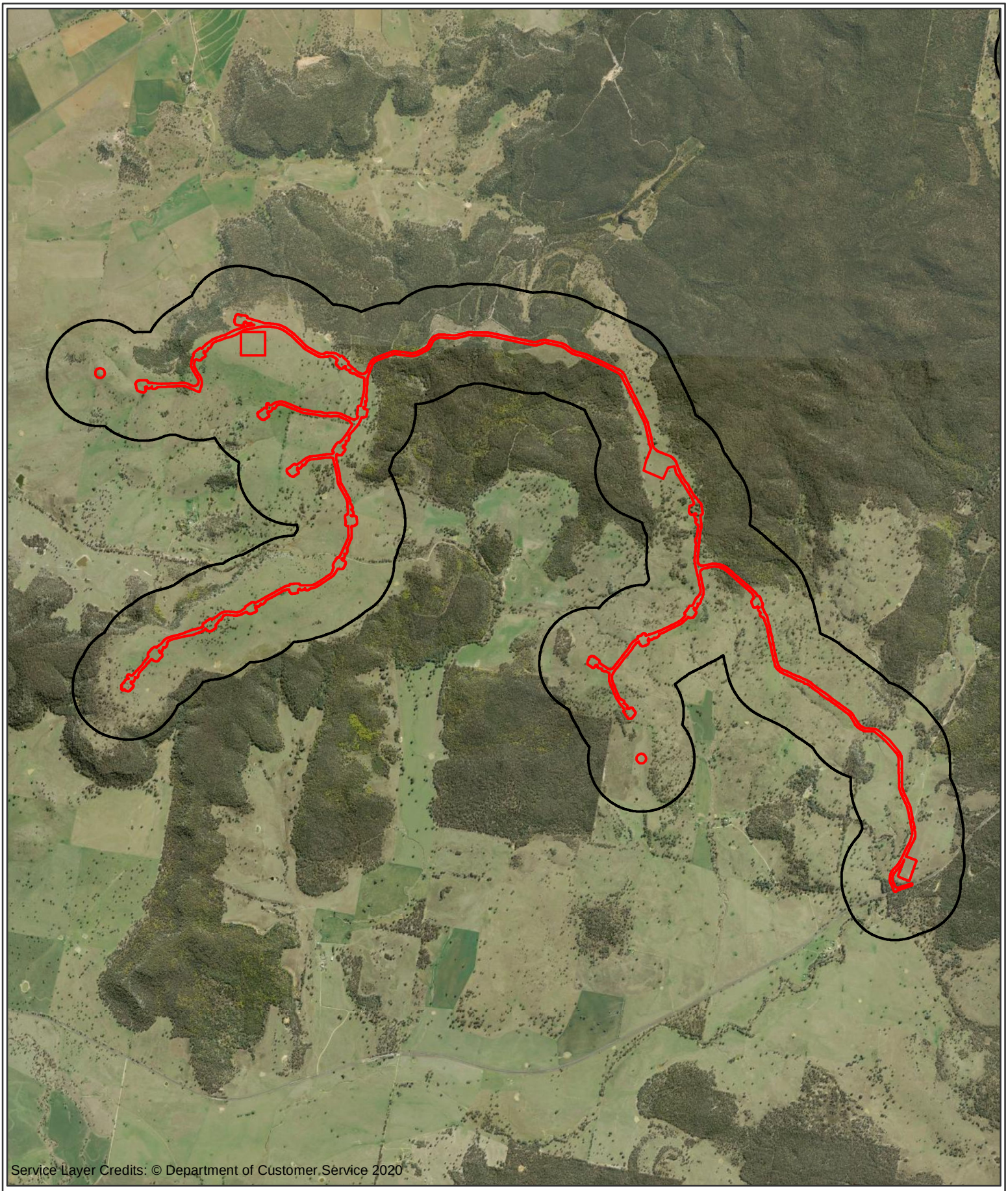
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Pale-headed Snake

Development site - wind farm (677 ha)

Study Area (14,001 ha)

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Pale-headed Snake

Development site - wind farm (677 ha)

Study Area (14,001 ha)

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Pale-headed Snake

Development site - wind farm (677 ha)

Study Area (14,001 ha)

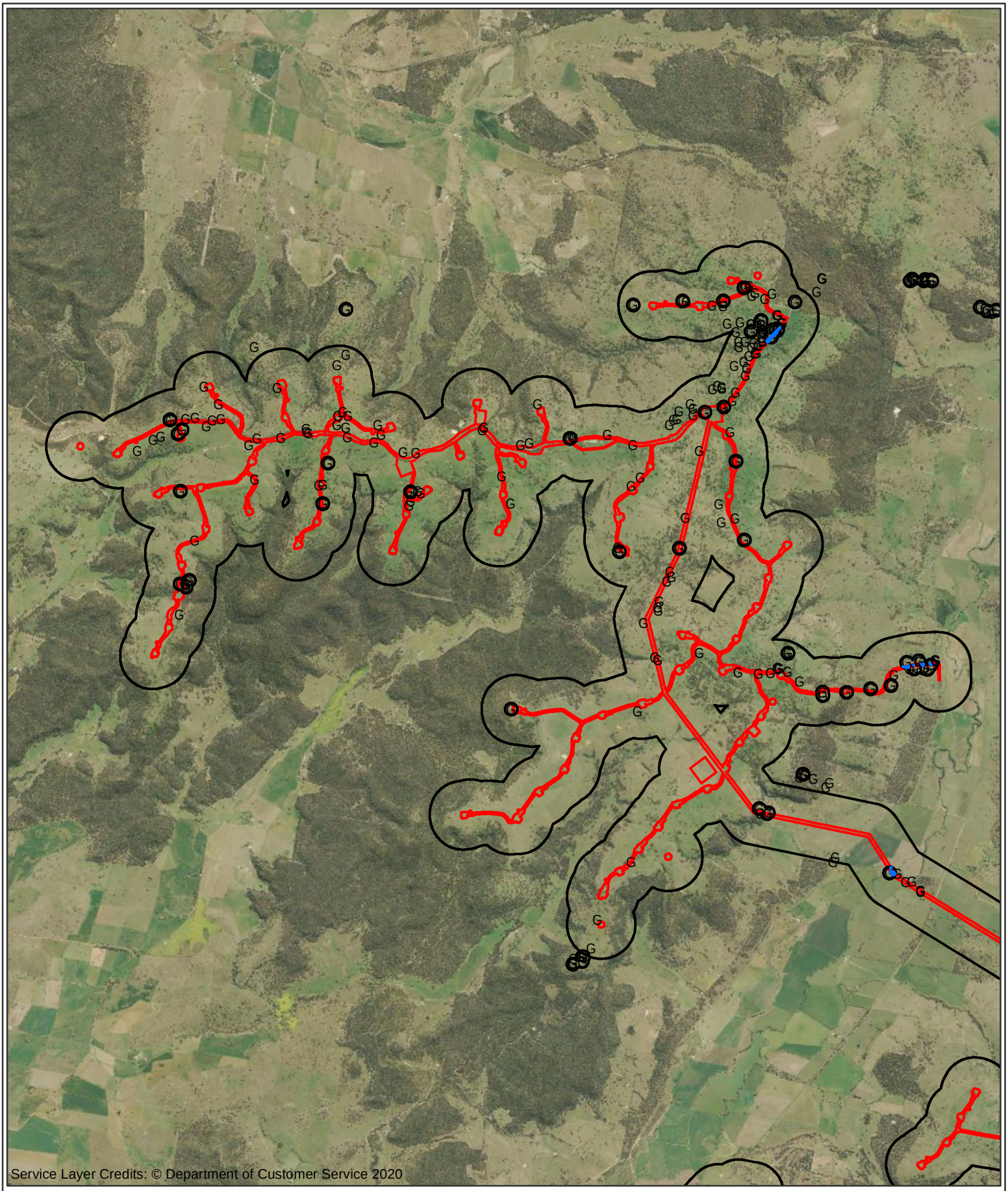
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Masked Owl

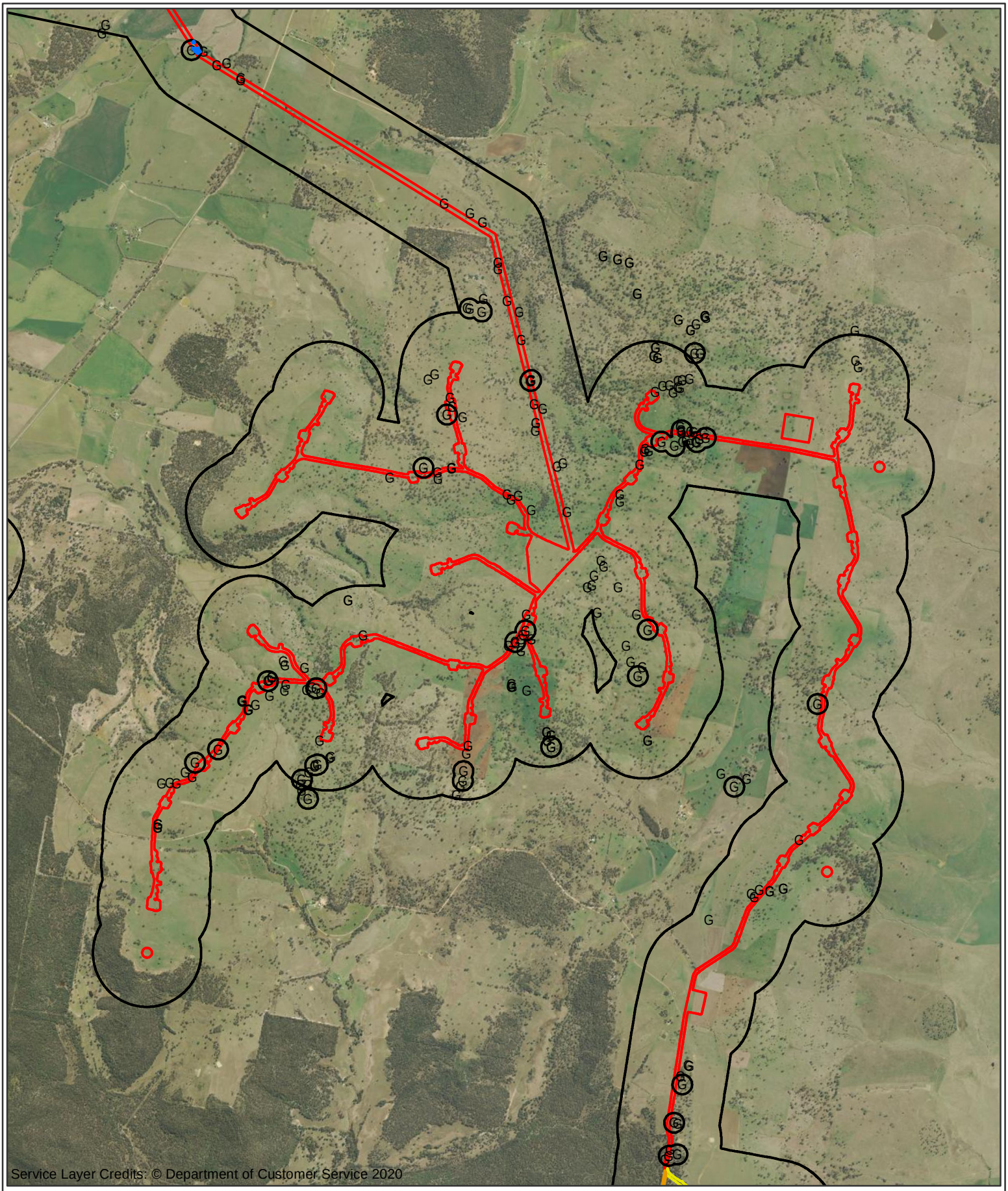
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- G Hollow-bearing Trees
- Hollow-bearing Trees (100m buffer on hollow>200mm)
- Masked Owl Species Polygon

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Masked Owl

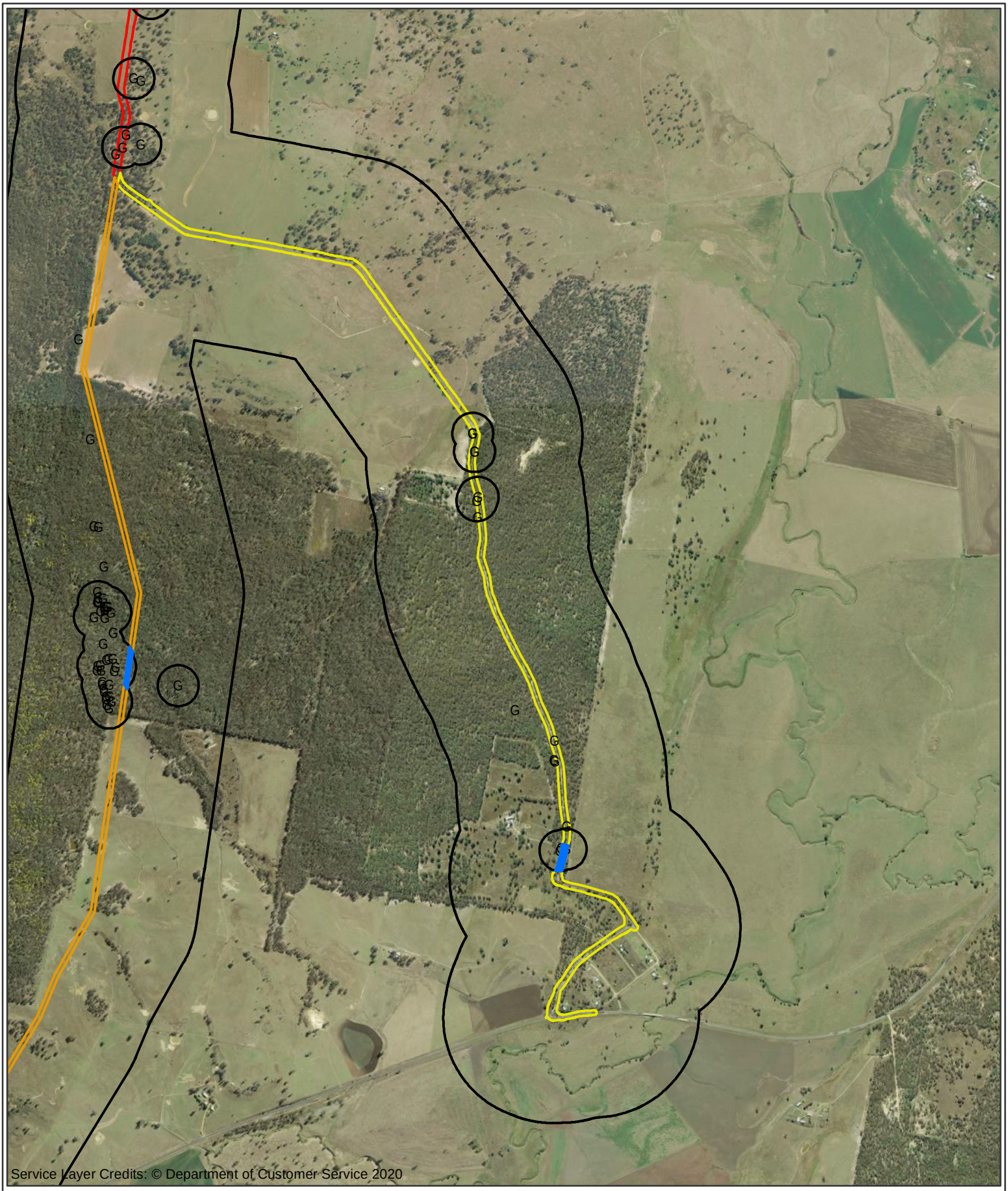
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- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- G Hollow-bearing Trees
- Hollow-bearing Trees (100m buffer on hollow>200mm)
- Masked Owl Species Polygon

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Masked Owl

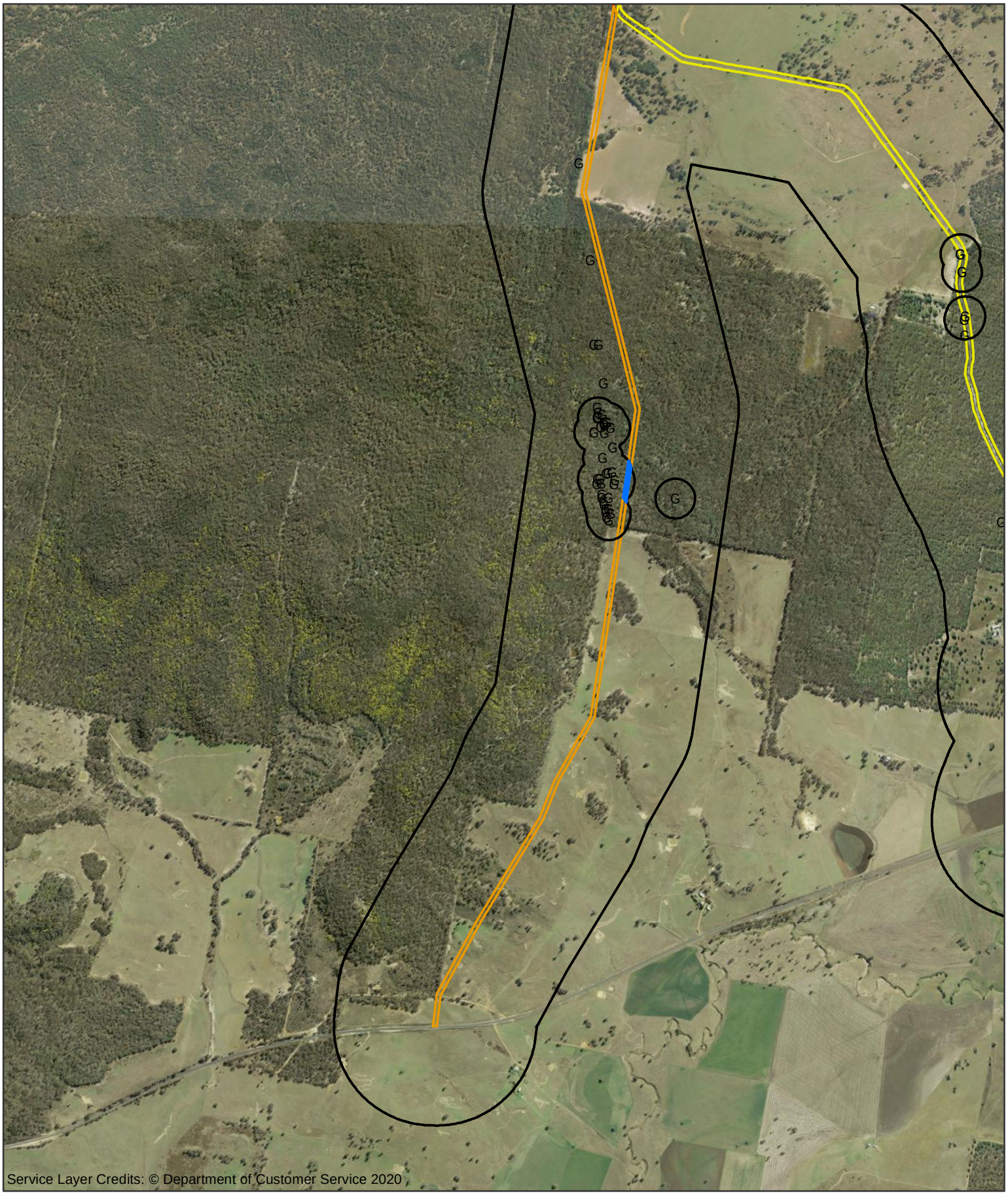
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0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Masked Owl

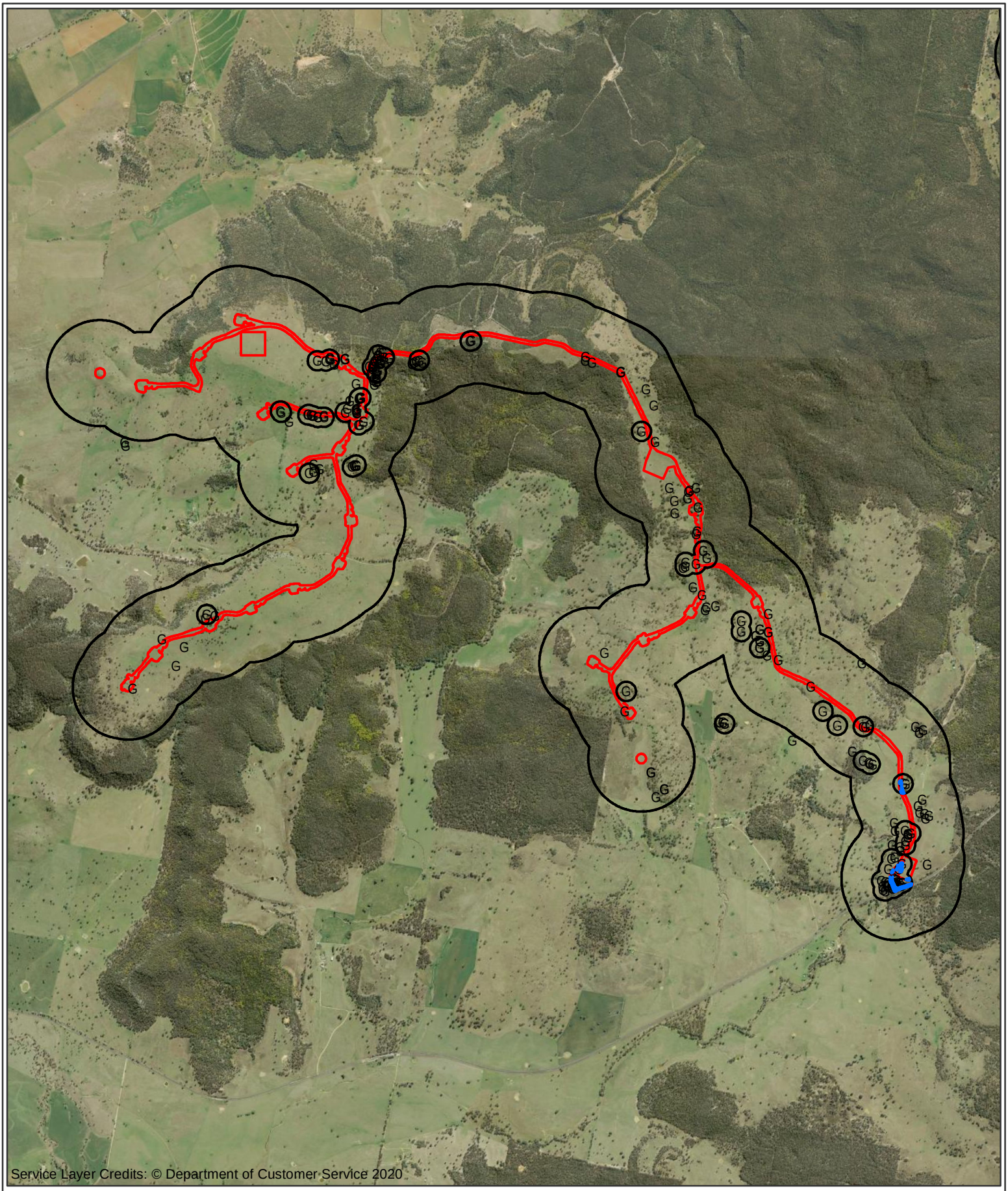
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0 0.25 0.5 1
Kilometers

Datum/Projection:
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Masked Owl

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0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Masked Owl

Development site - wind farm (677 ha)

Study Area (14,001 ha)

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Masked Owl

Development site - wind farm (677 ha)

Study Area (14,001 ha)

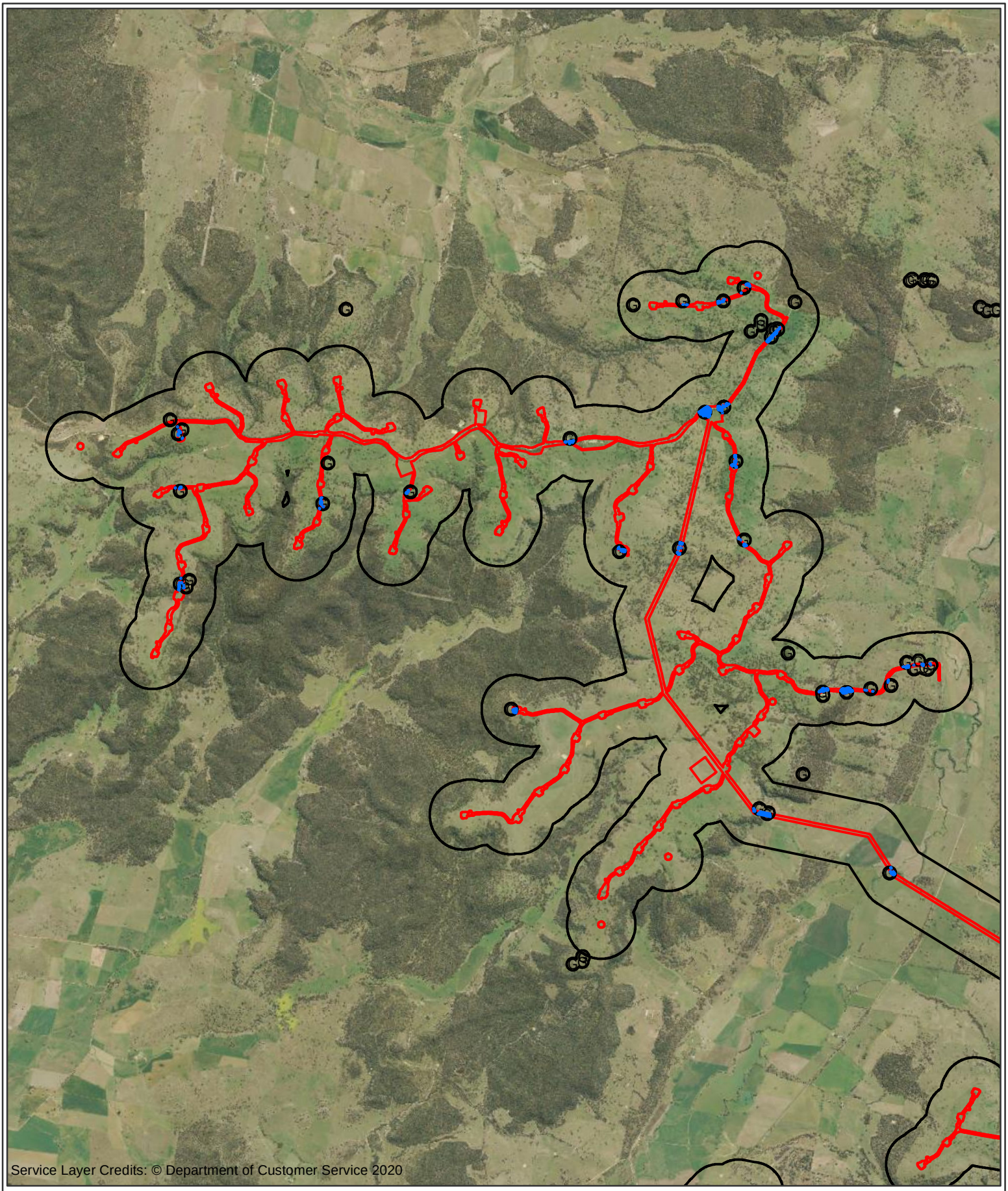
0 0.1 0.2 0.4

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Barking Owl

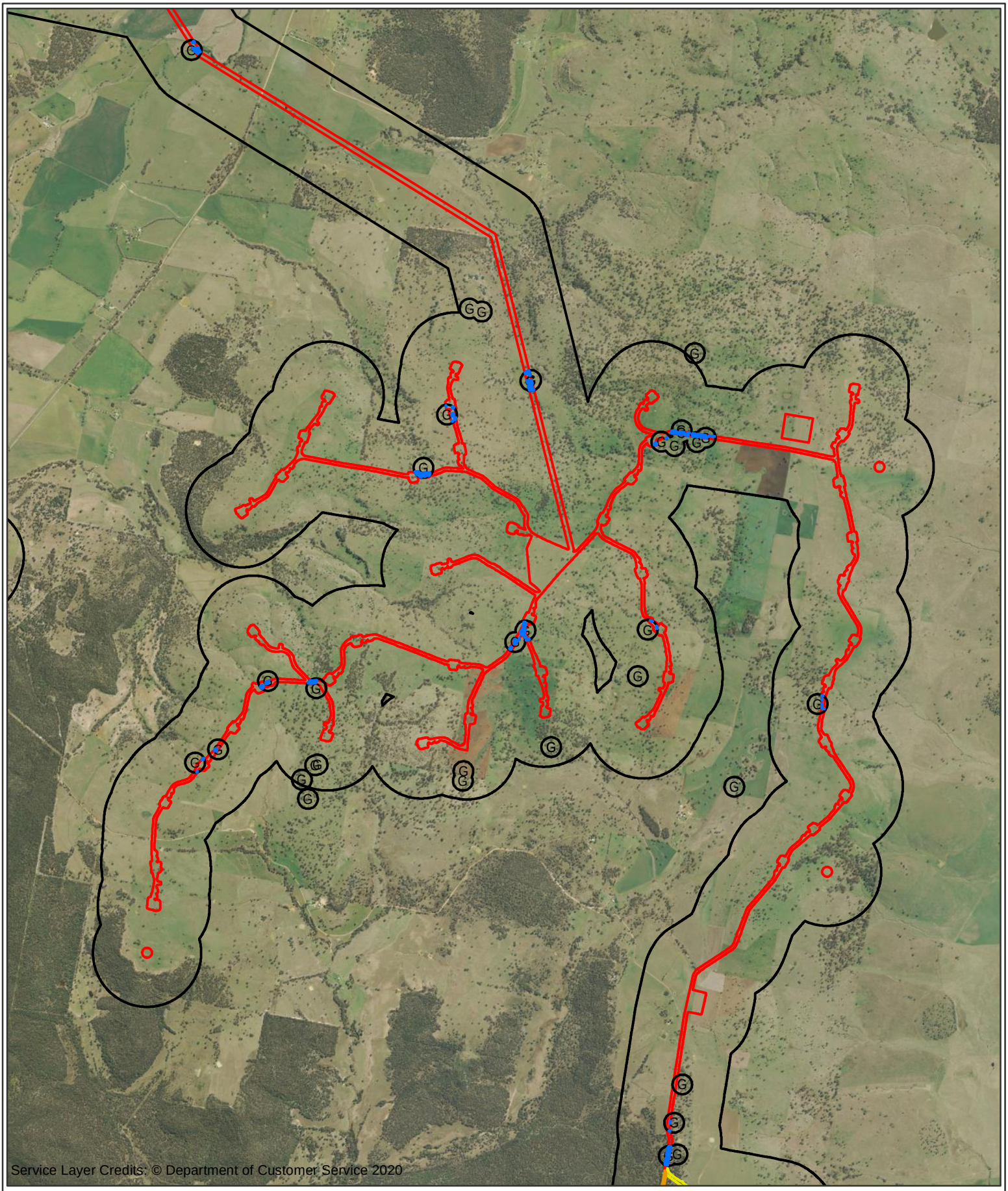
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- Study Area (14,001 ha)
- G Hollow-bearing Trees
- Hollow-bearing Trees (100m buffer on hollow>200mm)
- Barking Owl Species Polygon

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Barking Owl

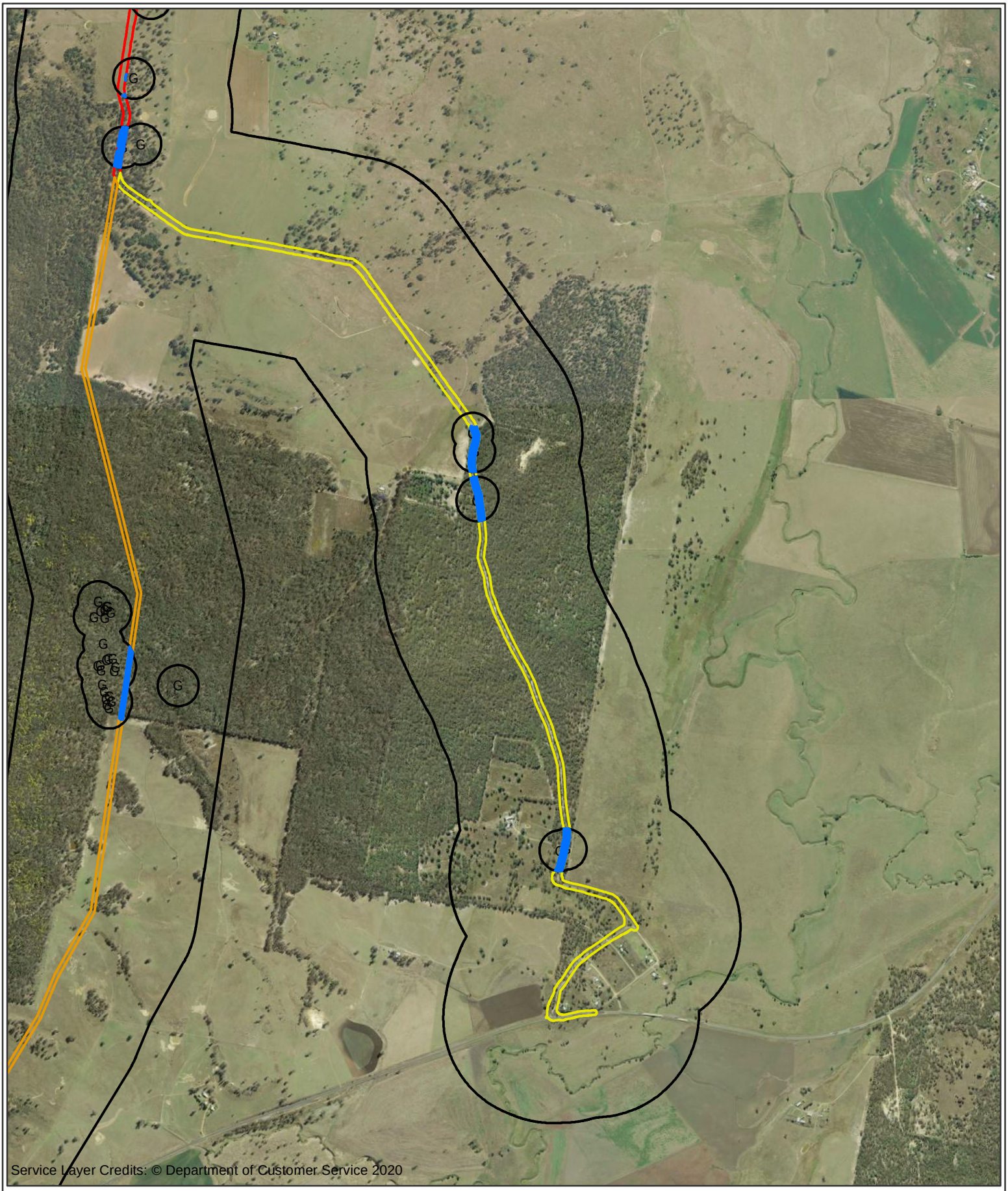
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0 0.5 1 2
Kilometers

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Project: 3178-AW Date: 13/10/2023

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Barking Owl

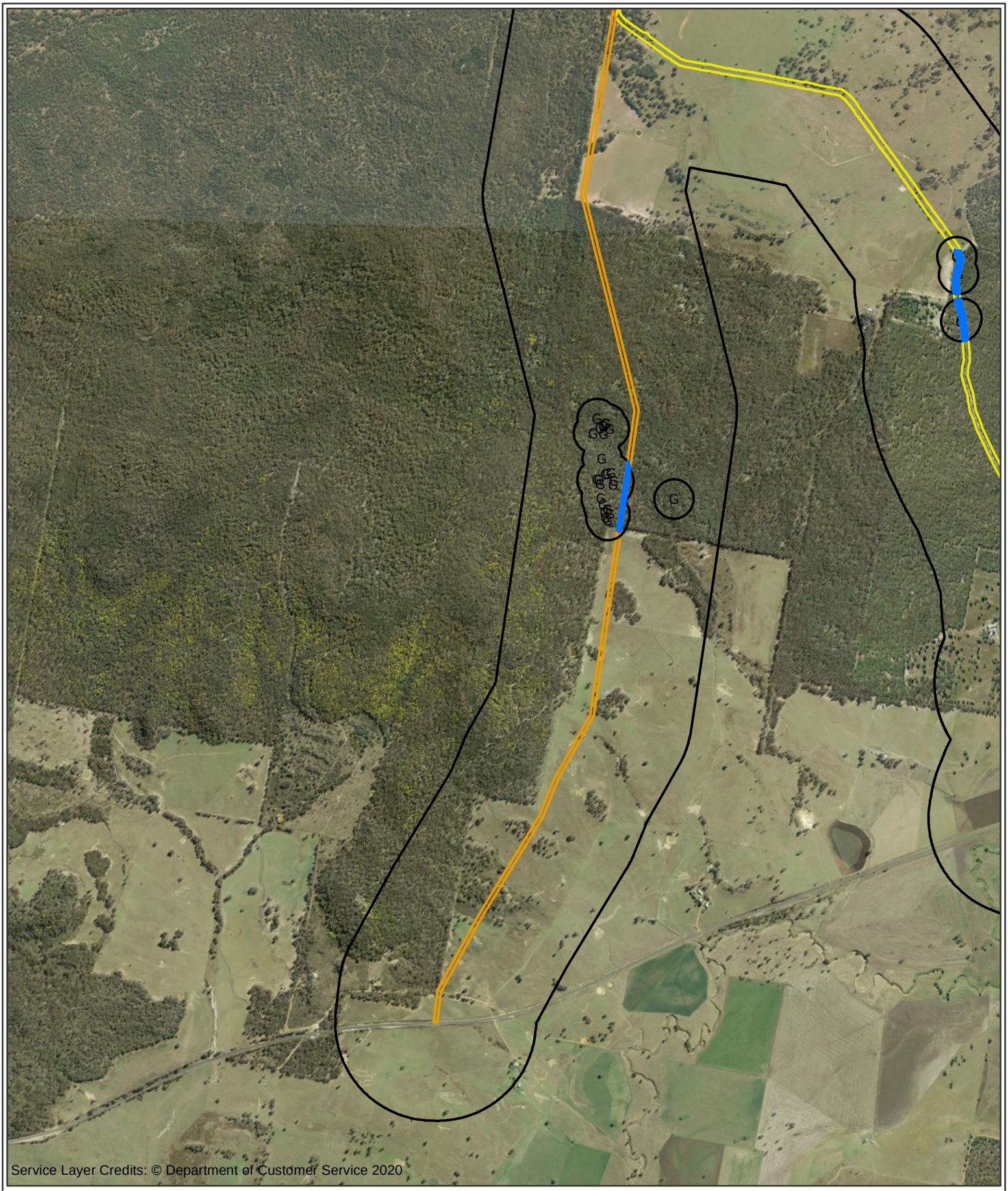
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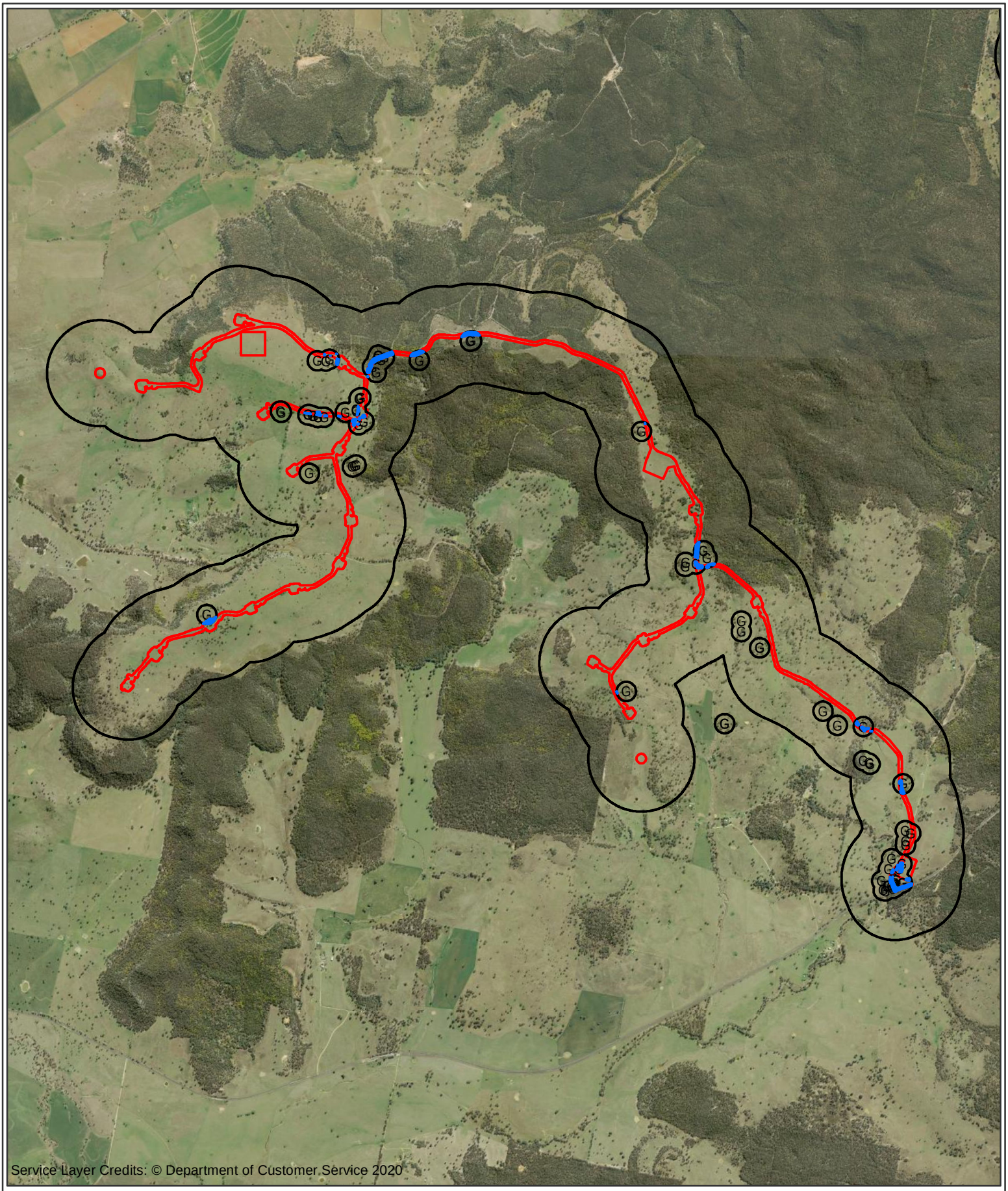
0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Barking Owl

Development site - wind farm (677 ha)

Study Area (14,001 ha)

G Hollow-bearing Trees

Hollow-bearing Trees (100m buffer on hollow>200mm)

Barking Owl Species Polygon

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Barking Owl

Development site - wind farm (677 ha)

Study Area (14,001 ha)

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Barking Owl

Development site - wind farm (677 ha)

Study Area (14,001 ha)

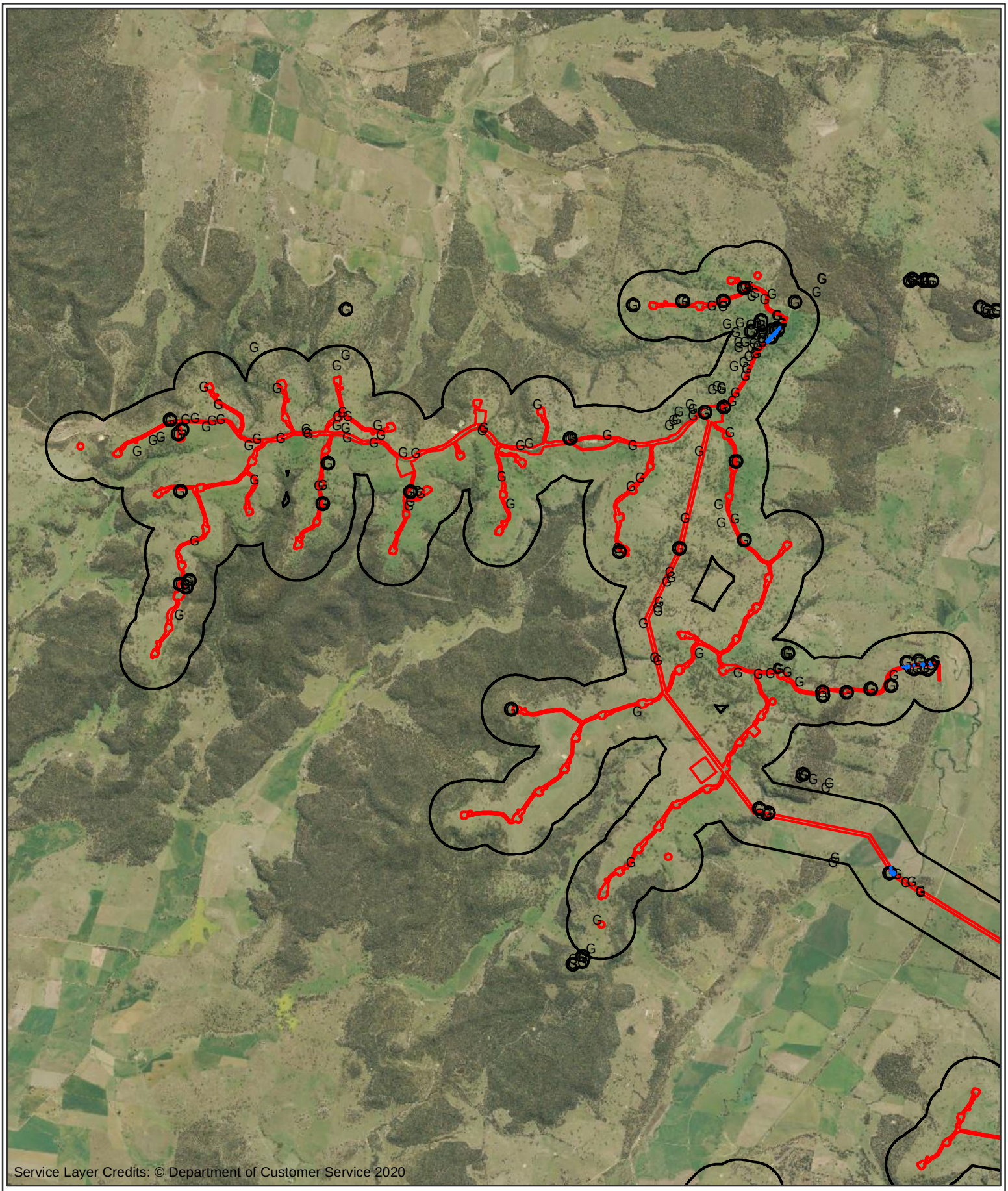
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Powerful Owl

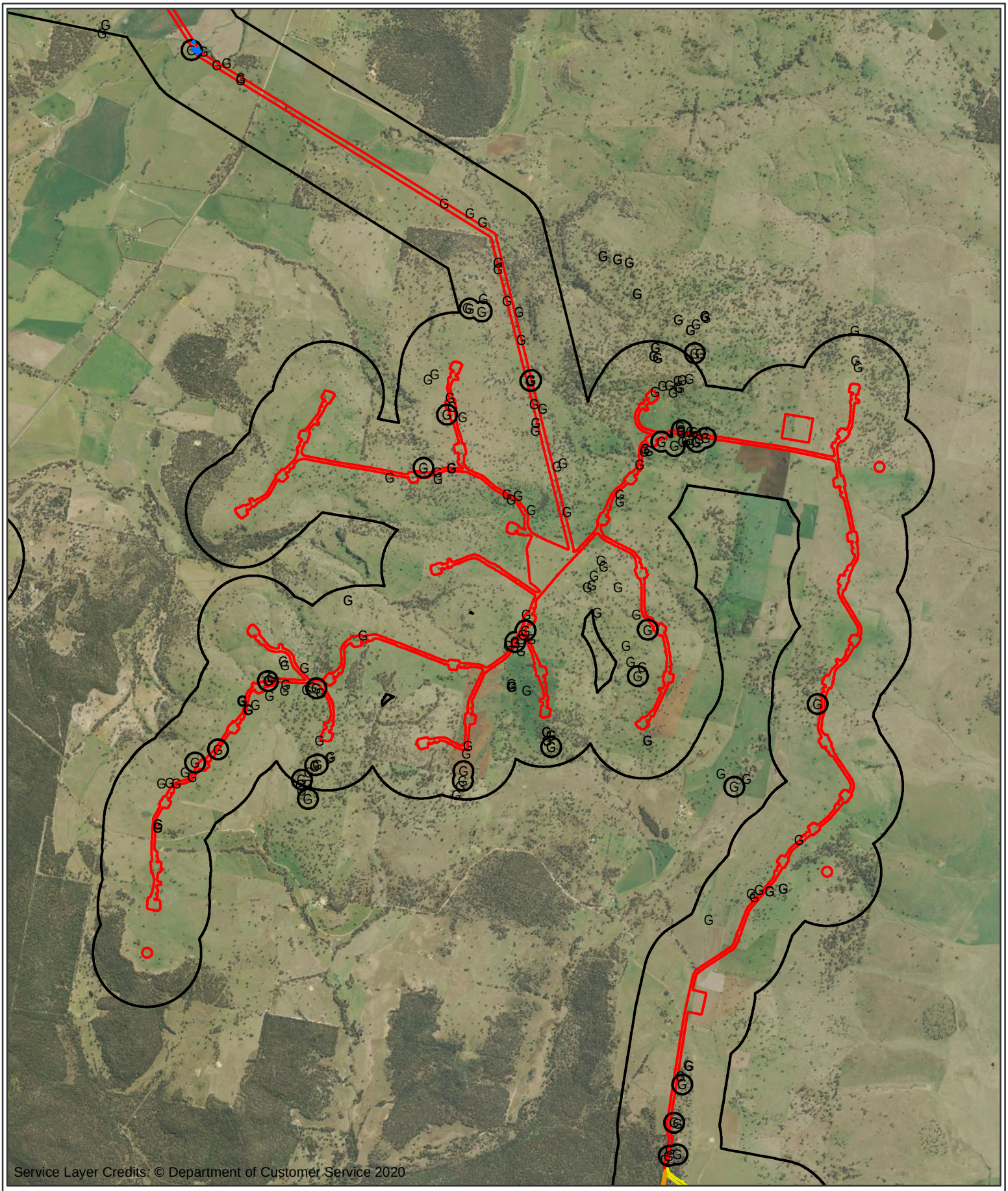
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- Powerful Owl Species Polygon

0 0.75 1.5 3
Kilometers

Datum/Projection:
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Powerful Owl

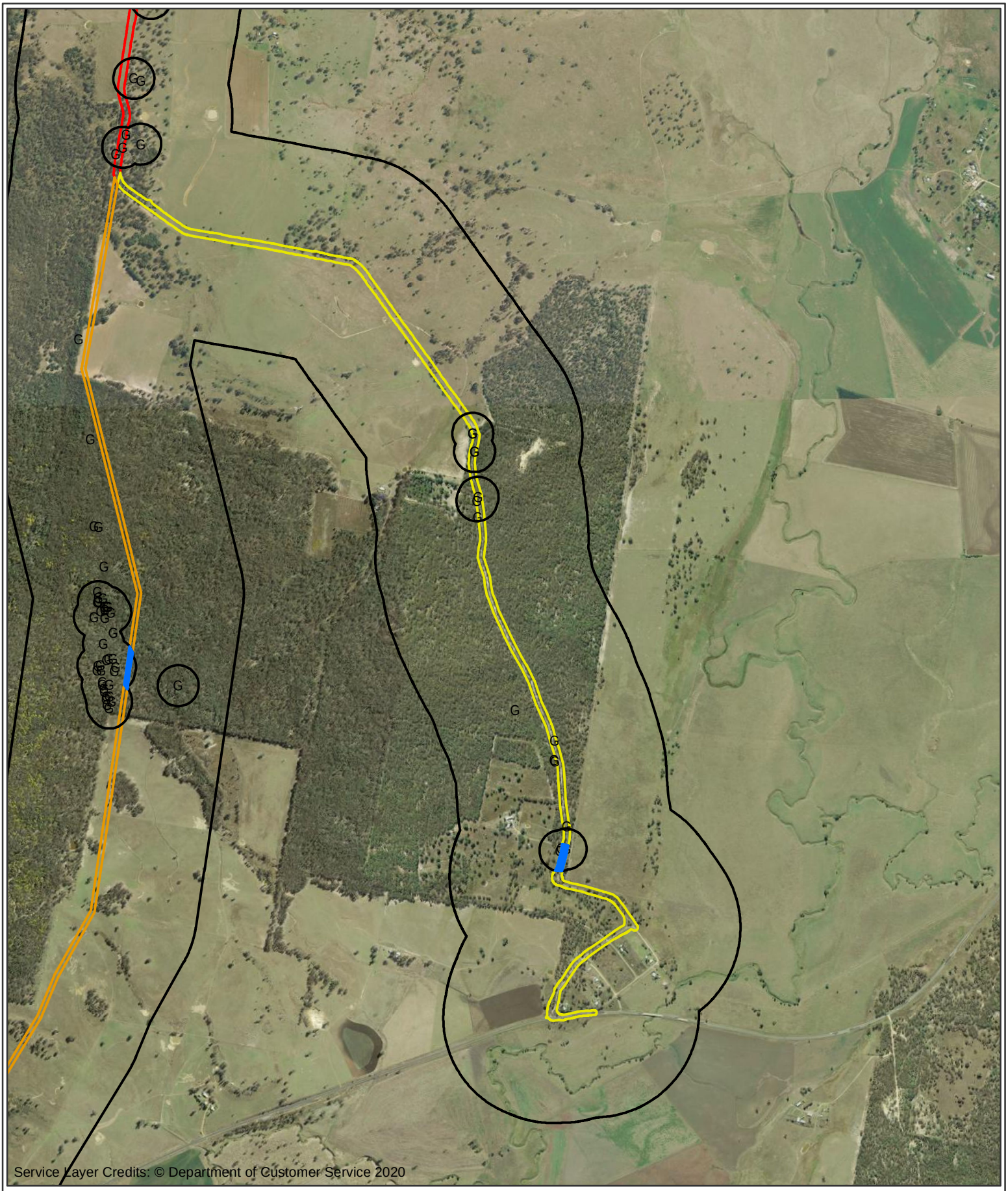
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0 0.5 1 2
Kilometers

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Powerful Owl

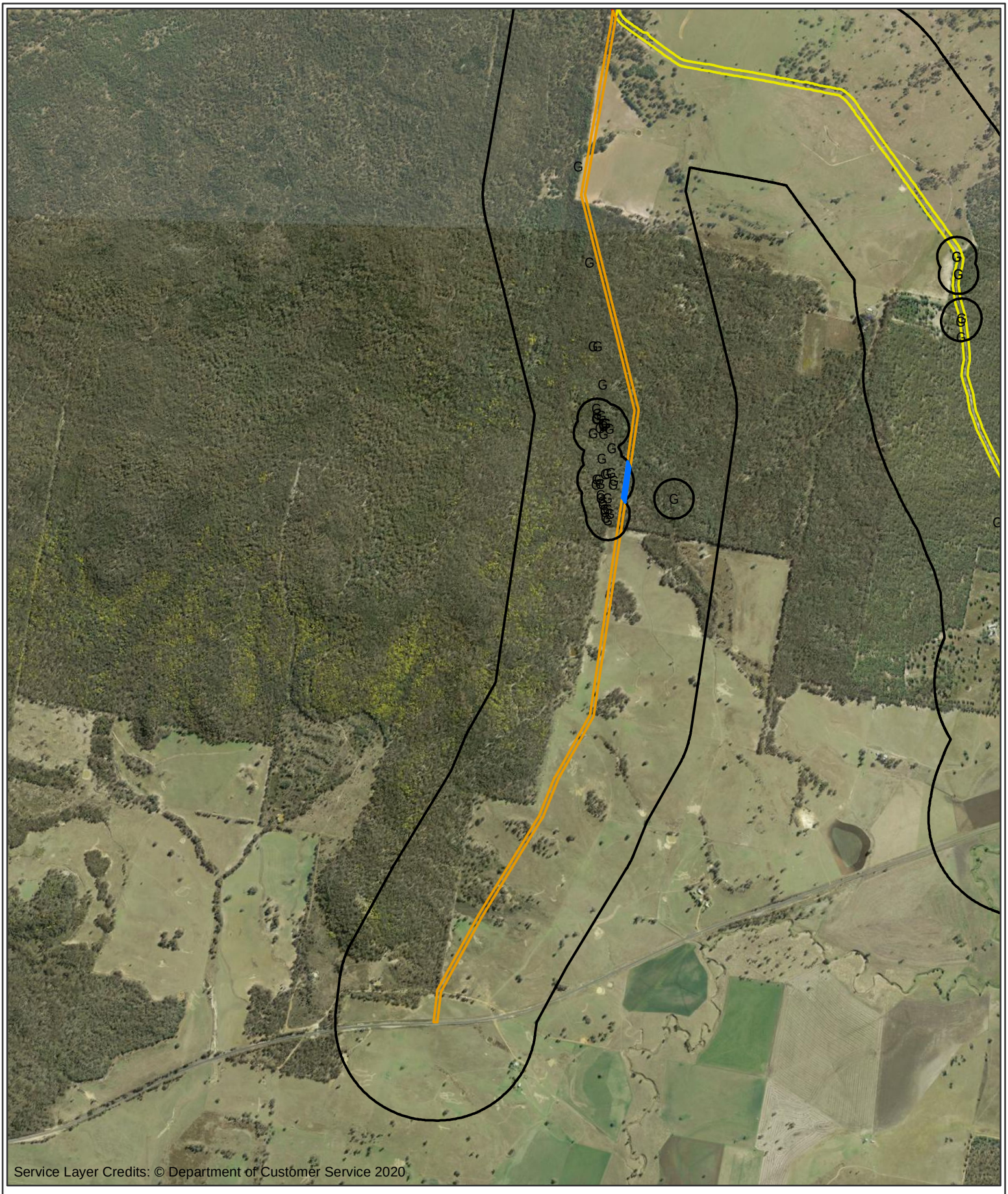
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0 0.25 0.5 1
Kilometers

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Powerful Owl

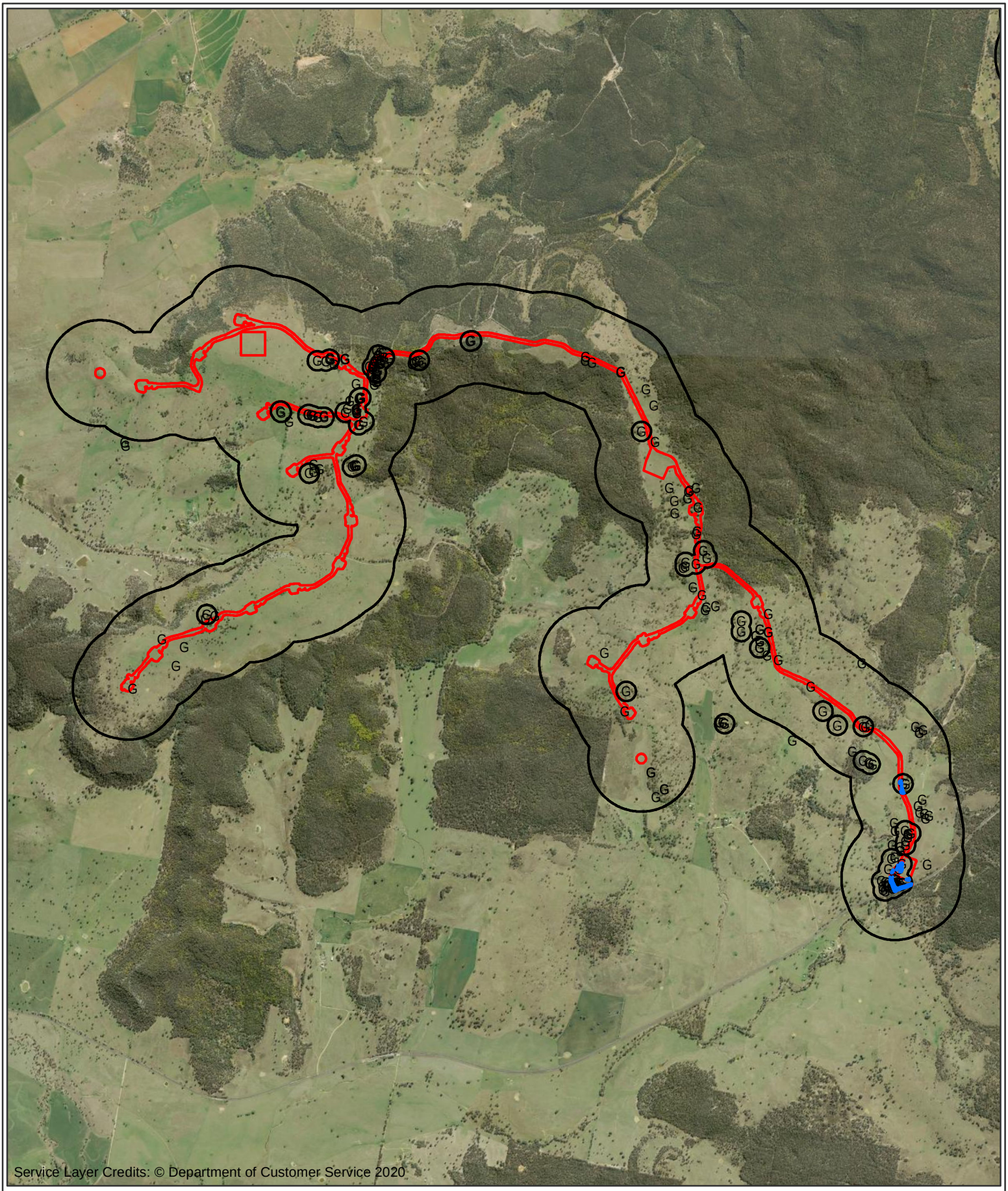
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0 0.25 0.5 1
Kilometers

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Powerful Owl

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0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

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Powerful Owl

Development site - wind farm (677 ha)

Study Area (14,001 ha)

0 0.125 0.25 0.5

Kilometers

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GDA2020 MGA Zone 55

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Powerful Owl

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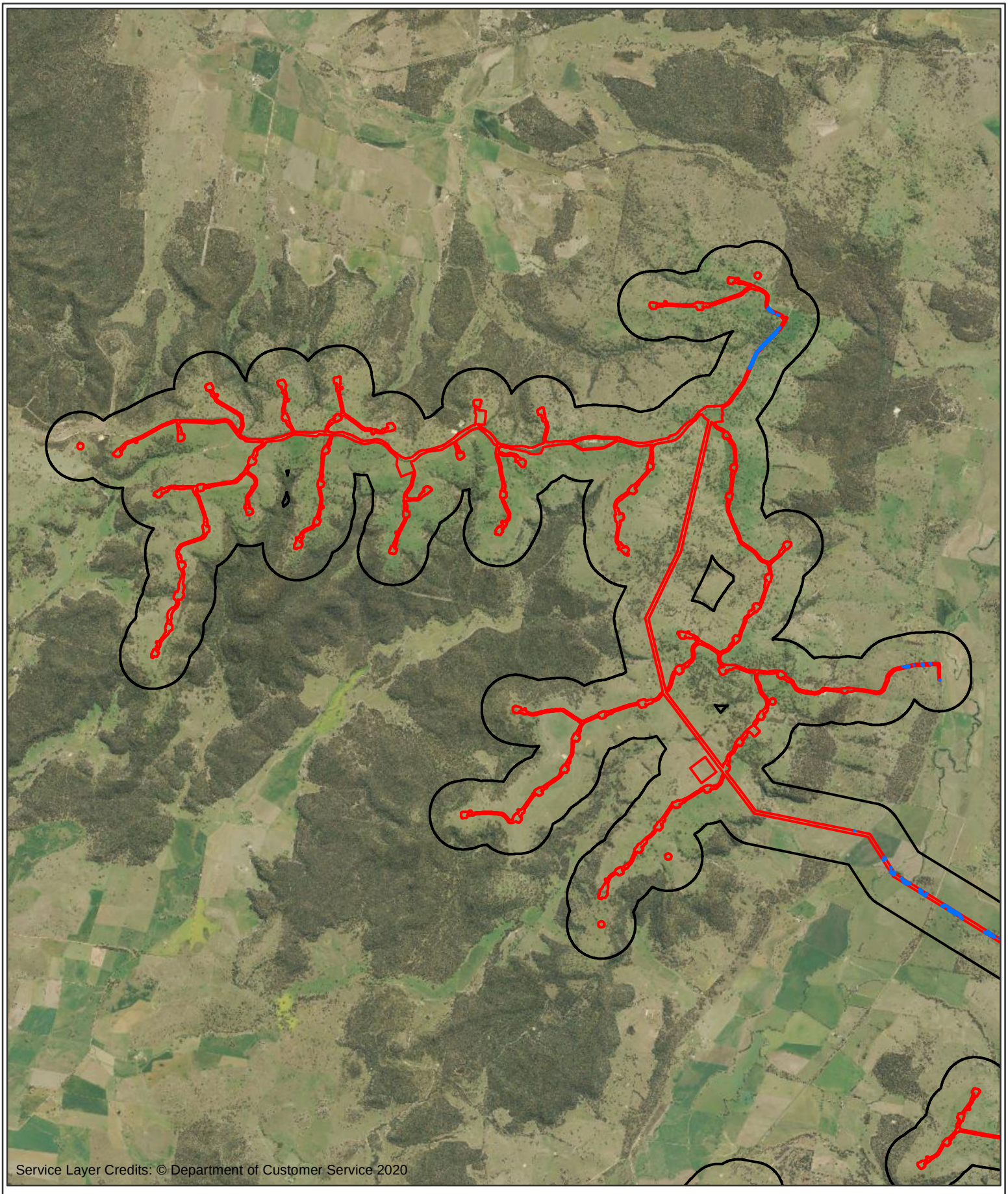
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Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Squirrel Glider

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Squirrel Glider species polygon

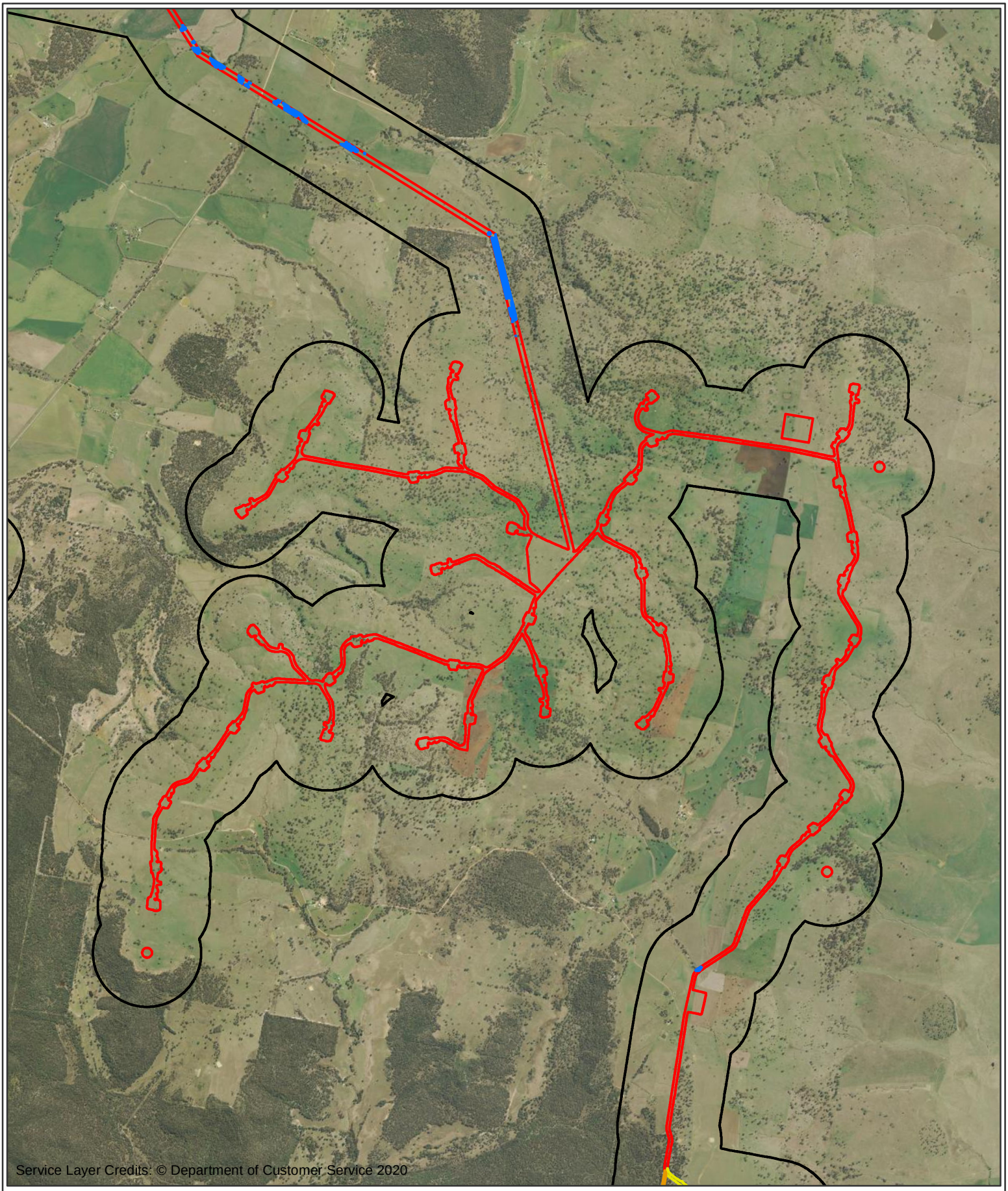
0 0.75 1.5 3

Kilometers

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Squirrel Glider

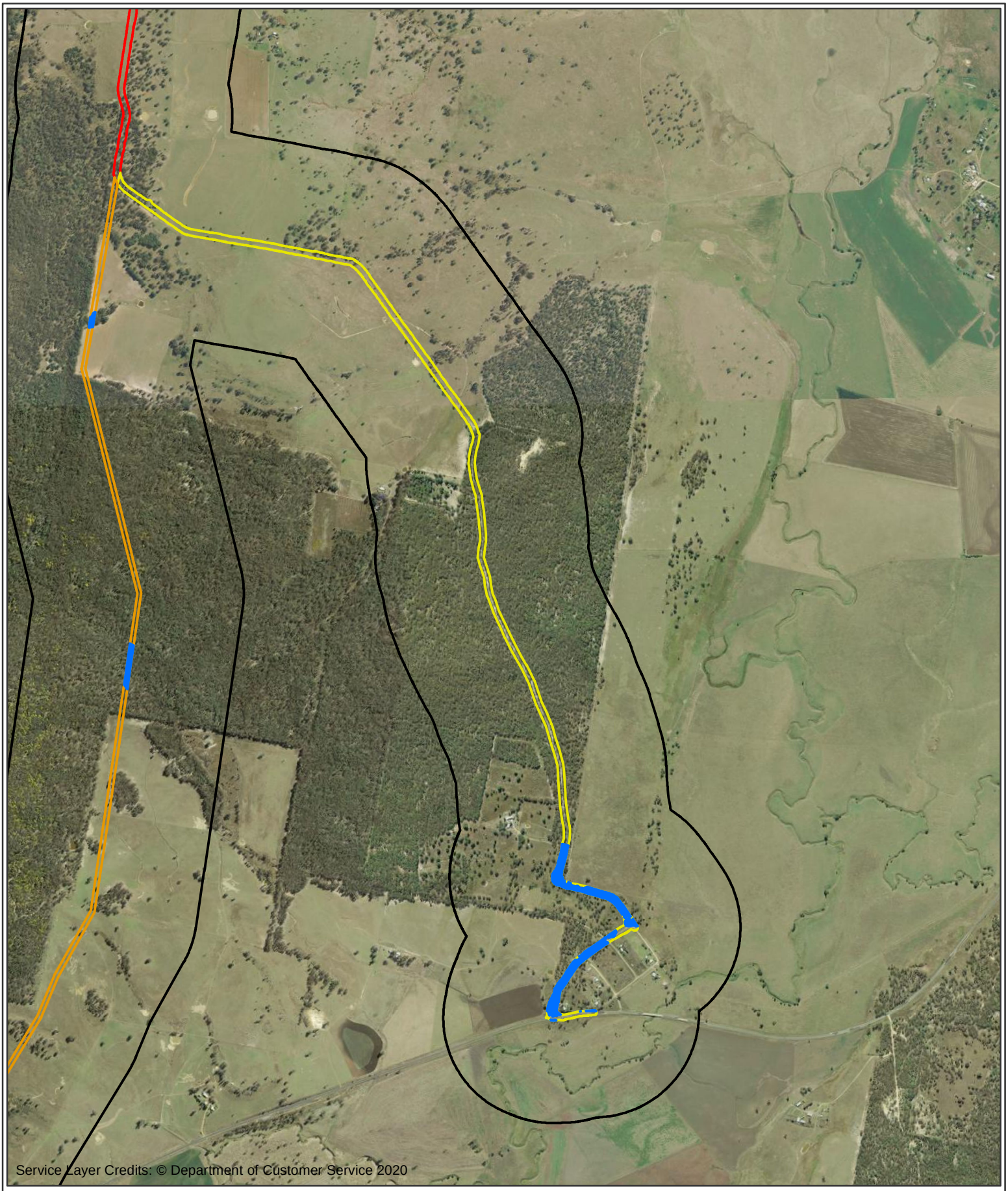
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- Study Area (14,001 ha)
- Squirrel Glider species polygon

0 0.5 1 2
Kilometers

Datum/Projection:
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Squirrel Glider

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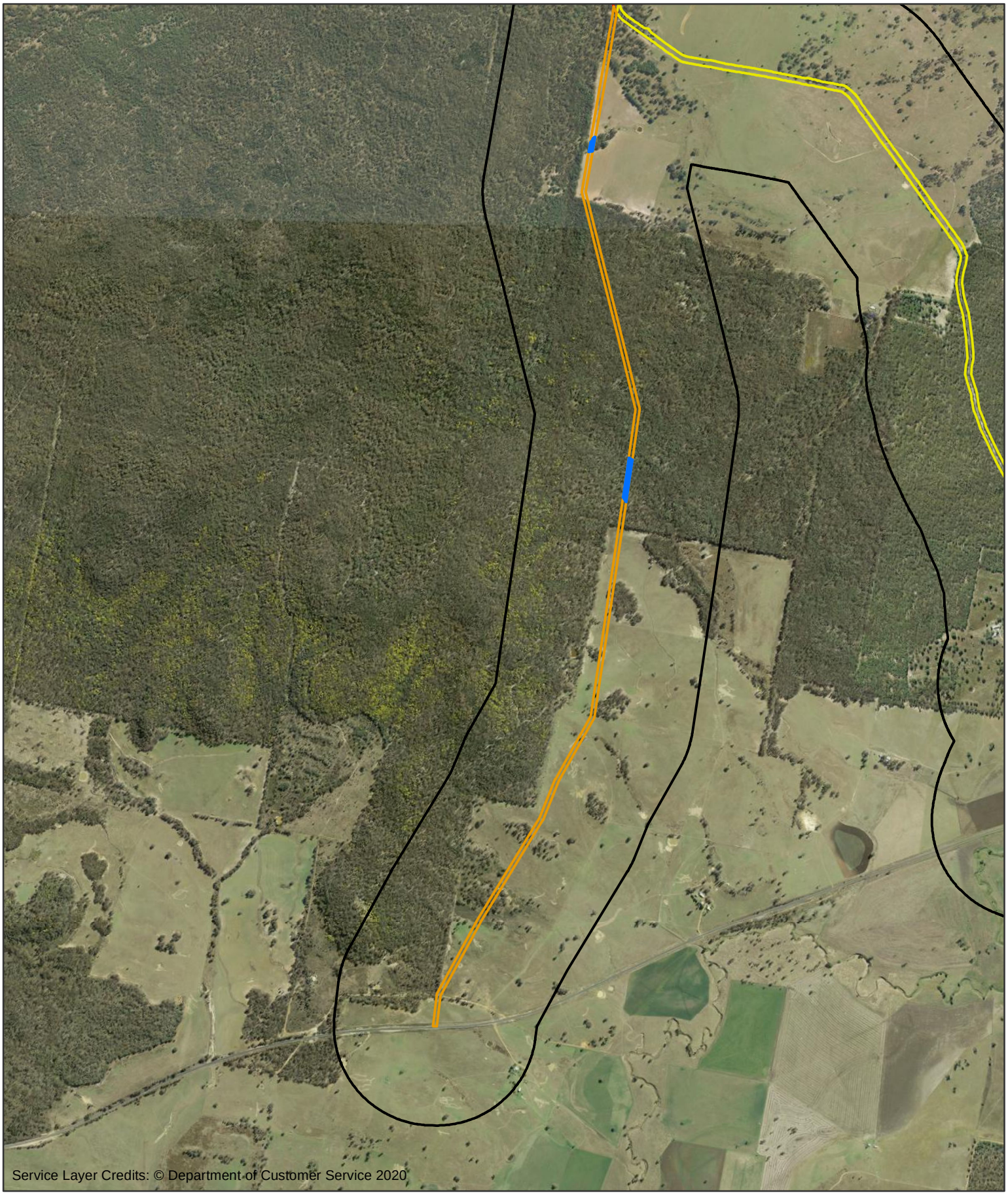
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Kilometers

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Squirrel Glider

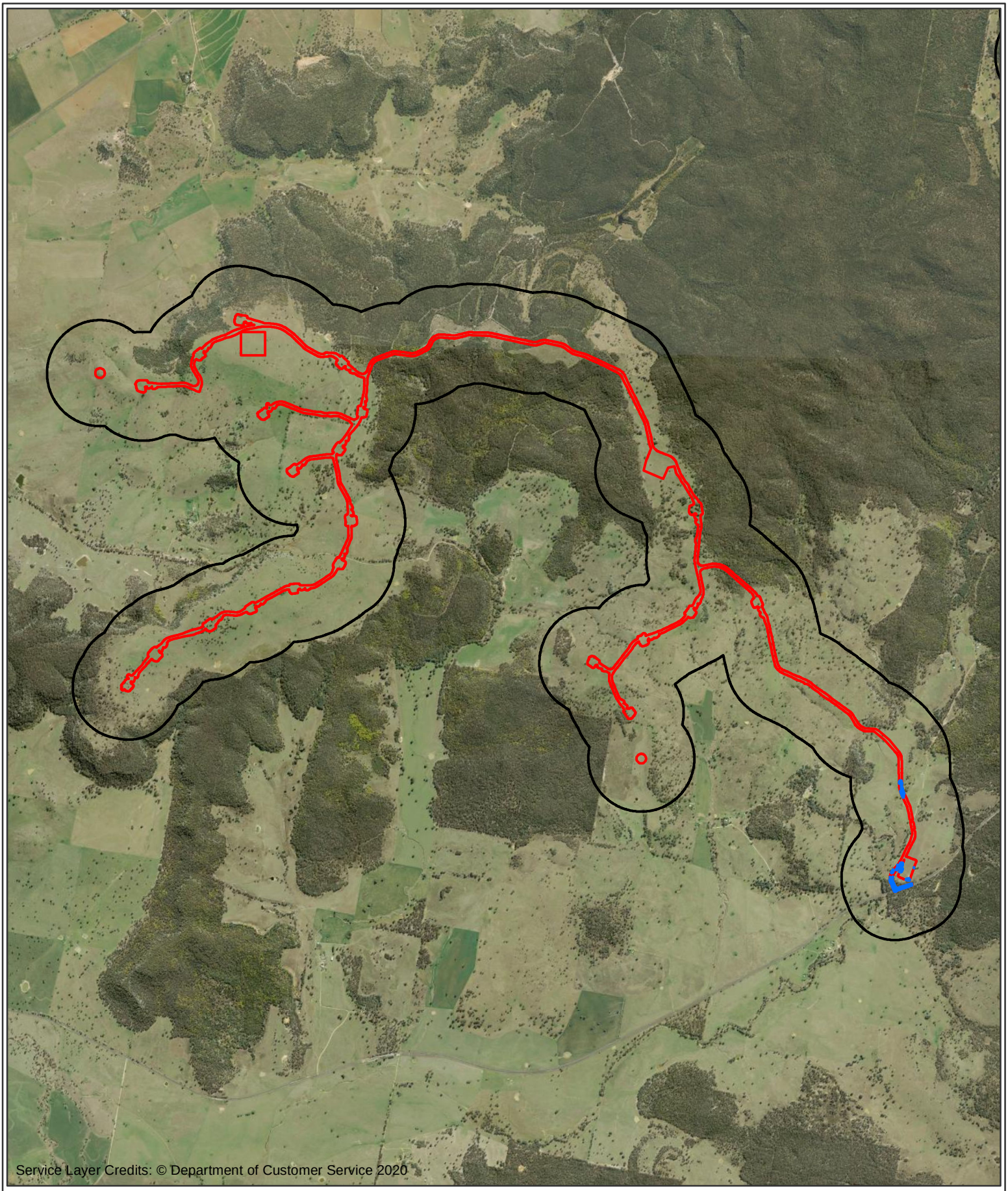
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Squirrel Glider

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0 0.5 1 2

Kilometers

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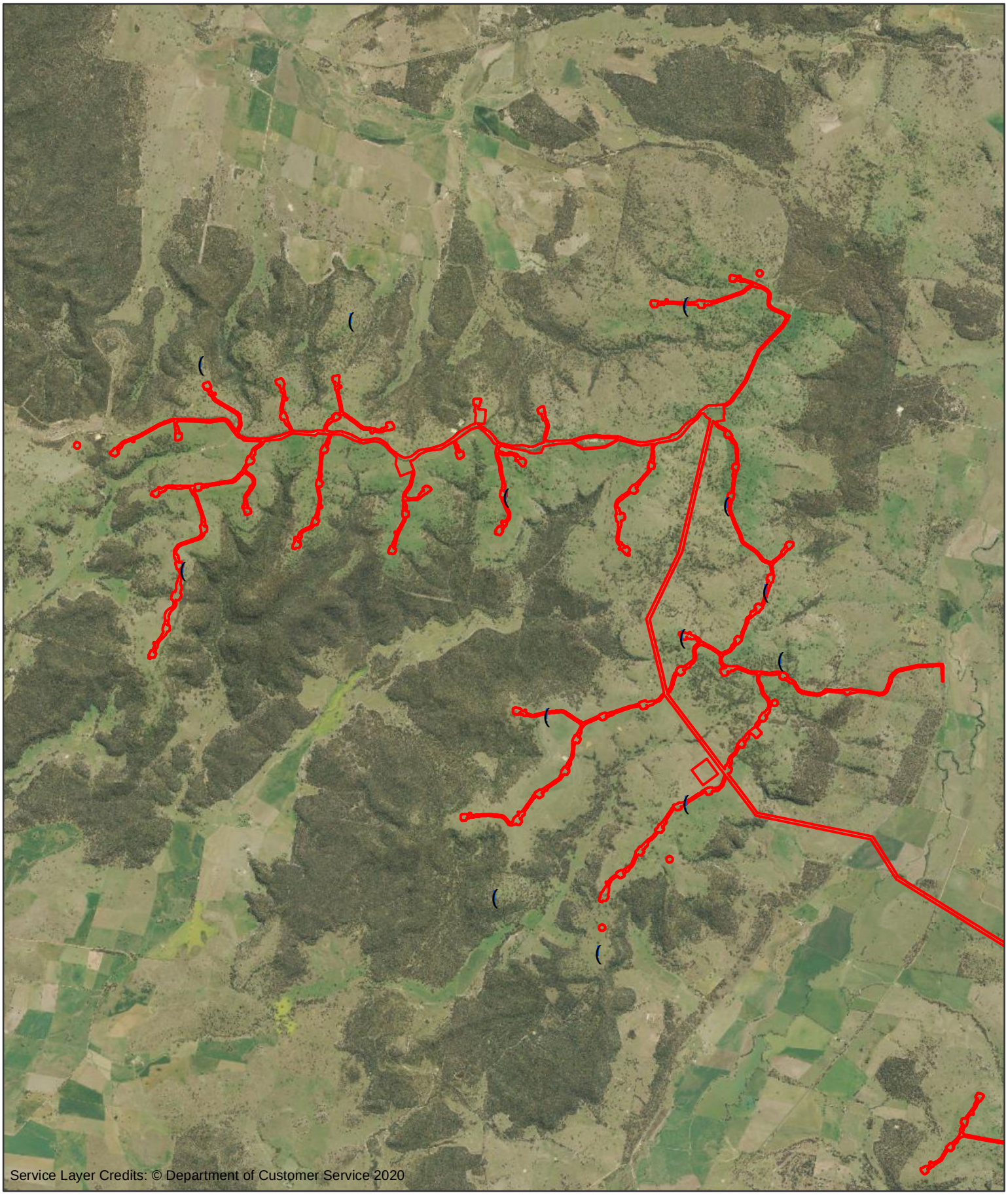
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Kilometers

Datum/Projection:
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Bird utilisation survey

Development site - wind farm (677 ha)

Bird utilisation survey locations

0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

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Bird utilisation survey

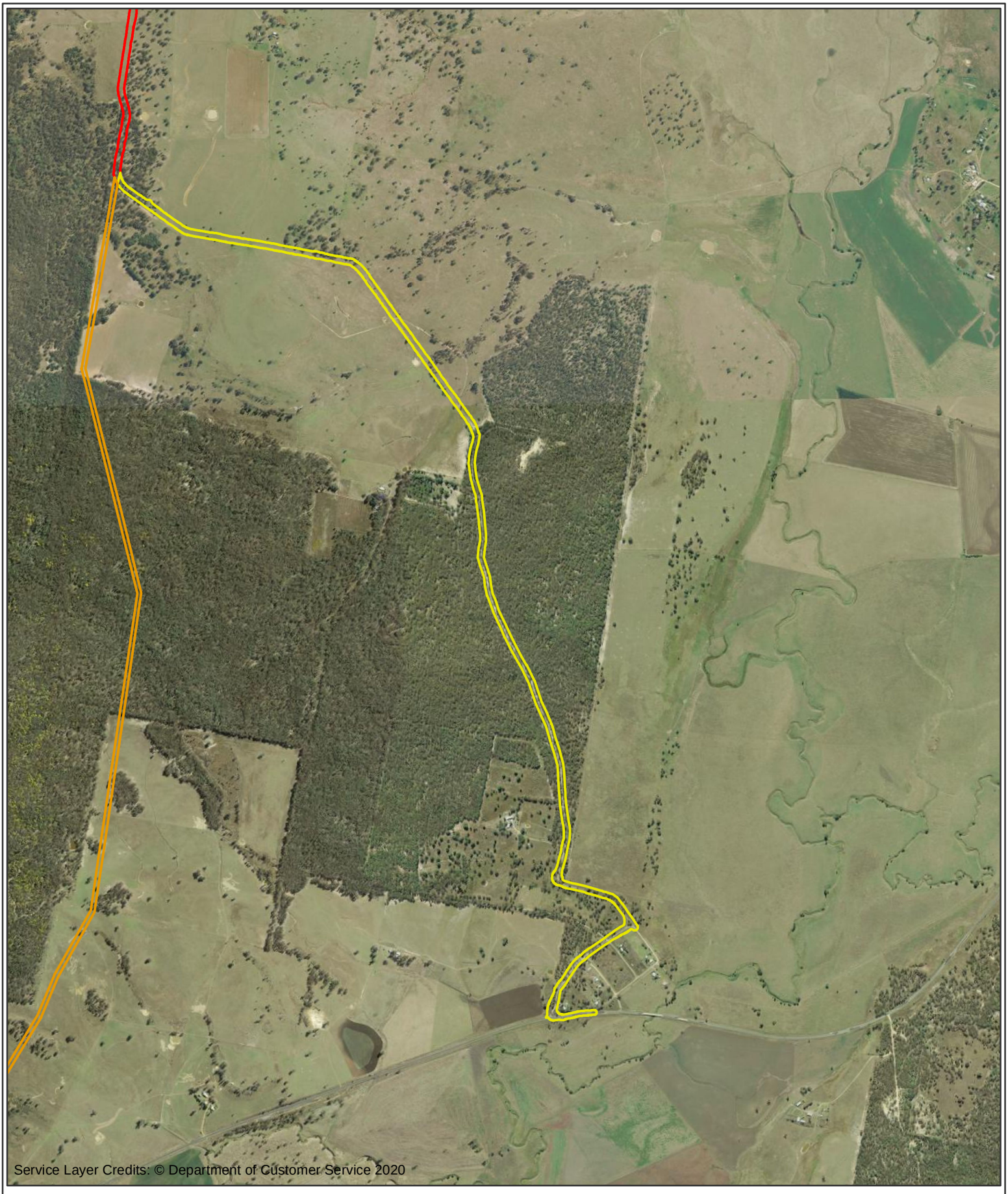
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- Bird utilisation survey locations

0 0.5 1 2
Kilometers

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Bird utilisation survey

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0 0.25 0.5 1
Kilometers

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Bird utilisation survey

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Bird utilisation survey

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Bird utilisation survey locations

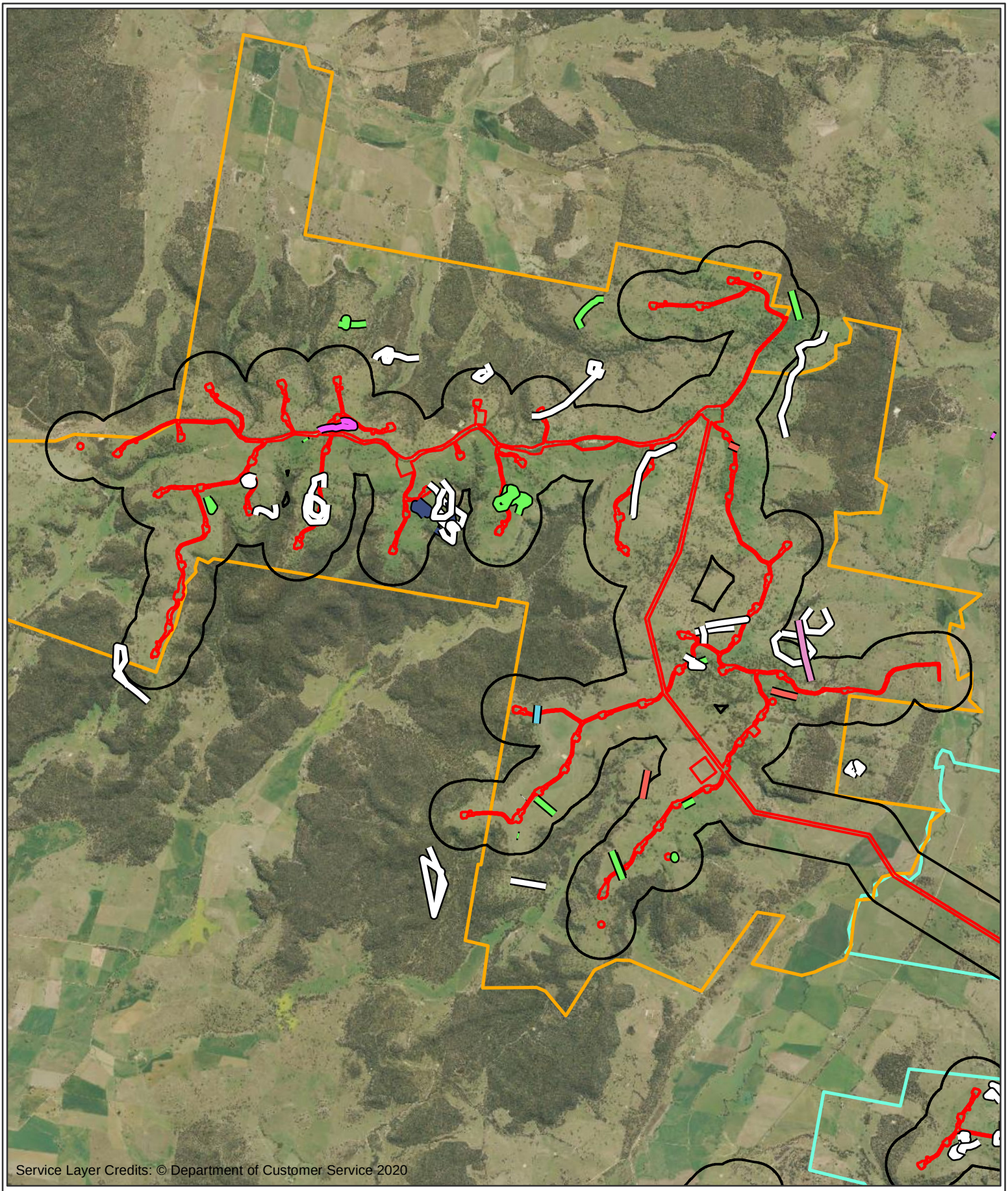
0 0.1 0.2 0.4

Kilometers

Datum/Projection:
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Aerial Flight Path

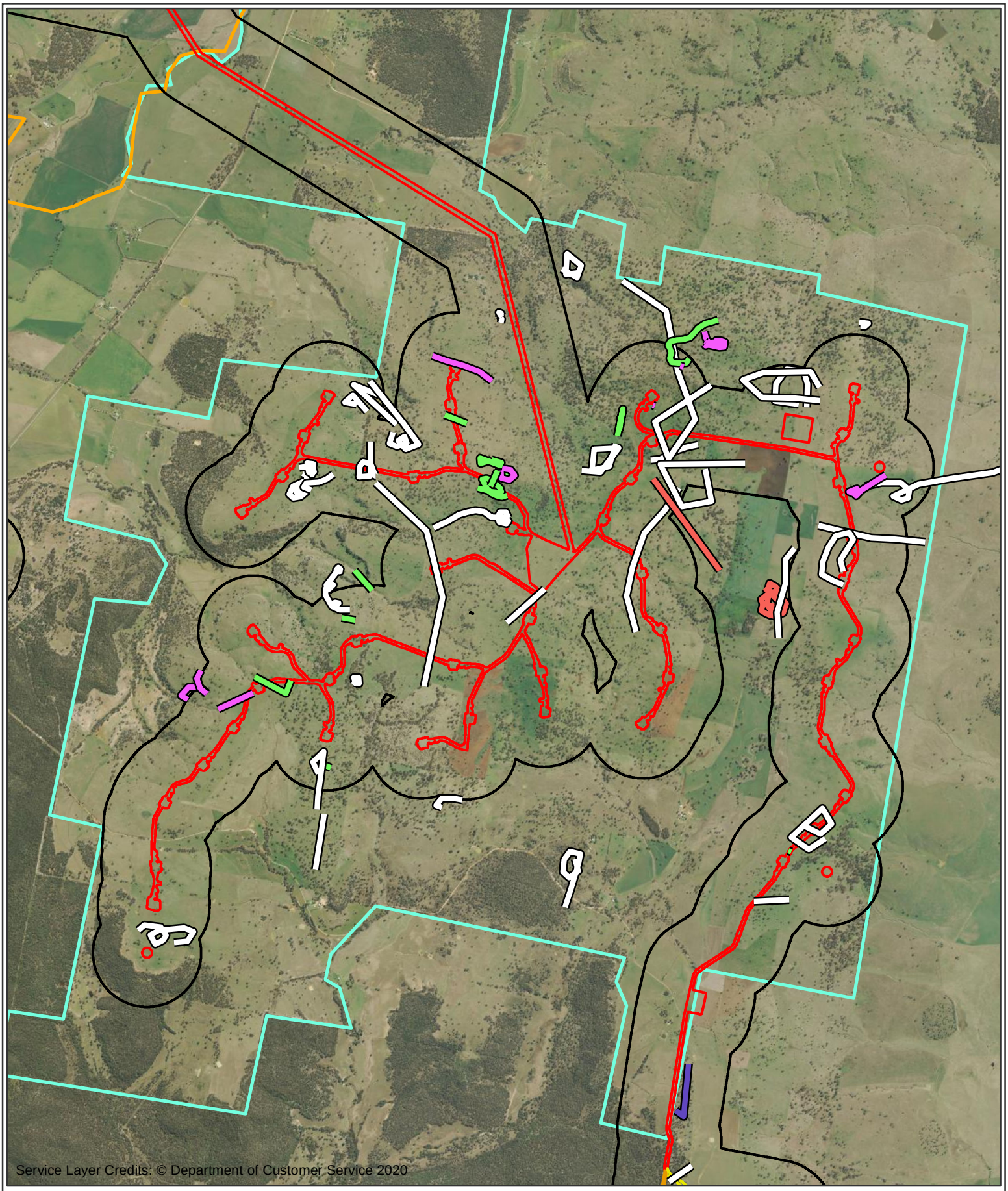
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Girragulang Road (51 WTG)
- Mount Hope (76 WTG)
- Black-shouldered Kite
- Brown Falcon
- Brown Goshawk
- Crimson Rosella
- Nankeen Kestrel
- Straw-necked Ibis
- Wedge-tailed Eagle

0 0.75 1.5 3
Kilometers

Datum/Projection:
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Aerial Flight Path

- Development site - wind farm (677 ha)
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- Girragulang Road (51 WTG)
- Mount Hope (76 WTG)

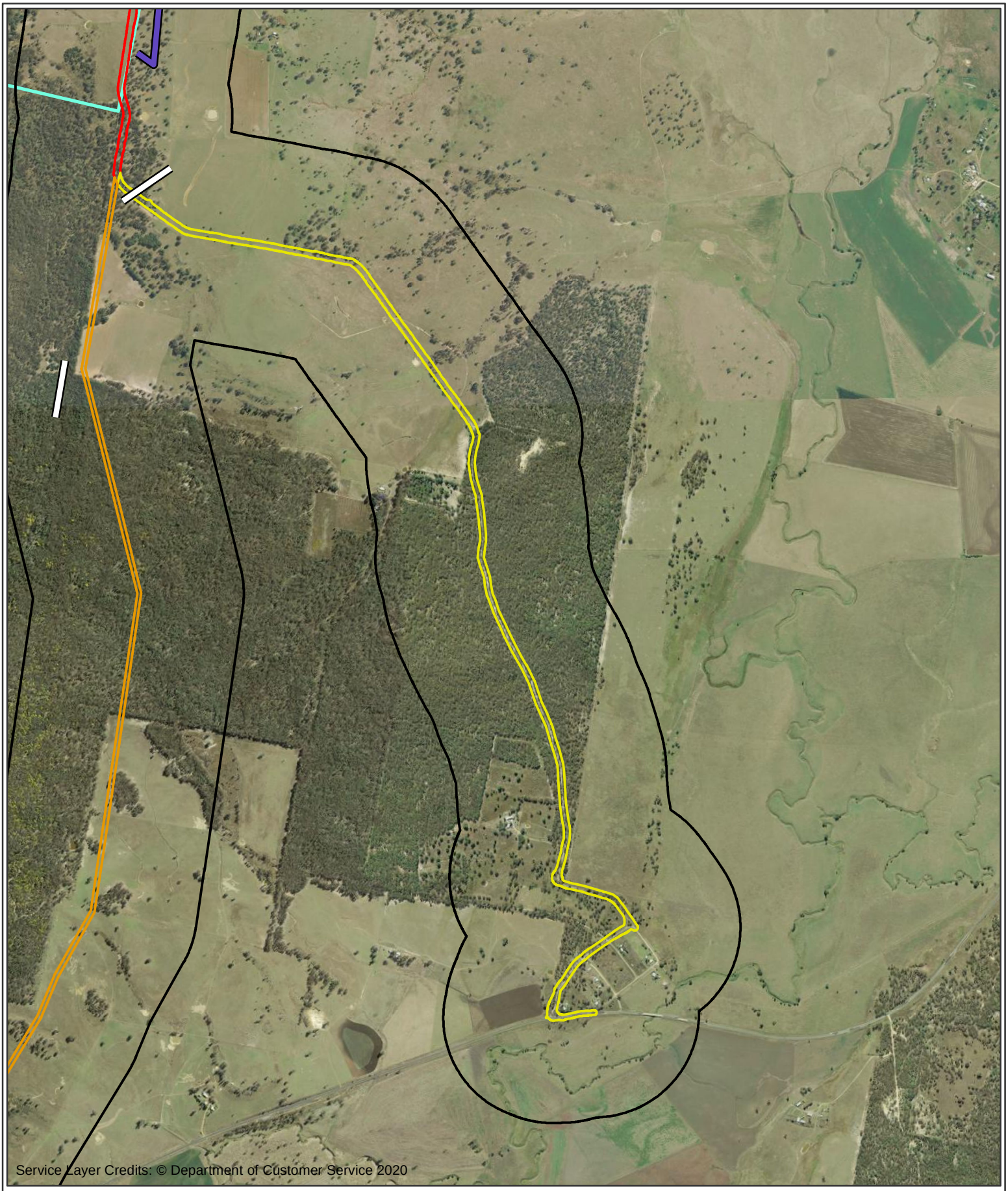
- Black-shouldered Kite
- Brown Falcon
- Nankeen Kestrel
- Sulphur-crested Cockatoo
- Wedge-tailed Eagle

0 0.5 1 2
Kilometers

Datum/Projection:
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Aerial Flight Path

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- Study Area (14,001 ha)
- Girragulang Road (51 WTG)
- Sulphur-crested Cockatoo
- Wedge-tailed Eagle

0 0.25 0.5 1

Kilometers

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Aerial Flight Path

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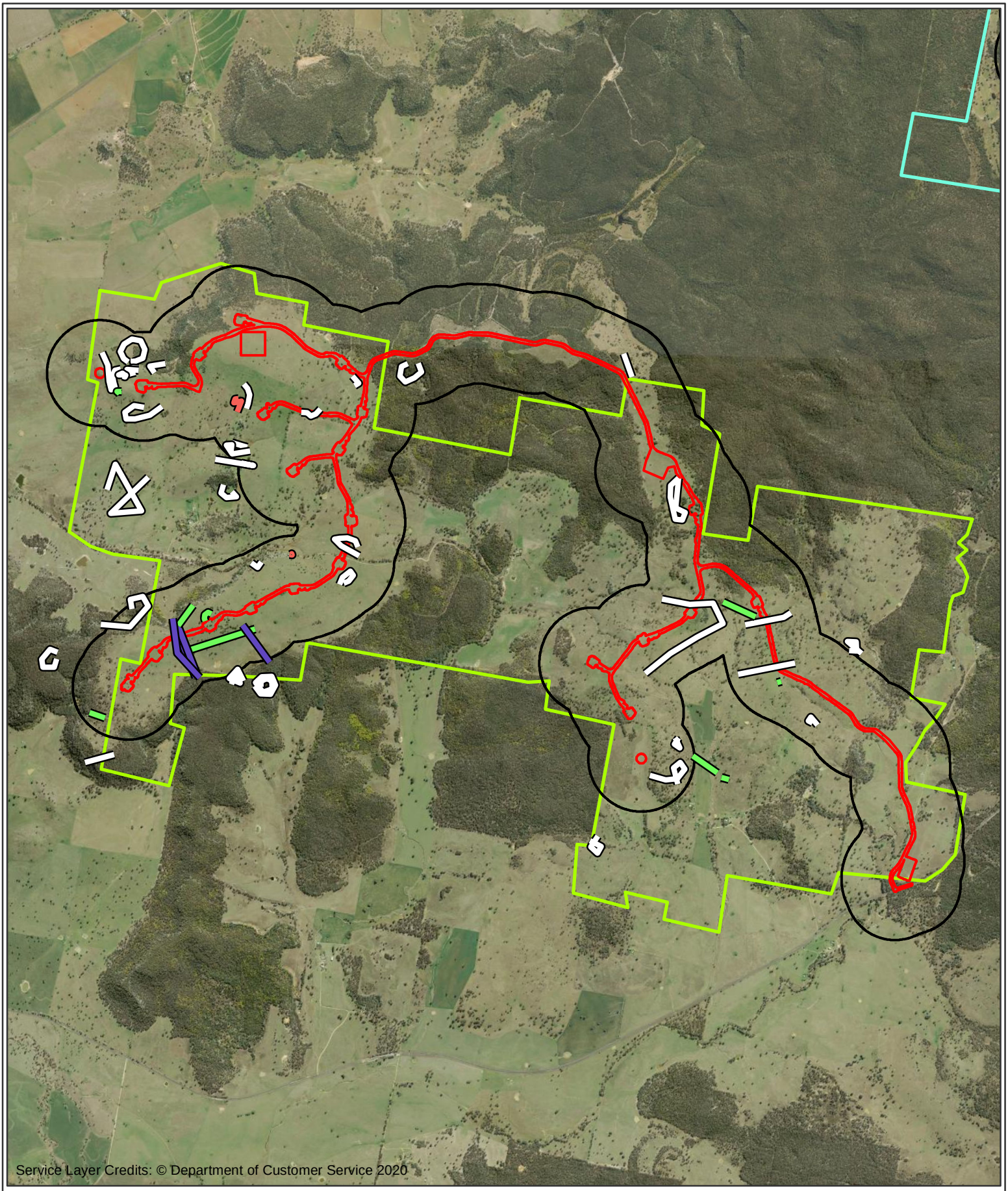
0 0.25 0.5 1

Kilometers

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Aerial Flight Path

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- Study Area (14,001 ha)
- Girragulang Road (51 WTG)
- Leadville (21 WTG)
- Brown Falcon
- Nankeen Kestrel
- Sulphur-crested Cockatoo
- Wedge-tailed Eagle

0 0.5 1 2
Kilometers

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Aerial Flight Path

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Girragulang Road (51 WTG)
- Barn Owl

0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Aerial Flight Path

Development site - wind farm (677 ha)

Study Area (14,001 ha)

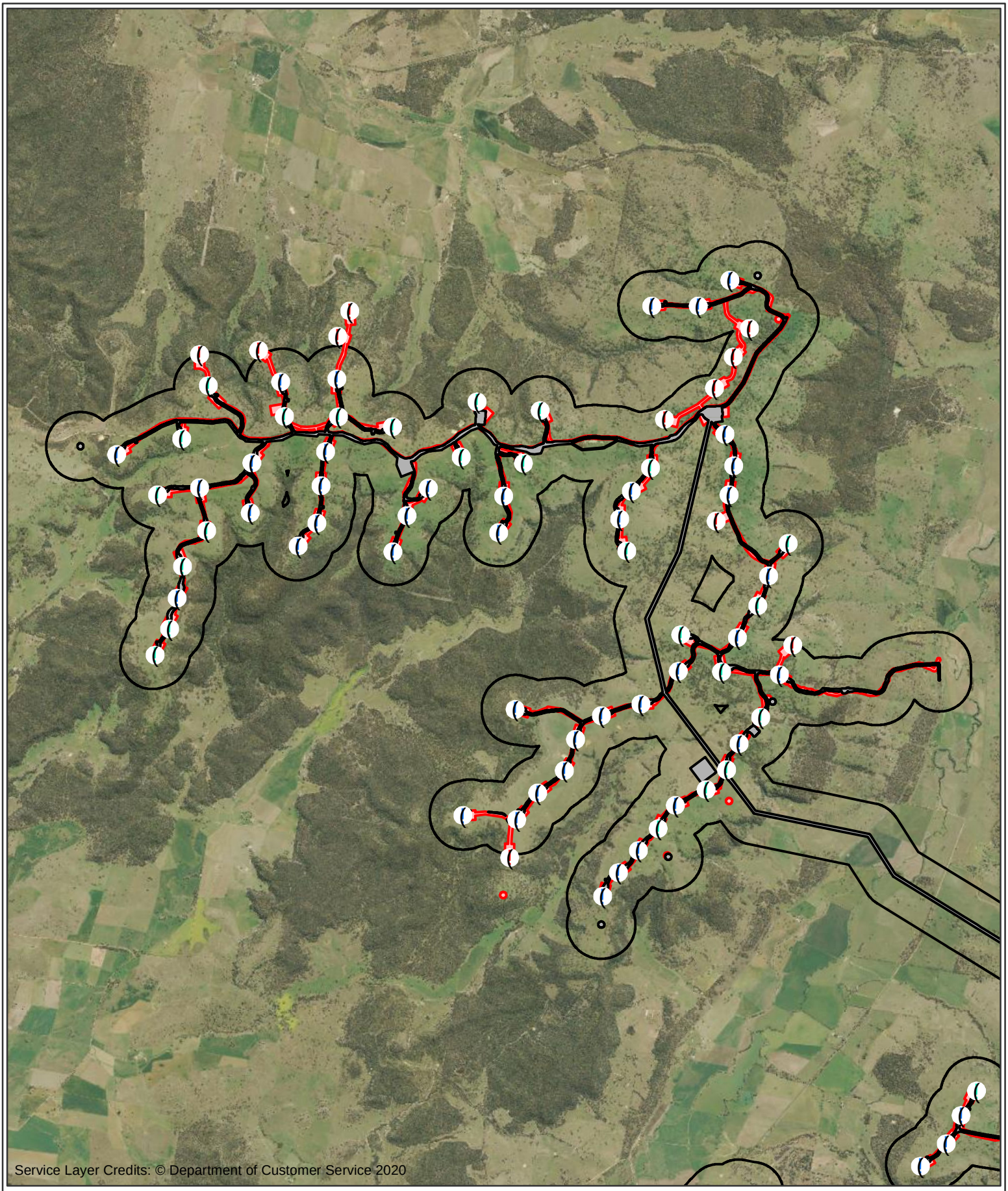
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Project Design Changes

Study Area (14,001 ha)

Avoided Development (August 2022 - 768 ha)

Current development footprint (August 2023 - 702 ha)

Turbine Status

Moved

Removed

Retained

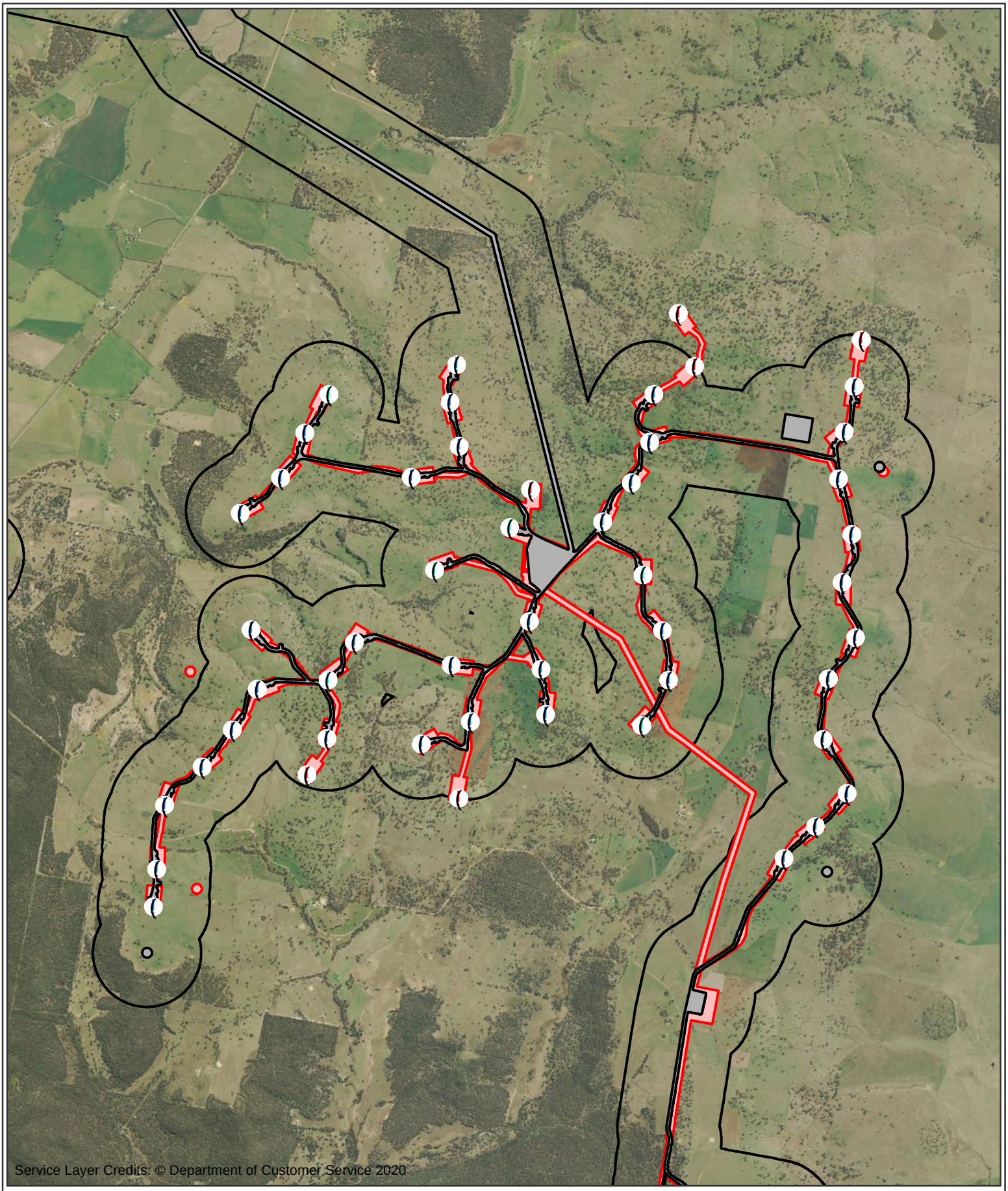
0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Project Design Changes

Study Area (14,001 ha)

Avoided Development (August 2022 - 768 ha)

Current development footprint (August 2023 - 702 ha)

Turbine Status

Moved

Removed

Retained

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Project Design Changes

- Study Area (14,001 ha)
- Avoided Development (August 2022 - 768 ha)
- Current development footprint (August 2023 - 702 ha)

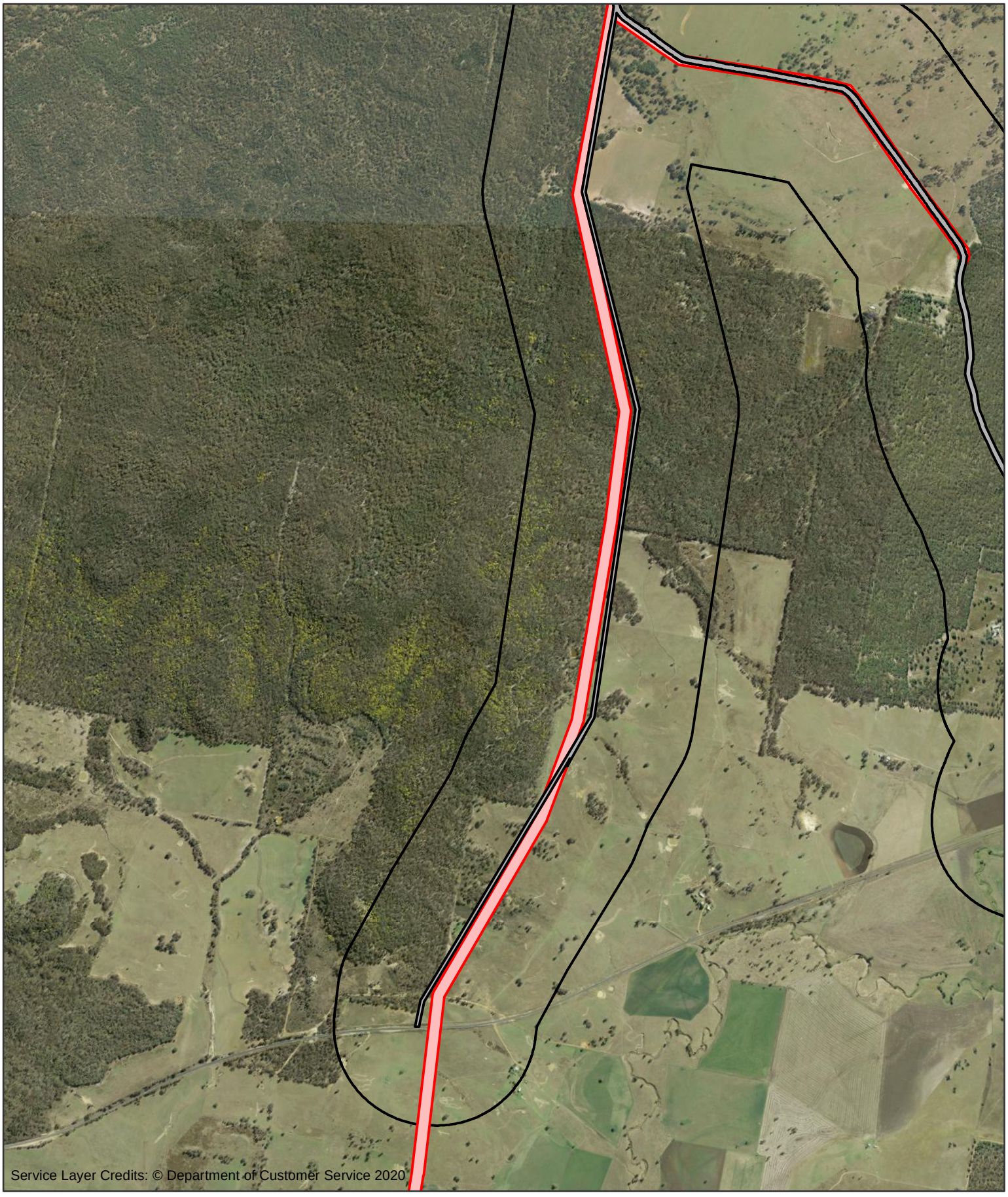
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Project Design Changes

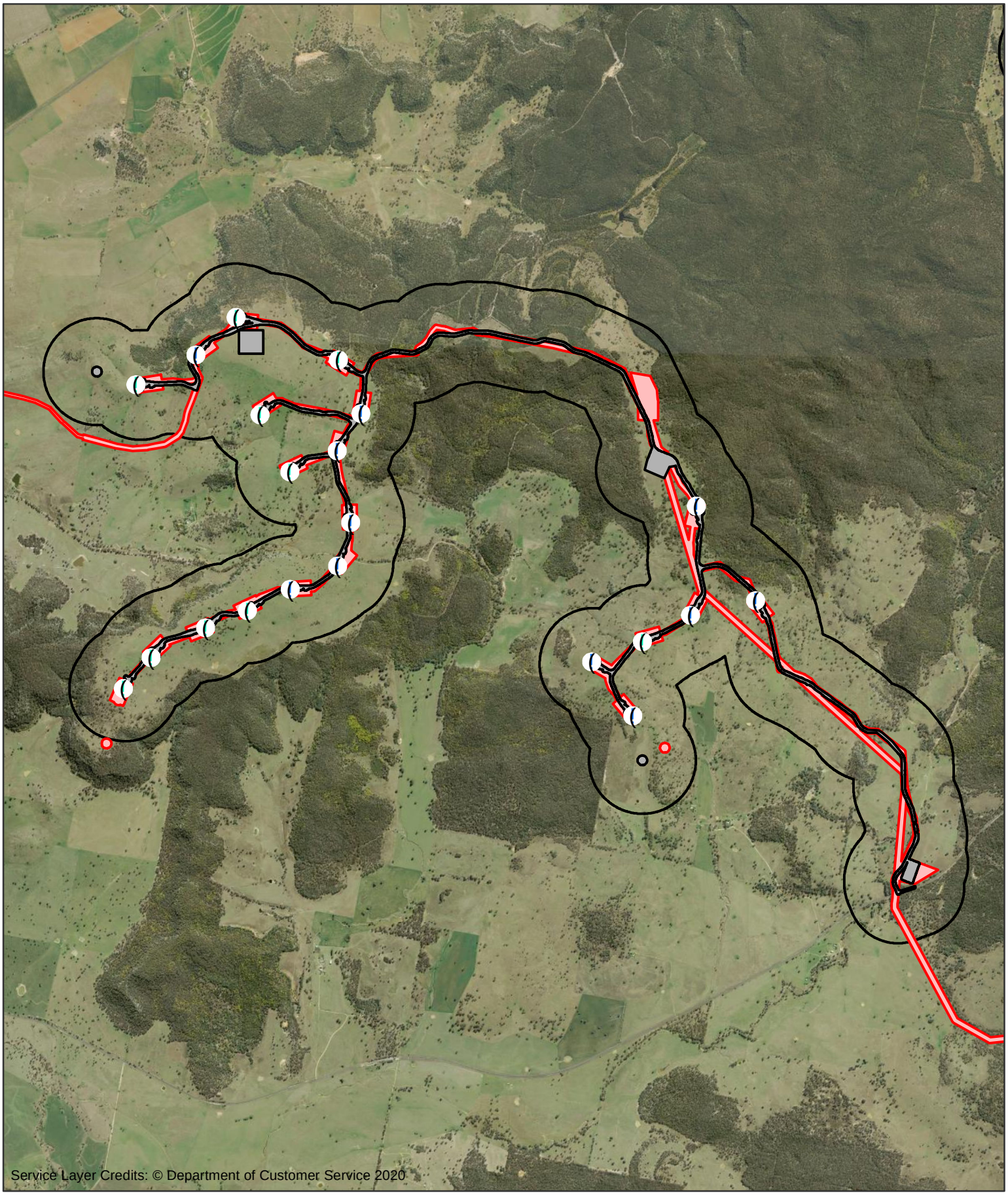
- Study Area (14,001 ha)
- Avoided Development (August 2022 - 768 ha)
- Current development footprint (August 2023 - 702 ha)

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Project Design Changes

Study Area (14,001 ha)

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Turbine Status

(Moved

(Retained

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Project Design Changes

Study Area (14,001 ha)

Avoided Development (August 2022 - 768 ha)

Current development footprint (August 2023 - 702 ha)

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Project Design Changes

Study Area (14,001 ha)

Current development footprint (August 2023 - 702 ha)

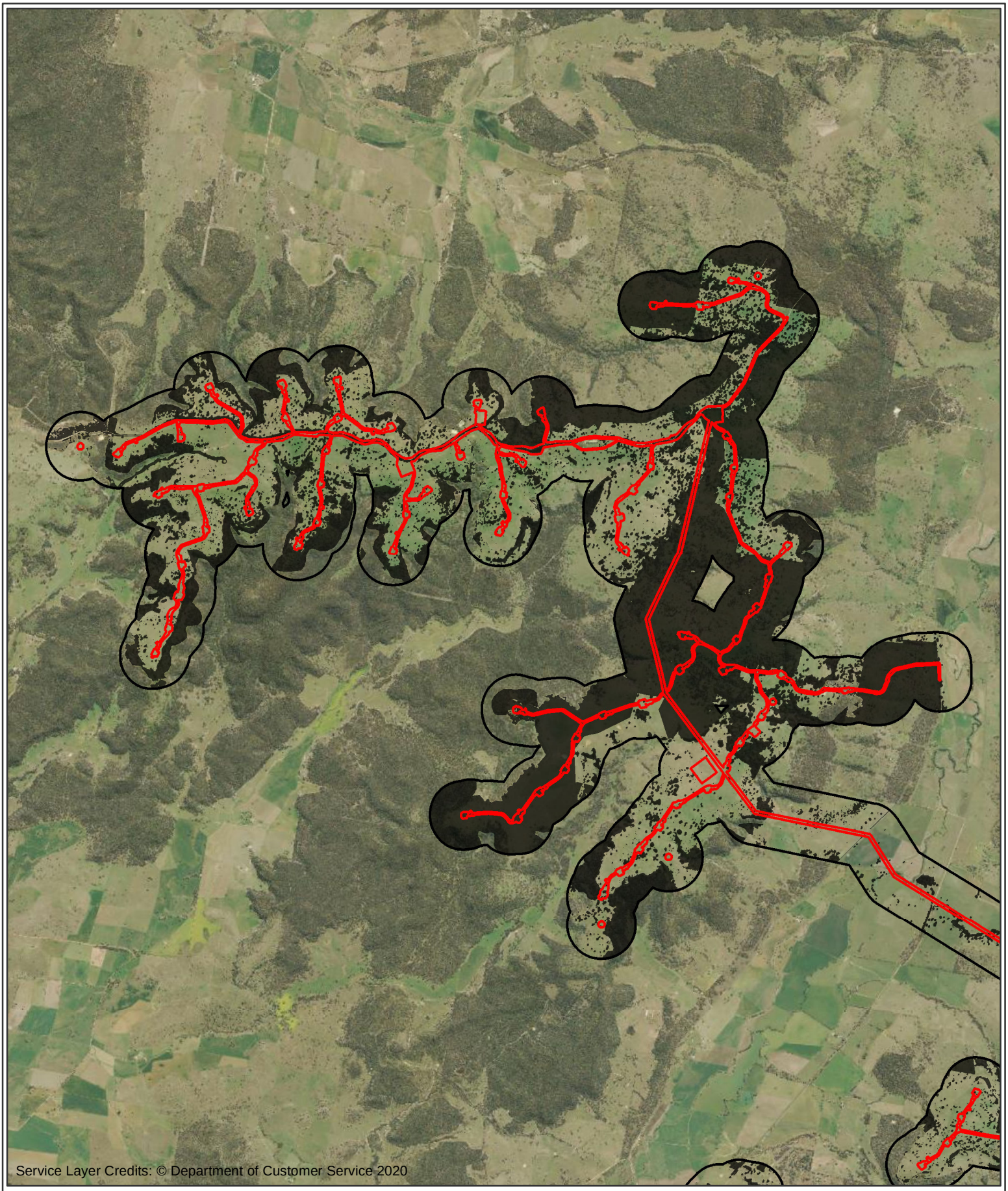
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 13/10/2023

eco logical AUSTRALIA
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Box Gum Woodland SAII

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Box Gum Woodland SAII

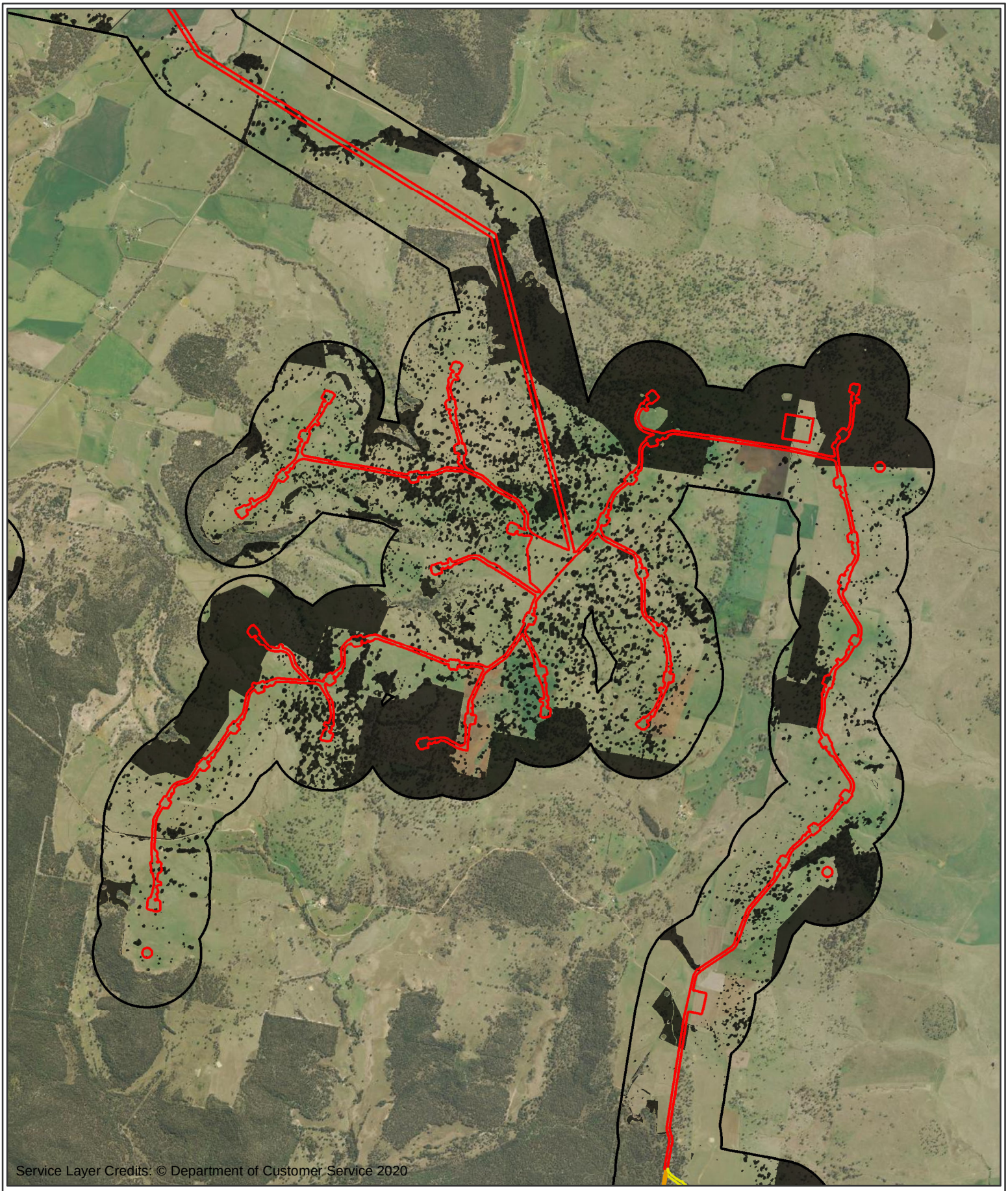
0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Box Gum Woodland SAII

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Box Gum Woodland SAII

0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



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- Box Gum Woodland SAII

0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
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Box Gum Woodland SAII

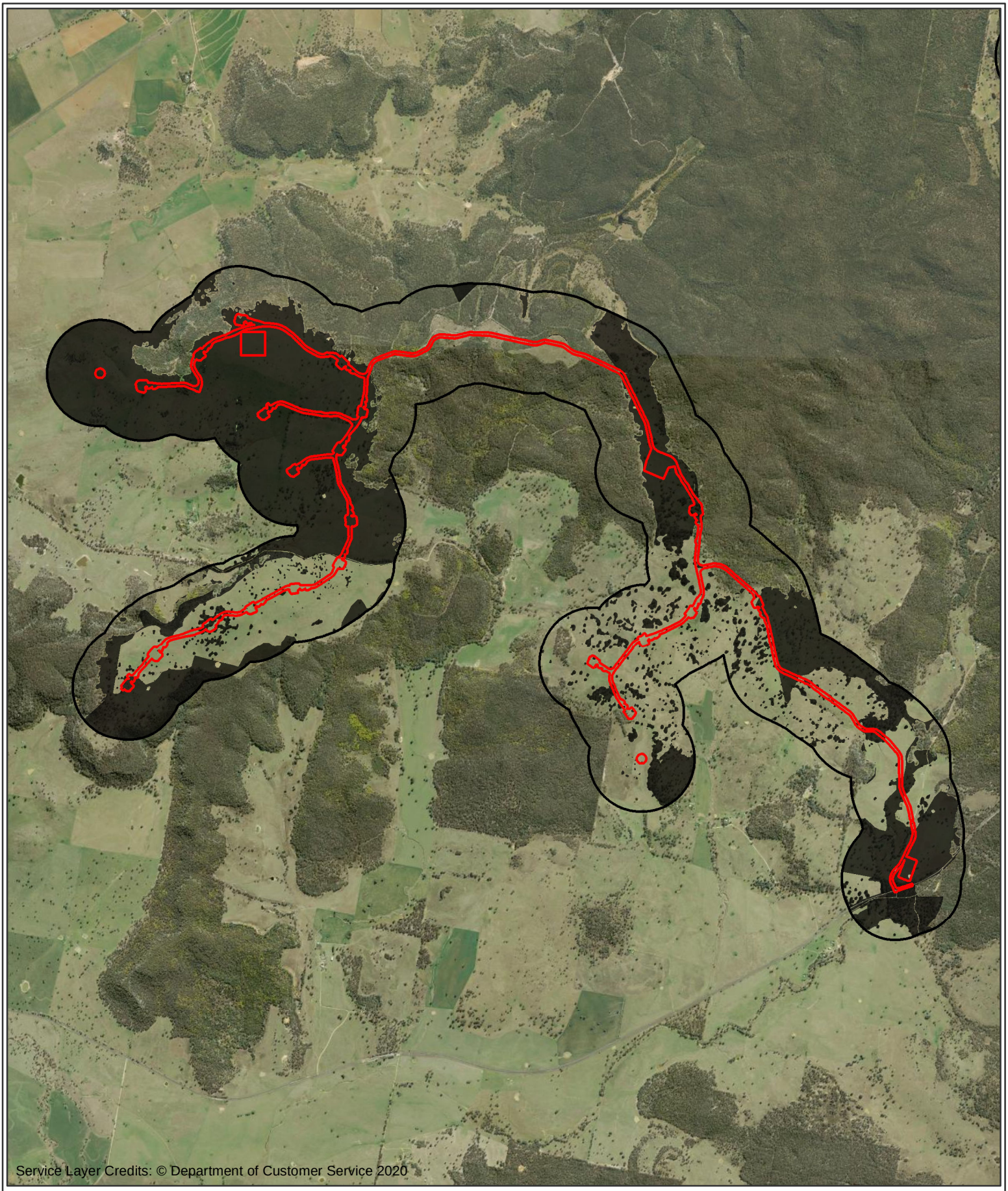
- Development site - wind farm (677 ha)
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- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Box Gum Woodland SAII

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Box Gum Woodland SAII

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Box Gum Woodland SAII

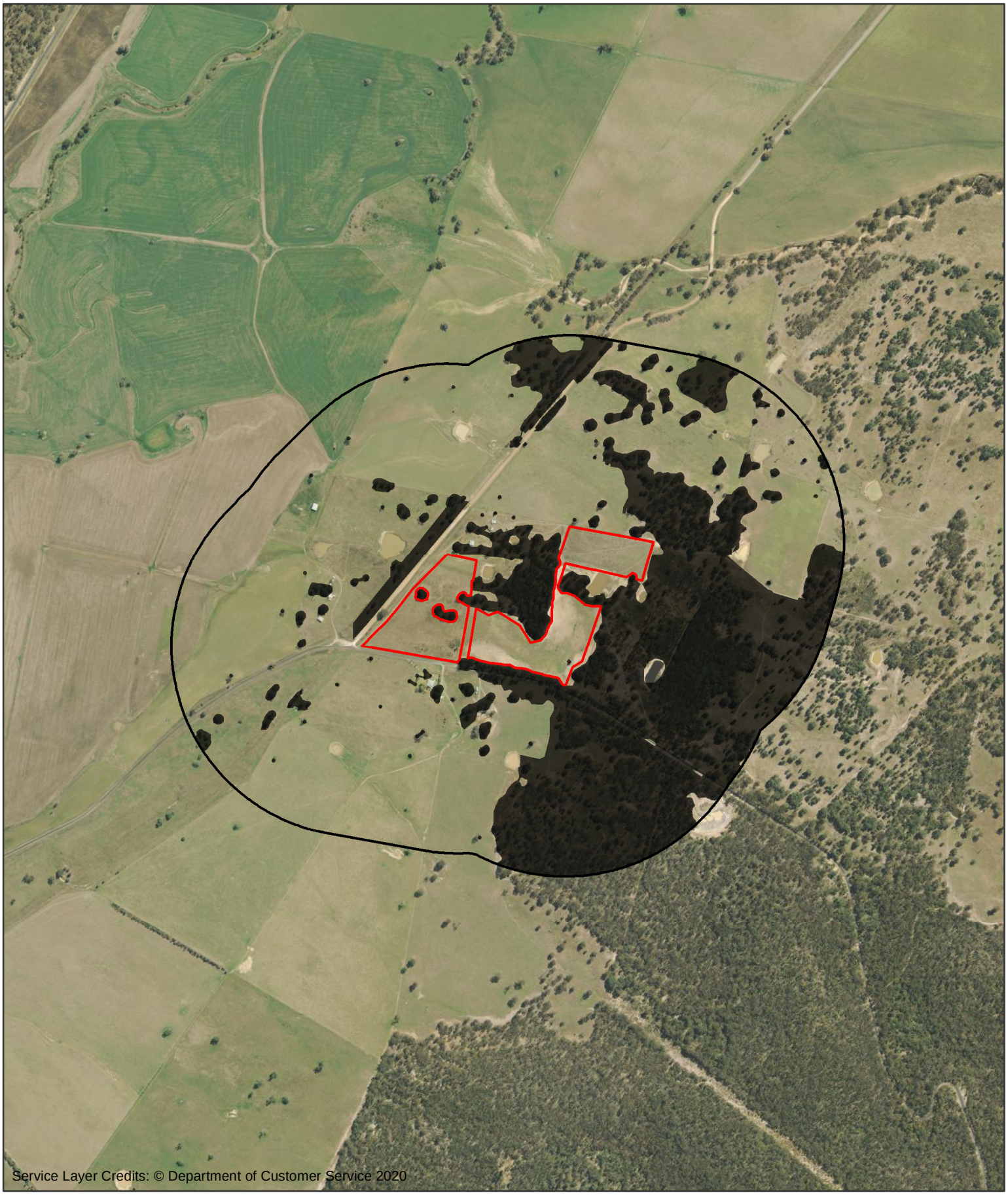
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

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Development site - wind farm (677 ha)

Study Area (14,001 ha)

Box Gum Woodland SAII

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

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ecological AUSTRALIA
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Box Gum Woodland SAII

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Box Gum Woodland SAII

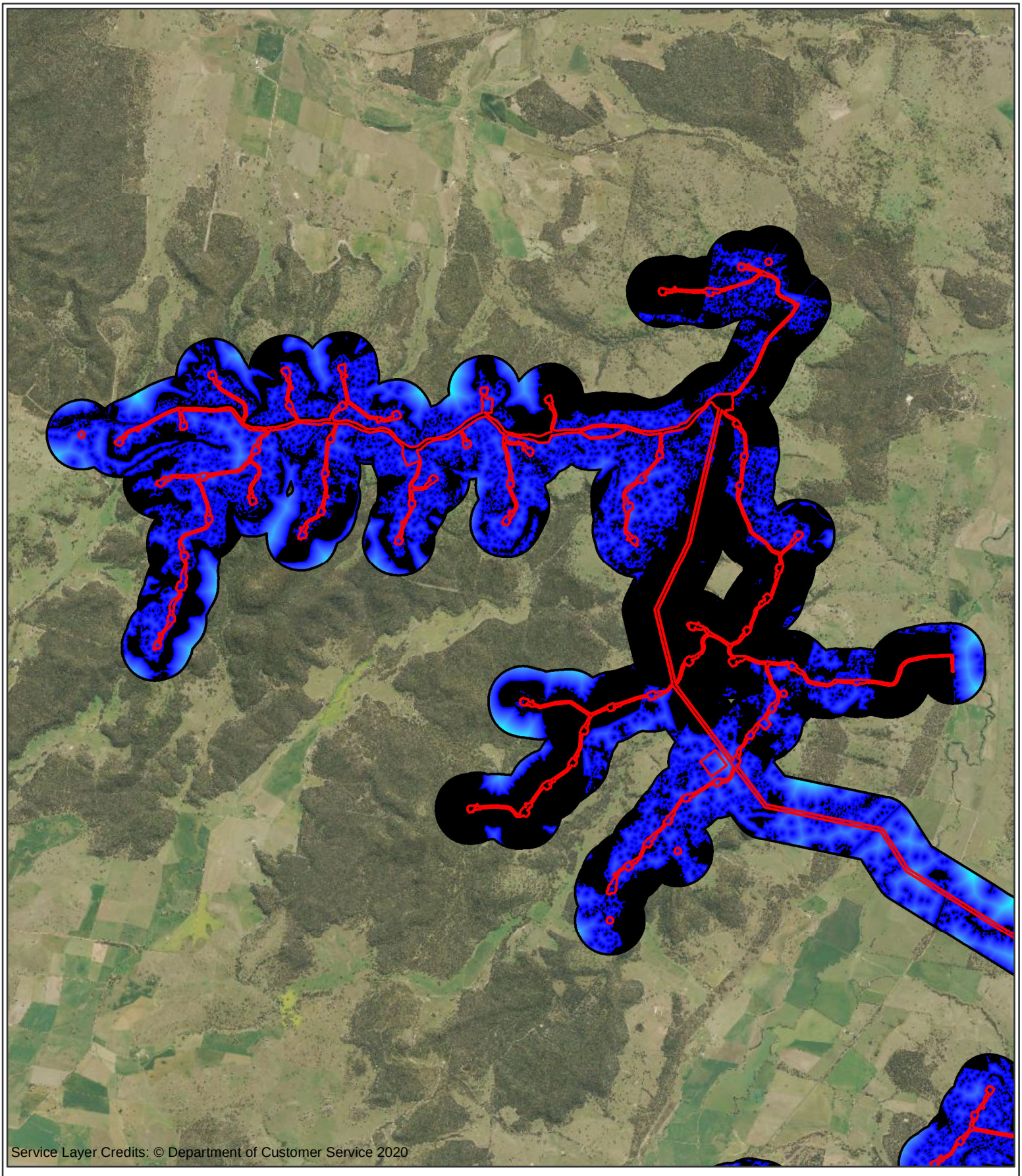
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
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Box Gum Woodland SAII Distance between TEC Patches

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Box Gum Woodland SAII

High : 1263.07

Low : 0

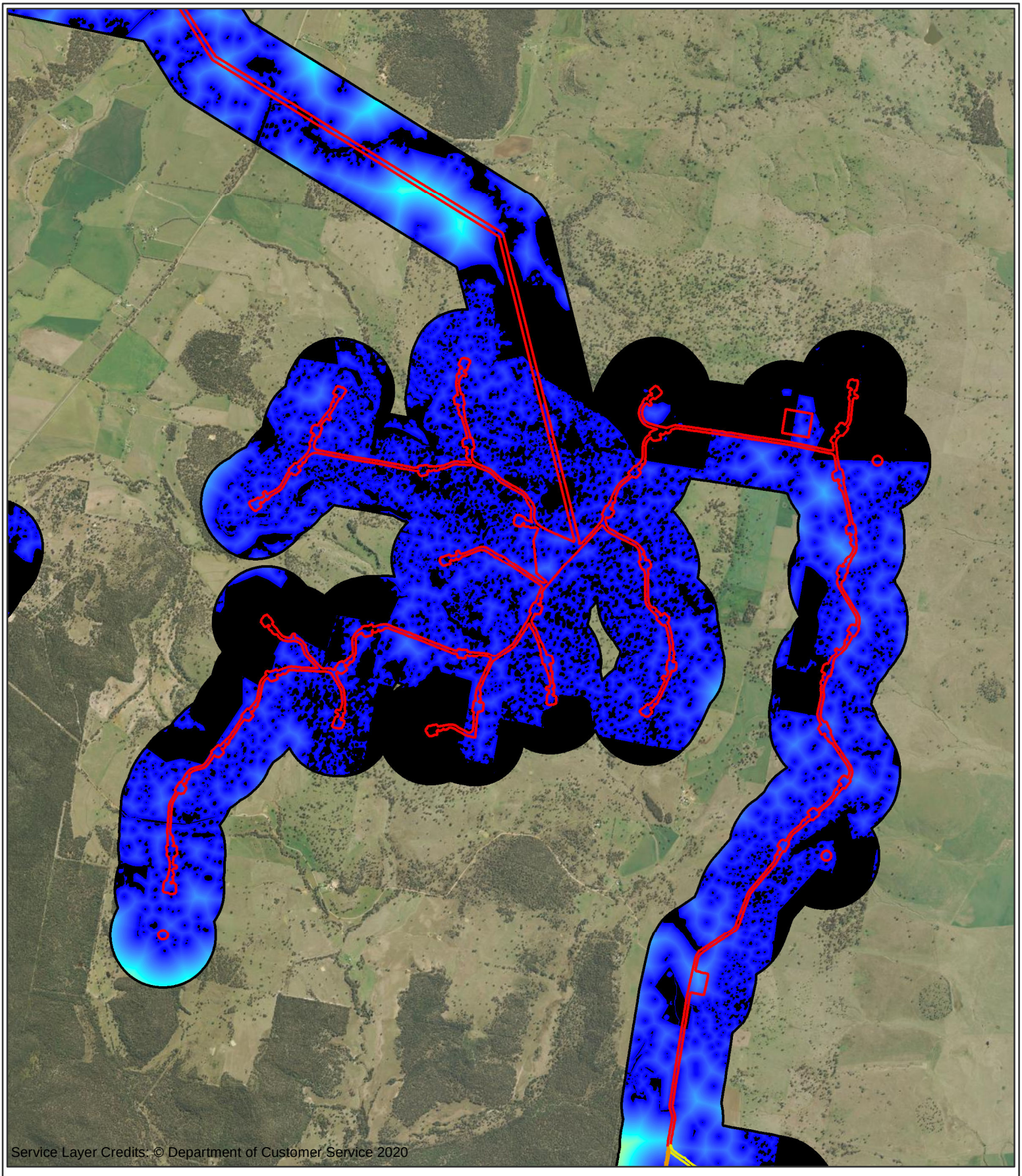
0 0.75 1.5 3

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project:3178-AW Date: 13/10/2023

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Box Gum Woodland SAII Distance between TEC Patches

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- Study Area (14,001 ha)
- Box Gum Woodland SAII
- High : 1263.07
- Low : 0

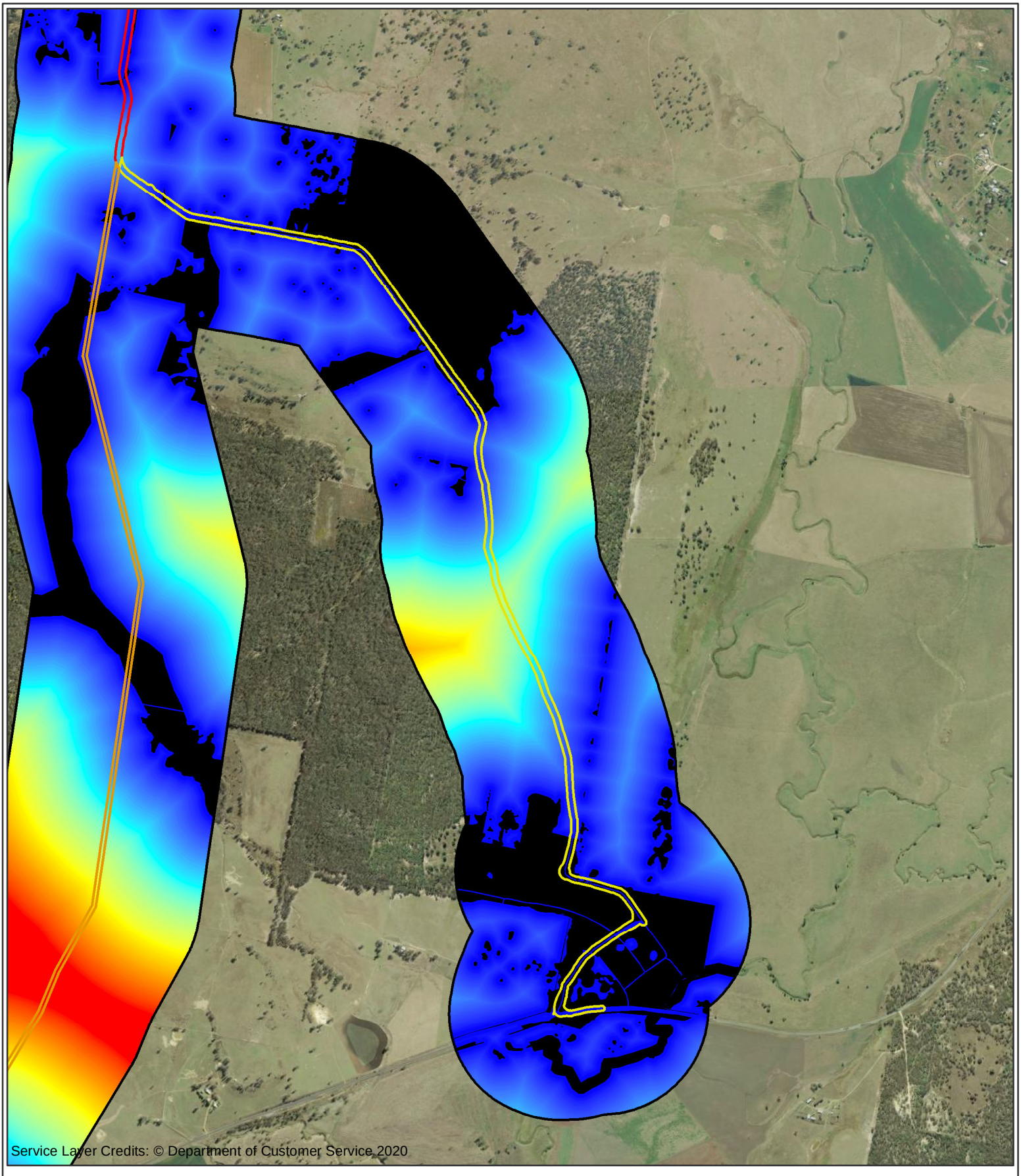
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project:3178-AW Date: 13/10/2023

ecological AUSTRALIA
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Box Gum Woodland SAII Distance between TEC Patches

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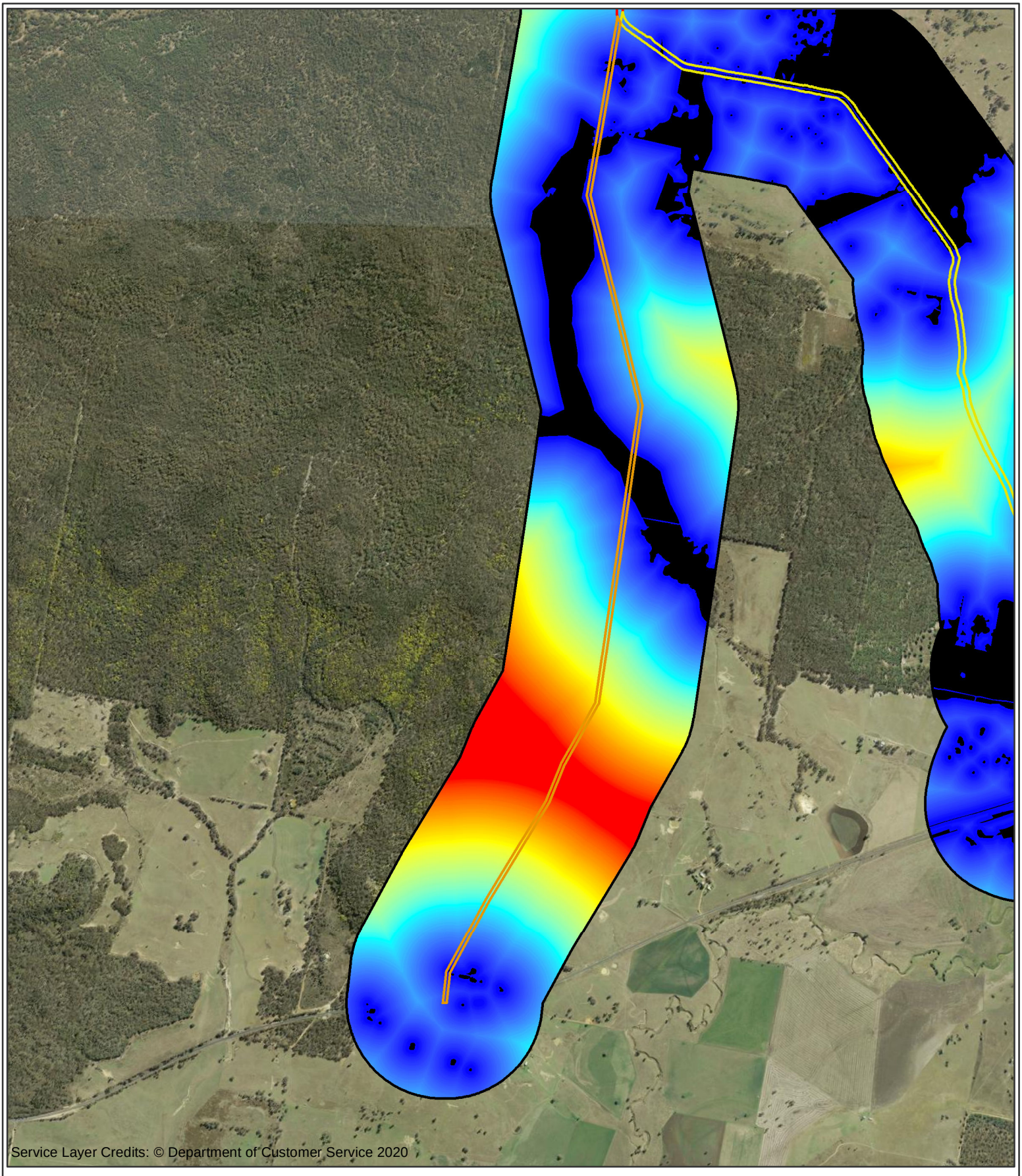
0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project:3178-AW Date: 13/10/2023

ecological AUSTRALIA
A TETRA TECH COMPANY



Box Gum Woodland SAII Distance between TEC Patches

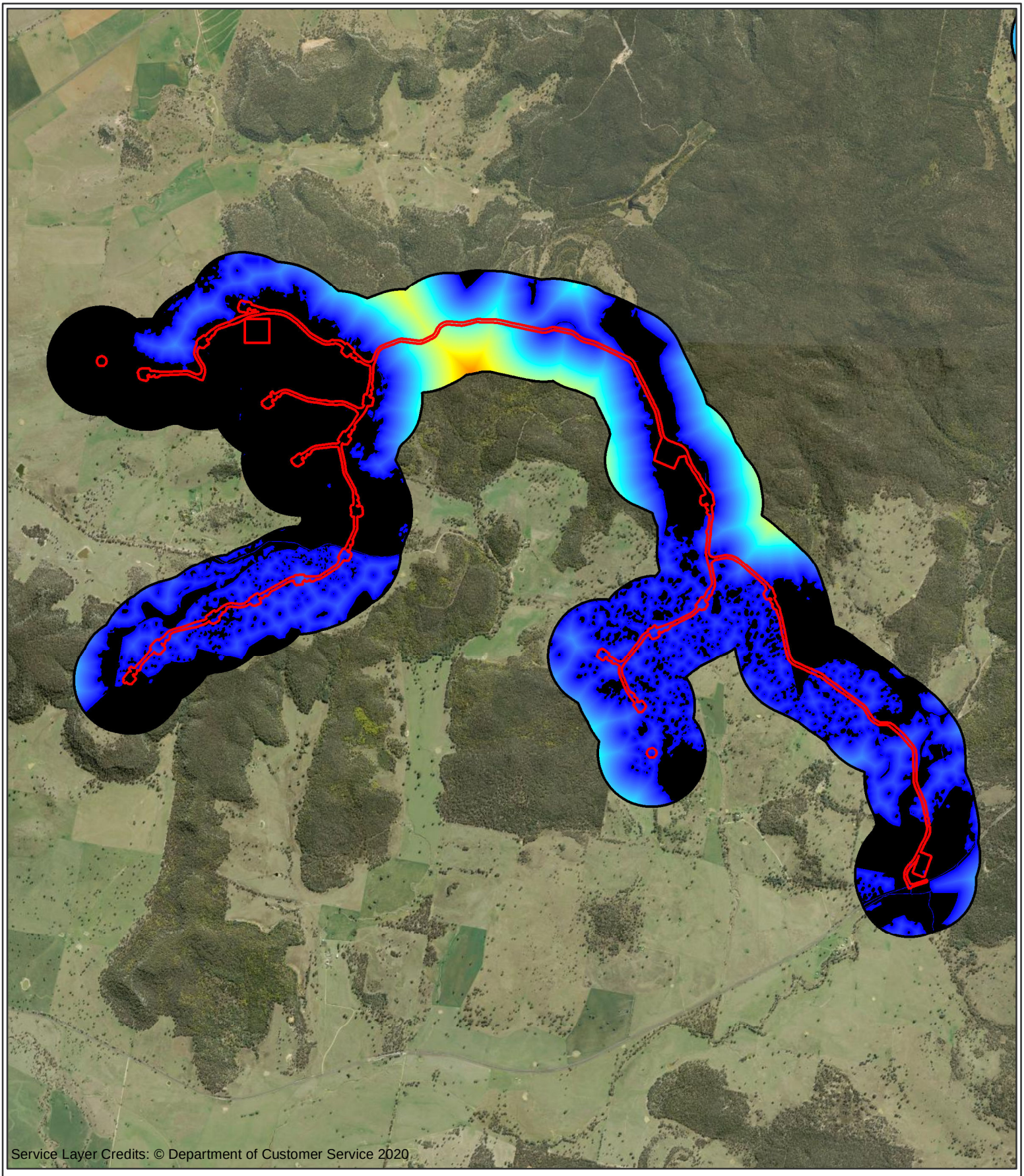
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Box Gum Woodland SAII
- High : 1263.07
- Low : 0

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project:3178-AW Date: 13/10/2023

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Box Gum Woodland SAII Distance between TEC Patches

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Box Gum Woodland SAII

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Low : 0

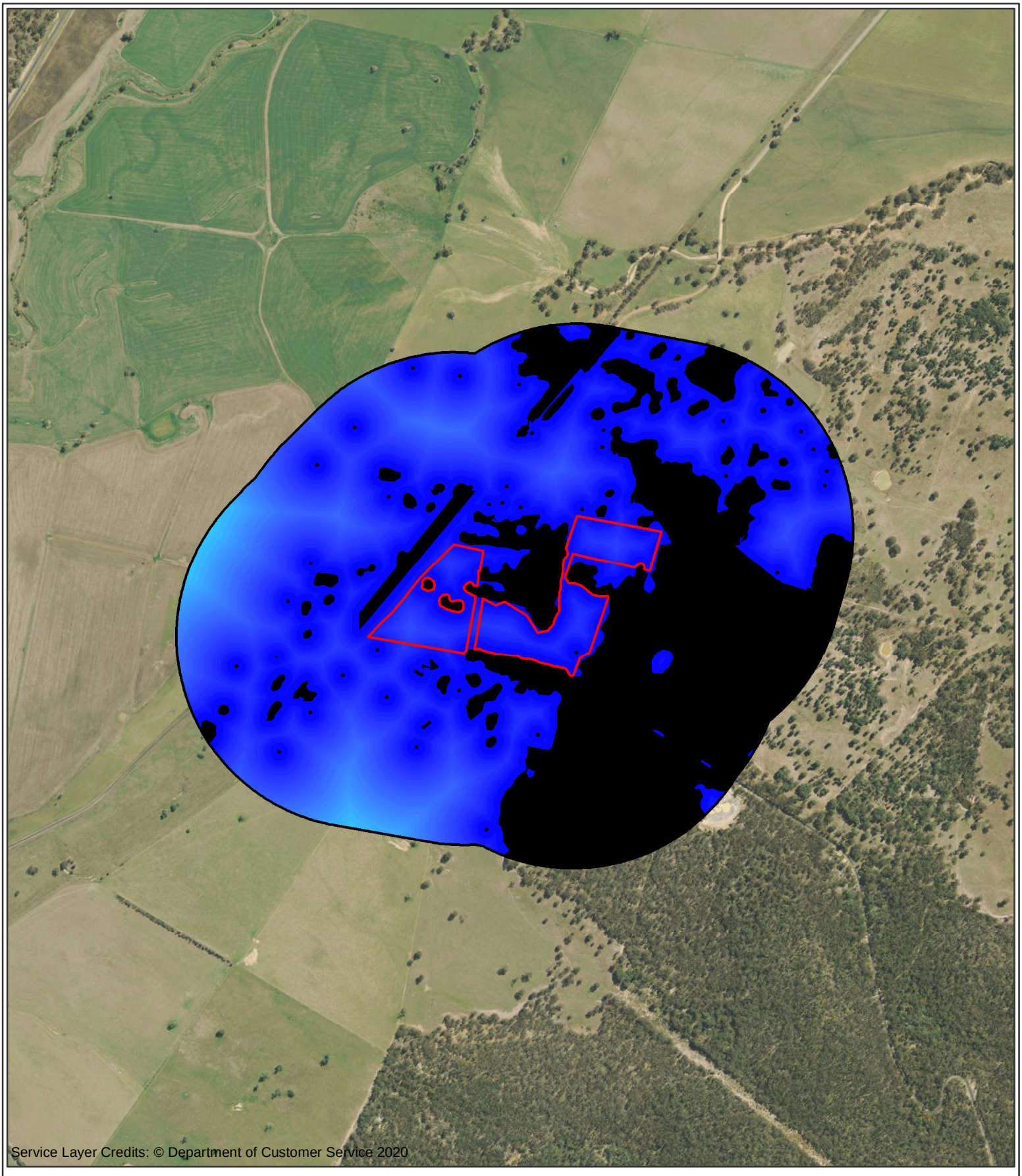
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project:3178-AW Date: 13/10/2023

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Box Gum Woodland SAII Distance between TEC Patches

Development site - wind farm (677 ha)

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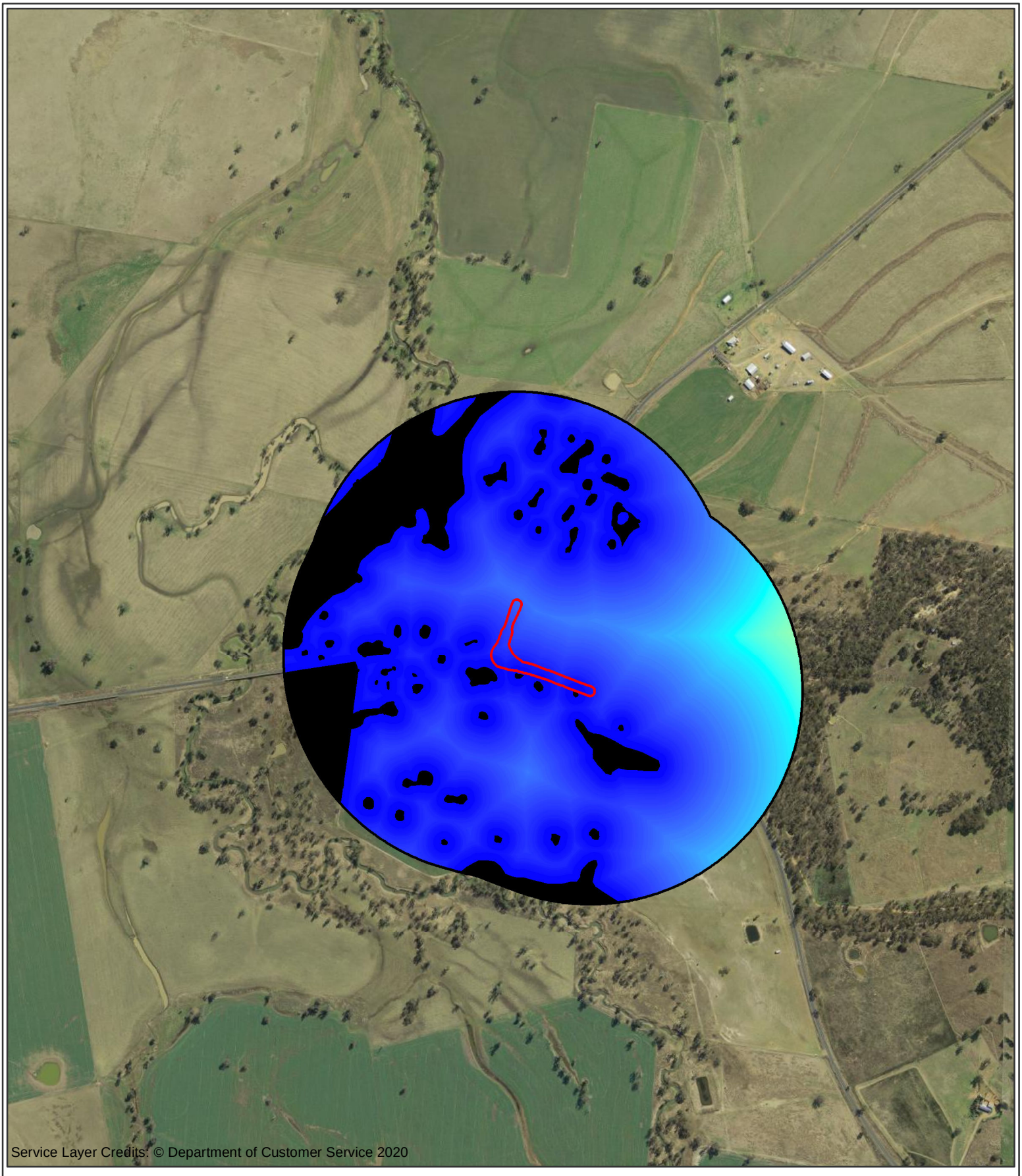
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project:3178-AW Date: 13/10/2023

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Box Gum Woodland SAII Distance between TEC Patches

Development site - wind farm (677 ha)

Study Area (14,001 ha)

Box Gum Woodland SAII

High : 1263.07

Low : 0

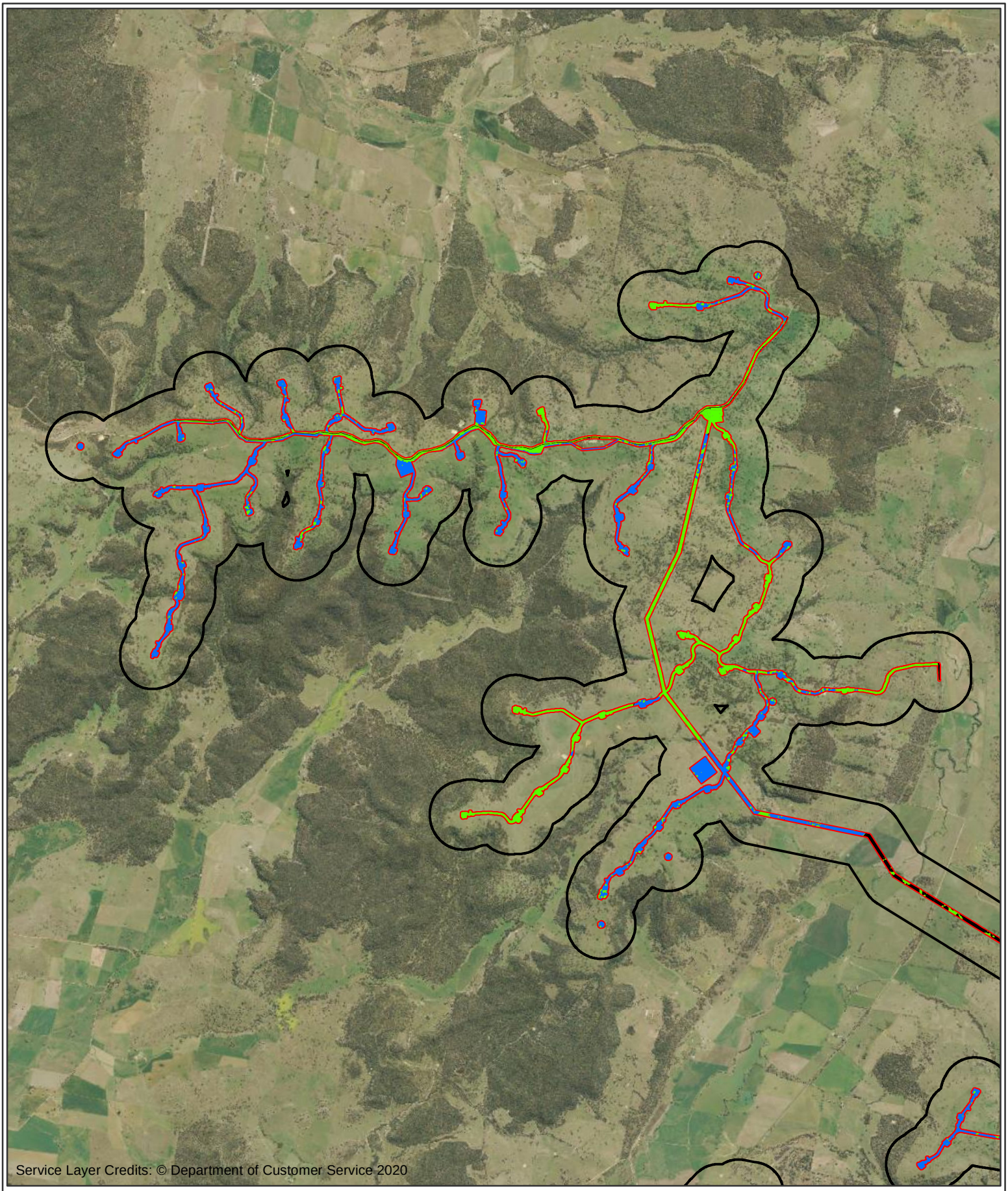
0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project:3178-AW Date: 13/10/2023

ecological AUSTRALIA
A TETRA TECH COMPANY



Impacts requiring offset

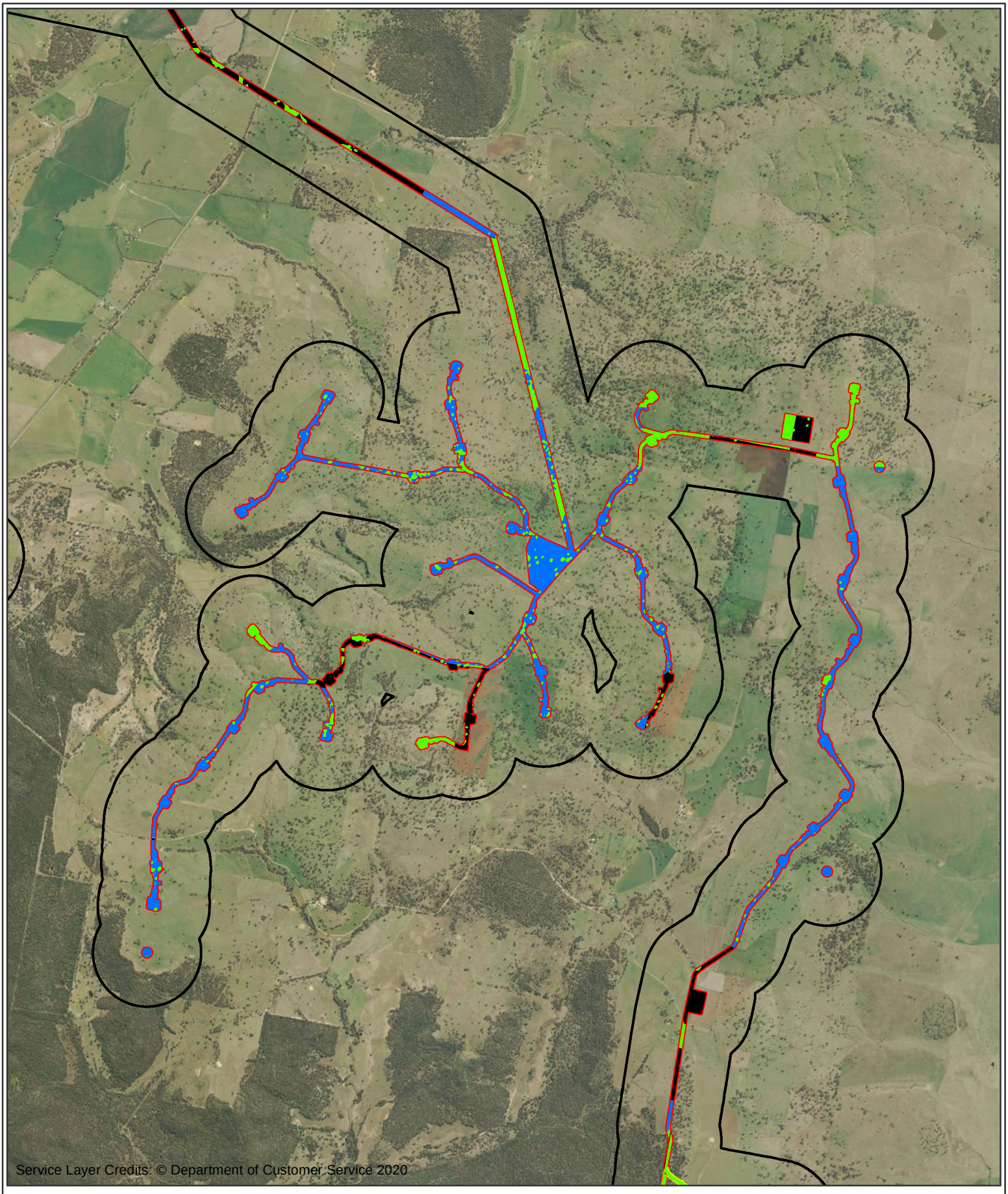
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Impacts requiring offset
- Impacts not requiring offset
- Excluded areas

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Impacts requiring offset

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Impacts requiring offset
- Impacts not requiring offset
- Excluded areas

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Impacts requiring offset

- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Impacts requiring offset
- Impacts not requiring offset
- Excluded areas

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Impacts requiring offset

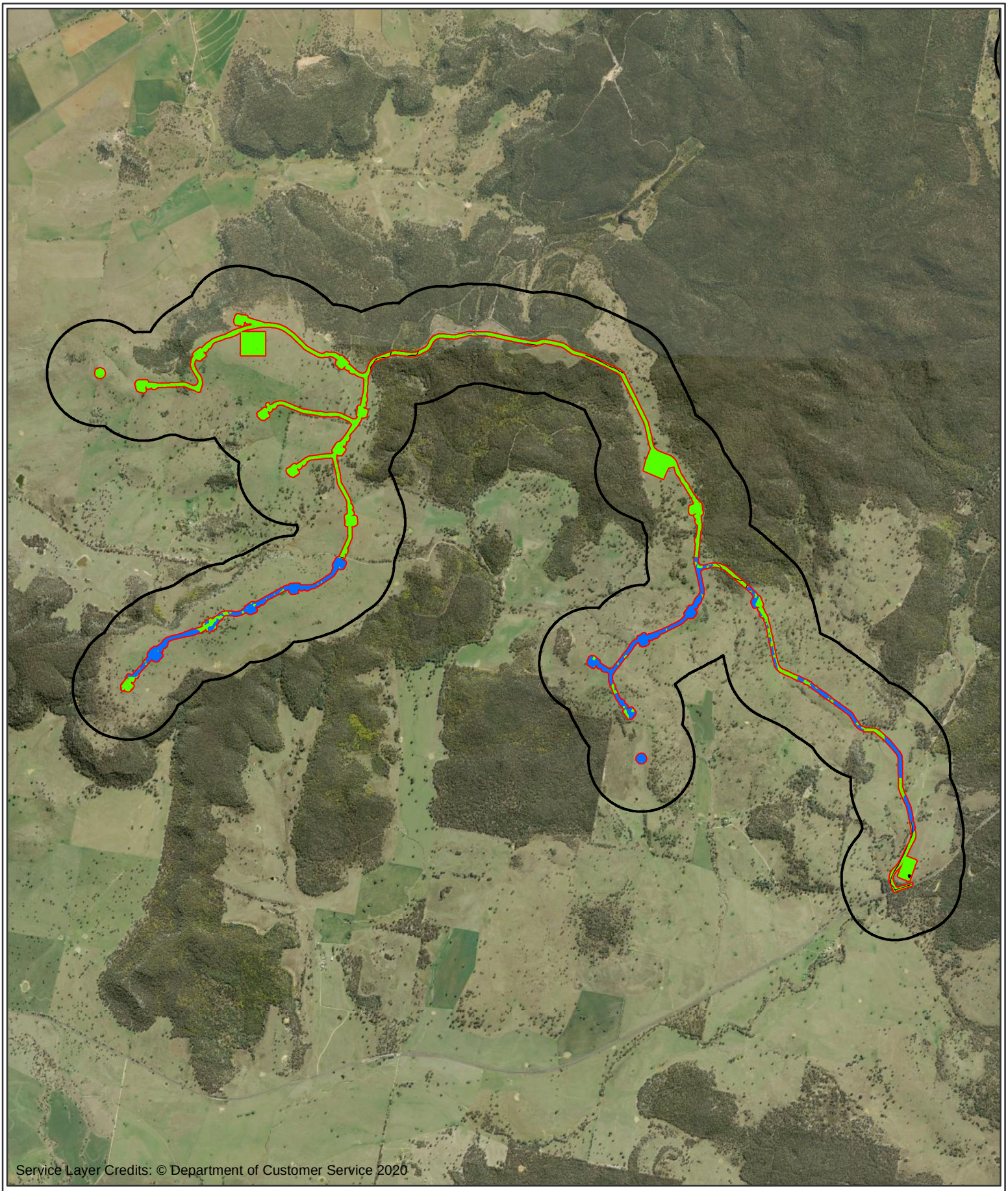
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Study Area (14,001 ha)
- Impacts requiring offset
- Impacts not requiring offset
- Excluded areas

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Impacts requiring offset

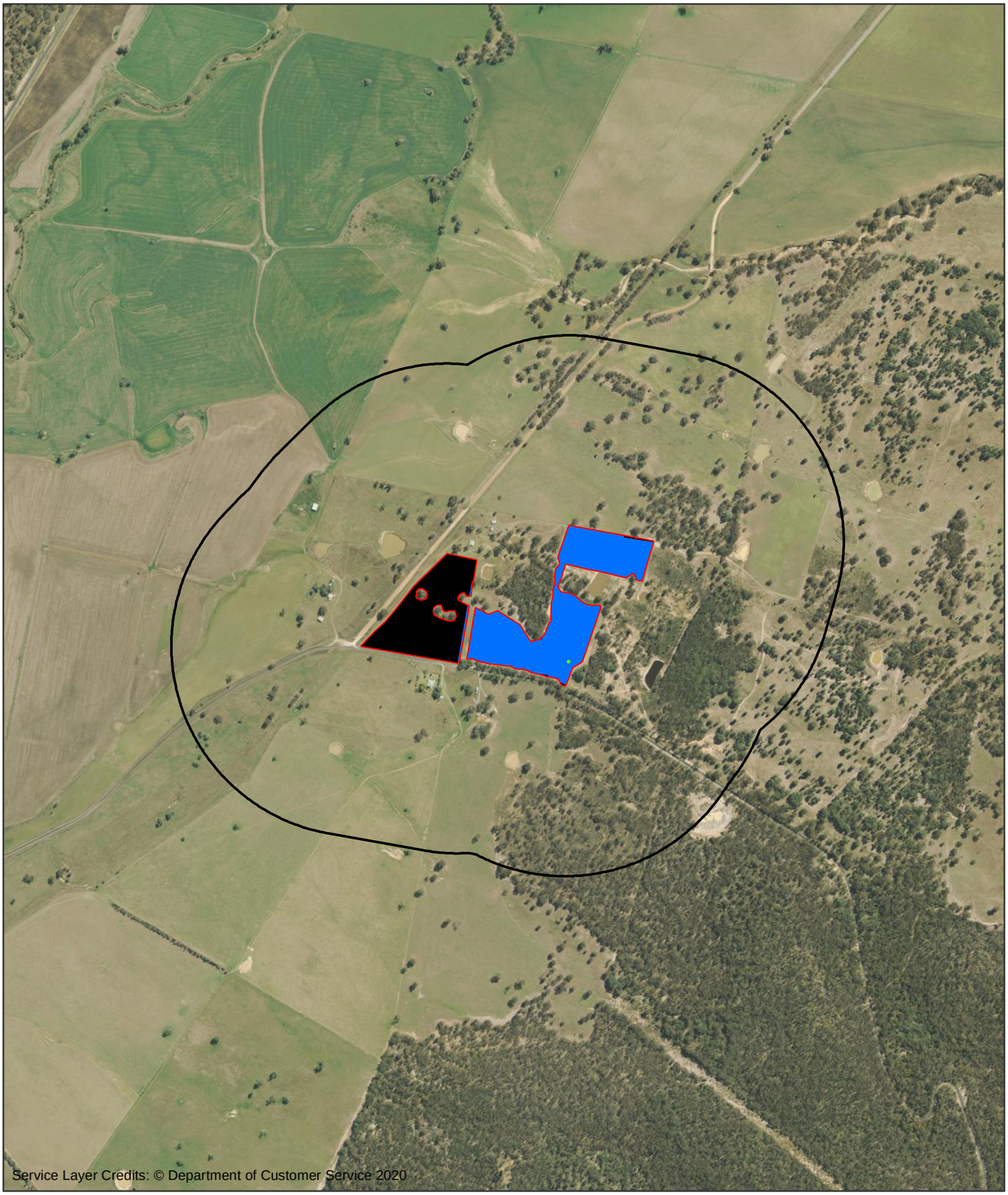
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Impacts requiring offset
- Impacts not requiring offset
- Excluded areas

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
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Impacts requiring offset

- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Impacts requiring offset
- Impacts not requiring offset
- Excluded areas

0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Impacts requiring offset

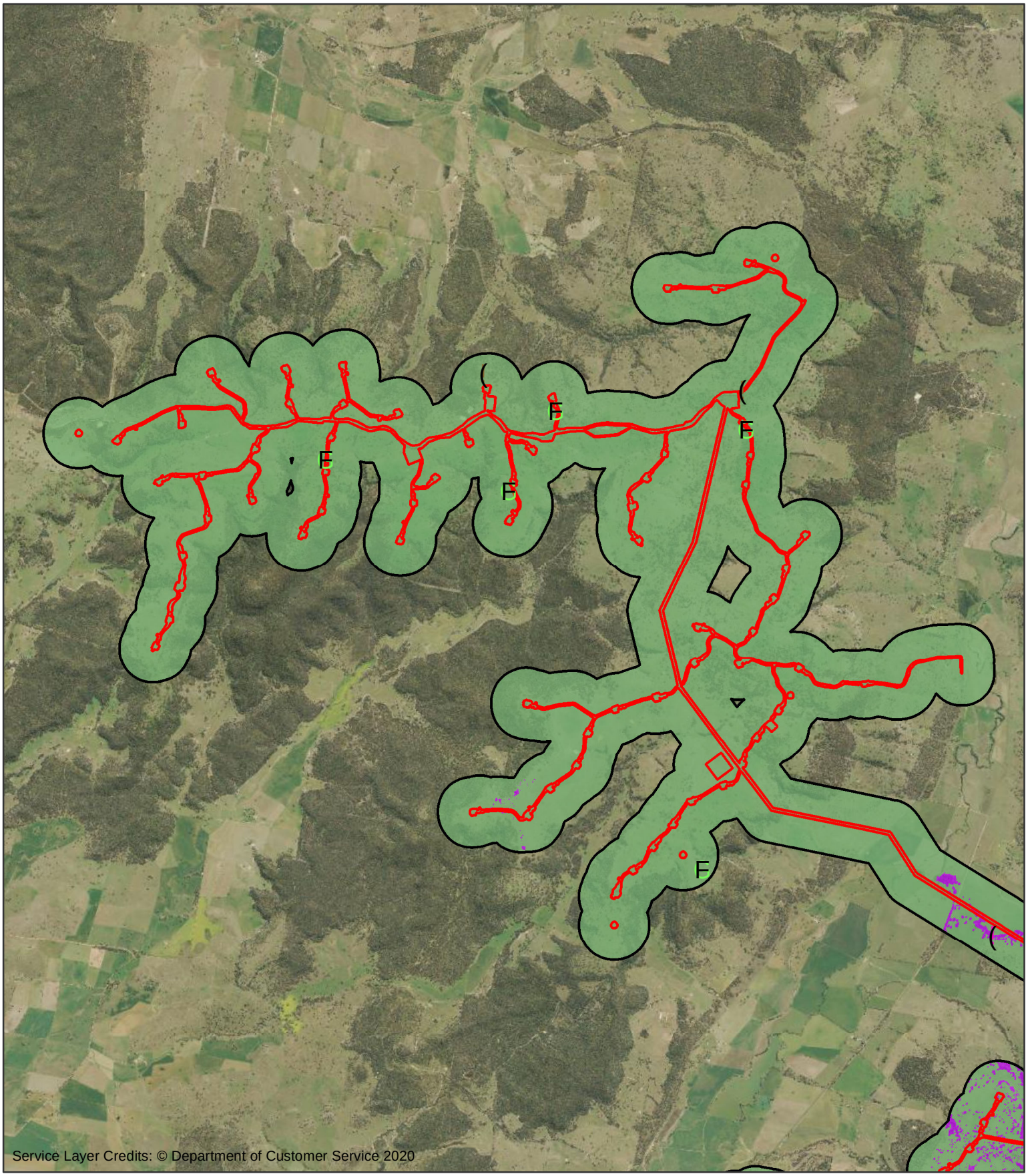
- Development site - wind farm (677 ha)
- Study Area (14,001 ha)
- Impacts requiring offset
- Excluded areas

0 0.125 0.25 0.5
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Matters of National Environmental Significance

- Study Area (14,001 ha)
- Development site - wind farm (677 ha)
- (Dichanthium setosum
- (White-throated Needletail
- F Large-eared Pied Bat

EPBC Act Listed TEC

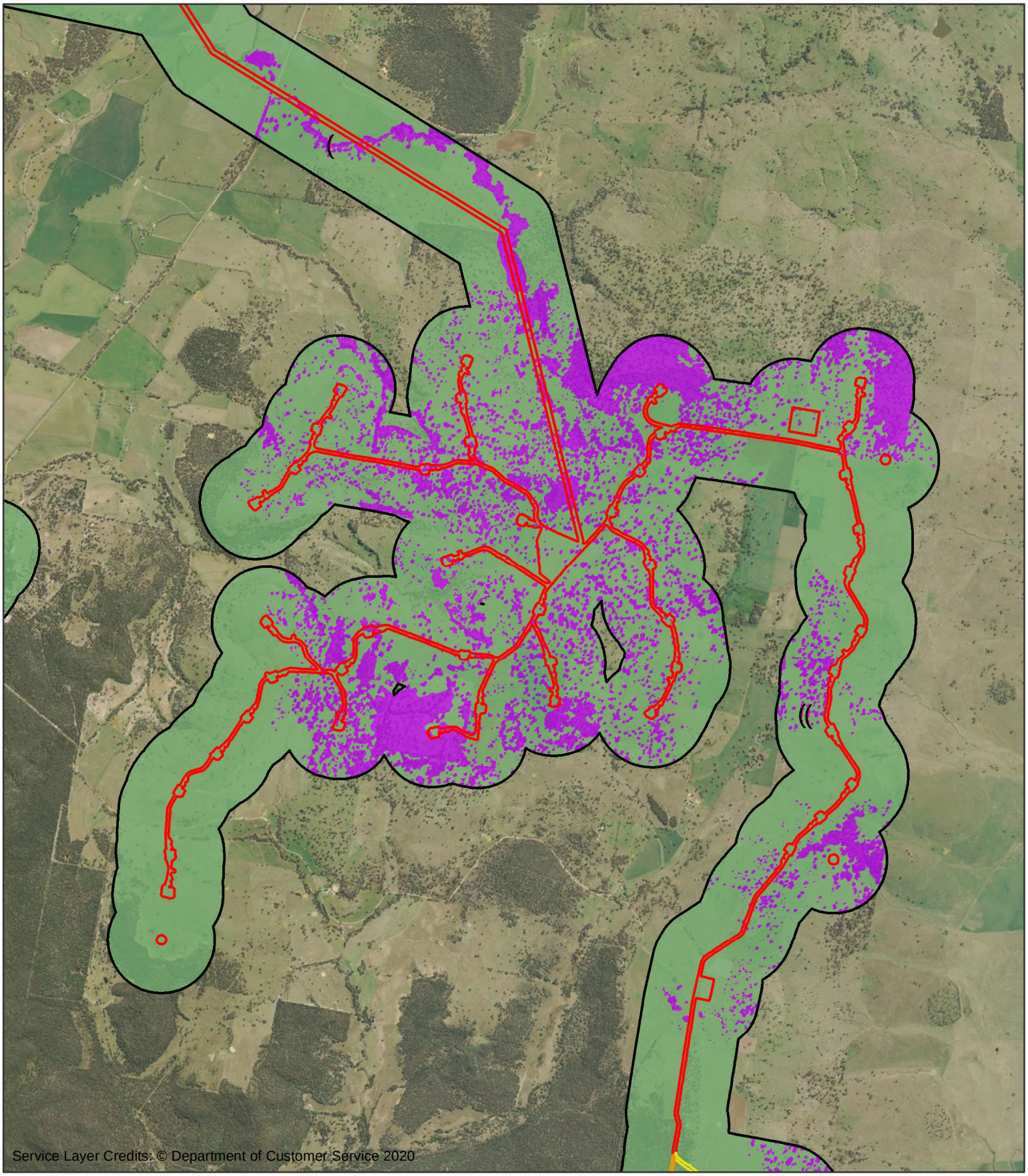
- Box Gum Grassy Woodland (CEEC)
- Not listed under the EPBC Act

0 0.75 1.5 3
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

ecological AUSTRALIA
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Matters of National Environmental Significance

- Study Area (14,001 ha)
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)
- Dichanthium setosum

EPBC Act Listed TEC

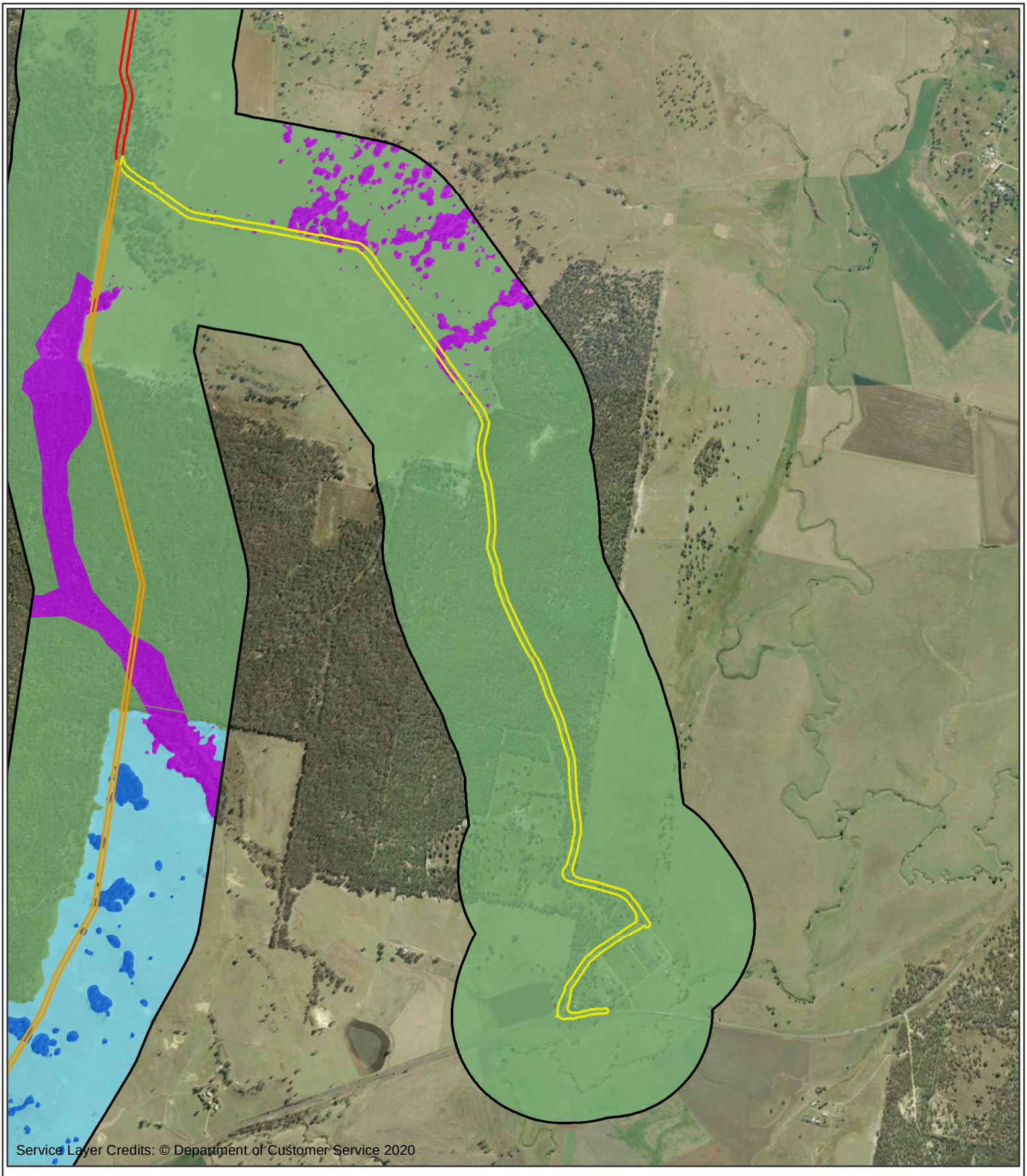
- Box Gum Grassy Woodland (CEEC)
- Not listed under the EPBC Act

0 0.5 1 2
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Matters of National Environmental Significance

- Study Area (14,001 ha)
- Development site - wind farm (677 ha)
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EPBC Act Listed TEC

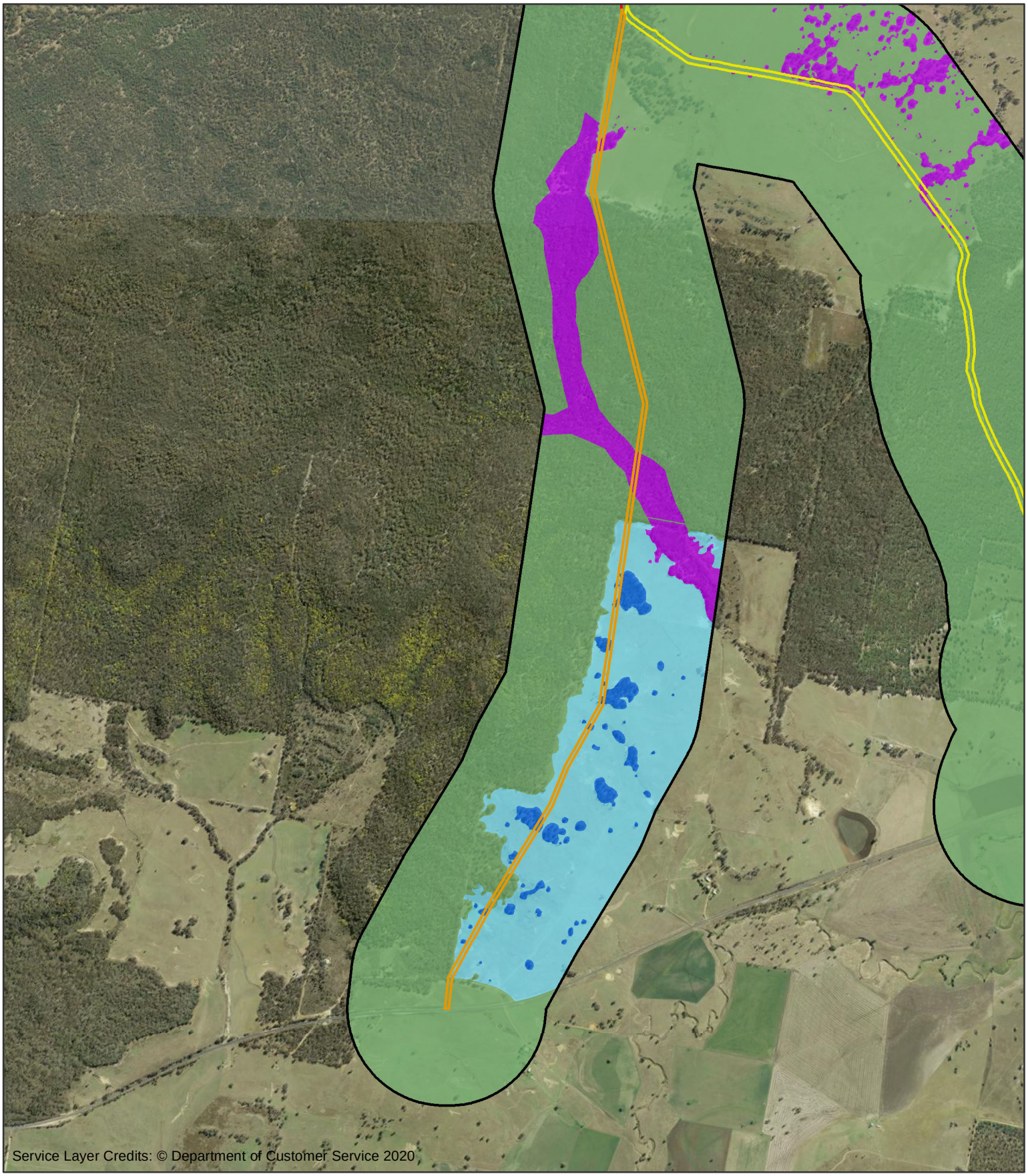
- Box Gum Grassy Woodland (CEEC)
- Inland Grey Box Woodland (EEC)
- Inland Grey Box Woodland - Derived Grassland (EEC)
- Not listed under the EPBC Act

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

ecological AUSTRALIA
A TETRA TECH COMPANY



Matters of National Environmental Significance

- Study Area (14,001 ha)
- Development site - wind farm (677 ha)
- Development site - GR access (18 ha)
- Development site - alternative GR access (11 ha)

EPBC Act Listed TEC

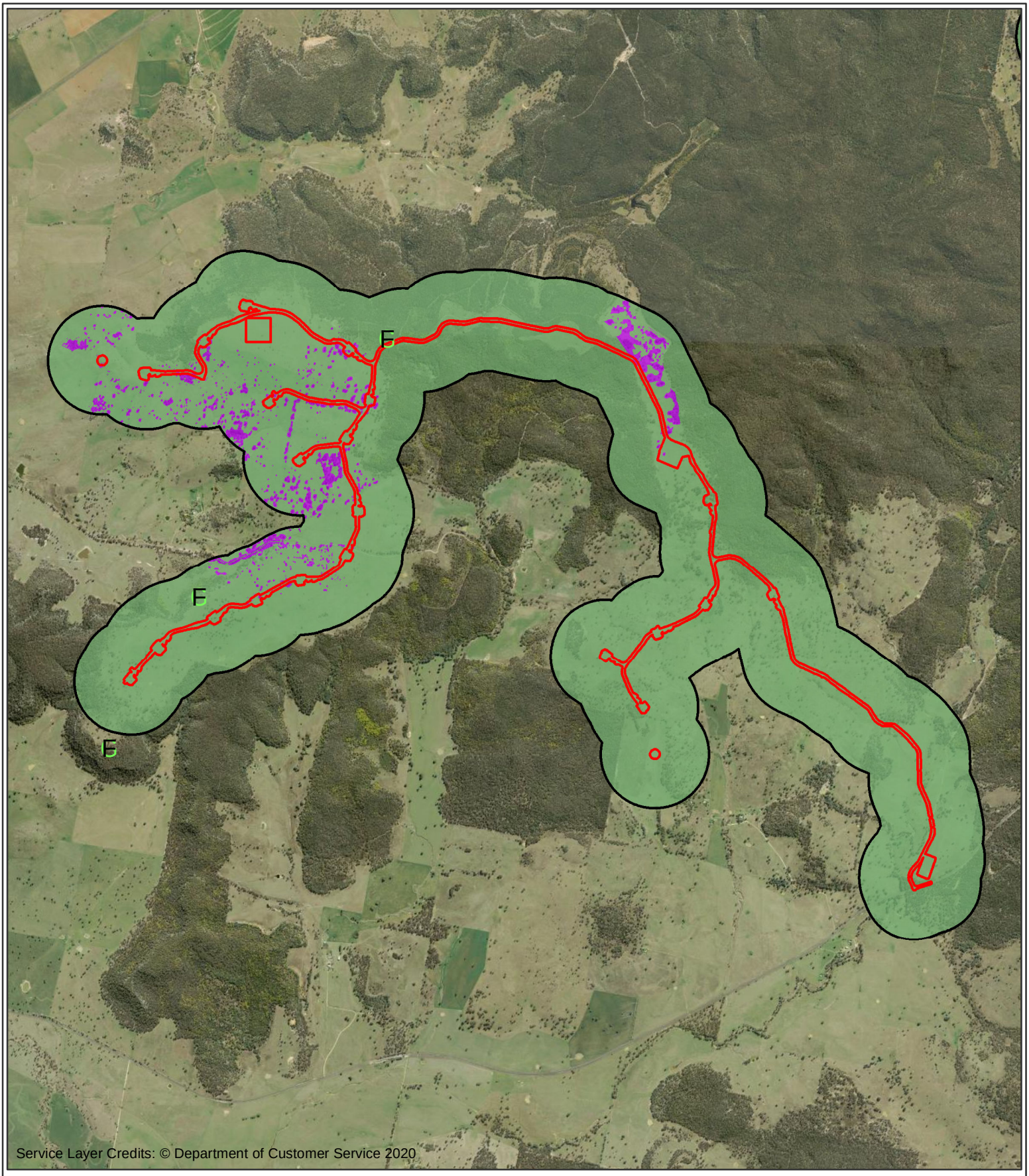
- Box Gum Grassy Woodland (CEEC)
- Inland Grey Box Woodland (EEC)
- Inland Grey Box Woodland - Derived Grassland (EEC)
- Not listed under the EPBC Act

0 0.25 0.5 1
Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Matters of National Environmental Significance

Study Area (14,001 ha)

Development site - wind farm (677 ha)

E Large-eared Pied Bat

EPBC Act Listed TEC

Box Gum Grassy Woodland (CEEC)

Not listed under the EPBC Act

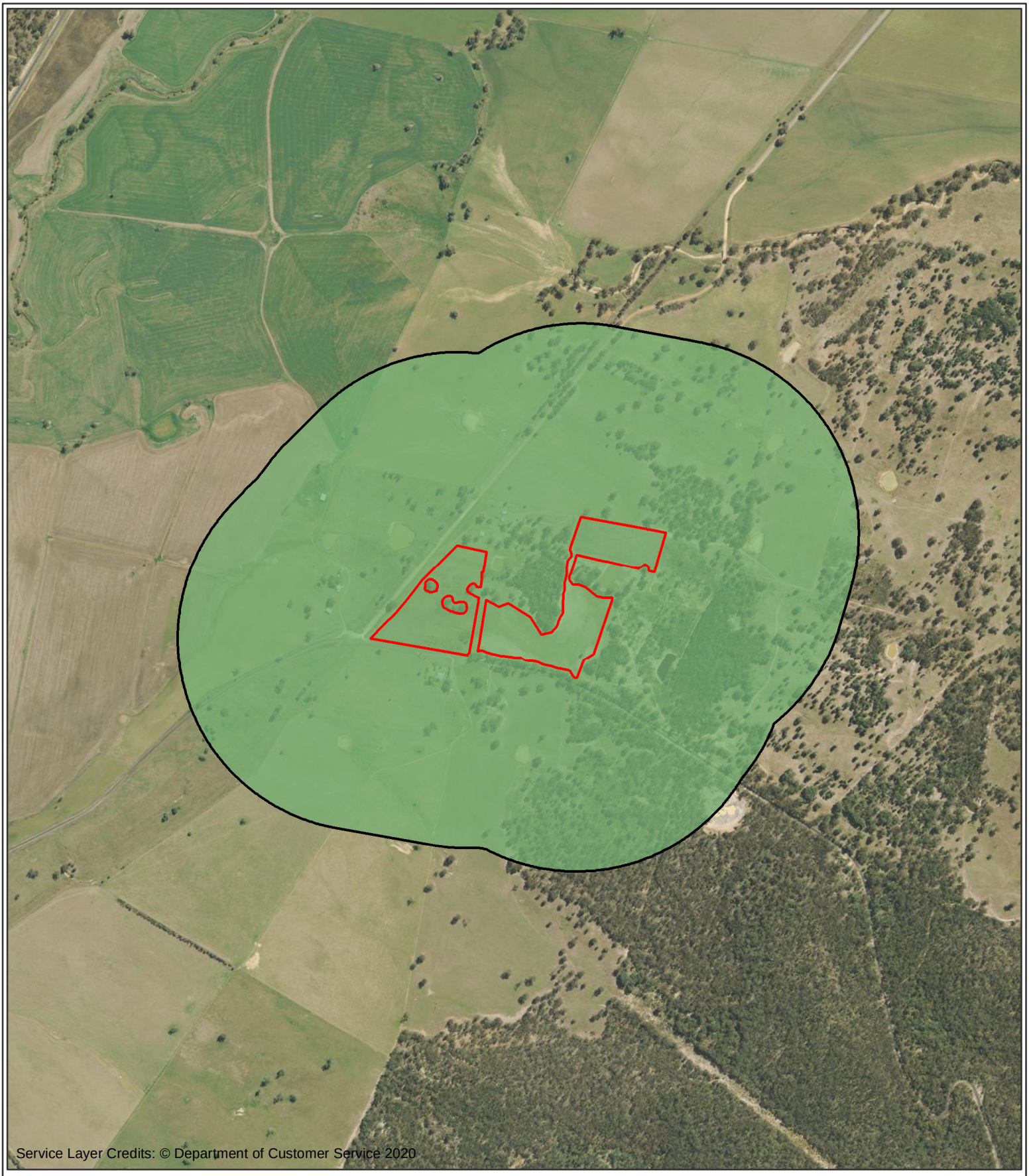
0 0.5 1 2

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY



Matters of National Environmental Significance

Study Area (14,001 ha)

Development site - wind farm (677 ha)

EPBC Act Listed TEC

Not listed under the EPBC Act

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

ecological AUSTRALIA
A TETRA TECH COMPANY



Matters of National Environmental Significance

Study Area (14,001 ha)

Development site - wind farm (677 ha)

EPBC Act Listed TEC

Not listed under the EPBC Act

0 0.125 0.25 0.5

Kilometers

Datum/Projection:
GDA2020 MGA Zone 55

Project: 3178-AW Date: 27/10/2023

ecological AUSTRALIA
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Appendix K Bat data analysis

Microbat Call Identification Report

Prepared for ("Client"):	Eco Logical Australia
Cape Bedford	Coolah area, central-western NSW
Survey dates:	30th Nov. 2020 – 10th Feb. 2021
Client project reference:	
Job no.:	ELA-2102
Report date:	9 June 2021

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Methods

Data received

Balance! Environmental received >219,000 WAV files recorded on Song Meter detectors at three localities (Girragulang Road, Leadville & Mount Hope) in the Coolah region between 30th November 2020 and 10th February 2021. Data were sorted by detector/site name for each locality.

The data had been processed by the client with Wildlife Acoustics' *Kaleidoscope* software to separate noise files from those containing bat calls. Consequently, the dataset analysed by *Balance! Environmental* included only ~106,000 of the submitted WAV files.

Call identification

Call analyses were performed in *Anabat Insight* Version 1.9.7 (Titley Scientific, Brisbane), as follows:.

- The ~106,000 WAV files recognised by the *Kaleidoscope* process as containing bat calls were filtered again to mark and exclude files that had only poor-quality (brief, highly-fragmented, noisy) bat calls or falsely-identified "calls" (usually insect song or anthropogenic sounds).
- Files that passed the filtration process were then passed through a Decision Tree analysis to group and label detected bat-calls based on a combination of call metrics derived from zero-crossing analysis, such as characteristic frequency (Fc), time between calls (TBC), slope (S1 and Sc) and pulse curvature.
- The preliminary call identities applied by the Decision Tree process were then confirmed or adjusted manually by comparing the call spectrograms and derived metrics with those of regionally relevant reference calls and published call descriptions (e.g. Reinhold *et al.* 2001; Pennay *et al.* 2004).
- The likelihood of species' occurrence in the study area was confirmed by referring to the Australasian Bat Society's *BatMaps* application (https://www.ausbats.org.au/batmap.html), other published distribution information (e.g., Churchill 2008; van Dyck et al. 2013) and on-line database records (e.g., http://www.ala.org.au).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003).

Species nomenclature follows Armstrong *et al.* (2020).

Results & Discussion

The *Anabat Insight* noise filtration process further reduced the analysis dataset to just 12,461 WAV files, within which a total of 12,612 bat calls were identified. Fifty-nine percent (7424) of those calls were positively identified, while the remaining "unresolved" calls had characteristics potentially attributable to two or more species. These were allocated to multi-species groups.

Visual review of a random subset of files excluded by the *Insight* noise filter showed that many contained bat calls of low amplitude (i.e., quiet/weak) that did not meet the filter's zero-crossing analysis threshold. All calls thus observed in the excluded files were from species that were identified in the set that passed the noise filter.

At least 16 and up to 19 species were recorded across the three survey localities (see **Tables 1-3**). Positive identification was achieved for 15 distinct species plus the *Nyctophilus* genus, within which species' calls cannot be reliably differentiated. Up to three *Nyctophilus* species potentially occur in the study area, including *N. geoffroyi*, *N. gouldi*, and the threatened *N. corbeni*.

Most of the unresolved calls represented species that were positively identified from more definitive calls; however, one call type potentially represented a species that was not otherwise identified (*Falsistrellus tasmaniensis*). All unresolved species group members are listed as "possible" in **Tables 1-3** unless they were also positively identified from other calls recorded at the same site.

Sample spectrograms of all identified call types are provided at **Appendix 1**. The accompanying Microsoft Excel file < ELA-2102_Coolah_summer 2020-21_ID-output.xlsx> includes data-sheets for each locality that give a breakdown of the number of calls allocated per species or unresolved species group for each site.

Threatened species

At least four and perhaps six threatened species were recorded, including:

- *Chalinolobus dwyeri* – Large-eared Pied Bat
    - Detected at three sites each in the Mt Hope and Leadville areas.
- *Falsistrellus tasmaniensis* – Eastern Falsistrelle
    - Not confirmed but possible calls from all three localities.
- *Nyctophilus corbeni* – Corben's Long-eared Bat
    - Not confirmed but could be responsible for some of the *Nyctophilus* calls.
- *Scoteanax rueppellii* – Greater Broad-nosed Bat
    - Detected across all three localities.
- *Miniopterus orianae oceanensis* – Large Bent-winged Bat (Eastern sub-species)
    - Detected at Girragulang Rd (just 1 call) and Mt Hope (6 sites)
- *Saccolaimus flaviventris* – Bare-rumped Sheath-tailed Bat
    - detected at four sites across all three localities

Table 1 Bats recorded in the Girragulang Road area.

♦ = 'definite' - at least one call was attributed unequivocally to the species at the site
□ = 'possible' - calls like those of the species were recorded, but were not reliably identified

Site/detector name:	GR_Bustard	GR_Flannyflower	GR_Helioporus	GR_Hibbertia	GR_Lionfish	GR_Spicebush	GR_Toadfish
Chalinolobus gouldii	♦	♦	♦	♦	♦	♦	♦
Chalinolobus morio	□	♦	♦	□	♦	♦	♦
Falsistrellus tasmaniensis			□	□		□	
Nyctophilus sp.		♦	♦	♦		♦	♦
Scoteanax rueppellii	□	□		♦	□	♦	
Scotorepens balstoni	♦	♦	♦	♦	♦	♦	♦
Scotorepens orion	□	□	□	□	□	□	□
Vespadelus darlingtoni	□	♦		□	□		
Vespadelus regulus	♦	♦	♦	♦	♦	♦	♦
Vespadelus vulturnus	♦	♦	♦	♦	♦	♦	♦
Miniopterus orianae	□	□	□		♦	□	
Austronomus australis	♦	♦	♦	♦	♦	♦	♦
Ozimops petersi	♦	♦	♦	♦	♦	♦	♦
Ozimops planiceps	□	♦	♦	♦	♦	♦	♦
Ozimops ridei	□	♦	□	□	♦	□	□
Saccolaimus flaviventris				♦			

Table 2 Bats recorded in the Leadville area.

♦ = 'definite' - at least one call was attributed unequivocally to the species at the site

□ = 'possible' - calls like those of the species were recorded, but were not reliably identified

Site/detector name:	LV_Bustard	LV_Firetail	LV_Lionfish	LV_Lotus
Rhinolophus megaphyllus		♦		
Chalinolobus dwyeri	♦	♦	♦	
Chalinolobus gouldii	♦	♦	♦	♦
Chalinolobus morio				□
Falsistrellus tasmaniensis				□
Nyctophilus sp.		♦		♦
Scoteanax rueppellii		♦		♦
Scotorepens balstoni		♦		♦
Scotorepens orion		♦		♦
Vespadelus regulus	♦	♦	□	♦
Vespadelus vulturnus	♦	♦	♦	♦
Miniopterus orianae	□	□		
Austronomus australis		♦	♦	♦
Ozimops petersi	♦	♦		♦
Ozimops planiceps	♦	♦	♦	♦
Ozimops ridei	♦	□	♦	□
Saccolaimus flaviventris	♦			

Table 3 Bats recorded in the Mount Hope area.

♦ = 'definite' - at least one call was attributed unequivocally to the species at the site

□ = 'possible' - calls like those of the species were recorded, but were not reliably identified

Site/detector name:	MH_Bustard	MH_Firetail-1	MH_Firetail-2	MH_Lionfish	MH_Lotus 1	MH_Lotus 2	MH_Spicebush	MH_Toadfish	MH_Wedgie	MH_Wolverine
Chalinolobus dwyeri		♦			♦			♦		
Chalinolobus gouldii	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Chalinolobus morio	□	♦	♦	♦	♦	♦	♦	♦	♦	♦
Falsistrellus tasmaniensis								□	□	
Nyctophilus sp.	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Scoteanax rueppellii		♦	♦	□	♦		♦	♦	♦	□
Scotorepens balstoni	♦	♦	♦	♦	♦	♦	♦	♦	♦	
Scotorepens orion	□	□	□	□	□		♦	♦	♦	□
Vespadelus darlingtoni		♦	♦	□	♦	♦	□	□	♦	
Vespadelus regulus	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Vespadelus vulturnus	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Miniopterus orianae	□	♦	♦	♦	♦	□	♦	□	□	♦
Austronomus australis	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Ozimops petersi	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Ozimops planiceps	♦	♦	♦	♦	♦	♦	♦	♦	♦	
Ozimops ridei	♦	♦	♦	□	♦	♦	♦	♦	♦	
Saccolaimus flaviventris	♦							♦		

References

Armstrong, K.N., Reardon, T.B., and Jackson, S.M. (2020). A current taxonomic list of Australian Chiroptera. Australasian Bat Society. Version 2020-06-09. http://ausbats.org.au/species-list/4593775065; Accessed 4/6/2021.

Australasian Bat Society (2021). *BatMap*. http://ausbats.org.au/batmap; Accessed 4/6/2021.

Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.

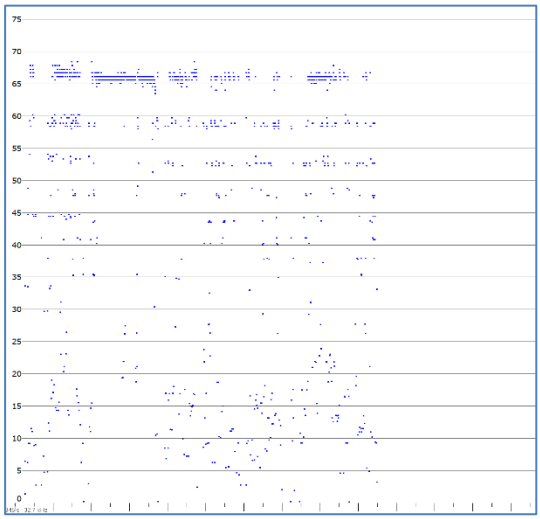
Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43. https://www.ausbats.org.au/newsletter.html; Accessed 4/6/2021.

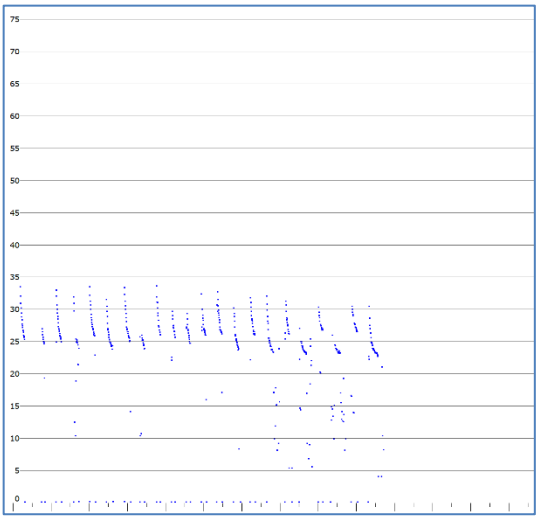
Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). *Field Companion to the Mammals of Australia*. New Holland; Sydney.

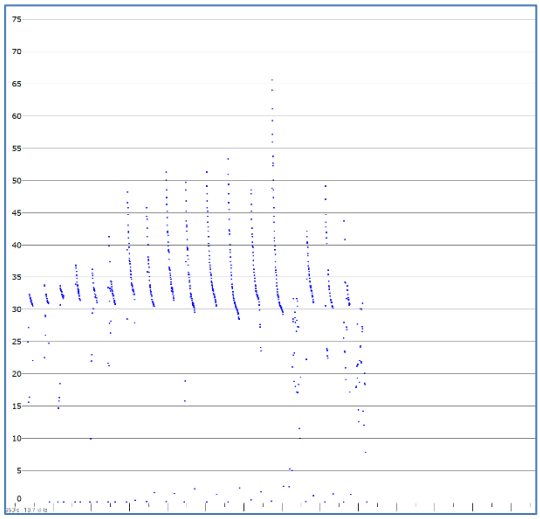
Appendix 1 Representative call sequences from the Coolah area surveys, summer 2020-21.
Scale *x*-axis =10 milliseconds per tick-mark; time between pulses compressed



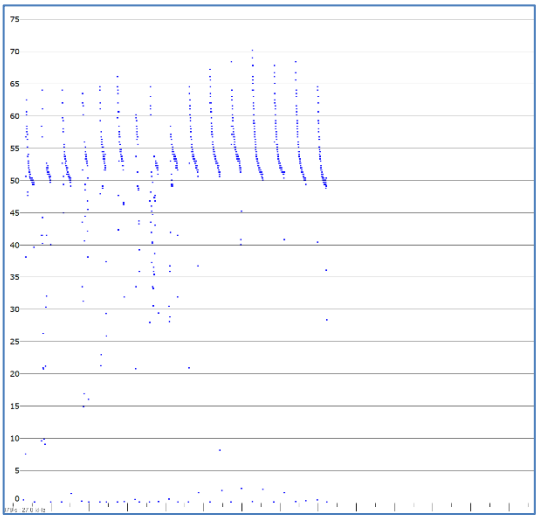
Rhinolophus megaphyllus



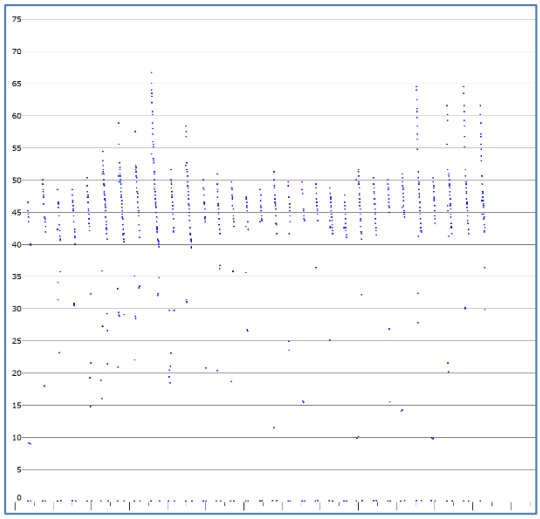
Chalinolobus dwyeri



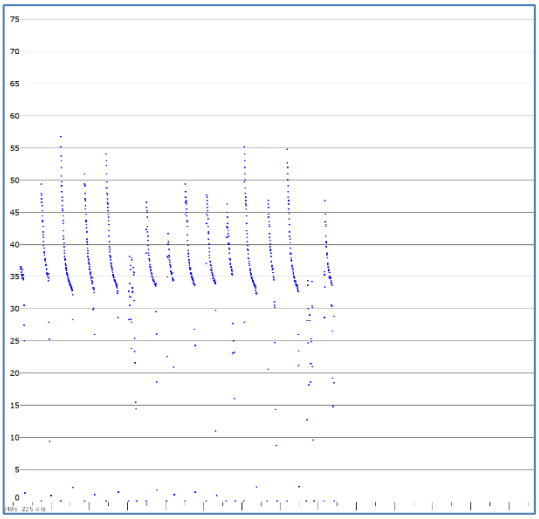
Chalinolobus gouldii



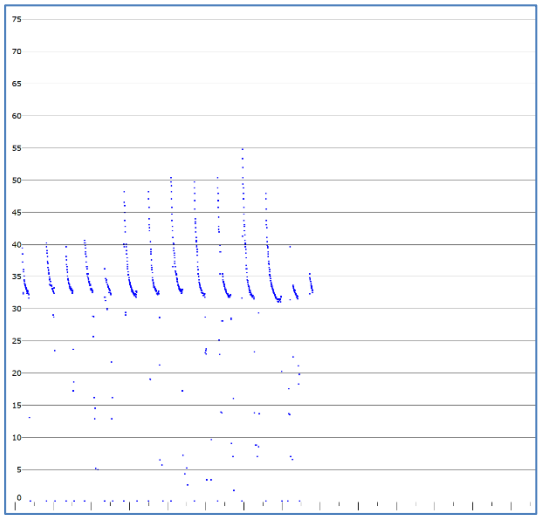
Chalinolobus morio



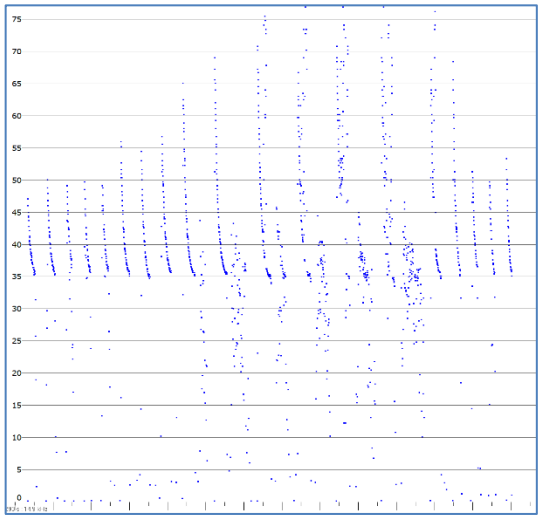
Nyctophilus sp.



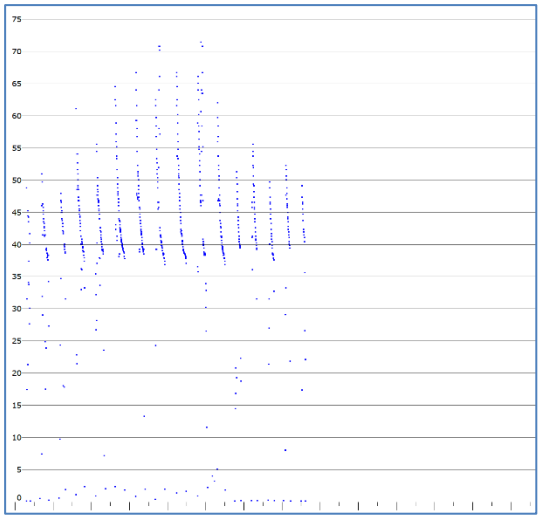
Scoteanax rueppellii



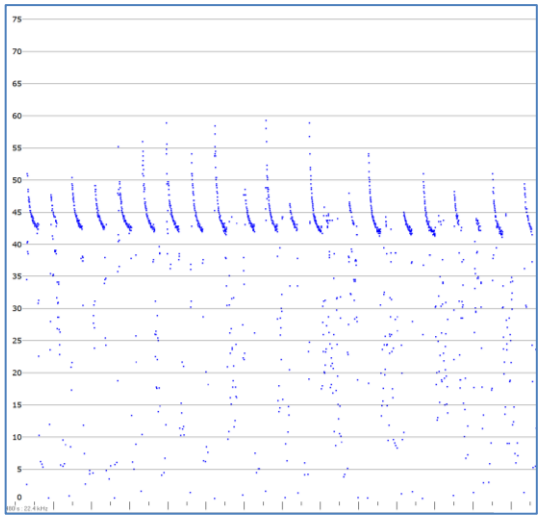
Scotorepens balstoni



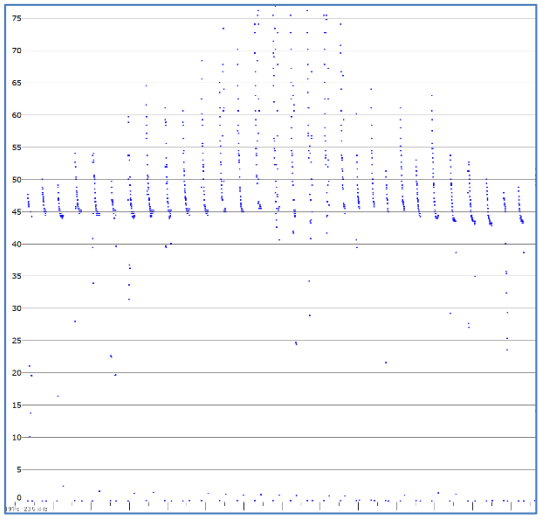
Scotorepens orion



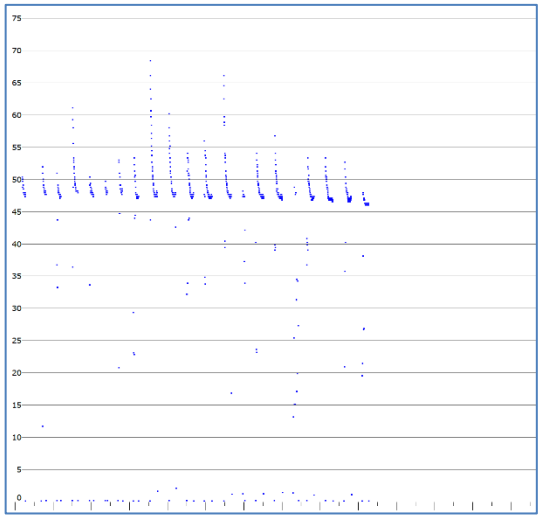
Possibly *Falsistrellus tasmaniensis*



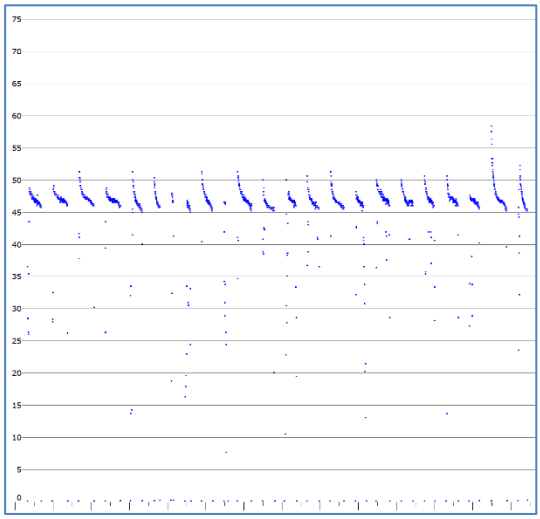
Vespadelus darlingtoni



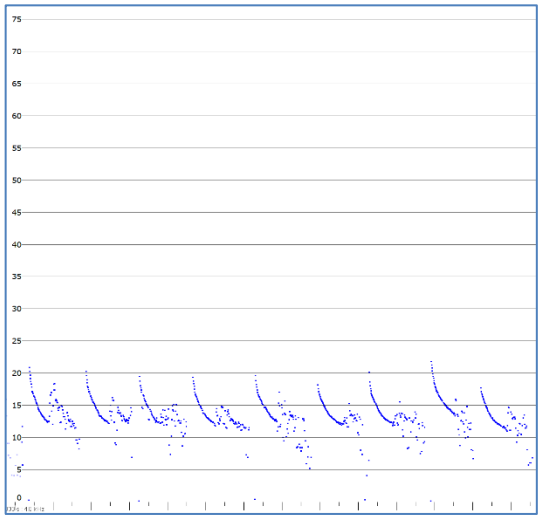
Vespadelus regulus



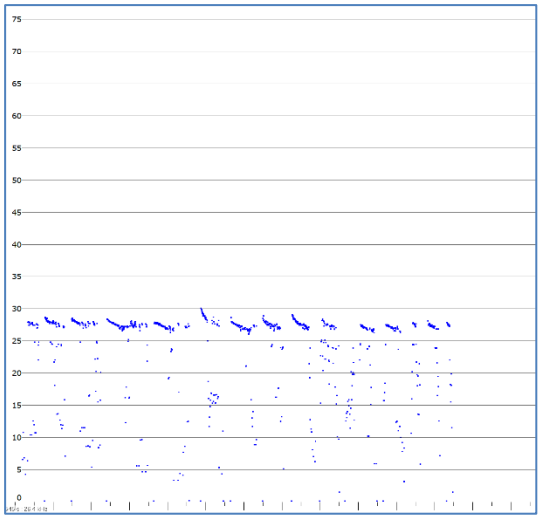
Vespadelus vulturnus



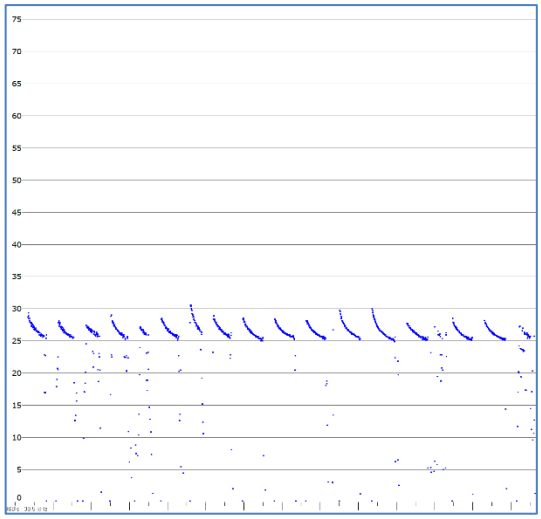
Miniopterus orianae



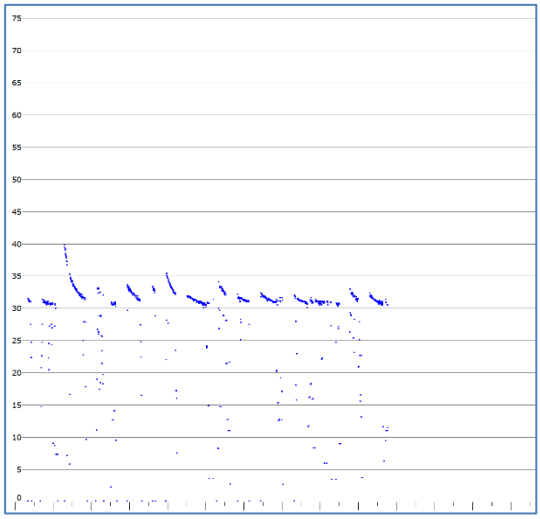
Austronomus australis



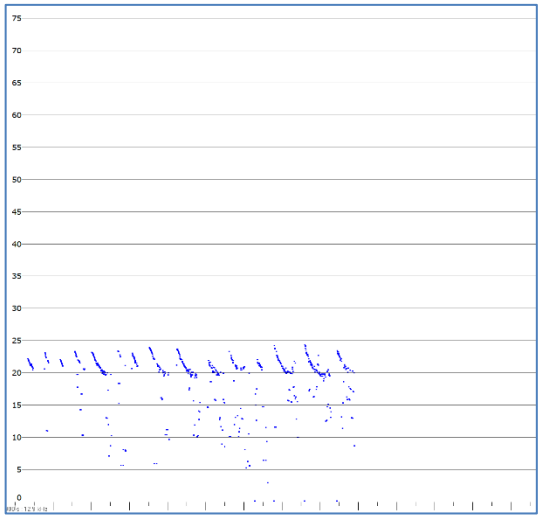
Ozimops petersi



Ozimops planiceps



Ozimops ridei



Saccolaimus flaviventris

Microbat Call Identification Report

Prepared for ("Client"):	Eco Logical Australia
Survey location/project name:	Coolah Met-masts
Survey dates:	28th August – 14th September 2021
Client project reference:	
Job no.:	ELA-2103
Report date:	7 October 2021

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Methods

Data received

Balance! Environmental received 5459 full-spectrum ultrasonic acoustic files (WAV files) recorded using six Song Meter SM4BAT detectors (Wildlife Acoustics, Maynard MA, USA). The detectors were deployed at two meteorological monitoring masts (met-masts), with microphones positioned at ground level (0 m), 50 m and 100 m height above ground. The total deployment period was from 28th July 2021 to 14th September 2021, with a few days' variation between the two sites (see **Table 1**).

Call analysis and species identification

Call analysis was performed in *Anabat Insight* (Titley Scientific, Brisbane), with all WAV files first processed through a generic noise filter to exclude files with only non-bat noise. Files that passed the noise filter were then run through a Decision Tree Analysis to group and label similar calls based on zero-crossing analysis metrics (e.g. characteristic frequency (Fc), pulse duration (Dur) and time between pulses (TBC)). The Decision Tree also set aside any call files that contained fewer than three measurable pulses ("short calls").

Each Decision Tree group was reviewed manually to confirm or adjust species labels, with the "short call" group only reviewed if there were obvious species gaps or few identifiable calls for a site. Species identification was based on comparison of call spectrograms and derived metrics with those of regionally relevant reference calls and published call descriptions (Reinhold *et al.* 2001; Pennay *et al.* 2004).

The likelihood of species' presence on site was confirmed by referring to the *BatMap* application (Australasian Bat Society 2021) and other published distributional information (e.g. Churchill 2008; van Dyck et al. 2013).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/.

Species nomenclature follows Armstrong *et al.* (2020).

Table 1. Bat detector deployment schedule at the Coolah met-masts, July-September 2021.

Location	Height m	Detector	Start date - time	End date - time
Girragulang Road	0	Wedgie	3/08/2021 - 17:26	10/09/2021 - 06:06
Girragulang Road	50	S4U11765	28/07/2021 - 17:20	10/09/2021 - 0 6:18
Girragulang Road	100	S4U11925	28/07/2021 - 17:20	10/09/2021 - 06:18
Mount Hope	0	Wombat	4/08/2021 - 17:27	14/09/2021 - 06:01
Mount Hope	50	S4U11737	28/07/2021 - 17:20	14/09/2021 - 06:12
Mount Hope	100	S4U11746	28/07/2021 - 17:20	14/09/2021 - 06:12

Results & Discussion

A total of 2080 bat calls were identified in 2060 WAV files.

More than 81% (1697) of the calls were positively identified to one of 11 distinct species or the *Nyctophilus* genus (see **Table 2**). Species within the latter genus cannot be reliably differentiated in call data and at least two species may be present in the study area (*N. geoffroyi* and *N. gouldi*).

Two threatened species were identified, including: *Miniopterus orianae oceanensis* (Eastern Bent-winged Bat); and *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed Bat).

The other 383 "unresolved" calls had characteristics potentially attributable to two or more species and were assigned to six multi-species groups (**Table 2** lower portion). One of the "unresolved" call groups potentially represents an additional species – *Ozimops lumsdenae*; however, it is possible that the 142 calls assigned to this group are simply low frequency variants of *O. planiceps*, which was the most frequently detected species at all elevations and both sites.

O. lumsdenae is a listed threatened species in New South Wales and, if present at Coolah, would be at the extreme southerly limit of its known geographic range.

Sample call spectrograms of each species and unresolved call-group are shown in **Appendix 1**.

Table 2 Bats recorded at three elevations at the Coolah met-masts; 28 July – 14 September 2021. Number of calls allocated per species or unresolved group.

Site:	Girragulang Road			Mount Hope			Species Total
Height (m):	0	50	100	0	50	100	
Positively identified calls							
Chalinolobus gouldii	159	6	3	141	26	4	339
Nyctophilus sp.	10						10
Scotorepens balstoni				1			1
Vespadelus darlingtoni	1				2	4	7
Vespadelus regulus	8	4	1	18	29	12	72
Vespadelus vulturnus	28			13	2	1	44
Miniopterus orianae	4	1	1	7	20	16	49
Austronomus australis	37	10	3		18	14	82
Ozimops petersi	11	1	2	1	10	14	39
Ozimops planiceps	246	108	120	47	230	146	897
Ozimops ridei	11	11	31	2	57	43	155
Saccolaimus flaviventris	2						2
Unresolved calls							
C. gouldii / *Ozimops* sp.	9	7	6	33	19	5	79
O. planiceps / ***O. lumsdenae***	56	17	31	4	23	11	142
O. petersi / *O. ridei*	8	6	10	1	19	13	57
V. darlingtoni / *V. regulus*	5			1	6	4	16
V. regulus / *V. vulturnus*	7	1		17	3	3	31
Vespadelus sp. / ***M. orianae***	6	4	3	15	17	13	58
Detector Total	608	176	211	301	481	303	2080

Comparison of bat activity at three elevations

Bat activity levels varied considerably between the two sites and between elevations at each site (see **Figure 1**). At Girragulang Road, bat activity at ground level (mean detection rate of 16.0 calls per detector-night) far exceeded that at 50m (3.9 calls/d-n) and 100m (4.7 calls/d-n), whereas the 50m microphone at Mount Hope detected higher bat activity (9.8 calls/d-n) than those at ground level (7.2 calls/d-n) and 100m (6.2 calls/d-n).

The relative contributions of individual species to activity levels at each elevation are somewhat consistent between the two sites (see **Figure 2**). While most species were detected at all three elevations, activity was dominated by the free-tailed bats (*Ozimops* spp.) at 50m and 100m, where more than 70% of the detected calls were from these high-flying, open-space-foraging specialists. Vespertilionid species adapted to foraging within or close to vegetation (e.g., *Chalinolobus gouldii* and *Vespadelus* spp.) were more prominent at ground level, although the open-space specialists still contributed ~60% of the ground-level calls at Girragulang Road.

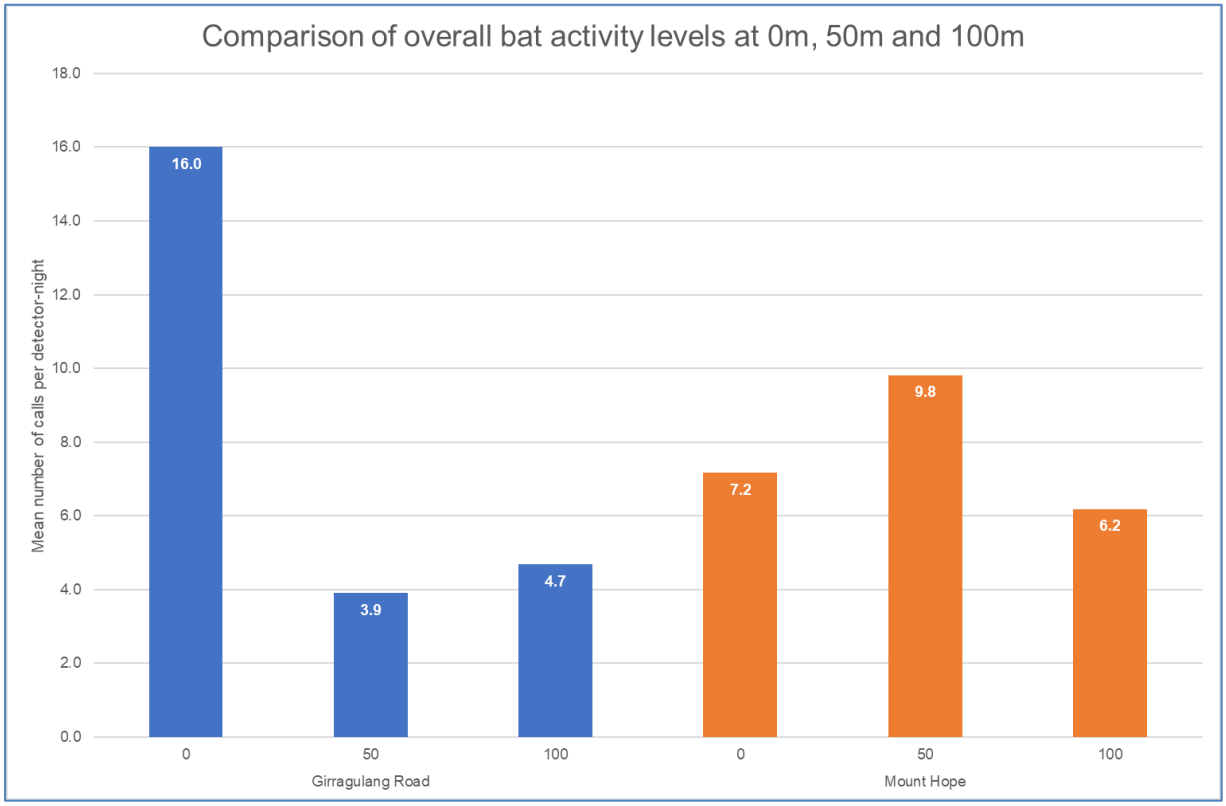


Figure 1 Comparison of bat activity levels at three heights above ground at the two Coolah met-masts.

Threatened species and elevation

The detection of just two *S. flaviventris* calls reflects the rarity of this species at the Coolah locality at the time of year during which this survey was undertaken (i.e., late winter/early spring). That it was detected only by the ground-level unit at Girragulang Road is perhaps indicative that the species will forage close to the ground in treeless habitats, but it is also known to forage at elevations that would put it within the rotor sweep zone of wind turbines. Being a summer migrant to southern Australia (Churchill 2008), it is possible that *S. flaviventris* will feature more prominently in call data recorded over coming months at Coolah.

The proportion of *M. orianae oceanensis* detections was greater at 50m and 100m for the Mount Hope site (see **Figure 2** and **Figure 3**). This may be of concern in terms of the implied turbine collision risk for the species if activity is more concentrated in the rotor sweep zone; however, the overall detection rate for the species was very low (<1 call per detector-night) at all altitudes and both sites (see **Figure 3**). Consequently, the likelihood of significant impact to the species is very low, at least during the late winter/early spring period represented by the present dataset.

Caution required in interpreting elevational activity comparisons

No attempt has been made to determine if individual calls were recorded by more than one detector at each site. Consequently, it is likely there is some overlap in call detections at each altitude and, therefore, considerable error in the relative activity levels discussed above.

In the right atmospheric conditions (e.g., low temperature and low humidity), some high amplitude (loud) low frequency, calls, such as those of the molossid species, could be detected at distances of 30-50m, or even more. Therefore, an *O. planiceps* (call frequency ~25 kHz) foraging at 50m could be recorded on all three detectors. Conversely, a higher frequency, lower amplitude (quieter) call (e.g., from *V. vulturnus*) is less likely to be detected simultaneously by multiple microphones.

With these basic assumptions, it is conceivable that the illustrated altitudinal differences in activity level are more reliable for *Vespadelus* spp., *Nyctophilus* spp. and perhaps *C. gouldii*, but less reliable for *Austronomus australis* and *Ozimops* spp.

However, the “detectability” at each microphone of a single call from a given species will be complicated by a range of factors, including orientation of the bat relative to each microphone, what the bat is doing at the time (e.g., a quiet bat making a louder call than usual), and variation in temperature and humidity at the different elevations, relative to where the bat is flying.

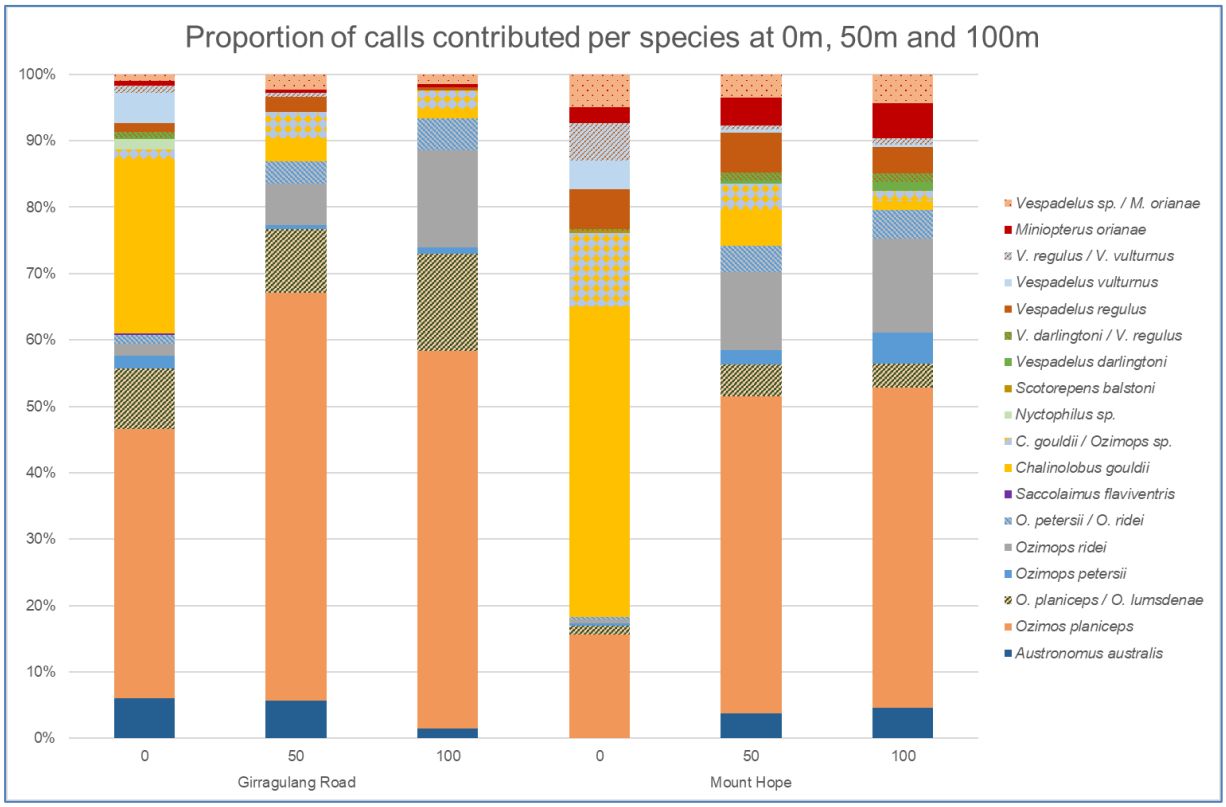


Figure 2 Relative proportions of total bat activity contributed by each species.

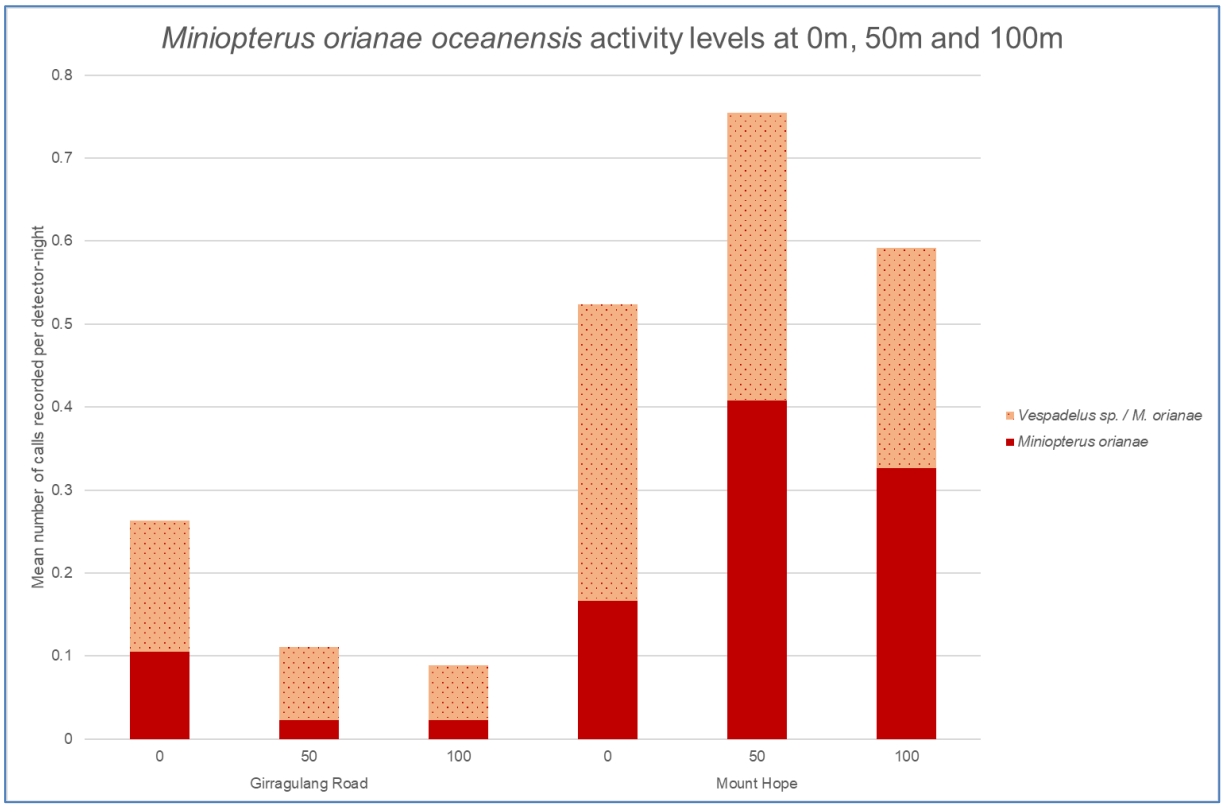


Figure 3 *Miniopterus orianae oceanensis* activity levels at the Coolah met-masts.

Temporal variation in bat activity levels

Total bat activity varied substantially between nights over the survey period (**Figure 4** and **Figure 5**). Several distinct peaks and troughs in activity were mirrored by the two sites, which suggests these changes in activity were probably driven by weather conditions.

While ground-level activity dominated the recordings on most nights at Girragulang Road (**Figure 4**), the opposite was true for the Mount Hope site (**Figure 5**), where activity levels at 50m and 100m were much higher than at ground level for most nights. There were, however, several significant shifts in activity levels, particularly at Mount Hope, where most activity switched from elevation (50m and 100m) to ground-level (0m) on 22nd August and again on 10th ad 11th September. Similar shifts, but in the opposite direction (i.e., from ground-level to elevation), occurred at Girragulang Road on 14th and 21st August.

The reasons for these shifts in bat activity have not been further investigated in this analysis; however, the changes may indicate altered foraging height preferences in response to changing weather conditions (e.g., bats foraging closer to ground when conditions are windy) and/or prey availability (e.g., warmer nights may result in greater insect abundance higher above ground).

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Reardon, T. (2003). Standards in bat detector based surveys. Australasian Bat Society Newsletter 20, 41-43.

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van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). Field Companion to the Mammals of Australia. New Holland; Sydney.

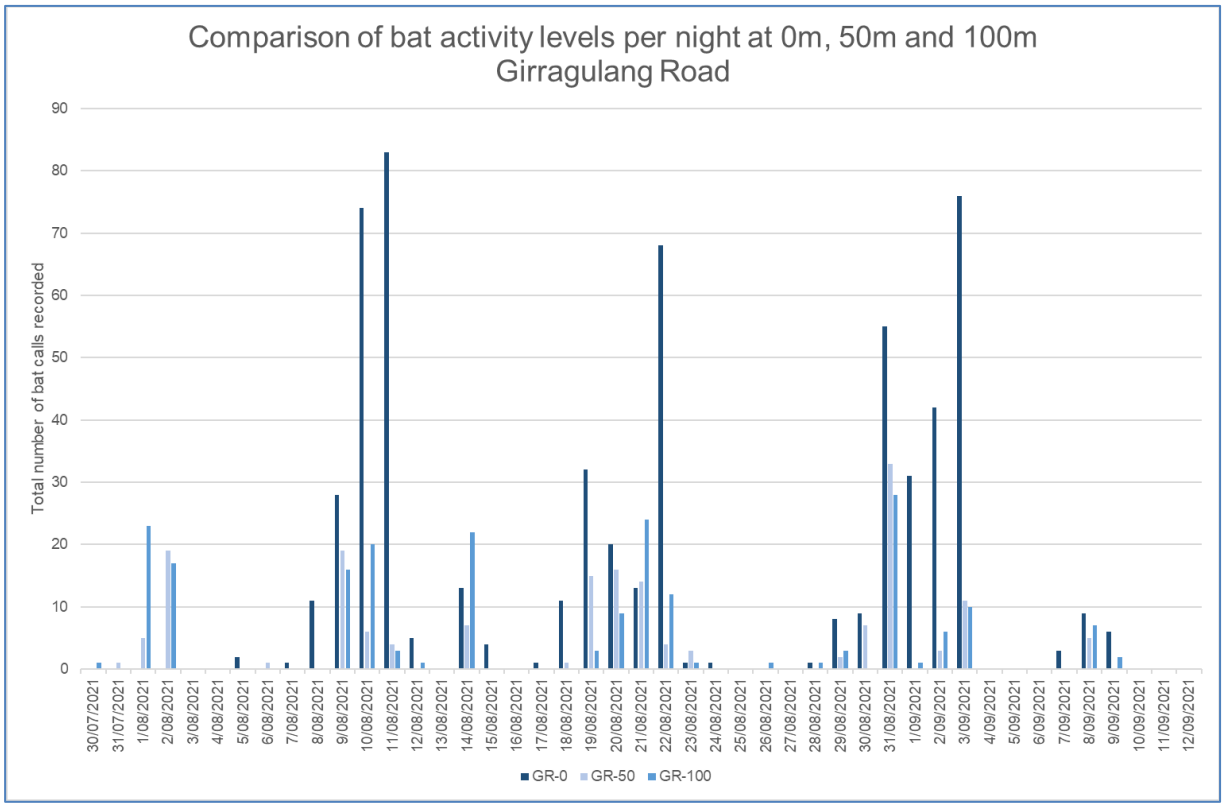


Figure 4 Nightly bat activity at three heights above ground for the Girragulang Road met-mast. Note that was no ground level (0m) detection before 3rd August.

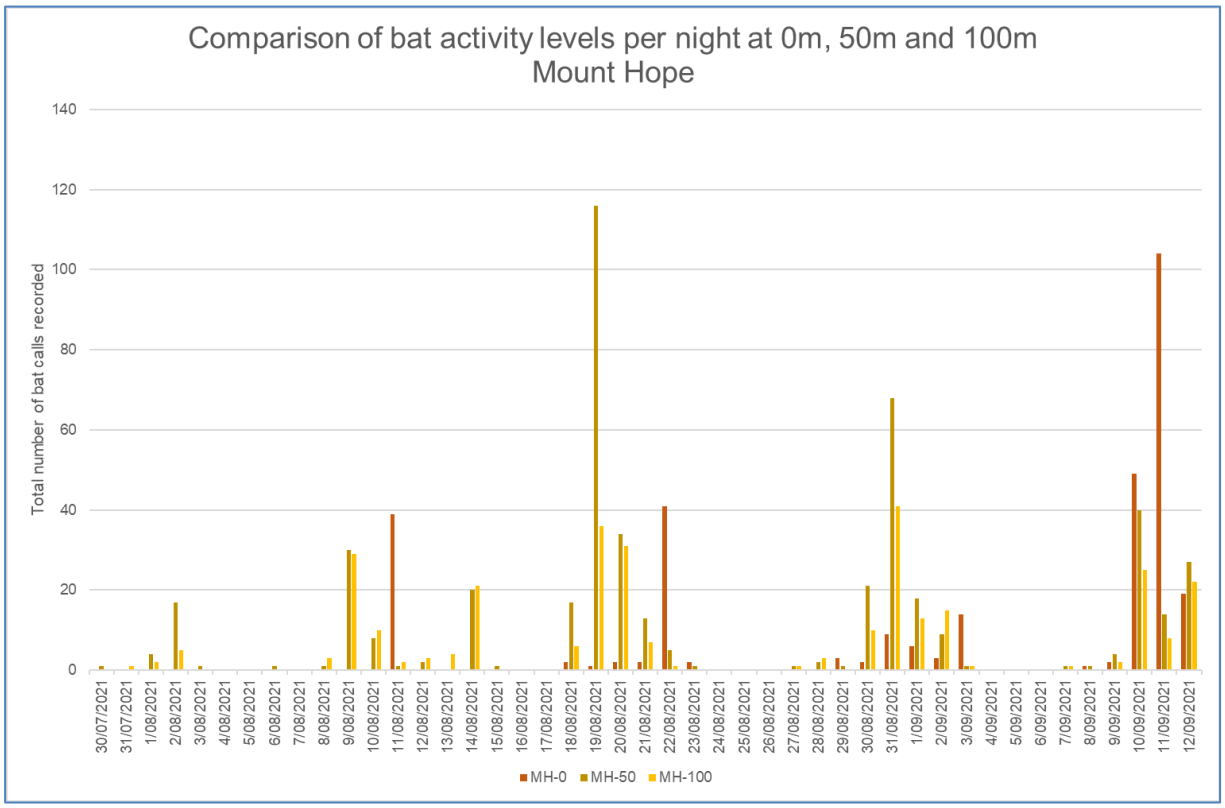
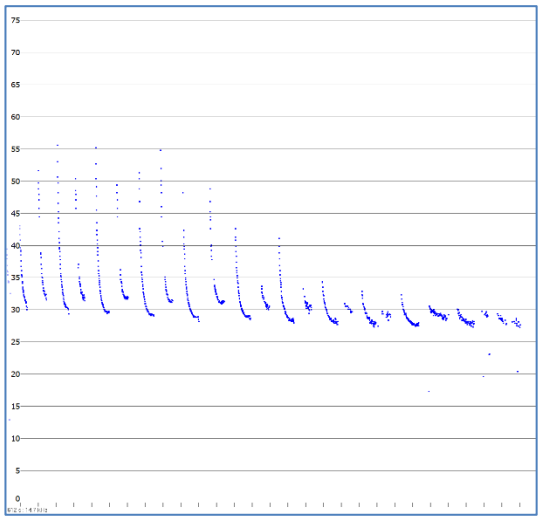
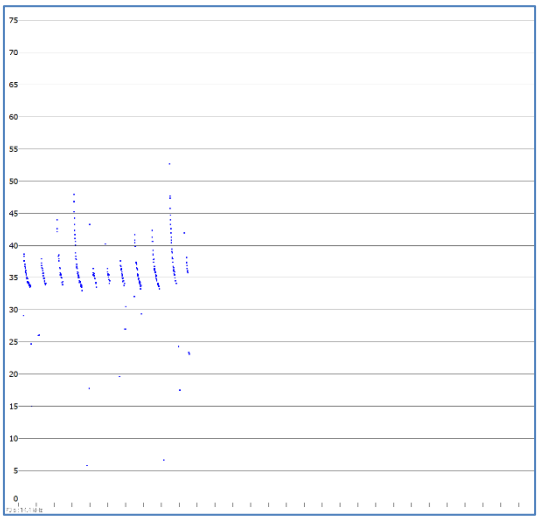


Figure 5 Nightly bat activity at three heights above ground for the Mount Hope met-mast. Note that was no ground level (0m) detection before 4th August.

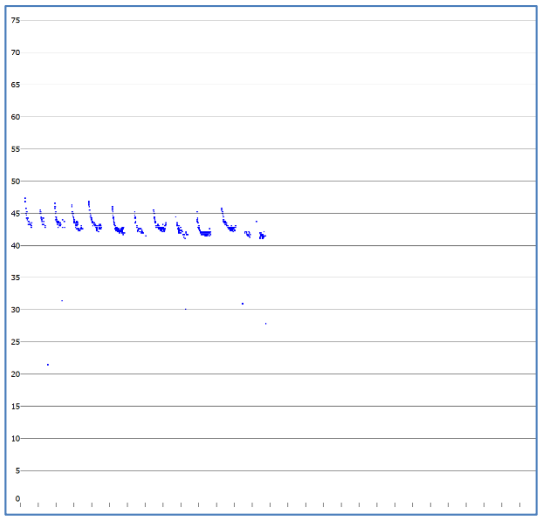
Appendix 1 Representative sonograms from the Coolah met-masts dataset.
X-axis (time)=10 msec per tick; time between pulses removed



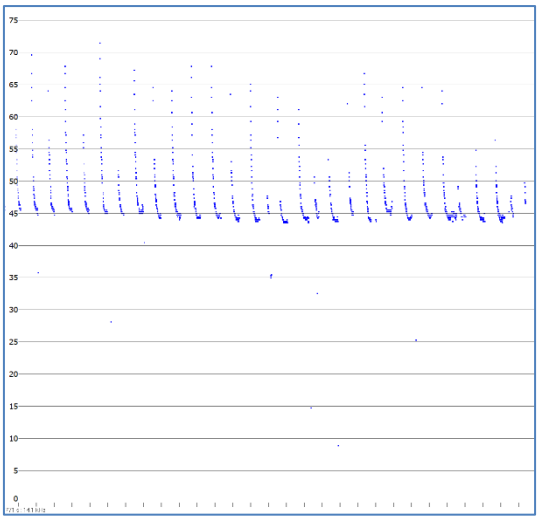
Chalinolobus gouldii



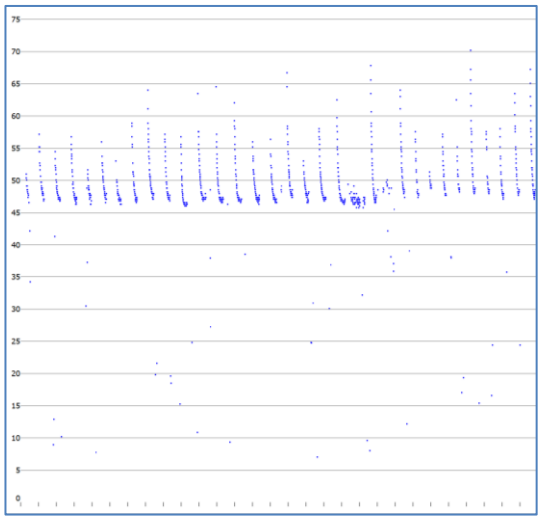
Scotorepens balstoni



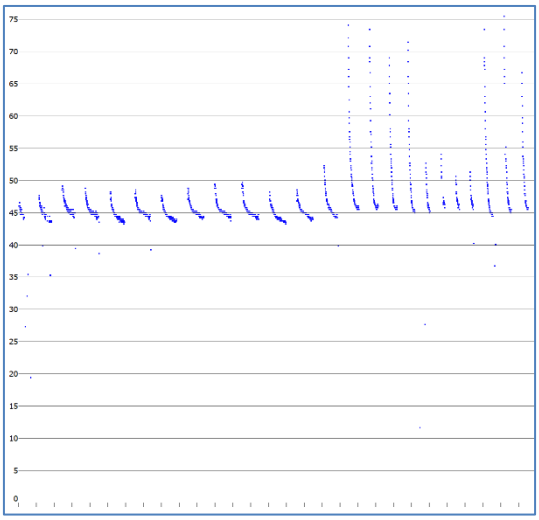
Vespadelus darlingtoni



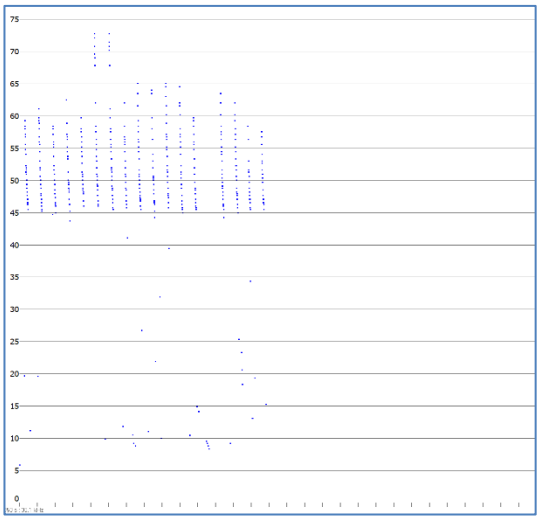
Vespadelus regulus



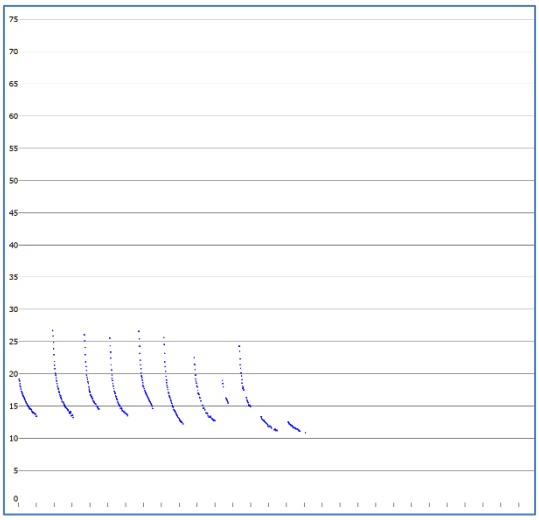
Vespadelus vulturnus



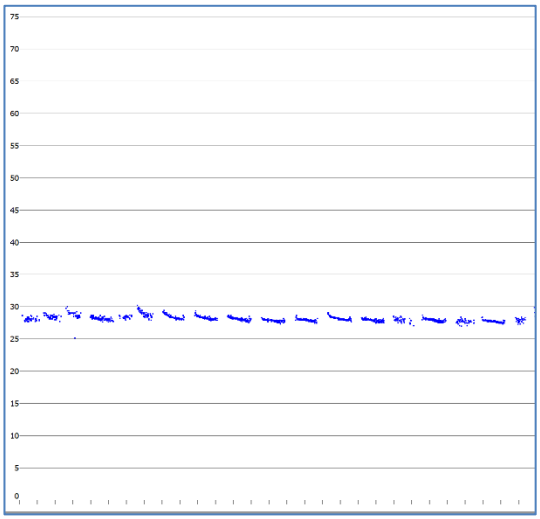
Miniopterus orianae



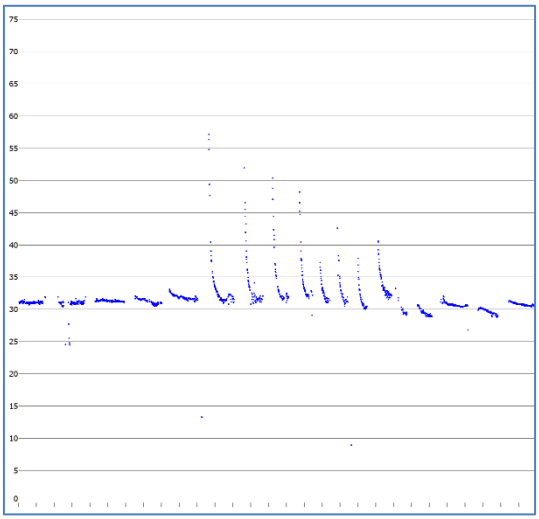
Nyctophilus sp.



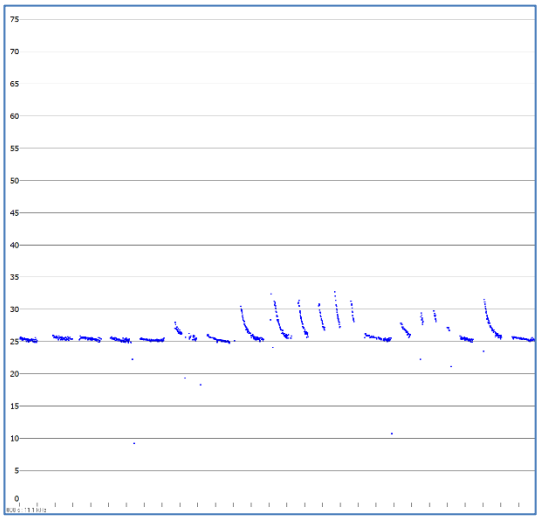
Austronomus australis



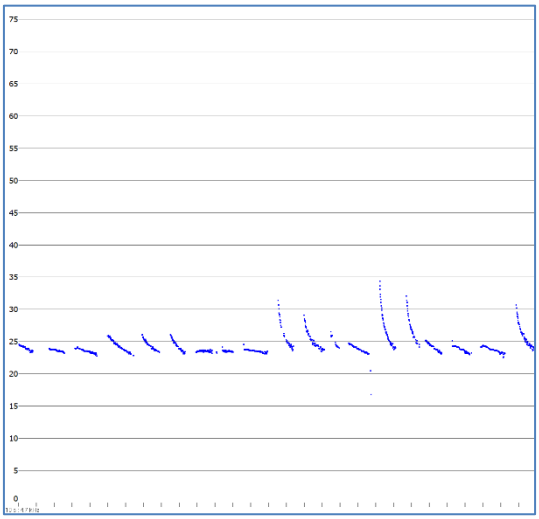
Ozimops petersi



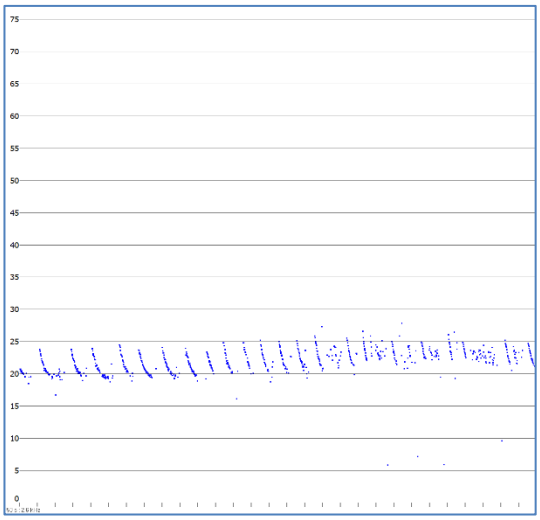
Ozimops ridei



Ozimops planiceps



O. planiceps / O. lumsdenae



Saccolaimus flaviventris

Appendix L Reference call library

Masked Owl reference calls were sourced from the following:

- Bird Observers Club of Australia, 2007. A Field Guide to Australian Birdsong (CD Edition).
- Stewart, D.A., 2007. Nocturnal Bird & Mammal Calls of NE-NSW.
- eBird.org contributors
    - Adrian Boyle
    - Chris Attewell
    - Chris Rehberg | Sydney Birding
    - Elliot Leach
    - Greg McLachlan
    - Matteo Grilli
    - Michael Daley
    - Mick Jerram
    - Pieter de Groot Boersma
    - Ramit Singal
    - Richard Fuller
- birdsinbackyards.net – *Tyto novaehollandiae*
    - Fred Van Gessel
- owlpages.com
    - Ed McNabb
- xeno-canto.org contributors
    - Boyd Wykes
    - Greg McLachlan
    - Marc Anderson
    - Mark Carter
    - Mike FitzGerald
    - Nigel Jackett
    - Pieter de Groot Boersma
    - Simon Gorta

Barking Owl reference calls were sourced from the following:

- Bird Observers Club of Australia, 2007. A Field Guide to Australian Birdsong (CD Edition)
- Stewart, D.A., 2007. Nocturnal Bird & Mammal Calls of NE-NSW.
- eBird.org contributors
    - Allan Pratt
    - Andrew Sides

  - Anonymous
  - Bradley Hacker
  - Chris Attewell
  - Chris Rehberg | Sydney Birding
  - Claire Anderson
  - Dan Pendavingh
  - Darron Gedge
  - David Vickers
  - Doug Hendricks
  - Elliot Leach
  - Holger Woyt
  - Ian Starling
  - Ivor Preston
  - James Lambert
  - Josep del Hoyo
  - Michael Dahlem
  - Murray Kelman
  - Niels Poul Dreyer
  - T B Bands
  - Thalia and Darren Broughton
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  - Vicki Powys

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  - Greg McLachlan
  - Marc Anderson
  - Nigel Jackett
  - Pieter de Groot Boersma
  - Simon Gorta

- birdsinbackyards.net – *Ninox connivens*
  - Fred Van Gessel

- iNaturalist.org contributors
  - Alicia Powell
  - d_kurek
  - maria_and_david
  - Will Ford
  - xeno-canto
  - Marc Anderson
  - Niels Poul Dreyer

Appendix M Koala SAT survey results

		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
Tree 1	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	30	150	38	200	80	120	140	100	120	80	60	80	80
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 2	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	50	150	36	112	80	80	40	150	100	65	35	80	30
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 3	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	50	90	32	59	80	110	40	180	120	60	40	90	40
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 4	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	30	60	33	78	80	80	50	150	150	60	75	50	30
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N

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		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
Tree 5	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	50	80	15	91	120	65	50	80	150	65	60	95	40
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 6	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	60	50	16	98	60	30	60	150	200	90	65	85	45
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 7	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	30	30	29	51	120	90	70	80	150	95	70	80	40
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	Y - BTP	N	N
Tree 8	Species	E. albemol	E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	30	15	22	18	150	120	35	80	60	80	70	60	35
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N

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		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
Tree 9	Species	E. albemol	E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E.albens	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	40	50	38	74	50	80	110	100	60	55	90	90	60
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 10	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albemol
	DBH	20	50	24	55	80	65		200	180	60	95	70	100
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 11	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol
	DBH	30	20	28	107	80	30		120	200	100	100	70	25
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 12	Species	E. albemol	C. endlicheri	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	Kurrajong	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	20	80	56	50	120	80		80	120	115	100	70	35
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N

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		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
	Scat present	N	N	N	N	N	N		N	N	N	N	Y	N
Tree 13	Species	E. albemol	E. albemol	E. albemol	brachychiton populneus	E. albemol	E. albemol		Stag	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol
	DBH	60	30	27	123	50	50		90	120	65	50	100	55
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 14	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol
	DBH	60	60	29	117	60	160		90	50	45	115	80	40
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 15	Species	E. albemol	E. albemol	E. albemol	B. populneus	E. albemol	E. albemol		B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	80	30	25	48	20	115		90	50	100	55	70	45
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 16	Species	E. albemol	E. albemol	E. albemol	B. populneus	E. albemol	E. albemol		B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	40	50	22	69	120	25		80	100	105	115	75	35

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		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 17	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	40	50	23	49	60	40		80	200	110	40	60	60
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 18	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	80	50	32	44	80	100		150	80	100	55	70	30
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 19	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol
	DBH	30	80	29	37	60	35		150	120	45	50	90	50
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 20	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	50	15	55	146	120	110		200	80	120	80	100	40

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		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 21	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	30	120	27	53	60	40		90	200	80	90	80	40
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 22	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	Stag	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	60	50	28	89	60	100		100	60	80	50	100	40
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 23	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albemol
	DBH	50	50	25	45	150	90		150	60	50	60	60	35
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 24	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	Stag	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	80	100	26	80	60	80		60	150	70	50	80	40
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N

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		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 25	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol
	DBH	50	90	40	68	80	100		60	80	45	50	105	30
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 26	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	80	120	65	67	80	30		200	60	90	75	95	30
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 27	Species	Stag	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	50	120	44	200	80	35		60	50	100	65	95	40
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	Y - BTP
Tree 28	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol		E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	100	120	38	41	60	120		120	120	80	90	70	35
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N

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		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13
Tree 29	Species	E. albemol	E. albemol	E. albemol	B. populneus	E. albemol	E. albemol		E. albemol	E. albemol	B. populneus	E. albemol	E. albemol	E. albemol
	DBH	100	120	42	86	80	105		90	80	70	70	50	35
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N
Tree 30	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	B. populneus		E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol
	DBH	60	80	35	40	30	45		50	100	90	45	40	35
	Koala present	N	N	N	N	N	N		N	N	N	N	N	N
	Scat present	N	N	N	N	N	N		N	N	N	N	N	N

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
Tree 1	Species	E. albemol	E. albemol	E. albemol	E. albens	E. albemol	E. dwyeri	E. punctata	A. floribunda	E. blakelyii	E. albemol	E. albemol	E. punctata	A. floribunda
	DBH	80	100	70	130	110	45	45	50	120	65	60	25	60
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 2	Species	E. albemol	E. albemol	B. populneus	E. albens	E. albemol	E. dwyeri	A. floribunda	A. floribunda	A. floribunda	E. albemol	E. albemol	A. Floribunda	E. albemol
	DBH	105	50	50	25	200	40	30	12	30	90	40	20	50
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 3	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. dwyeri	E. punctata	A.floribunda	E. blakelyii	E. albemol	E. albemol	A.floribunda	E. albemol
	DBH	115	40	60	70	150	25	40	20	70	70	60	25	100
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 4	Species	B. populneus	E. albemol	E. albemol	A. floribunda	E. albemol	A. floribunda	E. punctata	A. floribunda	E. blakelyii	A. floribunda	E. albemol	A.floribunda	E. albemol
	DBH	40	40	60	100	50	70	45	25	30	30	50	25	50

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 5	Species	B. populneus	E. albemol	E. albemol	E. rossii	E. albemol	E. dwyeri	E. punctata	A. floribunda	E. blakelyii	E. albemol	E. albemol	E.punctata	E. albemol
	DBH	50	45	80	130	80	35	50	20	35	90	60	30	40
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 6	Species	E. albemol	E. crebra	E. albemol	B. populneus	E. albemol	E. dwyeri	E. punctata	E. blakelyii	E. blakelyii	E. albemol	E. albemol	A.floribunda	E. albemol
	DBH	105	80	145	140	120	35	35	30	40	45	30	15	20
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 7	Species	E. albemol	E. crebra	E. albemol	A.floribunda	E. albemol	A.floribunda	E. crebra	A.floribunda	A.floribunda	E. albemol	E. albemol	E.punctata	E. crebra
	DBH	90	55	45	110	60	20	45	25	20	90	30	20	20
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	Y - BTP	N	N	N	N	N	N	N	N	N	N	N	N

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
Tree 8	Species	E. albemol	E. crebra	E. albemol	B. populneus	A.floribunda	E. dwyeri	A. floribunda	E. blakelyii	E. blakelyii	E. albemol	E. albemol	E.punctata	E. albemol
	DBH	85	40	40	100	100	45	35	30	40	110	40	45	20
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 9	Species	E. albemol	E. albemol	E. albemol	E.albens	A.floribunda	E. dwyeri	A. floribunda	A. floribunda	A. floribunda	E. albemol	E. albemol	A. floribunda	E. albemol
	DBH	70	70	40	40	160	35	40	25	30	95	30	13	15
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 10	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. dwyeri	A. floribunda	A. floribunda	E. blakelyii	E. albemol	E. albemol	E. punctata	E. albemol
	DBH	40	45	50	110	160	25	25	25	60	110	40	20	30
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	Y - BTP	N
Tree 11	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. macrorhyncha	A. floribunda	A. floribunda	A. floribunda	A. floribunda	E. albemol	E. punctata	E. crebra
	DBH	80	30	60	70	60	20	27	20	50	50	40	35	50

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	Y - BTP	N
Tree 12	Species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. macrorhyncha	A. floribunda	A. floribunda	E. blakelyii	A. floribunda	E. albemol	A. floribunda	A. floribunda
	DBH	60	50	70	200	250	25	65	35	50	100	65	12	50
	Koala present	N	N	N	N	N	N	N	N	N	N	N	N	N
	Scat present	N	N	N	N	N	N	N	N	N	N	N	N	N
Tree 13	Species	E. albemol	E. albemol	E. albemol		A. floribunda	E. dwyeri	A. floribunda	A. floribunda	E. blakelyii	A. floribunda	E. albemol	A. floribunda	A. floribunda
	DBH	80	40	60		170	35	25	30	45	100	75	15	40
	Koala present	N	N	N		N	N	N	N	N	N	N	N	N
	Scat present	N	N	N		N	N	N	N	N	N	N	N	N
Tree 14	Species	E. albemol	E. albemol	E. albemol		E. albemol	E. macrorhyncha	A. floribunda	A. floribunda	A. floribunda	E. albemol	E. albemol	A. floribunda	A. floribunda
	DBH	95	30	75		150	50	50	25	20	100	75	18	15
	Koala present	N	N	N		N	N	N	N	N	N	N	N	N
	Scat present	N	N	N		N	N	N	N	N	N	N	N	N

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
Tree 15	Species	B. populneus	E. crebra	E. albemol		E. albemol	E. macrorhyncha	A. floribunda	E. blakelyii	A. floribunda	E. albemol	E. albemol	A. floribunda	E. crebra
	DBH	35	65	70		200	40	45	50	60	110	60	15	40
	Koala present	N	N	N		N	N	N	N	N	N	N	N	N
	Scat present	N	N	N		N	N	N	N	N	N	N	N	N
Tree 16	Species	E. albemol	E. crebra	E. albemol		Stag	E. dwyeri	E. punctata	A. floribunda	E. blakelyii	E. albemol	E. albemol		A. floribunda
	DBH	110	60	60		180	45	25	12	40	80	100		100
	Koala present	N	N	N		N	N	N	N	N	N	N		N
	Scat present	N	N	N		N	N	N	N	N	N	N		N
Tree 17	Species	E. albemol	E. crebra	E. albemol		A. floribunda	E. dwyeri	A. floribunda	A. floribunda	A. floribunda	E. albemol	E. albemol		A. floribunda
	DBH	80	60	40		80	35	20	10	20	50	50		60
	Koala present	N	N	N		N	N	N	N	N	N	N		N
	Scat present	N	N	N		N	N	N	N	N	N	N		N
Tree 18	Species	E. albemol	E. crebra	E. albemol		E. albemol	E. macrorhyncha	A. floribunda	A. floribunda	E. blakelyii	E. albemol	E. albemol		E. melliodora
	DBH	100	50	80		100	90	25	20	35	25	50		50

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
	Koala present	N	N	N		N	N	N	N	N	N	N		N
	Scat present	N	N	N		N	N	N	N	N	N	N		N
Tree 19	Species	B. populneus	E. crebra	E. albemol			A. floribunda	A. floribunda	A. floribunda	E. blakelyii	E. albemol	E. albemol		E. albemol
	DBH	50	40	40			45	25	15	30	60	40		150
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 20	Species	E. albemol	E. albemol	E. albemol			A. floribunda	E. punctata	A. floribunda	E. blakelyii	E. albemol	E. albemol		E. crebra
	DBH	45	45	50			25	30	15	50	100	30		45
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 21	Species	E. albemol	E. albemol	E. albemol			A. floribunda	A. floribunda	A. floribunda	A. floribunda	E. albemol	E. albemol		E. albemol
	DBH	40	75	90			55	15	20	35	50	20		65
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	Y - BTP	N	N			N	N	N	N	N	N		N

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
Tree 22	Species	E. albemol	E. albemol	E. albemol			E. dwyeri	E. punctata	E. blakelyii	A. floribunda	E. albemol	E. albemol		E. melliodora
	DBH	45	55	60			80	20	50	40	80	50		30
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 23	Species	E. albemol	E. albemol	E. albemol			E. dwyeri	E. punctata	A. floribunda	A. floribunda	E. albemol	E. albemol		E. crebra
	DBH	40	50	110			50	45	20	30	50	50		65
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 24	Species	E. albemol	B. populneus	E. albemol			E. macrorhyncha	A. floribunda	A. floribunda	A. floribunda	E. albemol	E. albemol		E. crebra
	DBH	45	40	110			45	13	25	30	100	50		15
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 25	Species	E. albemol	E. crebra	B. populneus			A. floribunda	E. punctata	A. floribunda	A. floribunda	E. albemol	E. albemol		E. crebra
	DBH	50	80	50			35	20	15	25	60	50		15

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 26	Species	E. albemol	E. albemol	E. albemol			E. dwyeri	E. punctata	A. floribunda	E. blakelyii	E. albemol	E. albemol		E. crebra
	DBH	55	80	100			100	35	35	60	50	25		30
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	Y - BTP	N	N	N	N		N
Tree 27	Species	E. albemol	E. albemol	E. albemol			E. dwyeri	A. floribunda	E. blakelyii	A. floribunda	E. albemol	E. albemol		E. crebra
	DBH	85	40	130			25	12	40	25	40	20		35
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 28	Species	E. albemol	E. albemol	E. albemol			E. dwyeri	A. floribunda	A. floribunda	E. blakelyii	E. albemol	E. albemol		E. crebra
	DBH	45	95	55			65	15	15	30	60	30		75
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N

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		Site 14	Site 15	Site 16	Site 17	Site 18	Site 19	Site 20	Site 21	Site 22	Site 23	Site 24	Site 25	Site 26
Tree 29	Species	E. albemol	B. populneus	E. albemol			A. floribunda	A. floribunda	A. floribunda	E. blakelyii	E. albemol	E. albemol		A. floribunda
	DBH	65	100	45			30	18	15	25	50	30		55
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N
Tree 30	Species	E. albemol	B. populneus	B. populneus			A. floribunda	A. floribunda	A. floribunda	E. blakelyii	E. albemol	E. albemol		E. crebra
	DBH	50	80	100			28	15	25	35	50	30		55
	Koala present	N	N	N			N	N	N	N	N	N		N
	Scat present	N	N	N			N	N	N	N	N	N		N

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	SAT 26	SAT 27	SAT 28	SAT 29	SAT 30	SAT 31	SAT 32	SAT 33	SAT 34	SAT 35
Tree 1 species	E. albemol	E. crebra	E. crebra	Euca albe	E. albemol	E. blakelyi	E. albemol	E. albemol	E. crebra	E. albemol
DBH	90	50	65	105	80	60	80	25	85	120
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 2 species	E. albemol	A. littoralis	E. crebra	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. crebra	E. albemol
DBH	60	17	23	55	90	100	55	95	25	85
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 3 species	E. albemol	E. crebra	E. crebra	B. populneus	E. albemol	E. blakelyi	E. albemol	E. albemol	E. crebra	E. albemol
DBH	70	35	25	30	90	70	45	20	65	120
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 4 species	E. albemol	E. crebra	E. crebra	B. populneus	E. albemol	E. melliodora	E. albemol	E. albemol	E. crebra	B. populneus
DBH	90	38	65	32	80	130	25	18	45	35
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 5 species	E. albemol	E. crebra	E. crebra	B. populneus	E. albemol	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	110	50	28	45	30	100	60	25	45	95
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No

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	SAT 26	SAT 27	SAT 28	SAT 29	SAT 30	SAT 31	SAT 32	SAT 33	SAT 34	SAT 35
Tree 6 species	E. albemol	E. crebra	E. crebra	B. populneus	E. albemol	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	100	30	25	45	60	35	45	35	35	100
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 7 species	E. albemol	E. crebra	E. crebra	Euca albe	E. albemol	A. floribunda	E. albemol	E. albemol	E. crebra	E. albemol
DBH	45	32	30	90	55	60	45	50	40	75
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 8 species	E. albemol	E. crebra	E. crebra	Euca albe	E. albemol	E. albemol	E. albemol	E. albemol	E. crebra	E. albens
DBH	95	50	27	86	60	90	60	75	80	60
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 9 species	E. albemol	E. crebra	E. crebra	Euca albe	E. albemol	E. albemol	E. albemol	E. albemol	E. crebra	E. albens
DBH	95	60	22	65	95	100	85	25	50	40
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 9 species	E. albemol	E. crebra	E. crebra	Euca albe	E. albemol	E. blakelyi	E. albemol	E. albemol	E. crebra	E. albemol
DBH	90	47	65	90	80	85	40	40	18	45
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No

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	SAT 26	SAT 27	SAT 28	SAT 29	SAT 30	SAT 31	SAT 32	SAT 33	SAT 34	SAT 35
Tree species 11	E. albemol	E. crebra	E. crebra	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. crebra	E. albemol
DBH	80	17	19	30	85	75	50	25	25	55
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree species 12	E. albemol	E. crebra	E. crebra	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. crebra	E. albemol
DBH	80	50	23	30	18	95	60	25	40	65
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree species 13	E. albemol	E. crebra	Allo vert	Euca albe	E. albemol	A. floribunda	E. albemol	E. albemol	E. crebra	E. albemol
DBH	80	40	16	110	25	60	45	55	35	45
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree species 14	E. albemol	E. crebra	E. crebra	B. populneus	E. albemol	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	100	55	20	35	80	60	65	85	60	55
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree species 15	E. crebra	E. crebra	E. crebra	Euca albe	B. populneus	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol

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	SAT 26	SAT 27	SAT 28	SAT 29	SAT 30	SAT 31	SAT 32	SAT 33	SAT 34	SAT 35
DBH	60	30	20	88	35	45	70	60	55	50
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 16 species	E. crebra	E. crebra	Euc creb	E. albens	E. albemol	E. melliodora	E. albemol	B. populneus	E. crebra	B. populneus
DBH	40	60	45	85	100	40	100	55	25	65
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 17 species	E. crebra	E. crebra	E. crebra	E. albens	E. albemol	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	25	40	40	30	80	50	52	50	30	50
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 18 species	E. crebra	E. crebra	Euc creb	E. albens	E. albemol	E. albemol	E. albemol	E. albemol	E. crebra	E. albemol
DBH	80	25	50	70	90	90	58	80	50	51
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 19 species	E. crebra	E. crebra	E. crebra	E. melliodora	E. albemol	E. melliodora	E. albemol	B. populneus	E. crebra	E. albemol
DBH	45	80	45	100	100	85	65	29	51	48

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	SAT 26	SAT 27	SAT 28	SAT 29	SAT 30	SAT 31	SAT 32	SAT 33	SAT 34	SAT 35
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 20 species	E. crebra	E. crebra	E. crebra	E. melliodora	E. albemol	E. albemol	E. albemol	E. albemol	E. crebra	E. albemol
DBH	50	45	60	60	65	110	55	40	53	85
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 21 species	E. crebra	E. crebra	Ango flor	E. melliodora	E. albemol	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	45	50	40	90	95	65	33	103	40	125
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 22 species	E. crebra	E. crebra	Ango flor	E. melliodora	A. floribunda	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	40	45	35	40	35	60	60	41	35	95
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 23 species	A. littoralis	E. crebra	E. crebra	E. albens	E. albemol	E. melliodora	A. floribunda	E. albemol	E. crebra	E. albemol
DBH	25	40	45	90	65	60	30	65	20	60
Koala present?	No	No	No	No	No	No	No	No	No	No

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	SAT 26	SAT 27	SAT 28	SAT 29	SAT 30	SAT 31	SAT 32	SAT 33	SAT 34	SAT 35
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 24 species	E. crebra	Allo litt	Allo litt	E. albens	A. floribunda	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	30	25	20	90	65	40	57	50	31	58
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 25 species	E. crebra	E. crebra	E. crebra	B. populneus	A. floribunda	E. melliodora	E. albemol	E. albemol	E. crebra	B. populneus
DBH	45	30	40	45	45	80	65	60	37	34
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 26 species	E. crebra	E. crebra	E. crebra	E. albens	E. albemol	E. melliodora	E. albemol	B. populneus	E. crebra	E. albemol
DBH	80	45	25	50	70	20	40	90	30	70
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree 27 species	E. crebra	E. crebra	E. crebra	E. albens	E. albemol	E. melliodora	E. albemol	E. albemol	E. crebra	E. albemol
DBH	22	80	15	60	60	30	32	40	19	96
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No

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	SAT 26	SAT 27	SAT 28	SAT 29	SAT 30	SAT 31	SAT 32	SAT 33	SAT 34	SAT 35
Tree species 28	E. crebra	E. crebra	E. crebra	E. albens	E. albemol	E. melliodora	E. albemol	B. populneus	E. macrorhyncha	E. albemol
DBH	50	22	20	70	65	95	35	64	30	40
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree species 29	E. crebra	E. crebra	E. crebra	E. albens	E. albemol	E. melliodora	E. albemol	E. albemol	E. macrorhyncha	E. albemol
DBH	65	50	30	30	75	74	54	80	40	45
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No
Tree species 30	E. crebra	E. crebra	E. albemol	E. melliodora	E. albemol	E. melliodora	E. albemol	E. albemol	E. macrorhyncha	E. albemol
DBH	25	65	30	55	95	59	30	40	85	30
Koala present?	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No

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		SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
Tree species	**1**	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. blakelyi	B. populneus	B. populneus	E. albemol
DBH		95	95	35	40	45	90	30	20	55	50	90
Koala present?		No	No	No	No	No	No	No	No	No	No	No
Scat present?		No	No	No	No	No	No	No	No	No	No	No
Tree species	**2**	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. blakelyi	E. albens	E. albemol	E. albemol
DBH		40	70	45	35	40	30	35	20	80	80	65
Koala present?		No	No	No	No	No	No	No	No	No	No	No
Scat present?		No	No	No	No	No	No	No	No	No	No	No
Tree species	**3**	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH		85	60	35	35	25	12	18	40	70	55	60
Koala present?		No	No	No	No	No	No	No	No	No	No	No
Scat present?		No	No	No	No	No	No	No	No	No	No	No
Tree species	**4**	E. albemol	A. floribunda	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	B. populneus	E. albemol	E. albemol
DBH		100	50	25	35	18	60	20	30	100	40	80
Koala present?		No	No	No	No	No	No	No	No	No	No	No

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	SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 5	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	55	75	40	25	17	60	12	15	80	70	75
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 6	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	75	60	25	25	30	60	50	18	80	60	60
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 7	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. blakelyi	E. albens	E. albemol	E. albemol
DBH	100	65	22	25	45	55	45	18	60	65	80
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 8	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	90	70	20	12	60	50	35	17	80	40	60

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	SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 9	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albemol	E. albemol	E. albemol
DBH	70	55	60	20	30	60	20	19	80	70	65
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 9	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	65	50	15	15	30	60	25	18	100	65	80
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 11	E. albemol	A. floribunda	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	B. populneus	E. albemol
DBH	100	25	12	25	55	60	40	16	80	45	70
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 12	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol

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	SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
DBH	60	45	18	20	38	30	35	25	75	60	100
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree 13 species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	B. populneus
DBH	65	45	20	25	30	70	40	16	65	45	40
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree 14 species	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	A. floribunda	B. populneus	E. albemol	A. floribunda
DBH	100	35	18	30	18	55	12	20	35	50	100
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree 15 species	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	90	40	20	30	55	70	55	25	50	60	60
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No

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	SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
Tree species 16	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. blakelyi	E. albens	E. albemol	E. albemol
DBH	110	53	60	50	30	10	20	15	50	30	60
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 17	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. blakelyi	E. albens	E. albemol	E. albemol
DBH	45	50	40	15	30	10	40	20	70	45	83
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 18	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	70	47	20	30	50	100	30	40	35	90	100
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 19	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. blakelyi	E. albens	E. albemol	E. albemol
DBH	60	49	50	20	50	50	30	50	25	40	75
Koala present?	No	No	No	No	No	No	No	No	No	No	No

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	SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 20	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. blakelyi	E. albens	E. albemol	E. albemol
DBH	55	50	40	20	30	50	20	50	50	25	90
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 21	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	45	25	60	20	50	80	90	40	80	32	76
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 22	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	40	55	80	20	50	40	15	40	79	30	80
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 23	E. albemol	E. albemol	E. albemol	E. albemol	E. melliodora	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	80	40	30	30	40	15	20	15	30	35	68

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	SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 24	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	B. populneus
DBH	90	22	80	30	50	30	20	15	85	25	33
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 25	B. populneus	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	50	50	80	30	50	20	20	15	65	30	95
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 26	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	70	55	100	40	40	80	20	30	68	31	92
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 27	E. albemol	E. albemol	E. albemol	E. albemol	E. melliodora	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol

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	SAT 36	SAT 37	SAT 38	SAT 39	SAT 40	SAT 41	SAT 42	SAT 43	SAT 44	SAT 45	SAT 46
DBH	60	51	40	80	90	120	30	20	60	30	70
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 28	B. populneus	E. albemol	E. albemol	E. albemol	A. floribunda	E. albemol	E. albemol	A. floribunda	E. albens	E. albemol	E. albemol
DBH	45	20	50	60	50	60	40	20	30	45	78
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 29	E. albemol	E. albemol	E. albemol	E. albemol	E. melliodora	E. albemol	E. albemol	A. floribunda	B. populneus	E. albemol	E. albemol
DBH	100	58	90	15	80	25	30	20	30	27	40
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No
Tree species 30	E. albemol	E. albemol	E. albemol	E. albemol	A. floribunda	E. albemol	E. albemol	A. floribunda	B. populneus	E. albemol	E. albemol
DBH	70	90	20	15	20	30	30	20	40	40	45
Koala present?	No	No	No	No	No	No	No	No	No	No	No
Scat present?	No	No	No	No	No	No	No	No	No	No	No

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Appendix N Fauna species list

Class	Common	Scientific	Exotic	BC Act	EPBC Act
Aves	Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*			
Aves	Inland Thornbill	*Acanthiza apicalis*			
Aves	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			
Aves	Striated Thornbill	*Acanthiza lineata*			
Aves	Yellow Thornbill	*Acanthiza nana*			
Aves	Brown Thornbill	*Acanthiza pusilla*			
Aves	Buff-rumped Thornbill	*Acanthiza reguloides*			
Aves	Eastern Spinebill	*Acanthorhynchus tenuirostris*			
Aves	Brown Goshawk	*Accipiter fasciatus*			
Aves	Common Myna	*Acridotheres tristis*	*		
Aves	Australian King-Parrot	*Alisterus scapularis*			
Aves	Grey Teal	*Anas gracilis*			
Aves	Pacific Black Duck	*Anas superciliosa*			
Aves	Red Wattlebird	*Anthochaera carunculata*			
Aves	Australian Pipit	*Anthus novaeseelandiae*			
Aves	Red-winged Parrot	*Aprosmictus erythropterus*			
Aves	Wedge-tailed Eagle	*Aquila audax*			
Aves	Wedge-tailed Eagle	*Aquila audax*			
Aves	White-necked Heron	*Ardea pacifica*			
Aves	Dusky Woodswallow	*Artamus cyanopterus*		V	
Aves	White-browed Woodswallow	*Artamus superciliosus*			
Aves	Sulphur-crested Cockatoo	*Cacatua galerita*			
Aves	Fan-tailed Cuckoo	*Cacomantis flabelliformis*			
Aves	Yellow-faced Honeyeater	*Caligavis chrysops*			
Aves	Australian Wood Duck	*Chenonetta jubata*			
Aves	White-backed Swallow	*Cheramoeca leucosterna*			
Aves	Speckled Warbler	*Chthonicola sagittata*		V	
Aves	Brown Songlark	*Cincloramphus cruralis*			
Aves	Rufous Songlark	*Cincloramphus mathewsi*			
Aves	Spotted Harrier	*Circus assimilis*		V	
Aves	Grey Shrike-thrush	*Colluricincla harmonica*			
Aves	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*			
Aves	White-winged Chough	*Corcorax melanorhamphos*			
Aves	White-throated Treecreeper	*Cormobates leucophaea*			

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Class	Common	Scientific	Exotic	BC Act	EPBC Act
Aves	Australian Raven	*Corvus coronoides*			
Aves	Australian Raven	*Corvus coronoides*			
Aves	Little Raven	*Corvus mellori*			
Aves	Pied Butcherbird	*Cracticus nigrogularis*			
Aves	Pied Butcherbird	*Cracticus nigrogularis*			
Aves	Grey Butcherbird	*Cracticus torquatus*			
Aves	Grey Butcherbird	*Cracticus torquatus*			
Aves	Laughing Kookaburra	*Dacelo novaeguineae*			
Aves	Varied Sittella	*Daphoenositta chrysoptera*		V	
Aves	Mistletoebird	*Dicaeum hirundinaceum*			
Aves	Cicadabird	*Edolisoma tenuirostris*			
Aves	White-faced Heron	*Egretta novaehollandiae*			
Aves	Black-shouldered Kite	*Elanus axillaris*			
Aves	Blue-faced Honeyeater	*Entomyzon cyanotis*			
Aves	Galah	*Eolophus roseicapilla*			
Aves	Galah	*Eolophus roseicapilla*			
Aves	Eastern Yellow Robin	*Eopsaltria australis*			
Aves	Eastern Koel	*Eudynamys orientalis*			
Aves	Brown Falcon	*Falco berigora*			
Aves	Nankeen Kestrel	*Falco cenchroides cenchroides*			
Aves	Australian Hobby	*Falco longipennis*			
Aves	Black Falcon	*Falco subniger*		V	
Aves	Red Junglefowl	*Gallus gallus*			
Aves	Peaceful Dove	*Geopelia striata*			
Aves	White-throated Gerygone	*Gerygone olivacea*			
Aves	Musk Lorikeet	*Glossopsitta concinna*			
Aves	Little Lorikeet	*Glossopsitta pusilla*		V	
Aves	Magpie-lark	*Grallina cyanoleuca*			
Aves	Australian Magpie	*Gymnorhina tibicen*			
Aves	Australian Magpie	*Gymnorhina tibicen*			
Aves	White-throated Needletail	*Hirundapus caudacutus*			V, Migratory
Aves	Welcome Swallow	*Hirundo neoxena*			
Aves	Varied Triller	*Lalage leucomela*			
Aves	White-winged Triller	*Lalage sueurii*			
Aves	Brown Honeyeater	*Lichmera indistincta*			
Aves	Superb Fairy-wren	*Malurus cyaneus*			

Class	Common	Scientific	Exotic	BC Act	EPBC Act
Aves	Variegated Fairy-wren	*Malurus lamberti*			
Aves	Noisy Miner	*Manorina melanocephala*			
Aves	Noisy Miner	*Manorina melanocephala*			
Aves	Lewin's Honeyeater	*Meliphaga lewinii*			
Aves	Brown-headed Honeyeater	*Melithreptus brevirostris*			
Aves	White-naped Honeyeater	*Melithreptus lunatus*			
Aves	Jacky Winter	*Microeca fascinans*			
Aves	White-eared Honeyeater	*Nesoptilotis leucotis*			
Aves	Southern Boobook	*Ninox boobook*			
Aves	Barking Owl	*Ninox connivens*			
Aves	Crested Pigeon	*Ocyphaps lophotes*			
Aves	Rockwarbler	*Origma solitaria*			
Aves	Olive-backed Oriole	*Oriolus sagittatus*			
Aves	Golden Whistler	*Pachycephala pectoralis*			
Aves	Rufous Whistler	*Pachycephala rufiventris*			
Aves	Spotted Pardalote	*Pardalotus punctatus*			
Aves	Striated Pardalote	*Pardalotus striatus*			
Aves	Fairy Martin	*Petrochelidon ariel*			
Aves	Tree Martin	*Petrochelidon nigricans*			
Aves	Red-capped Robin	*Petroica goodenovii*			
Aves	Common Bronzewing	*Phaps chalcoptera*			
Aves	Noisy Friarbird	*Philemon corniculatus*			
Aves	Crimson Rosella	*Platycercus elegans*			
Aves	Eastern Rosella	*Platycercus eximius*			
Aves	Striped Honeyeater	*Plectorhyncha lanceolata*			
Aves	Tawny Frogmouth	*Podargus strigoides*			
Aves	Hoary-headed Grebe	*Poliocephalus poliocephalus*			
Aves	Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*		V	
Aves	Red-rumped Parrot	*Psephotus haematonotus*			
Aves	White-plumed Honeyeater	*Ptilotula penicillata*			
Aves	Brown-backed Honeyeater	*Ramsayornis modestus*			
Aves	Grey Fantail	*Rhipidura albiscapa*			
Aves	Willie Wagtail	*Rhipidura leucophrys*			
Aves	Channel-billed Cuckoo	*Scythrops novaehollandiae*			
Aves	White-browed Scrubwren	*Sericornis frontalis*			
Aves	Weebill	*Smicrornis brevirostris*			

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Class	Common	Scientific	Exotic	BC Act	EPBC Act
Aves	Double-barred Finch	*Stizoptera bichenovii*			
Aves	Pied Currawong	*Strepera graculina*			
Aves	Pied Currawong	*Strepera graculina*			
Aves	Common Starling	*Sturnus vulgaris*	*		
Aves	Brown Quail	*Synoicus ypsilophora*			
Aves	Australasian Grebe	*Tachybaptus novaehollandiae*			
Aves	Straw-necked Ibis	*Threskiornis spinicollis*			
Aves	Sacred Kingfisher	*Todiramphus sanctus*			
Aves	Rainbow Lorikeet	*Trichoglossus haematodus*			
Aves	Barn Owl	*Tyto alba*			
Aves	Masked Owl	*Tyto novaehollandiae*			
Aves	Masked Lapwing	*Vanellus miles*			
Mammalia	Yellow-footed Antechinus	*Antechinus flavipes*			
Mammalia	White-striped Freetail-bat	*Austronomus australis*			
Mammalia	Cattle	*Bos sp.*	*		
Mammalia	Wild Dog	*Canus lupis familiaris*	*		
Mammalia	Feral Goats	*Capra hircus*	*		
Mammalia	Large-eared Pied Bat	*Chalinolobus dwyeri*		V	V
Mammalia	Gould's Wattled Bat	*Chalinolobus gouldii*			
Mammalia	Chocolate Wattled Bat	*Chalinolobus morio*			
Mammalia	Eastern False Pipistrelle	*Falsistrellus tasmaniensis*		V	
Mammalia	Feral Cat	*Felis catus*	*		
Mammalia	Brown Hare	*Lepus capensis*			
Mammalia	Eastern Grey Kangaroo	*Macropus giganteus*			
Mammalia	Common Wallaroo	*Macropus robustus*			
Mammalia	Red-necked Wallaby	*Macropus rufogriseus*			
Mammalia	Large Bent-winged Bat	*Miniopterus orianae oceanensis*		V	
Mammalia	House Mouse	*Mus musculus*	*		
Mammalia	Long-eared bat sp.	*Nyctophilus sp.*			
Mammalia	European Rabbit	*Oryctolagus cuniculus*	*		
Mammalia	Sheep	*Ovis sp.*	*		
Mammalia		*Ozimops petersi*			
Mammalia	South-eastern Free-tailed Bat	*Ozimops planiceps*			
Mammalia	Eastern Free-tailed Bat	*Ozimops ridei*			
Mammalia	Squirrel Glider	*Petaurus norfolcensis*		V	
Mammalia	Black Rat	*Rattus rattus*	*		

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Class	Common	Scientific	Exotic	BC Act	EPBC Act
Mammalia	Eastern Horseshoe-bat	*Rhinolophus megaphyllus*			
Mammalia	Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*		V	
Mammalia	Greater Broad-nosed Bat	*Scoteanax rueppellii*			
Mammalia	Inland Broad-nosed Bat	*Scotorepens balstoni*			
Mammalia	Eastern Broad-nosed Bat	*Scotorepens orion*			
Mammalia	Feral Pig	*Sus scrofa*			
Mammalia	Short-beaked Echidna	*Tachyglossus aculeatus*			
Mammalia	Common Brushtail Possum	*Trichosurus vulpecula*			
Mammalia	Vespadelus darlingtoni	*Vespadelus darlingtoni*			
Mammalia	Southern Forest Bat	*Vespadelus regulus*			
Mammalia	Little Forest Bat	*Vespadelus vulturnus*			
Mammalia	Wombat	*Vombatus ursinus*			
Mammalia	Red Fox	*Vulpes vulpes*	*		
Mammalia	Swamp Wallaby	*Wallabia bicolor*			
Reptillia	Eastern Snake-necked Turtle	*Chelodina longicollis*			
Reptillia	Eastern Bearded Dragon	*Pogona barbata*			
Reptillia	Bearded Dragon	*Pogona barbata*			
Reptillia	Red-bellied Black Snake	*Pseudechis porphyriacus*			
Reptillia	Eastern Brown Snake	*Pseudonaja textilis*			

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Appendix O Staff CVs

Name	Qualifications	Experience
Croake, Rebecca	BAM Accredited Assessor – BAAS #21008 Bachelor of Environmental Science (Rehabilitation), University of New England, 2016 Bachelor of GeoScience (Fossil Fuels), University of New England, 2017	Rebecca is a Biodiversity Assessment Method (BAM) Accredited Assessor and performs a wide range of tasks within ELA including ecological monitoring and surveys, environmental impact assessments, targeted threatened species surveys and management plan preparation.
Devereaux, Janene	BAM Accredited Assessor – BAAS#19045 Bachelor of Science (Marine Science and Sustainable Resource Management) – 2009 – University of Newcastle	Janene has worked in Environmental Consulting for over 10 years, with 6 years in terrestrial ecology. She has experience in flora and fauna surveys, targeted threatened species surveys, data management and reporting. Janene is also experienced in project management, client communication and team management. Janene is also an accredited assessor under the Biodiversity Assessment Method.
Gorrell, Lily	Bachelor of Natural Resource Management (Honours), University of New England, 2007 BioBanking Assessor, Major Projects FBA and Biocertification Assessor BAM Accredited Assessor (BAAS17101)	Lily is a senior ecologist with over ten years' experience. Since graduating with a Bachelor of Natural Resource Management (Honours) in 2007, Lily has worked as a Research Assistant for the UNE, an Environmental Officer for the Department of Transport and Main Roads in Toowoomba (QLD), as an Ecologist with a private consultancy in Nelson Bay and for the last 6 years as an Ecologist in the Newcastle office with Eco Logical Australia.
Keane, Elise	Master of Environmental Management and Sustainability, Monash University 2017 Bachelor of Environmental Science (Wildlife and Conservation Biology), Deakin University 2013	Elise joined the Eco Logical Australia (ELA) Mudgee team in September 2018, bringing with her extensive survey experience in a range of ecological assessment techniques. Since this time, she has developed her ecology skills, performing a wide range of tasks including ecological monitoring and surveys, environmental impact assessments, targeted threatened species surveys, and associated reporting. In performing these tasks, Elise has developed knowledge and skills relevant to the environment and biodiversity of the Central West region of NSW
Kelly, Tomas	Bachelor of Science – Physical Geography/Environmental Science Major, University of Wollongong (2014)	Five years experience in ecological monitoring and surveys, environmental impact assessments, targeted threatened species surveys, management plan preparation and associated reporting
Lawrie, Mike	Bachelor of Environmental Science and Management – University of Newcastle 2011 Master of Environment (Specialisation in Environmental Science) – Macquarie University 2016	Mike is an ecologist with over 4 years of experience in ecological consulting. Mike has worked on projects in a variety of sectors including roads, electrical, infrastructure, residential, agriculture and mining

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Name	Qualifications	Experience
McKenzie, Daniel	Bachelor of Environmental Science and Management (Honours), University of Newcastle, 2011	targeted threatened fauna and flora surveys, ecological assessments, biodiversity monitoring projects, Bio-banking assessments, pre-clearing surveys and supervision of land clearing operations
Metzler, Lachlan	Bachelor of Commerce with a Bachelor of Science, Macquarie University 2020	Lachlan joined the Eco Logical Australia (ELA) Mudgee team in 2021, bringing with him extensive survey experience in a range of ecological assessment techniques. Since this time, Lachlan has developed his ecology skills, performing a wide range of tasks including ecological monitoring and surveys, environmental impact assessments, targeted threatened species surveys and associated reporting
Montgomery, Sophie	Bachelor of Environmental Science & Management (Sustainability) University of Newcastle 2020	Sophie joined the Eco Logical Australia (ELA) Newcastle team in December 2020, as a Graduate Ecologist. Sophie has a background in remote sensing, ecologically trained artificial intelligence research and development for fauna and flora species identification and field surveys.
Ng, May-le	Bachelor of Environmental Engineering (Hons) – University of Western Australia	May-Le is Senior Ecologist with 15 years of work experience in the consulting, resource and public sectors. She is skilled in fauna surveys, threatened species management planning, environmental impact studies, environmental auditing, acoustic monitoring, water resource management and hydrology.
Pursche, Alex	Doctor of Philosophy, University of New South Wales 2013 Bachelor of Science, Class 1 Honors, University of New South Wales (2007) BAM Accredited Assessor 17021	Alex is a senior ecologist at Eco Logical Australia with over ten years experience in consulting ecology. Alex has been the primary author on six Biodiversity Assessments for SSD/SSI in NSW including assessments under the FBA and BAM.
Scanlan, Liam	Bachelor of Science (Honours), University of the Sunshine Coast 2016 Bachelor of Science (Envirmental Studies), University of Tasmania 2015 Certificate III Conservation and Land Management, 2018	Liam joined the Eco Logical Australia (ELA) Newcastle team in 2019, bringing with him a background in native flora, conservation and restoration.
Schmidt, Tom	Bachelor of Environmental Science and Management (Living Systems), University of Newcastle, 2009 Bachelor of Environmental Science (Honours – First Class), Deakin University, 2017	Tom has extensive field experience on large projects in regional and remote areas of New South Wales, Victoria and Queensland which has led to the development of strong skills in field logistics including preparation of survey plans, safety documentation and journey management plans.
Sullivan, Martin	Bachelor of Science (Biodiversity and Conservation), Macquarie University, 2004 Accredited Biobanking Assessor under the NSW Threatened Species Conservation Act 1995	Principal Ecologist and Discipline Leader Ecology & Impact Assessment with a high level of technical expertise, I am responsible for leading large multidisciplinary teams to deliver nationally significant projects for key clients in Government, resources, infrastructure and urban development sectors

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Name	Qualifications	Experience
Watts, Dan	Bachelor of Science (Biology), University of Sydney, (Honours Class 1) 2013. BAM Accredited Assessor	Dan is an ecologist with approximately six years' experience in ecological consulting and environmental field work, with project experience across coastal NSW with a focus in the South Eastern Highlands, North West Slopes and Lake Macquarie areas.

Appendix P Biodiversity credit report – summary reports

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BAM Credit Summary Report

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040557

Proposal Name
GR Access Alt - Pilliga

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Report Created
27/10/2023

BAM Data version *
61

Assessor Number
BAAS17021

BAM Case Status
Finalised

Date Finalised
27/10/2023

Assessment Revision
3

Assessment Type
Major Projects

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
5	483_BBSPIL_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	29.6	29.6	0.12	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	2
											Subtotal	**2**
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
4	479_BBSPIL_Burnt	Not a TEC	55.2	55.2	3.2	PCT Cleared - 40%	High Sensitivity to Gain			1.50		65
											Subtotal	**65**

Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
3	281_BBSPIL_Good	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	79.1	79.1	0.55	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	27
											Subtotal	**27**

White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion												
1	267_BBSPIL_Mod	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	43.3	43.3	0.3	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Endangered	2.00		6
2	267_BBSPIL_Low	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	38.3	38.3	1.4	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Endangered	2.00		27
											Subtotal	**33**
											Total	**127**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Ninox connivens / Barking Owl (Fauna)									
281_BBSPIL_Good	79.1	79.1	0.55	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	22
479_BBSPIL_Burnt	55.2	55.2	3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	83
								Subtotal	**105**
Ninox strenua / Powerful Owl (Fauna)									
281_BBSPIL_Good	79.1	79.1	0.55	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	22
								Subtotal	**22**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
281_BBSPIL_Good	79.1	79.1	0.55	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	22
								Subtotal	**22**
Tyto novaehollandiae / Masked Owl (Fauna)									
281_BBSPIL_Good	79.1	79.1	0.55	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	22
								Subtotal	**22**

BAM Credit Summary Report

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040556

Proposal Name
GR Access Moorfield - Kerrabee

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Report Created
13/10/2023

BAM Data version *
61

Assessor Number
BAAS17021

BAM Case Status
Finalised

Date Finalised
13/10/2023

Assessment Revision
0

Assessment Type
Major Projects

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
1	281_SYBKER_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	36.6	36.6	1.3	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	29

2	281_SYBKER_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	19.1	19.1	0.03	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1
											Subtotal	**30**
											Total	**30**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Petaurus norfolcensis / Squirrel Glider (Fauna)									
281_SYBKER_Mod	36.6	36.6	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	23
								Subtotal	**23**

BAM Credit Summary Report

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021962

Proposal Name
GR Access Moorfield - BBSLIV

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Assessor Name
Alexander Pursche

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27/10/2023

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Assessment Revision
7

Assessment Type
Major Projects

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
5	483_BBSPIL_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	32.7	32.7	0.95	PCT Cleared - 90%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	19

6	483_BBSPIL_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	28.5	28.5	2.4	PCT Cleared - 90%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	43

7	483_BBSPIL_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	5.7	5.7	0.56	PCT Cleared - 90%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	0
											Subtotal	**62**
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
3	479_BBSPIL_Burnt	Not a TEC	55.2	55.2	5.1	PCT Cleared - 40%	High Sensitivity to Gain			1.50		105
4	479_BBSPIL_Mod	Not a TEC	66.7	66.7	0.41	PCT Cleared - 40%	High Sensitivity to Gain			1.50		10
											Subtotal	**115**

Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
1	281_BBSPIL_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	78.8	78.8	1.5	PCT Cleared - 67%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	75

2	281_BBSPIL_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	100	100.0	0.21	PCT Cleared - 67%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	13
											Subtotal	**88**
											Total	**265**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Ninox connivens / Barking Owl (Fauna)									
281_BBSPIL_Mod	78.8	78.8	1.5			Vulnerable	Not Listed	False	60

479_BBSPIL_Burnt	55.2	55.2	5.1			Vulnerable	Not Listed	False	141
483_BBSPIL_Mod	32.7	32.7	0.95			Vulnerable	Not Listed	False	16
								Subtotal	**217**
Ninox strenua / Powerful Owl (Fauna)									
281_BBSPIL_Mod	78.8	78.8	1.5			Vulnerable	Not Listed	False	60
								Subtotal	**60**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
281_BBSPIL_Mod	78.8	78.8	1.5			Vulnerable	Not Listed	False	60
								Subtotal	**60**
Tyto novaehollandiae / Masked Owl (Fauna)									
281_BBSPIL_Mod	78.8	78.8	1.5			Vulnerable	Not Listed	False	60
								Subtotal	**60**

BAM Credit Summary Report

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040560

Proposal Name
GR Access Alt - Kerrabee

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

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BAAS17021

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Assessment Revision
3

Assessment Type
Major Projects

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
3	479_SYBKER_Burnt	Not a TEC	37.7	37.7	0.39	PCT Cleared - 40%	High Sensitivity to Gain			1.50		6
											Subtotal	**6**
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
4	281_SYBKER_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	36.6	36.6	0.1	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	2
											Subtotal	**2**

White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion												
1	267_SYBKER_Mod	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	72	72.0	0.37	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Endangered	2.00		13
2	267_SYBKER_Low	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	23.6	23.6	2.6	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Endangered	2.00		31
											Subtotal	**44**
											Total	**52**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

BAM Credit Summary Report

Proposal Details

Assessment Id
00021959/BAAS17021/23/00039289

Proposal Name
GR Cluster - Liverpool Range

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Assessment Revision
2

Assessment Type
Major Projects

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
4	483_BBSLIV_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	25.3	25.3	22.5	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	356

5	483_BBSLIV_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	27	27.0	18.4	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	311

6	483_BBSLIV_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	7.8	7.8	80.6	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**667**
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
3	479_BBSLIV_Low	Not a TEC	8	8.0	1.9	PCT Cleared - 40%	High Sensitivity to Gain			1.50		0
											Subtotal	**0**

Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
1	281_BBSLIV_Good	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	38.1	38.1	0.11	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	3

2	281_BBSLIV_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	67.4	67.4	3.9	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	164
											Subtotal	**167**
											Total	**834**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Ninox connivens / Barking Owl (Fauna)									
483_BBSLIV_Mod	25.3	25.3	21.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	275
								Subtotal	**275**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
281_BBSLIV_Good	38.1	38.1	0.11	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	2
281_BBSLIV_Mod	67.4	67.4	3.9	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	131
								Subtotal	**133**

BAM Credit Summary Report

Proposal Details

Assessment Id
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Proposal Name
GR Cluster - BBSPIL

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Alexander Pursche

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Assessment Revision
1

Assessment Type
Major Projects

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
6	483_BBSPIL_Good	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	70.3	70.3	0.28	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	12

7	483_BBSPIL_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	34.3	34.3	5.2	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	112

8	483_BBSPIL_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	29.6	29.6	1.7	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	31

9	483_BBSPIL_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	6	6.0	31.2	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**155**
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
3	479_BBSPIL_Burnt	Not a TEC	55.2	55.2	0.01	PCT Cleared - 40%	High Sensitivity to Gain			1.50		1
4	479_BBSPIL_Mod	Not a TEC	66.7	66.7	1.8	PCT Cleared - 40%	High Sensitivity to Gain			1.50		45
5	479_BBSPIL_Low	Not a TEC	12.3	12.3	2.3	PCT Cleared - 40%	High Sensitivity to Gain			1.50		0

											Subtotal	**46**
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion												
1	84_BBSPIL_Mod	Not a TEC	27.3	27.3	1.1	PCT Cleared - 40%	High Sensitivity to Gain			1.50		12
											Subtotal	**12**
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
2	281_BBSPIL_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	78.8	78.8	1.6	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	81
											Subtotal	**81**
											Total	**294**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)									
84_BBSPIL_Mod	27.3	27.3	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	16
								Subtotal	**16**
Ninox connivens / Barking Owl (Fauna)									
84_BBSPIL_Mod	27.3	27.3	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	14
479_BBSPIL_Mod	66.7	66.7	0.94	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	31
483_BBSPIL_Good	70.3	70.3	0.22	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
								Subtotal	**53**

Ninox strenua / Powerful Owl (Fauna)									
84_BBSPIL_Mod	27.3	27.3	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	16
								Subtotal	**16**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
84_BBSPIL_Mod	27.3	27.3	1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	14
281_BBSPIL_Mod	78.8	78.8	1.6	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	65
								Subtotal	**79**
Tyto novaehollandiae / Masked Owl (Fauna)									
84_BBSPIL_Mod	27.3	27.3	1.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	16
								Subtotal	**16**

BAM Credit Summary Report

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021961

Proposal Name
Inland Slopes - LV Cluster

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22/06/2023

Assessor Name
Alexander Pursche

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13/10/2023

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61

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13/10/2023

Assessment Revision
3

Assessment Type
Major Projects

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
4	483_NSSINL_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	36.1	36.1	1.2	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	27

5	483_NSSINL_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	41.8	41.8	20.9	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	545

6	483_NSSINL_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	100	100.0	0.85	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	53
											Subtotal	**625**
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
1	479_NSSINL_Burnt	Not a TEC	100	100.0	0.97	PCT Cleared - 40%	High Sensitivity to Gain			1.50		36
2	479_NSSINL_Mod	Not a TEC	78.6	78.6	0.35	PCT Cleared - 40%	High Sensitivity to Gain			1.50		10

3	479_NSSINL_Reg	Not a TEC	33.9	33.9	2.2	PCT Cleared - 40%	High Sensitivity to Gain			1.50		28
											Subtotal	**74**
											Total	**699**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Ninox connivens / Barking Owl (Fauna)									
479_NSSINL_Mod	78.6	78.6	0.35			Vulnerable	Not Listed	False	14
479_NSSINL_Reg	33.9	33.9	2.2			Vulnerable	Not Listed	False	37
483_NSSINL_Mod	36.1	36.1	1.1			Vulnerable	Not Listed	False	20
479_NSSINL_Burnt	100.0	100.0	0.92			Vulnerable	Not Listed	False	46
								Subtotal	**117**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00021959/BAAS17021/20/00021960	LV Cluster - SYBKER	22/06/2023
Assessor Name	Report Created	BAM Data version *
Alexander Pursche	27/10/2023	61
Assessor Number	BAM Case Status	Date Finalised
BAAS17021	Finalised	27/10/2023
Assessment Revision	Assessment Type	
7	Major Projects	

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
5	483_SYBKER_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	57.2	57.2	8.2	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	294

6	483_SYBKER_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	30.9	30.9	30.2	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	584

7	483_SYBKER_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	8.7	8.7	28.7	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**878**
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
1	479_SYBKER_Burnt	Not a TEC	37.7	37.7	4.5	PCT Cleared - 40%	High Sensitivity to Gain			1.50		63
2	479_SYBKER_REG	Not a TEC	11.6	11.6	3.5	PCT Cleared - 40%	High Sensitivity to Gain			1.50		0
											Subtotal	**63**

Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
3	281_SYBKER_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	36.6	36.6	1.2	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	28

4	281_SYBKER_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	19.1	19.1	3.7	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	44
											Subtotal	**72**
											Total	**1013**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
281_SYBKER_Mod	36.6	36.6	1.2			Vulnerable	Vulnerable	True	34
								Subtotal	**34**

Ninox connivens / Barking Owl (Fauna)									
281_SYBKER_Mod	36.6	36.6	1.2			Vulnerable	Not Listed	False	23
479_SYBKER_Burnt	37.7	37.7	4.4			Vulnerable	Not Listed	False	83
479_SYBKER_REG	11.6	11.6	3.5			Vulnerable	Not Listed	False	20
483_SYBKER_Mod	57.2	57.2	8			Vulnerable	Not Listed	False	228
								Subtotal	**354**
Ninox strenua / Powerful Owl (Fauna)									
281_SYBKER_Mod	36.6	36.6	1.2			Vulnerable	Not Listed	False	23
								Subtotal	**23**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
281_SYBKER_Mod	36.6	36.6	1.2			Vulnerable	Not Listed	False	23
								Subtotal	**23**
Tyto novaehollandiae / Masked Owl (Fauna)									
281_SYBKER_Mod	36.6	36.6	1.2			Vulnerable	Not Listed	False	23
								Subtotal	**23**

BAM Credit Summary Report

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040567

Proposal Name
MH Cluster - Liverpool Range

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Assessment Type
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* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
2	483_BBSLIV_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	25.3	25.3	7.4	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	116

3	483_BBSLIV_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	27	27.0	5.6	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	94

4	483_BBSLIV_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	7.8	7.8	9.6	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**210**

Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
1	281_BBSLIV_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	67.4	67.4	0.25	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	11
											Subtotal	**11**
											Total	**221**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
281_BBSLIV_Mod	67.4	67.4	0.25	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	True	13
								Subtotal	**13**
Ninox connivens / Barking Owl (Fauna)									
483_BBSLIV_Mod	25.3	25.3	7.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	93
								Subtotal	**93**
Ninox strenua / Powerful Owl (Fauna)									
281_BBSLIV_Mod	67.4	67.4	0.25	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
								Subtotal	**8**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
281_BBSLIV_Mod	67.4	67.4	0.25	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	8
								Subtotal	**8**

BAM Credit Summary Report

Proposal Details

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Proposal Name
MH Cluster - Pilliga

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Assessment Type
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* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
3	483_BBSPIL_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	34.3	34.3	63.5	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1361

4	483_BBSPIL_Low	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	29.6	29.6	79.4	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	1467

5	483_BBSPIL_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	6	6.0	169.2	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**2828**
Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion												
2	479_BBSPIL_Mod	Not a TEC	66.7	66.7	1.8	PCT Cleared - 40%	High Sensitivity to Gain			1.50		46
											Subtotal	**46**

Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
1	281_BBSPIL_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	78.8	78.8	2.5	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	123
											Subtotal	**123**
											Total	**2997**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)									
281_BBSPIL_Mod	78.8	78.8	2.4	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	True	144
								Subtotal	**144**
Ninox connivens / Barking Owl (Fauna)									
281_BBSPIL_Mod	78.8	78.8	2.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	98
479_BBSPIL_Mod	66.7	66.7	0.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	27
483_BBSPIL_Mod	34.3	34.3	61.8	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	1059
								Subtotal	**1184**
Ninox strenua / Powerful Owl (Fauna)									
281_BBSPIL_Mod	78.8	78.8	2.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	98
								Subtotal	**98**

Petaurus norfolcensis / Squirrel Glider (Fauna)									
281_BBSPIL_Mod	78.8	78.8	2.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	98
								Subtotal	**98**
Tyto novaehollandiae / Masked Owl (Fauna)									
281_BBSPIL_Mod	78.8	78.8	2.5	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	98
								Subtotal	**98**

BAM Credit Summary Report

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Workers Camp - Pilliga

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* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley												
1	483_BBSPIL_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	6	6.0	6.9	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**0**
											Total	**0**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Appendix Q Biodiversity credit report – Like for like

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BAM Biodiversity Credit Report (Like for like)

Proposal Details

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	1.7	0	33	33
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.6	27	0	27
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	3.2	0	65	65
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.1	0	2	2

267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_BBSPIL_Mod	No	6	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_BBSPIL_Low	No	27	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSPIL_Good	Yes	27	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Burnt	No	65	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599,	-	483_BBSPIL_Low	No	2	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**281_BBSPIL_Good, 479_BBSPIL_Burnt**	3.6	105.00
Ninox strenua / Powerful Owl	**281_BBSPIL_Good**	0.6	22.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSPIL_Good**	0.6	22.00
Tyto novaehollandiae / Masked Owl	**281_BBSPIL_Good**	0.6	22.00

Credit Retirement Options

Like-for-like credit retirement options

Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

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Proposal Name
GR Access Moorfield - Kerrabee

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Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	1.3	29	1	30

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599,	-	281_SYBKER_Mod	Yes	29	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281,	-	281_SYBKER_Low	No	1	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Petaurus norfolcensis / Squirrel Glider	**281_SYBKER_Mod**	1.3	23.00

Credit Retirement Options

Like-for-like credit retirement options

Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021962

Proposal Name
GR Access Moorfield - BBSLIV

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Names

Report Created
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BAM Case Status
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7

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Predicted Threatened Species Not On Site

Name
No Changes

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	1.7	88	0	88
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	5.5	10	105	115
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	3.9	19	43	62

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New	-	281_BBSPIL_Mod	Yes	75	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or

	England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396,					Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSPIL_Low	Yes	13	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Burnt	No	105	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's:	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Mod	Yes	10	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool

	54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760,					Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281,	-	483_BBSPIL_Mod	Yes	19	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW	-	483_BBSPIL_Low	No	43	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley.

	North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387,					or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599,	-	483_BBSPIL_Poor	No	0	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**281_BBSPIL_Mod, 479_BBSPIL_Burnt, 483_BBSPIL_Mod**	7.6	217.00
Ninox strenua / Powerful Owl	**281_BBSPIL_Mod**	1.5	60.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSPIL_Mod**	1.5	60.00
Tyto novaehollandiae / Masked Owl	**281_BBSPIL_Mod**	1.5	60.00

Credit Retirement Options

Like-for-like credit retirement options

Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040560

Proposal Name
GR Access Alt - Kerrabee

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

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61

Proponent Names

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BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	3.0	13	31	44
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	0.4	0	6	6
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.1	2	0	2

267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_SYBKER_Mod	Yes	13	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_SYBKER_Low	No	31	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267,	-	281_SYBKER_Mod	Yes	2	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

BAM Biodiversity Credit Report (Like for like)

479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610,	Western Slopes Dry Sclerophyll Forests <50%	479_SYBKER_Burnt	No	6	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00039289

Proposal Name
GR Cluster - Liverpool Range

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

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61

Proponent Names

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2

Assessment Type
Major Projects

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	4.0	167	0	167
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	1.9	0	0	0
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	121.6	356	311	667

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New	-	281_BBSLIV_Good	Yes	3	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396,					

	3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSLIV_Mod	Yes	164	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSLIV_Low	No	0	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599,	-	483_BBSLIV_Mod	Yes	356	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281,	-	483_BBSLIV_Low	No	311	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW	-	483_BBSLIV_Poor	No	0	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the

	North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387,					impacted site.

	3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**483_BBSLIV_Mod**	21.7	275.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSLIV_Good, 281_BBSLIV_Mod**	4.0	133.00

Credit Retirement Options

Like-for-like credit retirement options

Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040564

Proposal Name
GR Cluster - BBSPIL

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Names

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
1

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	1.1	12	0	12
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	1.6	81	0	81
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	4.1	45	1	46
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	38.4	124	31	155

84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Eastern Riverine Forests This includes PCT's: 42, 84, 85, 485, 486, 1127, 1270, 1714, 3020, 4061, 4063, 4064, 4065, 4066, 4067, 4068, 4069, 4070, 4071, 4072, 4073, 4075, 4076, 4077, 4078, 4079, 4080, 4081, 4083, 4084, 4085, 4086, 4087, 4139	Eastern Riverine Forests <50%	84_BBSPIL_Mod	Yes	12	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin,	-	281_BBSPIL_Mod	Yes	81	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Burnt	No	1	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Mod	Yes	45	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100

	341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778,					kilometers of the outer edge of the impacted site.

	3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Low	No	0	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin,	-	483_BBSPIL_Good	Yes	12	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303,	-	483_BBSPIL_Mod	Yes	112	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421,	-	483_BBSPIL_Low	No	31	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin,	-	483_BBSPIL_Poor	No	0	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Hoplocephalus bitorquatus / Pale-headed Snake	**84_BBSPIL_Mod**	1.1	16.00
Ninox connivens / Barking Owl	**84_BBSPIL_Mod, 479_BBSPIL_Mod, 483_BBSPIL_Good**	2.2	53.00
Ninox strenua / Powerful Owl	**84_BBSPIL_Mod**	1.1	16.00
Petaurus norfolcensis / Squirrel Glider	**84_BBSPIL_Mod, 281_BBSPIL_Mod**	2.7	79.00
Tyto novaehollandiae / Masked Owl	**84_BBSPIL_Mod**	1.1	16.00

Credit Retirement Options

Like-for-like credit retirement options

Hoplocephalus bitorquatus / Pale-headed Snake	Spp	IBRA subregion
	Hoplocephalus bitorquatus / Pale-headed Snake	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW

Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021961

Proposal Name
Inland Slopes - LV Cluster

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Names

Report Created
13/10/2023

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Major Projects

Date Finalised
13/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	3.5	46	28	74
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	22.9	53	572	625

479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	479_NSSINL_Burnt	Yes	36	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's:	Western Slopes Dry Sclerophyll Forests <50%	479_NSSINL_Mod	Yes	10	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee,

	54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760,					Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940,	Western Slopes Dry Sclerophyll Forests <50%	479_NSSINL_Reg	No	28	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW	-	483_NSSINL_Mod	No	27	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga,

	North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387,					Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599,	-	483_NSSINL_Low	No	545	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281,	-	483_NSSINL_Poor	Yes	53	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

BAM Biodiversity Credit Report (Like for like)

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**479_NSSINL_Mod, 479_NSSINL_Reg, 483_NSSINL_Mod, 479_NSSINL_Burnt**	4.6	117.00

Credit Retirement Options

Like-for-like credit retirement options

	Spp	IBRA subregion
Ninox connivens / Barking Owl	**Ninox connivens /** Barking Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021960

Proposal Name
LV Cluster - SYBKER

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Names

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
7

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCT Outside Ibra Added

PCT
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

BAM Biodiversity Credit Report (Like for like)

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	8.0	0	63	63
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	4.9	28	44	72
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	67.1	294	584	878

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_SYBKER_Mod	Yes	28	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298,	-	281_SYBKER_Low	No	44	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

BAM Biodiversity Credit Report (Like for like)

479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610,	Western Slopes Dry Sclerophyll Forests <50%	479_SYBKER_Burnt	No	63	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468,	Western Slopes Dry Sclerophyll Forests <50%	479_SYBKER_REG	No	0	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	483_SYBKER_Mod	Yes	294	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298,	-	483_SYBKER_Low	No	584	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New	-	483_SYBKER_Poor	No	0	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the

	England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396,					impacted site.

	3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	**281_SYBKER_Mod**	1.2	34.00
Ninox connivens / Barking Owl	**281_SYBKER_Mod, 479_SYBKER_Burnt, 479_SYBKER_REG, 483_SYBKER_Mod**	17.1	354.00
Ninox strenua / Powerful Owl	**281_SYBKER_Mod**	1.2	23.00
Petaurus norfolcensis / Squirrel Glider	**281_SYBKER_Mod**	1.2	23.00
Tyto novaehollandiae / Masked Owl	**281_SYBKER_Mod**	1.2	23.00

Credit Retirement Options

Like-for-like credit retirement options

Chalinolobus dwyeri / Large-eared Pied Bat	Spp	IBRA subregion
	Chalinolobus dwyeri / Large-eared Pied Bat	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW

Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040567

Proposal Name
MH Cluster - Liverpool Range

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Names

Report Created
13/10/2023

BAM Case Status
Finalised

Assessment Revision
2

Assessment Type
Major Projects

Date Finalised
13/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCT Outside Ibra Added

PCT
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.3	11	0	11
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	22.6	116	94	210

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	-	281_BBSLIV_Mod	Yes	11	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	483_BBSLIV_Mod	Yes	116	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298,	-	483_BBSLIV_Low	No	94	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New	-	483_BBSLIV_Poor	No	0	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396,					

	3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	**281_BBSLIV_Mod**	0.3	13.00
Ninox connivens / Barking Owl	**483_BBSLIV_Mod**	7.4	93.00
Ninox strenua / Powerful Owl	**281_BBSLIV_Mod**	0.3	8.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSLIV_Mod**	0.3	8.00

Credit Retirement Options

Like-for-like credit retirement options

Chalinolobus dwyeri / Large-eared Pied Bat	Spp	IBRA subregion
	Chalinolobus dwyeri / Large-eared Pied Bat	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW

Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040568

Proposal Name
MH Cluster - Pilliga

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Names

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
2

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCT Outside Ibra Added

PCT
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

BAM Biodiversity Credit Report (Like for like)

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	2.5	123	0	123
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	1.9	46	0	46
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	312.2	1361	1467	2828

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSPIL_Mod	Yes	123	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Mod	Yes	46	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599,	-	483_BBSPIL_Mod	Yes	1361	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281,	-	483_BBSPIL_Low	No	1467	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW	-	483_BBSPIL_Poor	No	0	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley.

	North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387,					or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	**281_BBSPIL_Mod**	2.4	144.00
Ninox connivens / Barking Owl	**281_BBSPIL_Mod, 479_BBSPIL_Mod, 483_BBSPIL_Mod**	65.1	1184.00
Ninox strenua / Powerful Owl	**281_BBSPIL_Mod**	2.5	98.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSPIL_Mod**	2.5	98.00
Tyto novaehollandiae / Masked Owl	**281_BBSPIL_Mod**	2.5	98.00

Credit Retirement Options

Like-for-like credit retirement options

Chalinolobus dwyeri / Large-eared Pied Bat	Spp	IBRA subregion
	Chalinolobus dwyeri / Large-eared Pied Bat	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW

Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040555

Proposal Name
Workers Camp - Pilliga

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Names

Report Created
13/10/2023

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Major Projects

Date Finalised
13/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	6.9	0	0	0

BAM Biodiversity Credit Report (Like for like)

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	483_BBSPIL_Poor	No	0	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040560

Proposal Name
GR Access Alt - Kerrabee

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

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Proponent Name(s)

Report Created
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BAM Case Status
Finalised

Assessment Revision
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Assessment Type
Major Projects

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	3.0	13	31	44.00
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	0.4	0	6	6.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.1	2	0	2.00

267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_SYBKER_Mod	Yes	13	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_SYBKER_Low	No	31	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Grassy Woodlands	Tier 2 or higher threat status	267_SYBKER_Mod	Yes (including artificial)	13	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Grassy Woodlands	Tier 2 or higher threat status	267_SYBKER_Low	No	31	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437,	-	281_SYBKER_Mod	Yes	2	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409,	Western Slopes Dry Sclerophyll Forests <50%	479_SYBKER_Burnt	No	6	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_SYBKER_Burnt	No	6	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040557

Proposal Name
GR Access Alt - Pilliga

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
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Proponent Name(s)

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	1.7	0	33	33.00
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.6	27	0	27.00

479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	3.2	0	65	65.00
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.1	0	2	2.00

267-White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_BBSPIL_Mod	No	6	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia This includes PCT's: 76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	-	267_BBSPIL_Low	No	27	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 2 or higher threat status	267_BBSPIL_Mod	No	6	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Grassy Woodlands	Tier 2 or higher threat status	267_BBSPIL_Low	No	27	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381,	-	281_BBSPIL_Good	Yes	27	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Burnt	No	65	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSPIL_Burnt	No	65	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	483_BBSPIL_Low	No	2	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**281_BBSPIL_Good, 479_BBSPIL_Burnt**	3.6	105.00
Ninox strenua / Powerful Owl	**281_BBSPIL_Good**	0.6	22.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSPIL_Good**	0.6	22.00
Tyto novaehollandiae / Masked Owl	**281_BBSPIL_Good**	0.6	22.00

Credit Retirement Options

Like-for-like options

Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing	IBRA region

		under Part 4 of the BC Act shown below	
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp	IBRA region	
	Ninox strenua/Powerful Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	

	Petaurus norfolcensis/Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	Spp		IBRA region
	Tyto novaehollandiae/Masked Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040556

Proposal Name
GR Access Moorfield - Kerrabee

BAM data last updated *
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Assessor Name
Alexander Pursche

Assessor Number
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Proponent Name(s)

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

BAM Biodiversity Credit Report (Variations)

PCT
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	1.3	29	1	30.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland,	-	281_SYBKER_Mod	Yes	29	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy	-	281_SYBKER_Low	No	1	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo.

	Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406,					or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Petaurus norfolcensis / Squirrel Glider	**281_SYBKER_Mod**	1.3	23.00

Credit Retirement Options

Like-for-like options

Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	
	Petaurus norfolcensis/Squirrel Glider	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021962

Proposal Name
GR Access Moorfield - BBSLIV

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Name(s)

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
7

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	1.7	88	0	88.00
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	5.5	10	105	115.00

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	3.9	19	43	62.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSPIL_Mod	Yes	75	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492,	-	281_BBSPIL_Low	Yes	13	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Burnt	No	105	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Mod	Yes	10	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the

	341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSPIL_Burnt	No	105	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSPIL_Mod	Yes (including artificial)	10	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421,	-	483_BBSPIL_Mod	Yes	19	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281,	-	483_BBSPIL_Low	No	43	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	-	483_BBSPIL_Poor	No	0	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

BAM Biodiversity Credit Report (Variations)

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**281_BBSPIL_Mod, 479_BBSPIL_Burnt, 483_BBSPIL_Mod**	7.6	217.00
Ninox strenua / Powerful Owl	**281_BBSPIL_Mod**	1.5	60.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSPIL_Mod**	1.5	60.00
Tyto novaehollandiae / Masked Owl	**281_BBSPIL_Mod**	1.5	60.00

Credit Retirement Options

Like-for-like options

Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp	IBRA region	

	Ninox strenua/Powerful Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp		IBRA region
	Petaurus norfolcensis/Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	Spp	IBRA region	
	Tyto novaehollandiae/Masked Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00039289

Proposal Name
GR Cluster - Liverpool Range

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Name(s)

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
2

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	4.0	167	0	167.00
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	1.9	0	0	0.00

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	121.6	356	311	667.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSLIV_Good	Yes	3	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492,	-	281_BBSLIV_Mod	Yes	164	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSLIV_Low	No	0	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSLIV_Low	No	0	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	483_BBSLIV_Mod	Yes	356	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492,	-	483_BBSLIV_Low	No	311	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347,	-	483_BBSLIV_Poor	No	0	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**483_BBSLIV_Mod**	21.7	275.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSLIV_Good, 281_BBSLIV_Mod**	4.0	133.00

Credit Retirement Options

Like-for-like options

Ninox connivens/ Barking Owl	Spp		IBRA region
	Ninox connivens/Barking Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp		IBRA region
	Petaurus norfolcensis/Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040564

Proposal Name
GR Cluster - BBSPIL

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Name(s)

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
1

Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	1.1	12	0	12.00
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	1.6	81	0	81.00

479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	4.1	45	1	46.00
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	38.4	124	31	155.00

84-River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Eastern Riverine Forests This includes PCT's: 42, 84, 85, 485, 486, 1127, 1270, 1714, 3020, 4061, 4063, 4064, 4065, 4066, 4067, 4068, 4069, 4070, 4071, 4072, 4073, 4075, 4076, 4077, 4078, 4079, 4080, 4081, 4083, 4084, 4085, 4086, 4087, 4139	Eastern Riverine Forests <50%	84_BBSPIL_Mod	Yes	12	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Forested Wetlands	Tier 4 or higher threat status	84_BBSPIL_Mod	Yes (including artificial)	12	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSPIL_Mod	Yes	81	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Burnt	No	1	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Mod	Yes	45	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Low	No	0	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100

	325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					kilometers of the outer edge of the impacted site.
	Variation options					

	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSPIL_Burnt	No	1	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSPIL_Mod	Yes (including artificial)	45	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSPIL_Low	No	0	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267,	-	483_BBSPIL_Good	Yes	12	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt	-	483_BBSPIL_Mod	Yes	112	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the

	South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					impacted site.
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived	-	483_BBSPIL_Low	No	31	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga

	Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149,					Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359,	-	483_BBSPIL_Poor	No	0	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Hoplocephalus bitorquatus / Pale-headed Snake	**84_BBSPIL_Mod**	1.1	16.00
Ninox connivens / Barking Owl	**84_BBSPIL_Mod, 479_BBSPIL_Mod, 483_BBSPIL_Good**	2.2	53.00
Ninox strenua / Powerful Owl	**84_BBSPIL_Mod**	1.1	16.00
Petaurus norfolcensis / Squirrel Glider	**84_BBSPIL_Mod, 281_BBSPIL_Mod**	2.7	79.00
Tyto novaehollandiae / Masked Owl	**84_BBSPIL_Mod**	1.1	16.00

Credit Retirement Options

Like-for-like options

Hoplocephalus bitorquatus/ Pale-headed Snake	Spp	IBRA region	
	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp	IBRA region	
	Ninox strenua/Powerful Owl	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	
	Petaurus norfolcensis/Squirrel Glider	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Tyto novaehollandiae/ Masked Owl	Spp		IBRA region
	Tyto novaehollandiae/Masked Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021961

Proposal Name
Inland Slopes - LV Cluster

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Name(s)

Report Created
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BAM Case Status
Finalised

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3

Assessment Type
Major Projects

Date Finalised
13/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	3.5	46	28	74.00
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	22.9	53	572	625.00

479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770,	Western Slopes Dry Sclerophyll Forests <50%	479_NSSINL_Burnt	Yes	36	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313,	Western Slopes Dry Sclerophyll Forests <50%	479_NSSINL_Mod	Yes	10	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576,	Western Slopes Dry Sclerophyll Forests <50%	479_NSSINL_Reg	No	28	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_NSSINL_Burnt	Yes (including artificial)	36	IBRA Region: NSW South Western Slopes, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_NSSINL_Mod	Yes (including artificial)	10	IBRA Region: NSW South Western Slopes, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_NSSINL_Reg	No	28	IBRA Region: NSW South Western Slopes, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381,	-	483_NSSINL_Mod	No	27	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276,	-	483_NSSINL_Low	No	545	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin,	-	483_NSSINL_Poor	Yes	53	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100

	South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					kilometers of the outer edge of the impacted site.

Species Credit Summary

BAM Biodiversity Credit Report (Variations)

Species	Vegetation Zone/s	Area / Count	Credits
Ninox connivens / Barking Owl	**479_NSSINL_Mod, 479_NSSINL_Reg, 483_NSSINL_Mod, 479_NSSINL_Burnt**	4.6	117.00

Credit Retirement Options

Like-for-like options

Ninox connivens/ Barking Owl

Spp	IBRA region
Ninox connivens/Barking Owl	Any in NSW

Variation options

Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
Fauna	Vulnerable	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040567

Proposal Name
MH Cluster - Liverpool Range

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

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61

Proponent Name(s)

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BAM Case Status
Finalised

Assessment Revision
2

Assessment Type
Major Projects

Date Finalised
13/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCT Outside Ibra Added

PCT
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	0.3	11	0	11.00

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	22.6	116	94	210.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	281_BBSLIV_Mod	Yes	11	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381,	-	483_BBSLIV_Mod	Yes	116	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276,	-	483_BBSLIV_Low	No	94	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin,	-	483_BBSLIV_Poor	No	0	Liverpool Range,Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	**281_BBSLIV_Mod**	0.3	13.00

Ninox connivens / Barking Owl	**483_BBSLIV_Mod**	7.4	93.00
Ninox strenua / Powerful Owl	**281_BBSLIV_Mod**	0.3	8.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSLIV_Mod**	0.3	8.00

Credit Retirement Options

Like-for-like options

Chalinolobus dwyeri/ Large-eared Pied Bat	Spp	IBRA region	
	Chalinolobus dwyeri/Large-eared Pied Bat	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp	IBRA region	
	Ninox strenua/Powerful Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	
	Petaurus norfolcensis/Squirrel Glider	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Liverpool Range, Hunter, Kerrabee, Liverpool Plains, Peel and Pilliga. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040568

Proposal Name
MH Cluster - Pilliga

BAM data last updated *
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Assessor Name
Alexander Pursche

Assessor Number
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Assessment Type
Major Projects

Date Finalised
27/10/2023

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

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCT Outside Ibra Added

PCT
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	2.5	123	0	123.00

479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	1.9	46	0	46.00
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	312.2	1361	1467	2828.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437,	-	281_BBSPIL_Mod	Yes	123	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409,	Western Slopes Dry Sclerophyll Forests <50%	479_BBSPIL_Mod	Yes	46	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_BBSPIL_Mod	Yes (including artificial)	46	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654,	-	483_BBSPIL_Mod	Yes	1361	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492,	-	483_BBSPIL_Low	No	1467	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347,	-	483_BBSPIL_Poor	No	0	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	**281_BBSPIL_Mod**	2.4	144.00
Ninox connivens / Barking Owl	**281_BBSPIL_Mod, 479_BBSPIL_Mod, 483_BBSPIL_Mod**	65.1	1184.00
Ninox strenua / Powerful Owl	**281_BBSPIL_Mod**	2.5	98.00
Petaurus norfolcensis / Squirrel Glider	**281_BBSPIL_Mod**	2.5	98.00
Tyto novaehollandiae / Masked Owl	**281_BBSPIL_Mod**	2.5	98.00

Credit Retirement Options

Like-for-like options

Chalinolobus dwyeri/ Large-eared Pied Bat	Spp		IBRA region
	Chalinolobus dwyeri/Large-eared Pied Bat		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	Spp		IBRA region
	Ninox connivens/Barking Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp	IBRA region	
	Ninox strenua/Powerful Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	
	Petaurus norfolcensis/Squirrel Glider	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	Spp	IBRA region	
	Tyto novaehollandiae/Masked Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/23/00040555

Proposal Name
Workers Camp - Pilliga

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Name(s)

Report Created
13/10/2023

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Major Projects

Date Finalised
13/10/2023

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Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

BAM Biodiversity Credit Report (Variations)

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	6.9	0	0	0.00

483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin,	-	483_BBSPIL_Poor	No	0	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

No Species Credit Data

BAM Biodiversity Credit Report (Variations)

Credit Retirement Options

Like-for-like options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00021959/BAAS17021/20/00021960

Proposal Name
LV Cluster - SYBKER

BAM data last updated *
22/06/2023

Assessor Name
Alexander Pursche

Assessor Number
BAAS17021

BAM Data version *
61

Proponent Name(s)

Report Created
27/10/2023

BAM Case Status
Finalised

Assessment Revision
7

Assessment Type
Major Projects

Date Finalised
27/10/2023

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Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	Critically Endangered Ecological Community	483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

Species
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCT Outside Ibra Added

PCT
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
479-Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Not a TEC	8.0	0	63	63.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	4.9	28	44	72.00
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	67.1	294	584	878.00

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437,	-	281_SYBKER_Mod	Yes	28	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298,	-	281_SYBKER_Low	No	44	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
479-Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333,	Western Slopes Dry Sclerophyll Forests <50%	479_SYBKER_Burnt	No	63	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Western Slopes Dry Sclerophyll Forests	Western Slopes Dry Sclerophyll Forests <50%	479_SYBKER_REG	No	0	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo.

	This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1610, 1654, 1655, 1656, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1679, 1709, 1711, 1770, 1771, 3753, 3754, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774,					or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3775, 3776, 3777, 3778, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 4153					
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_SYBKER_Burnt	No	63	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 4 or higher threat status	479_SYBKER_REG	No	0	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
483-Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276,	-	483_SYBKER_Mod	Yes	294	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin,	-	483_SYBKER_Low	No	584	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the	-	483_SYBKER_Poor	No	0	Kerrabee,Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100

	NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 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, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Chalinolobus dwyeri / Large-eared Pied Bat	**281_SYBKER_Mod**	1.2	34.00
Ninox connivens / Barking Owl	**281_SYBKER_Mod, 479_SYBKER_Burnt, 479_SYBKER_REG, 483_SYBKER_Mod**	17.1	354.00
Ninox strenua / Powerful Owl	**281_SYBKER_Mod**	1.2	23.00
Petaurus norfolcensis / Squirrel Glider	**281_SYBKER_Mod**	1.2	23.00
Tyto novaehollandiae / Masked Owl	**281_SYBKER_Mod**	1.2	23.00

Credit Retirement Options

Like-for-like options

Chalinolobus dwyeri/ Large-eared Pied Bat

Spp	IBRA region
Chalinolobus dwyeri/Large-eared Pied Bat	Any in NSW

Variation options

Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	Spp	IBRA region	
	Ninox connivens/Barking Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp	IBRA region	
	Ninox strenua/Powerful Owl	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing	IBRA region

		under Part 4 of the BC Act shown below	
	Fauna	Vulnerable	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	Spp	IBRA region	
	Petaurus norfolcensis/Squirrel Glider	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	Spp	IBRA region	
	Tyto novaehollandiae/Masked Owl	Any in NSW	
	Variation options		

	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Kerrabee, Hunter, Inland Slopes, Liverpool Range, Pilliga, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.



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