



Premise

BORAL RESOURCES (COUNTRY) PTY LTD

Water Holding Pond, Currabubula Quarry

BIODIVERSITY ASSESSMENT

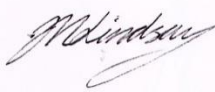
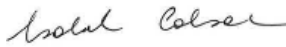
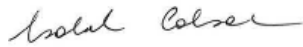
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Prepared by		Reviewed by		Authorised by	
Michelle Lindsay		Isobel Colson		Isobel Colson	

CONTENTS

1. EXECUTIVE SUMMARY	1
2. INTRODUCTION	4
2.1 PROJECT DESCRIPTION	4
2.2 OBJECTIVES	7
2.3 THE SUBJECT LAND	7
2.4 THREATENED BIODIVERSITY	8
3. METHODS	20
3.1 SURVEY TIMING	20
3.2 VEGETATION SAMPLING	20
3.3 FAUNA	21
4. RESULTS AND DISCUSSION	21
4.1 FLORA	21
4.2 FAUNA	31
4.3 THREATENED BIODIVERSITY	32
5. BIODIVERSITY IMPACT ASSESSMENT	32
5.1 IMPACT AVOIDANCE AND MINIMISATION MEASURES	32
5.2 RESIDUAL PROJECT IMPACTS	35
5.3 IMPACT ASSESSMENT – FIVE PART TEST	35
5.4 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999	38
5.5 SERIOUS AND IRREVERSIBLE IMPACTS (SAII)	38
5.6 STATE ENVIRONMENTAL PLANNING POLICY (BIODIVERSITY AND CONSERVATION) 2021	38
6. CONCLUSION	41
7. REFERENCES	42

FIGURES

Figure 1. Holding Water Pond Location	5
.....	5
Figure 2. Holding Water Pond Location Proposed Works	6
Figure 3. Vegetation on the Study Area	23
Figure 4. Impact Avoidance Measures	34
Figure 5. BioNet Koala Recorded Sightings.....	40

PLATES

Plate 1. Mapping Unit 1: Woodland Dominated by Tumbledown Red Gum	28
Plate 2. Mapping Unit 1: Woodland with a Shrubby Mid-storey	28
Plate 3. Mapping Unit 2: DNG (moderate) with high grass and forb diversity	29
Plate 4. Mapping Unit 2: DNG (moderate) dominated by Yellow Burr Daisy, Purple Wiregrass and Speargrass	29

Plate 5. Mapping Unit 3: DNG (poor) dominated by purple Wiregrass with high cover of *Verbena quadrangularis*.....30
Plate 7. Mapping Unit 4: Drainage Line dominated by *Cyperus* spp., Paspalum and Water Cress31
Plate 8. Mapping Unit 4: Dense vegetation along the drainage line and surrounding woodland vegetation ...31

TABLES

Table 1. Threatened Species and Ecological Communities identified via database searches 10
Table 2. PCT Justification25

APPENDICES

APPENDIX A VEGETATION INTEGRITY PLOT RESULTS

APPENDIX B TREE ASSESSMENT RESULTS

1. EXECUTIVE SUMMARY

Premise Australia Pty Ltd (Premise) was commissioned by Boral Resources (Country) Pty Ltd to provide this Biodiversity Assessment Report (BAR) for the proposed construction of a 3ML holding water pond at Currabubula Quarry at 3716 Werris Creek Road, Currabubula. The Subject Land consists of 0.5 hectares (ha), which includes the water holding pond footprint and 5 meter (m) buffer, and the proposed access road. Vegetation on the Subject Land is predominantly native and includes 0.18 ha of remnant woodland and 0.21 ha of native grassland, with 0.09 ha of exotic riparian vegetation and 0.01 ha of disturbed ground. The proposed works involves clearing all vegetation on the site.

The proposed development is assessed as a Part 4 development under the *Environmental Planning and Assessment Act* (EP&A Act). This Report has been prepared to support a Statement of Environmental Effects for the development being prepared by Premise. The Project does not trigger entry into the Biodiversity Offset Scheme (BOS) because the minimum clearing threshold will not be exceeded, the Subject Land does not intersect the NSW Biodiversity Values Map and the Project will not have a significant impact on threatened flora, fauna or ecological communities as determined by a Five Part Test of Significance.

The BAR comprises:

- Searches of relevant State and Commonwealth databases and a literature review to determine which threatened biodiversity has potential to occur on the Subject Land.
- A biodiversity survey conducted in early November 2021, with data collected from a total of 4 locations using the Biodiversity Assessment Method Vegetation Integrity (VI) plot method for flora.

Key Findings of the Survey:

- A comprehensive list of plant species identified on the Subject Land is provided in **Appendix A** and **Appendix B**. A total of 107 flora species were recorded, 66 native and 41 exotic species.
- Vegetation on the Subject land was classified into five Mapping Units: Remnant Woodland (moderate condition), Derived Native Grassland (DNG) (moderate condition), DNG (poor condition), Exotic Riparian Vegetation and Disturbed Ground
- Five species listed as High Threat Weeds by the NSW Department of Planning and Environment were found on the Subject Land: *Agrostis capillaris* (Browntop Bent), *Carthamus lanatus* (Saffron Thistle), *Opuntia aurantiaca* (Tiger Pear), *Opuntia stricta* (Common Prickly Pear) and *Paspalum dilatatum* (Paspalum) (DPE 2022b). Of these, Browntop Bent, Common Prickly Pear and Tiger Pear are also classified as a Priority Weed for the North West under the *Biosecurity Act 2015* (DPI 2022), while Common Prickly Pear and Tiger Pear are Weeds of National Significance (WON) as listed by the Australian Weeds Committee of the Australian Government (2022).
- Four broad habitat features were identified on the Subject Land: Native vegetation, riparian vegetation, the unnamed drainage line and rocky areas.

Threatened Biodiversity:

- Literature and database searches identified eight (8) threatened species with potential to occur on the Subject Land including two (2) threatened flora species: *Dichanthium setosum* (Bluegrass) and *Eucalyptus nicholii* (Narrow-leaved Peppermint); and six (6) threatened fauna species: *Anthochaera Phrygia* (Regent Honeyeater), *Falco hypoleucos* (Grey Falcon), *Lathamus discolor* (Swift Parrot),

Neophema pulchella (Turquoise Parrot), *Chalinolobus dwyeri* (Large-eared Pied Bat) and *Phascolarctos cinereus* (Koala),

- No Threatened Ecological Communities (TEC) listed under the *Biodiversity Conservation Act 2016* (BC Act) were identified as likely to occur on the Subject Land,
- No endangered populations listed under the BC Act or TECs listed under the BC Act and *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) occur on the Subject Land,
- No Areas of Outstanding Biodiversity Value as identified by the BC Act or areas of Critical Habitat under the EPBC Act have been declared on or near the Subject Land.

Impact Avoidance and Mitigation:

Measures to avoid biodiversity impacts were established in the planning phase of the proposal. After biodiversity surveys were undertaken, the Subject Land was redesigned to avoid large remnant woodland patches, hollow-bearing trees and most of the rocky habitat. The Subject Land also allows for a 5 m construction buffer surrounding the water holding pond to reduce biodiversity impacts on surrounding native vegetation.

The Project has been designed to minimise impacts on biodiversity using the following strategies:

- Prior to clearing, all surrounding vegetation to be retained will be identified to prevent inadvertent damage;
- Prior to clearing, temporary fencing will be erected around significant environmental features (i.e., adjacent remnant woodland, rocky areas to be retained);
- Pre-clearing fauna surveys will be undertaken by a qualified Ecologist or equivalent specialist to inspect trees for the presence of fauna, and any identified fauna are to be captured, treated and relocated by WIRES;
- Clearing activities will be undertaken during late summer/autumn to avoid critical lifecycle events;
- Felled trees, fallen timber and surface rocks will be relocated to surrounding woodland areas to enhance habitat values;
- Machinery will be stored away from riparian areas and adjacent woodland to minimise soil compaction and disturbance where possible.
- All rubbish and materials will be removed from the lay down areas when construction is completed.
- Erosion from exposed ground during the water holding pond and access road construction will be minimised using sediment traps.
- Topsoil will be stockpiled and stored on site and sediment fencing erected to prevent sediment runoff into the unnamed drainage line.
- A cofferdam will be constructed to temporarily stop the flow of the unnamed drainage line during the construction of the water holding pond. This involves pumping water out of the constructed cofferdam to provide a dry working environment and minimise the impact to the drainage line.
- Construction will take place during the day to avoid disturbance of nocturnal animals.
- Dust suppression measures will be put in place during earthworks.

This BAR assumes the afore mentioned impact avoidance and minimisation measures will be implemented. If deviations from these actions are undertaken, the conclusions of this report and identified impacts on species and habitat may need to be reviewed.

Residual Impacts:

Residual impacts once impact minimisation measures have been implemented include:

- The removal of 0.39 ha of native vegetation, including 18 trees, for the construction of the water holding pond and access road.
- Temporarily stopping the flow of the unnamed drainage line during Project construction.

Five Part Test of Significance:

The Project is not considered likely to have an adverse impact on the life cycle or habitat of any threatened species identified as having potential to occur on the Subject Land. A Species Impact Statement is not required under Section 7.8 of the BC Act, nor does the proposed activity trigger the Biodiversity Offsets Scheme under Section 7.2 of the BC Act.

Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act):

Five threatened fauna species (Regent Honeyeater, Grey Falcon, Swift Parrot, Large-eared Pied Bat and Koala) considered likely to utilise the Subject Land for foraging are classified as Matters of National Environmental Significance (MNES) under the EPBC Act. Based on the Five Part Test, the Project is not anticipated to have a significant impact on any of these species. Therefore, no referrals to the Commonwealth government are required.

Serious and Irreversible Impacts:

Three species (Regent Honeyeater, Swift Parrot and Large-eared Pied Bat) considered likely to utilise the Subject Land for foraging are listed as species at risk of SAI species under the BC Act. However, as the native vegetation clearing associated with the Project is below the clearing threshold (<1 ha) for entry into the Biodiversity Offset Scheme, SAI do not apply.

State Environment Planning Policy (Koala Habitat Protection) 2020:

The State Environment Planning Policy (Koala Habitat Protection) 2020 (K-SEPP 2020) now lies within Chapter 3 of the State Environment Planning Policy (Biodiversity and Conservation) 2021. The K-SEPP 2020 applies to this Project as the Subject Land lies within the Liverpool Plains Local Government Area (LGA) and is zoned as RU1 Primary Production. The K-SEPP 2020 aims to protect habitat utilised by the Koala which is known to occur in the North West Slopes of the New England region of NSW (DPE 2020). The Subject Land and adjoining land are owned by Boral Resources (Country) Pty Ltd. As this area is > 1 ha, Part 2 of the K-SEPP 2020 applies to the Subject Land. An assessment of potential koala habitat and core koala habitat on the Subject Land is assessed below according to Part 2 of the K-SEPP 2020 determined the following results:

- The Subject Land contains potential koala habitat due to the presence of three White Box trees listed on Schedule 2 of the K-SEPP 2020
- The closest BioNet recorded sightings are 7 km north-east, 10 km north-west and 14 km south-west of the Subject Land. Therefore, breeding populations and habitat are considered absent from the Subject Land as no recorded sightings occur in proximity to the site
- The Subject Land is not considered core koala habitat. Impact avoidance and minimisation methods for potential koalas on the Subject Land are identified in Section 5.1 of this report.

2. INTRODUCTION

Premise Australia Pty Ltd (Premise) was commissioned by Boral Resources (Country) Pty Ltd to provide this Biodiversity Assessment Report (BAR) for the proposed construction of a 3ML holding water pond at Currabubula Quarry at 3716 Werris Creek Road, Currabubula.

The Project is assessed as a Part 4 development under the *Environmental Planning and Assessment Act* (EP&A Act). This report has been prepared to support a Statement of Environmental Effects for the Project being prepared by Premise. This BAR considers the impact of the Project on threatened flora and fauna species, populations and ecological communities listed on the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) to determine whether the proposed development triggers the Biodiversity Offset Scheme (BOS) or whether a Species Impact Statement is required. Triggers for entry into the BOS include:

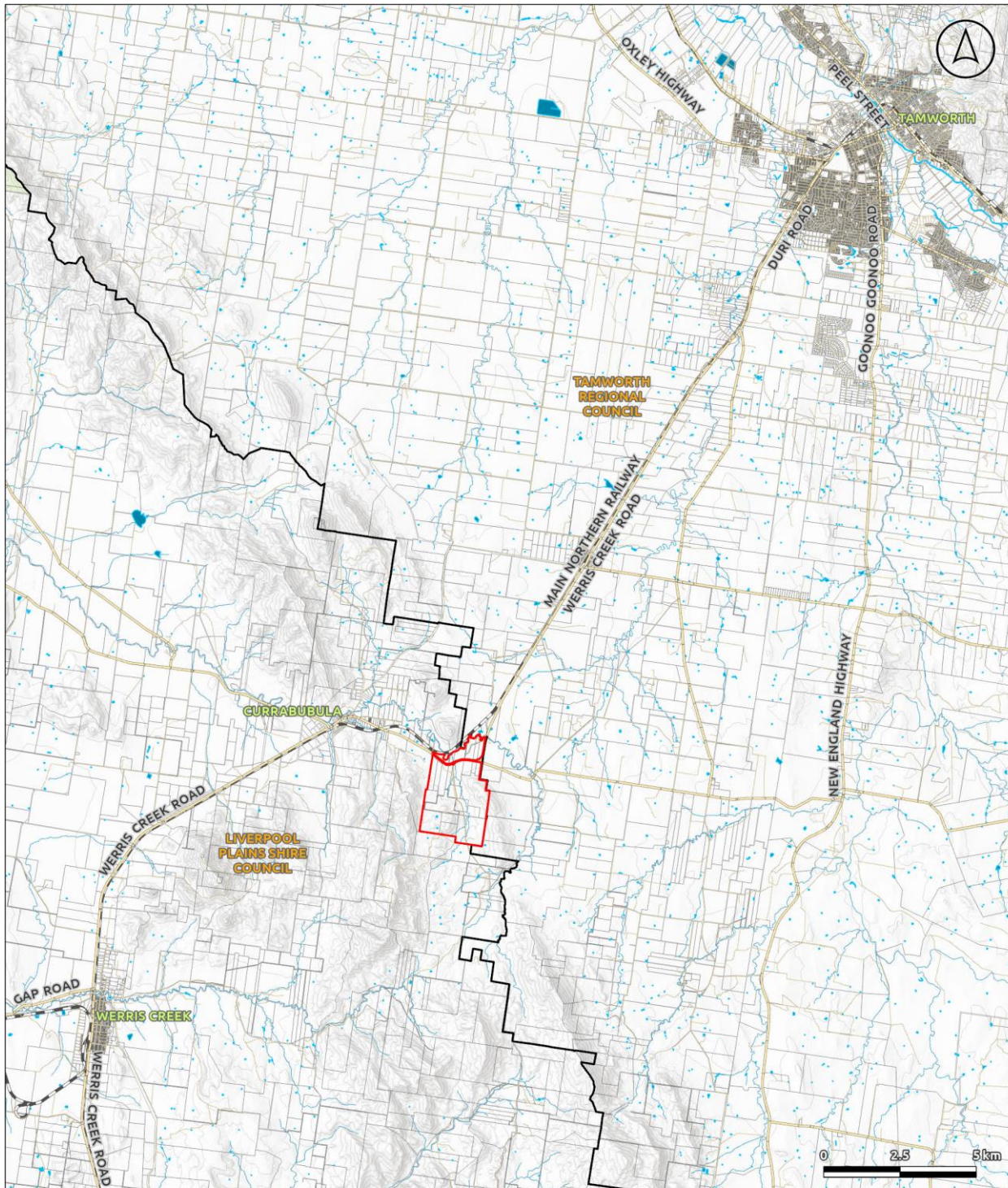
- Minimum clearing threshold (minimum lot size is currently 200 ha, therefore the BOS is not triggered since clearing native vegetation does not exceed 1 ha)
- Intersection of the proposed development area with the NSW Biodiversity Values Map (Not applicable)
- Significant impact on threatened flora, fauna or ecological communities as determined by the Five Part Test of Significance.

2.1 PROJECT DESCRIPTION

The proposal is to construct a 3ML holding water pond downstream of the existing sediment basin on Lot 236 DP751011 at the Currabubula Quarry (**Figure 1**). The holding water pond is proposed to address management issues identified with the existing sediment basin and improve site water management. The proposed Subject Land (0.5 ha) includes the holding water pond with a 3 m buffer for construction activities, and a 5 m wide access road on the south-western extent (**Figure 2**). All vegetation will be cleared on the Subject Land for the construction and operation of the holding water pond and access road, including 0.37 ha of native vegetation. The Subject Land is located on land owned by Boral Resources (Country) Pty Ltd and is occasionally used for livestock grazing.

The construction of the new water holding pond and access road will involve the use of a temporary cofferdam to stop the flow of an unnamed drainage line. This involves pumping water out of the constructed cofferdam to provide a dry working environment and minimise the impact to the drainage line further downstream.

Figure 1. Holding Water Pond Location



Sources: © State of NSW, Department of Customer Service, Spatial Services 2022

CDA2020 MGA Zone 56 File: 221296_03_ECLOGY.aprx Prepared By: adam.davis Date: 19/10/2022

- Legend**
- Development Site
 - LGA Boundary
 - Cadastre
 - Road
 - Railway
 - Water Body
 - Watercourse

Figure 2. Holding Water Pond Location Proposed Works



Sources: © State of NSW, Department of Customer Service, Spatial Services 2022
GDA2020 MGA Zone 56 File: 221296_03_ECOCLOGY.aprx Prepared By: adam.davis Date: 02/11/2022

- Legend**
- Study Area
 - Subject Land
 - Dam Footprint
 - Dam Footprint 5m Buffer
 - Proposed Access Road
 - Watercourse

2.2 OBJECTIVES

The objectives of the Biodiversity Assessment Report (BAR) are to:

- develop prior to the field biodiversity survey a list of threatened flora and fauna species, populations, communities or critical habitat, listed in the schedules of the *NSW Biodiversity Conservation Act 2016* (BC Act) and *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* that could potentially occur on the Subject Land, based on searches of the BioNet Atlas of NSW Wildlife (DPE 2022a) and querying of the Commonwealth Department of the Environment Protected Matters Search Tool (DCCEEW 2022a);
- assess the likelihood of occurrence of the identified potential threatened entities by comparing the habitats on the Subject Land with their known habitat requirements as identified in the NSW BioNet Threatened Biodiversity Data Collection database (DPE 2022c);
- sample the vegetation on the Subject Land using standard flora Biodiversity Assessment Method (BAM) survey techniques;
- identify and map the vegetation communities (Plant Community Types [PCT]) present within the Subject Land in consideration of the NSW State Vegetation Type Map (DPE 2022e) and the BioNet Vegetation Classification (DPE 2022f);
- list flora and fauna species for the Subject Land and immediate surrounds, including High Threat Weeds (HTW), and Priority and Nationally Significant weeds;
- conduct targeted searches for potentially occurring threatened flora and fauna species, populations, communities and critical habitat, and map any occurrences;
- undertake an analysis of the potential impacts of the proposed development on threatened flora, fauna and their habitats;
- develop avoidance and mitigation measures designed to minimise impacts on threatened flora and fauna; and
- assess potential project impacts using Five Part Tests.

2.3 THE SUBJECT LAND

The Subject Land (0.5 ha) is located 4.5 km south-east of the village of Currabubula on the North West Slopes of the New England region of NSW. Most of the site is dominated by native groundcover species with remnant woodland present over the western and north-eastern extent. The Subject Land also contains areas of scattered surface and partially embedded rocks, and 0.01 ha of disturbed ground north of the existing dam wall along the southern extent. An unnamed drainage line flows northwards through the centre of the site.

2.3.1 LAND USE

The Liverpool Plains Shire Council Local Government Area is located in the ancestral lands of Kamilaroi people. Since European settlement, native vegetation has been cleared for agricultural development with cropping and livestock grazing dominating the surrounding landscape. The Subject Land itself is zoned as RU 1: Primary production and is occasionally used for livestock grazing.

2.3.2 GEOLOGY AND SOILS

The Subject Land lies within the Melville Soil Landscape which occurs on undulating to rolling hills and sideslopes along the Melville Ranges (300-750 m Above Sea Level [ASL]) (DPE 2022g). Soils are extremely variable throughout this landscape and include Black, Grey, Red and Brown Vertosols; Red, Brown and Black Dermosols; Red, Brown and Yellow Kurosols; Red, Brown and Black Chromosols; and sandy Tenosols, Rudosols, Calcarosols, Red Ferrosols and Red, Yellow and Brown Sodosols. Biodiversity surveys conducted on the site determined the Subject Land contains red-brown earths.

2.3.3 CLIMATE

The closest Australian Weather Station (AWS) with long-term annual data is the Tamworth Airport AWS (055325) (BOM 2022). Elevation on the Subject Land ranges from 544 m ASL in the south to 537 m ASL in the north which is significantly higher than the Tamworth Airport AWS (395 m). Average annual temperatures range from 17.7 degrees Celsius (°C) to 33 °C in summer (January) to between 2.3 °C and 16.5 °C in winter (July). Average annual rainfall is 638.5 mm with highest rainfall occurring in November (82.3 mm) and lowest rainfall in April (25.3 mm).

2.3.4 BIOGEOGRAPHICAL AND BOTANICAL REGIONS

The Subject Land is located within the Slippery Rock Range NSW Landscape (Mitchell 2002), in the Nandewar IBRA Region and the Peel IBRA Subregion within the Liverpool Plains Shire Local Government Area (Thackway and Cresswell 1995).

2.4 THREATENED BIODIVERSITY

Threatened species, populations and ecological communities predicted to occur or have suitable habitat on the Subject Land were identified during desktop review using the following sources:

- BioNet website – Searches of the NSW Atlas of Wildlife, NSW State Forests, Australian Museum and Royal Botanic Gardens Sydney databases (DPE 2022a). The search area comprised a 20 × 20 km square centred on the Subject Land. This search returned a list of threatened species known to occur within the search area.
- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) website – Protected Matters Search Tool (PMST) (DCCEEW 2022a). The search area comprised the same 20 × 20 km square as for the BioNet search. The PMST uses actual records and habitat modelling to return a list of 'protected matters' that are known or predicted to occur in the search area, including threatened species, migratory species, ecological communities, wetlands of international significance, and national and world heritage properties.
- The NSW BioNet Threatened Biodiversity Data Collection (TBDC) (DPE 2022c) – Provides data on vegetation types (PCTs), habitats and habitat constraints for threatened species, as well as Serious and Irreversible Impact (SAII) status.

2.4.1 THREATENED FLORA AND FAUNA SPECIES

Database searches returned a total of twelve (12) threatened flora and thirty-two (32) threatened fauna that could occur within 20 km of the Subject Land. Specific habitat requirements of these threatened species have been considered in the context of the vegetation and habitat features found on the Subject Land during the November 2021 biodiversity surveys. The likelihood of each threatened flora species, fauna species and

ecological community to occur on the Subject land is assessed in **Table 1**. Species that are not considered likely to occur on the Subject Land for all or part of their life cycle based on geographic limitations, habitat constraints, vagrancy or habitat degradation are not considered further in this BAR.

2.4.2 ENDANGERED POPULATIONS

29 flora populations and 20 terrestrial fauna populations are listed as endangered under NSW BC Act, as of 6th October 2022 (DPE 2022h). None are applicable to the Subject Land.

2.4.3 THREATENED ECOLOGICAL COMMUNITIES

The database searches indicated that 4 threatened ecological communities (TECs) listed in the schedules of the NSW BC Act and/or the Commonwealth EPBC Act may potentially occur on the investigation area (**Table 1**).

2.4.4 AREAS OF OUTSTANDING BIODIVERSITY VALUE

No Areas of Outstanding Biodiversity Value have been declared on or near the Subject Land under the BC Act (DPE 2022i) or areas of Critical Habitat under the EPBC Act (DCCEEW 2022b).

Table 1. Threatened Species and Ecological Communities identified via database searches

Scientific Name	Common Name	BioNet	PMST	NSW Status ¹	Comm. Status ²	Migratory Species	SAII	Description and assessment	Likelihood of Occurrence on Subject Land
Plants									
<i>Cadellia pentastylis</i>	Ooline	-	✓	V	V	-	No	This medium-sized spreading tree occurs along the western edge of the North West Slopes between Gunnedah and Tenterfield (DPE 2022c). This species is associated with <i>Eucalyptus</i> and <i>Callitris</i> spp. and grows on low- to medium-nutrient, sandy clay soils. Ooline is unlikely to occur on the Subject Land due to geographic limitations as most recorded sightings occur north of Boggabri (DPE 2022a).	Nil
<i>Callistemon pungens</i>		-	✓	-	V	-	No	This species occurs between Inverell and the eastern escarpment of New England National Park and is associated with rocky watercourses (DPE 2022c). <i>Callistemon pungens</i> is unlikely to occur on the Subject Land as it is only known to occur north of Manilla (geographic limitations) and associated species such as <i>Casuarina cunninghamiana</i> (River Oak) are absent from the site and surrounds (habitat constraints) (DPE 2022a).	Nil
<i>Dichanthium setosum</i>	Bluegrass	✓	✓	V	V	-	No	Bluegrass occurs on basaltic black soils and red-brown clay loams within the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW (DPE 2022c). This species is well known in the Tamworth area and has been recorded in the Currabubula Cemetery in 1992 and 2001 (DPE 2022a). This species is likely to occur in native woodland and grassland areas on the Subject Land.	Low

<i>Eucalyptus nicholii</i>	Narrow-leaved Peppermint	-	✓	V	V	-	No	Narrow-leaved Peppermint occurs across a sparse but widespread distribution between Nundle and Tenterfield but has been recorded in Tamworth and is frequently planted well outside its range (DPE 2022c). This species grows in dry grassy woodland on shallow soils of slopes and ridges. Suitable habitat is present on the Subject Land.	Low
<i>Euphrasia arguta</i>	-	-	✓	CE	CE	-	Yes	<i>Euphrasia arguta</i> was re-discovered in the Nundle area in 2008 (DPE 2022c). This species occurs within eucalypt forest with a mixed grass and shrub understorey but is unlikely to occur on the Subject Land due to unsuitable habitat as sandy soils are absent from the site (DPE 2022a).	Nil
<i>Lepidium aschersonii</i>	Spiny Peppergrass	-	✓	V	V	-	No	Erect perennial restricted to the central-western slopes and north-western plains of NSW on ridges of gilgai clays dominated by <i>Acacia harpophylla</i> (Brigalow). This species has not been recorded east of Boggabri and gilgai-forming clays are absent from the Subject Land.	Nil
<i>Lepidium monoplocoides</i>	Winged Peppergrass	-	✓	E	E	-	No	This species is widespread in the semi-arid western plains regions of NSW on seasonally moist sites with heavy, fertile soils (DPE 2022c). Winged Peppergrass is highly unlikely to occur on the Subject Land due to unsuitable soils and geographic limitations since it is not known to occur east of Narrabri (DPE 2022a).	Nil
<i>Picris evae</i>	Hawkweed	-	✓	V	V	-	No	This annual plant has a highly restricted geographic range, only occurring near Inverell on black, dark grey and red-brown clay loams (DPE 2022c). This species is likely to occur on the Subject Land which contains red-brown clay loams and associated canopy species: <i>Dichanthium</i> spp. and <i>Eucalyptus albens</i> (White Box).	Low
<i>Pomaderris brunnea</i>	Rufous Pomaderris	-	✓	E	V	-	No	Rufous Pomaderris occurs in a very restricted geographic range near the Colo, Nepean and Hawksbury Rivers in moist woodland on clay-based alluvial soils (DPE 2022c). Species is unlikely to occur on the Subject Land due to unsuitable microhabitat as	Nil

								associated species (<i>Eucalyptus amplifolia</i> [Cabbage Gum], <i>Angophora floribunda</i> [Rough-barked Apple], <i>Acacia parramattensis</i> [Parramatta Wattle], <i>Bursaria spinosa</i> [Blackthron] and <i>Kunzea ambigua</i> [Tick Bush]) are absent from the site (DPE 2022c).	
<i>Prasophyllum sp Wybong</i> (Classified as <i>Prasophyllum petilum</i> under BC Act)	-	-	✓	-	CE	-	Yes	This terrestrial orchid occurs near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga within open eucalypt woodland and grassland (DPE 2022c). <i>Prasophyllum sp. Wybong</i> is highly unlikely to occur on the Subject Land due to habitat degradation and disturbance from grazing	Nil
<i>Thesium australe</i>	Austral Toadflax	-	✓	V	V	-	No	Austral Toadflax is found in grasslands and grassy woodlands and maintains a semi-parasitic association with <i>Themeda triandra</i> (Kangaroo Grass) which is absent from the Subject Land. This species is highly unlikely to occur due to habitat constraints as Kangaroo Grass is absent from the Subject Land.	Nil
<i>Vincetoxicum forsteri</i> (syn. <i>Tylophora linearis</i>)		-	✓	V	E	-	No	<i>Vincetoxicum forsteri</i> occurs from southern QLD into central NSW between 300-400 m ASL and is predominantly known from State Conservation Areas (SCA), Nature Reserves (NR) and National Parks (NP) (DPE 2022c). This species is associated with White Box and <i>Callitris glaucophylla</i> (White Cypress Pine) but is unlikely to occur on the Subject Land due to geographic limitations as the site occurs at >550 m ASL.	Nil
Birds									
<i>Actitis hypoleucos</i>	Common Sandpiper	-	✓	-	-	✓	No	Within NSW, the Common Sandpiper occurs within coastal and inland wetlands (DCCEEW 2022b). This species has not been recorded near Currabubula and the closest recorded inland sightings are at Moree and Gulgong (DPE 2022a).	Nil

<i>Anthochaera phrygia</i>	Regent Honeyeater	-	✓	CE	CE	-	Yes	Regent Honeyeaters inhabit temperate woodlands and open forests across the inland slopes of south-east Australia (DPE 2022c). The Subject Land is not considered an Important Area, but Regent Honeyeaters have potential to forage on the site due to the presence of mistletoe.	Low (foraging)
<i>Apus pacificus</i>	Fork-tailed Swift	-	✓	-	-	✓	No	The Fork-tailed Swift is a non-breeding visitor to Australia which occurs predominantly east of the Great Dividing Range in NSW (DCCEEW 2022b). This species is almost exclusively aerial but can inhabit riparian woodland, swamps or saltmarshes. This species is highly unlikely to utilise the Subject Land due to its aerial lifestyle.	Nil
<i>Botaurus poiciloptilus</i>	Australian Bittern	-	✓	E	E	-	No	Australian Bitterns are restricted to permanent freshwater wetlands with dense vegetation (DPE 2022c). The closest inland recorded sightings are near Guyra and Gilgandra (DPE 2022a). This species is unlikely to utilise the Subject Land due to the absence of large, shallow wetland areas.	Nil
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	✓	-	-	✓	No	This species is a non-breeding visitor to south-eastern Australia, occurring in freshwater and saline habitats along the coast and inland (DCCEEW 2022b). The Sharp-tailed Sandpiper requires mudflats or the muddy edges of wetlands for foraging. Suitable habitat is absent from the Subject Land as the unnamed drainage line is surrounded by grasses.	Nil
<i>Calidris ferruginea</i>	Curlew Sandpiper	-	✓	E	CE	✓	No	This species is restricted to freshwater wetlands and estuaries along the coastline and occasionally inland in the Murray-Darling Basin (DPE 2022c). The Curlew Sandpiper is not known to occur in the Nandewar IBRA Bioregion and has not been recorded near Currabubula (DPE 2022a). Species is unlikely to occur on the Subject Land due to the absence of freshwater wetland habitat.	Nil
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	✓	-	-	✓	No	The Pectoral Sandpiper is widespread throughout NSW in shallow fresh to saline wetlands and forages in	Nil

								shallow water and soft mud at the edge of wetlands, and occasionally creeks (DCCEEW 2022b). The unnamed drainage line on the Subject Land is overgrown with vegetation and has steep sides which makes it unsuitable habitat.	
<i>Calyptorhynchus lathamii lathamii</i>	South-eastern Glossy Black-Cockatoo	-	✓	V	V	-	No	This species inhabits open forest and woodlands and relies on <i>Allocasuarina</i> and <i>Casuarina</i> spp. for foraging. Suitable feed tree species are absent from the Subject Land.	Nil
<i>Falco hypoleucos</i>	Grey Falcon	-	✓	E	V	-	No	Grey Falcons occur in shrubland, grassland and wooded watercourses in arid and semi-arid regions and has been recorded in the surrounding area (DPE 2022a; 2022c). This species may utilise the Subject Land which has suitable foraging habitat.	Low (foraging)
<i>Gallinago hardwickii</i>	Latham's Snipe	-	✓	-	-	✓	No	Latham's Snipe is a non-breeding visitor to south-eastern Australia, inhabiting permanent and ephemeral wetlands with low, dense vegetation and muddy areas for foraging (DCCEEW 2022b). Suitable foraging habitat is absent from the Subject Land.	Nil
<i>Grantiella picta</i>	Painted Honeyeater	-	✓	V	V	-	No	Painted Honeyeaters occur at low densities throughout their range, predominantly occurring on the inland slopes of NSW in <i>Acacia pendula</i> (Weeping Myall) and Box-Gum Woodland. This species requires mistletoe at a density of >5 per hectare (DPE 2022c). Mistletoe is present on the site but at lower densities than required by this species.	Nil
<i>Hirundapus caudacutus</i>	White-throated Needle-tail	-	✓	-	V	✓	No	Migratory species found in Australia between October and April inhabiting coastal areas (DPE 2022c). White-throated Needle-tails are almost exclusively aerial species and are highly unlikely to utilise the Subject Land due their migratory and aerial lifestyle (DCCEEW 2022b).	Nil
<i>Lathamus discolor</i>	Swift Parrot	-	✓	E	CE	-	Yes	Swift Parrots breed in Tasmania before migrating to south-eastern Australia in autumn and winter to feed	Low (Foraging)

								on winter flowering eucalypts and lerp (DPE 2022c). The Subject Land is not included in the Important Areas map for this species. However, Swift Parrots may utilise the site for foraging due to the presence of winter flowering eucalypts.	
<i>Monarcha melanopsis</i>	Black-faced Monarch	-	✓	-	-	✓	No	The Black faced-Monarch is widespread in eastern Australia within rainforests (DCCEEW 2022b). Rainforest habitat is absent from the Subject Land.	Nil
<i>Motacilla flava</i>	Yellow Wagtail	-	✓	-	-	✓	No	Yellow Wagtails inhabit damp habitats with low vegetation including bogs, meadows, marshes, waterside pasture and tundra (Birdlife International 2022). This species is unlikely to occur on the Subject Land due to geographic limitations as it is known to migrate between Europe, Siberia and China and has only been recorded near Newcastle and Sydney (DPE 2022a).	Nil
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	✓	-	-	✓	No	Satin Flycatchers are widespread east of the Great Dividing Range with scattered records on the western slopes (DCCEEW 2022b). Species occurs within heavily vegetated gullies which are absent from the sparsely vegetated Subject Land.	Nil
<i>Neophema pulchella</i>	Turquoise Parrot	✓	-	V	-	-	No	Turquoise Parrots inhabit the edges of eucalypt woodland adjoining clearings, ridges and creeks in agricultural land (DPE 2022c). The species is well known in the Currabubula area and is likely to utilise the Subject Land for foraging (DPE 2022a).	Low (Foraging)
<i>Polytelis swainsonii</i>	Superb Parrot	-	✓	V	V	-	No	Superb Parrots occupy Box-Gum, Box-Cypress-pine and Boree Woodlands, nesting in living or dead eucalypt trees with hollows (DPE 2022c). This species is highly unlikely to occur on the Subject Land due to geographic limitations as this species is not known to occur west of Narrabri (DPE 2022a).	Nil
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	✓	-	-	✓	-	Rufous Fantails are found in gullies east of the Great Dividing Range in wet sclerophyll forests (DCCEEW	Nil

								2022b). Wet sclerophyll eucalypt species are absent from the Subject Land.	
<i>Rostratula australis</i>	Australian Painted Snipe	-	✓	E	E	-	-	Australian Painted Snipes prefer the fringes of dams, swamps and marshy areas with muddy flats which are absent from the Subject Land (DPE 2022c).	Nil
Fish									
<i>Maccullochella peelii</i>	Murray Cod	-	✓	-	V	-	-	This species requires large, permanent waterbodies (DCCEEW 2022b). The Subject Land contains a shallow, drainage line which does not provide suitable habitat for this species.	Nil
Frogs									
<i>Litoria booroolongensis</i>	Booroolong Frog	-	✓	E	E	-	No	This species requires permanent, cobble bedded waterbodies which are absent from the Subject Land as the unnamed drainage line contains a silt substrate (DPE 2022c)	Nil
Reptiles									
<i>Aprasia parapulchella</i>	Pink-tailed Legless-lizard	-	✓	V	V	-	No	Pink-tailed Legless-lizards are found in sloping, open woodland areas within 50m of rocky habitat. Suitable habitat is present on the Subject Land which contains areas of scattered surface rocks.	Low
<i>Delma impar</i>	Striped Legless Lizard	-	✓	V	V	-	No	Striped Legless Lizards inhabit Natural Temperate Grasslands or grasslands with a high exotic component (DPE 2022c). Suitable habitat including native or exotic tussock-forming grasses are present on the Subject Land.	Low
<i>Uvidicolus sphyrurus</i>	Border Thick-tailed Gecko	-	✓	V	V	-	No	This species is endemic to the tablelands and slopes of northern NSW and southern QLD on steep rocky slopes derived from granite (DPE 2022c). Border Thick-tailed Geckos occur within shrubby open forest or woodland with boulders, rock slabs, fallen timber and abundant leaf litter. This species is unlikely to occur on the Subject Land due to the absence of granite, boulders and rock slabs.	Nil

Mammals									
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	-	✓	V	V	-	Yes	Large-eared Pied Bats are found within 2 km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within 2 km of old mines or tunnels (DPE 2022c). Suitable habitat is absent from the Subject Land but may be present in the surrounding area, as this species is known to occur south of Currabubula (DPE 2022a). Therefore, this species may utilise the Subject Land within their wider foraging range.	Low (Foraging)
<i>Dasyurus maculatus</i>	Spot-tailed Quoll	-	✓	V	E	-	No	Spot-tailed Quolls occur across a variety of habitats and use tree hollows, fallen logs, other animal burrows or rocky outcrops as den sites (DPE 2022c). Preferred habitats include undisturbed mature wet forests which are absent from the Subject Land. Suitable den habitat is also absent from the Subject Land which is likely too disturbed by adjacent quarry activities to provide suitable foraging habitat.	Nil
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	-	✓	V	V	-	No	Corben's Long-eared Bat occurs within the Murray-Darling Basin and Pilliga Scrub within Mallee, Buloke and box eucalypt communities (DPE 2022c). Roosting occurs in tree hollows, crevices and under loose bark. Suitable habitat is absent from the Subject Land.	Nil
<i>Petauroides volans</i>	Greater Glider	-	✓	-	E	-	No	Greater Gliders require large, hollow bearing trees and occupy home ranges of 1-3 ha (DPE 2022c). This species is unlikely to occur on the Subject Land due to unsuitable microhabitat as it is usually found in tall, montane, moist eucalypt forests with mature trees and abundant hollows (DCCEEW 2022c). Hollow-bearing trees are absent from the Subject Land.	Nil
<i>Petaurus australis australis</i>	Yellow-bellied Glider	-	✓	V	-	-	No	Hollow dependent species occurring in tall mature eucalypt forests in coastal forests, dry escarpment forests, moist coastal gullies and tall montane forests (DPE 2022c). This species is unlikely to occur on the	Nil

								Subject Land due to unsuitable microhabitat and the absence of hollow-bearing trees (DPE 2022a).	
<i>Phascolarctos cinereus</i>	Koala	-	✓	E	E	-	No	Koalas are well known between Gunnedah and Werris Creek (DPE 2022a). The Subject Land is considered to contain unsuitable breeding habitat as Koalas require large intact woodland areas with high numbers of feed tree species for breeding (DAWE 2022). However, as the Subject Land is connected to large remnant woodland <3 km west of the site, Koalas may occasionally utilise the site within their wider foraging habitat due to the presence of two feed tree species (White Box and <i>Eucalyptus dealbata</i> [Tumbledown Red Gum]).	Low (Foraging)
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	-	✓	V	V	-	No	The Grey-headed Flying-fox is found in rainforest, forests, woodlands and urban gardens in gullies, close to water, in vegetation with a dense canopy within 20 km of a regular food source (DPE 2022c). There are two roosting camps in Tamworth (DAFF 2022; DPE 2022a). However, as these known breeding camps are >30 km north-east of the site, Grey-headed Flying-foxes are unlikely to utilise the Subject Land for foraging.	Nil
Threatened Ecological Communities									
<i>Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions</i>		-	✓	E	E	-	No	This community is associated with the floodplains and drainage areas of the Darling Riverine Plains and the Brigalow Belt South IBRA Bioregions, occurring on grey, self-mulching clays (DSEWPC 2011). Coolibah – Black Box Woodlands occur on flat to low reliefs and are dominated by <i>Eucalyptus coolabah</i> (Coolibah) and <i>Eucalyptus largifloens</i> (Black Box) which are absent from the Subject Land.	Nil
<i>Natural grassland on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland</i>		-	✓	-	CE	-	No	Native tussock grassland occurs on plains and is associated with fine-textured, cracking clays derived from basalt or quaternary alluvium (TSSC 2009a). Grassland on the Subject Land is located on slopes and characteristic groundcover species such as	Nil

							<i>Rytidosperma</i> , <i>Austrostipa</i> , <i>Bothriochloa</i> and <i>Chloris spp.</i> are present in low quantities but not at densities characteristic of the community.	
<i>New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands</i>	-	✓	CE	CE	-	Yes	This community occurs on the ranges and slopes of the Great Dividing Range and is dominated or co-dominated by <i>Eucalyptus nova-anglica</i> (New England Peppermint) (TSSC 2011). New England Peppermint is absent from the Subject Land and surrounds.	Nil
<i>Poplar Box Grassy Woodland on Alluvial Plains</i>	-	✓	-	E	-	No	This community is a grassy woodland dominated by <i>Eucalyptus populnea</i> (Poplar Box) occurring on gently undulating to flat landscapes (DEE 2019). Poplar Box is absent from the Subject Land and surrounds.	Nil
<i>Weeping Myall Woodlands</i>	-	✓	-	E	-	No	<i>Acacia pendula</i> (Weeping Myall) trees are the sole or dominant overstorey species of this community (TSSC 2009b). Weeping Myall are absent from the Subject Land and surrounds.	Nil
<i>White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland</i>	-	✓	CE	CE	-	Yes	Box-Gum Woodland occurs on the tablelands and western slopes of the Great Dividing Range and is characterised by widely-spaced trees and native tussock grasses (TSSC 2020). White Box is present on the Subject Land, however the association with Rough-barked Apple and Tumbledown Red Gum (PCT 588) is not representative of this community.	Nil

¹ NSW Biodiversity Conservation Act 2016

² Commonwealth Environmental Protection and Biodiversity Conservation Act 1999

V Vulnerable

E Endangered

CE Critically Endangered

3. METHODS

3.1 SURVEY TIMING

Biodiversity surveys were conducted on 2nd and 3rd November 2021 to identify and describe vegetation composition, structure and available fauna habitat, and assess the likelihood of any potential impacts of the proposal on threatened species. The weather was clear and rainfall in preceding months made conditions favourable for plant identification due to the presence of flowering parts.

3.2 VEGETATION SAMPLING

3.2.1 BAM VEGETATION INTEGRITY PLOTS

Four BAM Vegetation Integrity (VI) Plots were undertaken in native areas to determine species and structural data, as well as to determine the conservation status of the vegetation on the Subject Land. The quadrats comprised:

- A 20 × 20 m full floristic sub-plot was conducted at one end of each 50 × 20 m BAM quadrat to gain data on vegetation structure and composition in the remnant vegetation. A list of all vascular plant species was made on each plot with estimates of abundance and cover for each species. For input into BAM-C the flora species were categorised into trees, shrubs, grasses and grass-like, forbs, ferns and other. The total numbers of species in each of these categories and the total percentage of cover for each category was measured and input into the BAM Calculator.
- The full 50 × 20 m quadrat was used for estimates of leaf litter cover on five 1 m² sub-plots, counts of trees according to seven size classes, the presence or absence of hollow limbs in each tree and the length of habitat logs on the ground.

All trees on the Subject Land and within approximately 50 m of the northern boundary were identified. The species, location, presence of hollows or other habitat features and distance at breast height (DBH) of each tree were recorded.

The vegetation survey results were collated to assess the native composition of the Subject Land and determine whether the vegetation is low, medium or high conservation value.

3.2.2 TARGETED THREATENED FLORA SPECIES SEARCHES

Targeted threatened flora searches were undertaken within woodland and grassland areas during the site visit in November 2021 for the three species likely to occur on the Subject Land, based on habitat suitability: *Dichanthium setosum* (Bluegrass), *Eucalyptus nicholii* (Narrow-leaved Peppermint) and *Picris evae* (Hawkweed). Searches for Bluegrass and Hawkweed were conducted by two ecologists using transects at 10 metre spacings throughout the entire grassland area. Searches for Narrow-leaved Peppermint involved recording all trees within the Subject Land.

3.2.3 VEGETATION TYPES AND PLANT COMMUNITY

Vegetation types were described and categorised according to the dominant species, level of disturbance and the presence or absence of exotic and native vegetation.

The Plant Community Type (PCT) present on the Subject Land was identified using the BioNet Vegetation Classification System (DPE 2022f). Threatened Ecological Communities (TEC) associated with this PCT are identified in BioNet and conformance of the vegetation with a TEC is verified by reference to the relevant published species reports on SPRAT (DCCEEW 2022b).

3.3 FAUNA

3.3.1 TARGETED THREATENED FAUNA SPECIES SEARCHES

Targeted threatened fauna searches were undertaken for *Aprasia parapulchella* (Pink-tailed Legless Lizard) and *Delma impar* (Striped Legless Lizard). These were performed in areas with scattered surface and partially buried rocks and involved overturning all rocks within the Subject Land.

3.3.2 FAUNA OBSERVATIONS

Fauna present on the Subject Land were recorded opportunistically while conducting the VI Plots and generally moving throughout the site. One 20-minute morning bird survey was also undertaken on the Subject Land within woodland and grassland areas to document bird species utilising the site.

3.3.3 HABITAT ASSESSMENT

The suitability of the Subject Land for threatened fauna was assessed by observing habitat condition and searching for key habitat features such as:

- presence and absence of mistletoe
- nectar and seed sources
- roosting sites
- fallen logs and stags
- shrubs, tussock grasses and sedges
- ground litter and dead tree branches
- riparian habitat such as edge vegetation, riffles and pools and shallow water.

4. RESULTS AND DISCUSSION

4.1 FLORA

4.1.1 FLORA SPECIES

A comprehensive list of plant species identified on the Subject Land is provided in **Appendix A** and **Appendix B**. A total of 107 flora species were recorded, 66 native and 41 exotic species.

Plant species identities were confirmed using keys available on NSW PlantNet (RBG&DT 2022), Richardson, Richardson and Sheperd (2016) and Harden (1993).

4.1.2 VEGETATION TYPES

According to the State Vegetation Type Map: Western Region, the Subject Land is mapped as Candidate Native Grasslands. Two woodland PCTs are mapped within proximity of the site: PCT 588 *White Box - White*

Cypress Pine shrubby hills open forest mainly in the Nandewar Bioregion north of the site and PCT 592 *Narrow-leaved Ironbark - cypress pine - White Box shrubby open forest* in the Brigalow Belt South Bioregion and Nandewar Bioregion west of the site (DPE 2022e). Candidate Native Grasslands are no longer recognised as a PCT according to the BioNet Vegetation Classification database (DPE 2022f). PCTs 588 and 592 are included in an assessment of suitable PCT(s) to describe native vegetation on the Subject Land (Section 4.1.3).

During biodiversity surveys, it was determined that the Subject Land contains remnant woodland, derived native grassland (DNG) and exotic riparian vegetation within and along the unnamed drainage line (**Figure 3**). A description of each vegetation type, including vegetation composition and structure, is outlined in Section 4.1.4.

Figure 3. Vegetation on the Study Area



Sources: © State of NSW, Department of Customer Service, Spatial Services 2022
 GDA2020 MGA Zone 56 File: 221296_03_ECOCLOGY.aprx Prepared By: adam.davis Date: 02/11/2022

Legend

- Study Area
- Subject Land
- Watercourse
- Vegetation Integrity Plots

- Vegetation Zones**
- PCT 588 DNG (Mod)
 - PCT 588 DNG (Poor)
 - PCT 588 Woodland (Mod)
 - Exotic Riparian Vegetation
 - Non-vegetated

- Trees**
- Angophora floribunda
 - Callitris glaucophylla
 - Eucalyptus albens
 - Eucalyptus dealbata

4.1.3 PCT JUSTIFICATION

Filtered searches of the BioNet Vegetation Classification database were undertaken using the results of the vegetation surveys to determine which PCTs occur on the Subject Land (DPE 2022f). The following filters were applied: White Box, Dry Sclerophyll Forests (Shrub/grass sub-formation) Vegetation Formation, North-west Slopes Dry Sclerophyll Woodlands Vegetation Class, Nandewar IBRA Region and Peel Subregion. Of the 13 results, only those containing White Box, White Cypress Pine and Tumbledown Red Gum were retained. Nine potential PCTs are assessed in **Table 2**.

Further analysis of PCTs identified by the BioNet Vegetation Classification and the State Vegetation Type Map: Western Region are provided in **Table 2**. As the groundcover across the DNG areas of the Subject Land is consistent with the species composition of the woodland, the DNG has been assessed as a derived form of the woodland community on the Subject Land. For this reason, the following PCT justification addresses native vegetation on the Subject Land as a whole.

Table 2. PCT Justification

Characteristics of Plant Community (from description in BioNet Veg Classification)								Comparison of PCT characteristics with vegetation on the Subject Land	
PCT	IBRA Region (Nandewar IBRA Region, Peel subregion)	Vegetation Formation	Vegetation Class	Dominant Tree Species	Geomorphology	Landscape Position	Vegetation Structure	Assessment of similarity to Subject Land	Likelihood of Occurrence
Source of PCT list: State Vegetation Type Map: Western Region									
588	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	White Box, White Cypress Pine, <i>Angophora floribunda</i> (Rough-barked Apple), Tumbledown Red Gum, <i>Eucalyptus melliodora</i> (Yellow Box) and <i>Eucalyptus melanophloia</i> (Silver-leaved Ironbark)	Brown to red clay loam soils Parent rock: sandstone, sedimentary or metamorphic rocks	Lower-mid hillslopes	Open forest to woodland with a mid-sense to sparse shrub layer and a mid-dense grassy groundcover	Total number of species associated with this PCT which are present on the Subject Land (hereafter referred to as 'total number of characteristic species') is 21 (4 trees, 10 grasses, 4 forbs, 1 fern and 2 other). PCT 588 is highly likely to occur on the woodland and DNG areas of the Subject Land due to suitable soils, landscape position and the presence of the greatest number of characteristic species compared with other PCTs.	High
592	Yes	Dry sclerophyll Forests (shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	<i>Eucalyptus crebra</i> (Narrow-leaved Ironbark), White Box, White Cypress Pine, Silver-leaved Ironbark, Tumbledown Red Gum, <i>Brachychiton populneus</i> (Kurrajong) and <i>Alstonia constricta</i> (Quinine Bush)	Loamy soils Parent rock: volcanic or sedimentary substrate	Hillslopes, footslopes and flats	Tall or mid-high open forest to woodland with a sparse shrubby understorey and grassy/sub-shrubby understorey.	Total number of characteristic species on the Subject Land is 15 (4 trees, 2 potential shrubs, 6 grasses, 2 forbs and 1 other). Although the Subject Land contains suitable soils and landscape position, characteristic species, including all but one of the dominant tree species, are absent from the site and the surrounding area.	Low
Source of PCT list: BioNet Vegetation Classification System									
506	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	<i>Callitris endlicheri</i> (Black Cypress Pine), White Box, Tumbledown Red Gum and <i>Eucalypts caleyi</i> (Caley's Ironbark)	Brown loamy sands Parent rock: volcanic and sedimentary substrate	Steep, mid-elevation slopes in mountain landforms	Low to mid-high open woodland or forest with a mid-dense to sparse shrub layer containing <i>Callitris</i> spp. regeneration. The sparse groundcover	Total number of characteristic species is 19 (4 trees, 2 potential shrubs, 10 grasses and 3 forbs). Steep mountain landforms are absent from the Subject Land which does not contain Black Cypress Pine or Caley's	Nil

Characteristics of Plant Community (from description in BioNet Veg Classification)								Comparison of PCT characteristics with vegetation on the Subject Land	
PCT	IBRA Region (Nandewar IBRA Region, Peel subregion)	Vegetation Formation	Vegetation Class	Dominant Tree Species	Geomorphology	Landscape Position	Vegetation Structure	Assessment of similarity to Subject Land	Likelihood of Occurrence
							contains grasses, mat-rushes and forbs.	Ironbark. The site contains red-brown clays and White Cypress Pine which is uncommon in this community.	
549	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	Silver-leaved Ironbark, Black Cypress Pine, White Box, White Cypress Pine and Tumbledown Red Gum.	Shallow loamy sand soils Parent rock: sandstone	Hills with rocky outcrops	Tall woodland to open forest with a sparse to mid-dense shrub layer and a sparse grassy groundcover.	Total number of characteristic species is 11 (4 trees, 1 potential shrub, 3 grasses, 2 forbs and 1 fern). Rocky outcrops, sandy soils and the two dominant tree species are absent from the Subject Land.	Nil
563	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	White Box, <i>Eucalyptus laevopinea</i> (Silver-top Stringybark), Rough-barked Apple, White Cypress Pine, <i>Eucalyptus blakelyi</i> (Blakely's Red Gum) and Yellow Box	Parent rock: Granite, sedimentary and granite rocks	Mid-elevation hilly areas	Tall open forest containing a well-developed shrub layer and a sparse to mid-dense groundcover.	Total number of characteristic species is 9 (4 trees, 1 potential shrub, 2 grasses, 1 forb and 1 fern). PCT 563 is restricted to near Watson's Creek, Kaputar NP and Single NP which are geographically distinct from the Subject Land. Tumbledown Red Gum is uncommon in this community.	Nil
587	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	White Box, Rough-barked Apple, White Cypress Pine and Black Cypress Pine	Parent rock: volcanic	Steep hills	Mid-high to tall open forest or woodland with a dense shrub layer and a sparse groundcover dominated by forbs, ferns and grasses.	Total number of characteristic species is 9 (4 trees, 1 potential shrub, 2 grasses, 1 forb and 1 fern). PCT 587 is restricted to the Mount Kaputar area which is geographically distinct from the Subject Land. Groundcover on the Subject Land is also grassy which is not characteristic of this PCT.	Nil
588	Addressed above								
597	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	White Box, White Cypress Pine and Silver-leaved Ironbark	Clay loam to clay soils Parent rock: basalt or sedimentary substrate	Hillslopes and hillcrests	Mid-high to tall open forest or woodland with small trees and a shrubby understorey containing semi-	Total number of characteristic species is 18 (4 trees, 1 potential shrub, 8 grassland, 3 forbs, 1 fern and 2 other).	Low

Characteristics of Plant Community (from description in BioNet Veg Classification)								Comparison of PCT characteristics with vegetation on the Subject Land	
PCT	IBRA Region (Nandewar IBRA Region, Peel subregion)	Vegetation Formation	Vegetation Class	Dominant Tree Species	Geomorphology	Landscape Position	Vegetation Structure	Assessment of similarity to Subject Land	Likelihood of Occurrence
							evergreen cine thickets. The groundcover is a mix of grasses and forbs	The Subject Land contains suitable soils and landscape position. However, Silver-leaved Ironbark is absent from the site and Tumbledown Red Gum only occasionally occurs within PCT 597.	
598	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	Silver-leaved Ironbark and White Cypress Pine	Parent rock: sedimentary and volcanic substrates	Hills	Tall woodland with a mid-dense shrubby layer of dry rainforest species and a grass and forb dominated groundcover.	Total number of characteristic species is 11 (4 trees, 2 potential shrubs, 3 grasses, 2 forb, 1 fern and 1 other). Silver-leaved Ironbark is absent from the Subject Land which is dominated by White Box and Tumbledown Gum which are uncommon in this community.	Nil
1308	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	White Box, White Cypress Pine, Rough-barked Apple and Kurrajong	Not provided	Hills	Not provided	Total number of characteristic species is 8 (4 trees, 1 shrub, 2 grasses and 1 fern). PCT 1308 is unlikely to occur on the Subject Land due to the absence of most upper and middle stratum species. Tumbledown Red Gum is also a minor component of this PCT, whereas it dominates the canopy of the site.	Nil
1317	Yes	Dry Sclerophyll Forests (shrub/grass sub-formation)	North-west Slopes Dry Sclerophyll Woodlands	White Cypress Pine, White Box, Silver-leaved Ironbark, Narrow-leaved Ironbark and Tumbledown Red Gum	Parent rock: sedimentary substrate or basalt	Hills at low altitudes	Not provided	Total number of characteristic species is 8 (4 trees, 2 grasses, 1 forb and 1 fern). PCT 1317 is unlikely to occur on the Subject Land due to the absence of Silver-leaved Ironbark, Narrow-leaved Ironbark and other characteristic species.	Nil

4.1.4 VEGETATION COMMUNITY DESCRIPTIONS

4.1.4.1 Mapping Unit 1 – PCT 588 Remnant Woodland (moderate condition) – 0.18 ha

PCT 588 Remnant Woodland occurs along the western and north-eastern extents of the Subject Land. This vegetation occurs in moderate condition and includes nine (9) White Cypress Pine trees, seven (7) Tumbledown Red Gum trees, three (3) White Box trees and approximately one hundred (100) *Notelaea microcarpa* (Native Olive) trees. These trees occur as mature and regenerating individuals. There are no hollow-bearing trees within the Subject Land, however mistletoes are present in low abundances. Mapping Unit 1 (Q4) contains an intact mid-storey comprised of *Pittosporum angustifolium* (Butterbush), *Bursaria spinosa* (Native Blackthorn), *Pimelea* spp., and *Acacia* spp. The groundcover is dominated by native species including the grasses *Anthosachne scabra* (Wheatgrass) and *Aristida ramosa* (Purple Wiregrass), and the forbs *Geranium* spp. and *Einadia hastata* (Berry Saltbush). Exotic groundcover species are uncommon and include *Bidens subalternans* (Greater Beggar's Ticks). Mapping Unit 1 contains one exotic species classified as a High Threat Weed (HTW) according to the NSW Department of Planning and Environment priority list: *Opuntia stricta* (Common Prickly Pear) (DPE 2022b).

Plate 1. Mapping Unit 1: Woodland Dominated by Tumbledown Red Gum



Plate 2. Mapping Unit 1: Woodland with a Shrubby Mid-storey



4.1.4.2 Mapping Unit 2 – PCT 588 DNG (moderate condition) – 0.06 ha

Within the Subject Land, Mapping Unit 2 occurs along the south-western and north-western extent and contains high native species diversity with White Box regeneration (Q1). DNG (moderate) is dominated by the forbs: *Calotis lappulacea* (Yellow Burr-daisy), *Vittadinia muelleri*, *Dichondra* sp. Inglewood and *Geranium* spp; the grasses: Purple Wiregrass, *Austrostipa scabra* (Speargrass), *Dichanthium sericeum* (Queensland Bluegrass) and *Panicum* spp; and the creepers: *Desmodium varians* (Slender Tick-trefoil) and *Glycine tabacina* (Variable Glycine). Exotic species are mostly rare, however *Trifolium arvense* (Haresfoot Clover) is relatively common.

Low covers of three HTW, *Carthamus lanatus* (Saffron Thistle), Common Prickly Pear and *Opuntia aurantiaca* (Tiger Pear), also occur in DNG (moderate).

Plate 3. Mapping Unit 2: DNG (moderate) with high grass and forb diversity



Plate 4. Mapping Unit 2: DNG (moderate) dominated by Yellow Burr Daisy, Purple Wiregrass and Speargrass



4.1.4.3 Mapping Unit 3 – PCT 588 DNG (poor condition) – 0.15 ha

Mapping Unit 3 occurs across the eastern and southern extents of the Subject Land and is characterised by Q2. This grassland area contains a mix of native and exotic groundcover species and regenerating Tumbledown Red Gum. Dominant native species include the grass Purple Wiregrass and the forbs *Geranium* spp., *Daucus glochidiatus* (Native Carrot) and *Dichondra* sp. *Inglewood*, while dominant exotics include *Bromus hordeaceus* (Soft Brome), *Verbena quadrangularis*, Haresfoot Clover and *Marrubium vulgare* (White Horehound). Common HTW in this vegetation zone include *Paspalum dilatatum* (Paspalum) and Saffron Thistle, while Tiger Pear and *Agrostis capillaris* (Browntop Bent) are present as scattered plants.

Plate 5. Mapping Unit 3: DNG (poor) dominated by purple Wiregrass with high cover of *Verbena quadrangularis*



4.1.4.4 Mapping Unit 4 – Exotic Riparian Vegetation – 0.09 ha

Vegetation within and lining the unnamed drainage line is dominated by the HTW species *Cyperus eragrostis* and *Paspalum*, as well as the exotic species *Nasturtium officinale* (Water Cress). Native groundcover species are uncommon and primarily consist of water-tolerant species such as *Juncus* spp., *Schoenus* spp., *Euphorbia* spp., and *Rumex brownii* (Swamp Dock). Additional HTW species were uncommon and included Browntop Bent and Saffron Thistle.

Plate 6. Mapping Unit 4: Drainage Line dominated by *Cyperus* spp., Paspalum and Water Cress



Plate 7. Mapping Unit 4: Dense vegetation along the drainage line and surrounding woodland vegetation



4.1.4.5 Mapping Unit 5 – Disturbed Ground – 0.01 ha

The Subject Land also includes 0.01 ha of bare ground north of the existing dam access road.

4.1.5 PRIORITY, NATIONALLY SIGNIFICANT AND HIGH THREAT WEEDS

Six species listed as High Threat Weeds on the NSW Department of Planning and Environment priority list were found on the Subject Land: *Agrostis capillaris* (Browntop Bent), *Carthamus lanatus* (Saffron Thistle), *Opuntia aurantiaca* (Tiger Pear), *Opuntia stricta* (Common Prickly Pear), *Cyperus eragrostis* and *Paspalum dilatatum* (Paspalum) (DPE 2022b). Of these, Browntop Bent, Common Prickly Pear and Tiger Pear are also classified as a Priority Weed for the North West under the *Biosecurity Act 2015* (DPI 2022), while Common Prickly Pear and Tiger Pear are Weeds of National Significance (WON) as listed by the Australian Weeds Committee of the Australian Government (2022).

4.2 FAUNA

4.2.1 FAUNA SURVEY RESULTS

The following fauna species were recorded during the 20-minute bird survey and while generally moving throughout the site: Noisy Miner, Eastern Rosella, Superb Fairy Wren, White-faced Heron, Yellow-rumped Thornbill, Australian Magpie, White Winged Cough, Rainbow Bee-eater, Red-rumped Parrot, Willy Wagtail, Black-faced Cuckooshrike and Wedge-tailed Eagle (flying overhead).

No threatened fauna species were recorded on the Subject Land during biodiversity surveys and targeted threatened species searches.

4.2.2 HABITAT FEATURES

Habitat features on the Subject Land are as follows:

- Native vegetation (remnant woodland with shrubs, regenerating trees, scattered mistletoe and Native Olive, and derived native grassland with interspaced tussock grasses)

- Dense exotic riparian vegetation
- Unnamed drainage line
- Rocky areas

No hollow-bearing trees were identified on the Subject Land.

These habitats provide a variety of resources for native wildlife, and it can be expected that numerous native fauna species utilise the area as permanent residents, regular migrants or occasional visitors.

Foraging habitat is present for four threatened bird species and two mammal species (**Table 1**). Native tree and shrub species within the remnant woodland and scattered throughout the derived native grassland can be expected to provide foraging, shelter, roosting and nesting habitat for a range of native bird. The grass-dominated groundcover may provide seed resources for granivorous fauna species and cover for rodents that represent prey for birds of prey, including the Grey Falcon which may utilise the site for hunting as part of its range (**Table 1**). The open condition of the site may be utilised by a range of bats and birds of prey for foraging, while the unnamed drainage line would provide seasonal habitat for frogs and some water birds.

4.3 THREATENED BIODIVERSITY

4.3.1 THREATENED ECOLOGICAL COMMUNITIES (TEC)

PCT 588 is not associated with any TECs in the BioNet Vegetation Classification database (DPE 2022f).

4.3.2 THREATENED FLORA AND FAUNA SPECIES

No threatened species, populations or critical habitat listed under the BC Act or the EPBC Act were identified during biodiversity surveys.

5. BIODIVERSITY IMPACT ASSESSMENT

5.1 IMPACT AVOIDANCE AND MINIMISATION MEASURES

Measures to avoid biodiversity impacts were established in the planning phase of the proposal. After biodiversity surveys were undertaken, the Subject Land was redesigned to avoid large remnant woodland patches, hollow-bearing trees and most of the rocky habitat (**Figure 4**). The Subject Land also allows for a 5 m construction buffer surrounding the water holding pond to reduce biodiversity impacts on surrounding native vegetation.

The Project has been designed to minimise impacts on biodiversity using the following strategies:

- Prior to clearing, all surrounding vegetation to be retained will be identified to prevent inadvertent damage;
- Prior to clearing, temporary fencing will be erected around significant environmental features (i.e., adjacent remnant woodland, rocky areas to be retained);
- Pre-clearing fauna surveys will be undertaken by a qualified Ecologist or equivalent specialist to inspect trees for the presence of fauna, and any identified fauna are to be captured, treated and relocated by WIRES;

- Clearing activities will be undertaken during late summer/autumn to avoid critical lifecycle events;
- Felled trees, fallen timber and surface rocks will be relocated to surrounding woodland areas to enhance habitat values;
- Machinery will be stored away from riparian areas and adjacent woodland to minimise soil compaction and disturbance where possible;
- All rubbish and materials will be removed from the Subject Land when construction is completed;
- Erosion from exposed ground during the water holding pond and access road construction will be minimised using sediment traps;
- Topsoil will be stockpiled and stored on site and sediment fencing erected to prevent sediment runoff into the unnamed drainage line;
- A cofferdam will be constructed to temporarily stop the flow of the unnamed drainage line during the construction of the water holding pond. This involves pumping water out of the constructed cofferdam to provide a dry working environment and minimise the impact to the drainage line;
- Construction will take place during the day to avoid disturbance of nocturnal animals; and
- Dust suppression measures will be put in place during earthworks.

This BAR assumes the afore mentioned impact avoidance and minimisation measures will be implemented. If implementation deviates from these measures, the conclusions of this report and identified impacts on species and habitat may need to be reviewed.

Figure 4. Impact Avoidance Measures



Sources: © State of NSW, Department of Customer Service, Spatial Services 2022
 GDA2020 MGA Zone 56 File: 221296_03_ECOLOGY.aprx Prepared By: adam.davis Date: 02/11/2022

- | | |
|-----------------------------|----------------------------|
| Legend | |
| | Study Area |
| | Subject Land |
| | Watercourse |
| | Rocky Habitat |
| | Aquatic Habitat |
| Hollow-bearing trees | |
| | Eucalyptus albens |
| | Eucalyptus dealbata |
| Vegetation Zones | |
| | PCT 588 DNG (Mod) |
| | PCT 588 DNG (Poor) |
| | PCT 588 Woodland (Mod) |
| | Exotic Riparian Vegetation |
| | Non-vegetated |

5.2 RESIDUAL PROJECT IMPACTS

5.2.1 DIRECT IMPACTS

Residual impacts once impact avoidance and minimisation measures have been implemented include:

- The removal of 0.39 ha of native vegetation, including 18 trees, for the construction of the water holding pond and access road.
- Temporarily stopping the flow of the unnamed drainage line during Project construction.

5.2.2 INDIRECT AND LONG-TERM IMPACTS

The indirect and long-term impacts of this project are expected to include:

- Noise and dust generated during the construction phase of the Project
- The abundance of low disturbance-sensitive and opportunistic bird species, such as the Australian White Ibis (*Threskiornis moluccus*) and Crimson Rosella (*Platycercus elegans*), may increase in woodland habitat adjacent to the Subject Land post-disturbance

5.2.3 CUMULATIVE IMPACTS

The Project will result in the loss of 0.39 ha of native vegetation assigned to PCT 588. The pre-European extent of PCT 588 is estimated to have been 150,000 ha, of which approximately only 50,000 ha remains (33% cleared). The clearing of 0.39 ha of PCT 588 accounts for additional clearing of 0.00078% of the remaining area.

5.3 IMPACT ASSESSMENT – FIVE PART TEST

5.3.1 FAUNA SPECIES

Species recorded in **Table 1** with nil likelihood of occurring on the Subject Land are not considered further in this assessment. Species with a low likelihood of occurrence are subject to the Threatened Species Test of Significance (Five Part Test) under to Section 7.3 of the BC Act (i.e. whether significant impacts to listed threatened species or their habitat are likely). No threatened flora or TEC are considered likely to occur on the Subject Land based on targeted searches and vegetation surveys and are not considered further in this BAR.

Six threatened fauna species are considered to potentially utilise the Subject Land for foraging purposes. No breeding habitat for threatened species occurs on the Subject Land. These species are considered in the Five Part Test below.

Regent Honeyeaters have a patchy distribution throughout the inland slopes of NSW within temperate woodlands (DPE 2022c). Preferred habitat features include a large number of mature trees, high canopy cover and mistletoes. This generalist forager feeds on White Box nectar, mistletoe nectar and fruit, lerps, honeydew and insects, while nesting occurs in open cup-shaped nests. There are two known key breeding areas in NSW in the Capertee Valley and Bundarra-Barraba regions. The Subject Land is not part of the Important Areas map for this species. However, Regent Honeyeaters have been recorded north of Gowrie <20 km north-east of the site and suitable foraging habitat is present on the Subject Land in the form of some scattered mistletoes and White Box trees (DPE 2022a).

The Turquoise Parrot is distributed from southern QLD to northern Victoria and is found between the coastal plains and western slopes of the Great Dividing Range in NSW (DPE 2022c). This species inhabits eucalypt woodland adjoining clearings, ridges and creeks. This ground forager species feeds in the shade of trees on seeds, grasses and herbs, while nesting occurs in tree hollows, logs or posts. Turquoise Parrots are disturbance tolerant species who return to foraging areas shortly after disturbance. This species is well known in the Tamworth area, particularly south of Currabubula, and suitable foraging habitat is present within the woodland and grassland vegetation zones on the Subject Land.

Grey Falcons are sparsely distributed in NSW throughout the arid and semi-arid regions of the Murray-Darling Basin (DPE 2022c). This species inhabits shrubland, grassland and wooded watercourses within 100 m of a water source and is often found near wetlands. Foraging for birds, reptiles and mammals occurs in open areas using high-speed chases and stoops, while nesting occurs in living eucalypts near water. The Grey Falcon is not well known in the Tamworth area. However, has been recorded near Gunnedah and Carroona, west of the Subject Land. The open grassland areas on the Subject Land are potential suitable foraging habitat.

The Swift Parrot is a winter migrant species present in south-eastern Australia between March and September in areas with profusely flowering eucalypts (DPE 2022c). Breeding occurs in Tasmania, while favoured winter foraging tree species include White Box which is present on the Subject Land. The Subject Land is not part of the Important Areas map. However, this species is known to occur in the Tamworth-Gunnedah area based on scattered recorded sightings (DPE 2022a).

The Large-eared Pied Bat is a small to medium-sized bat found within 2 km of roosting habitat including caves, overhangs, escarpments, outcrops, crevices, old mines or tunnels (DPE 2022c). This species has a very patchy distribution in NSW in well-timbered gullies and is predominantly found between Newcastle, Gulgong and Sussex Inlet, with scattered recorded sightings occurring near Tamworth, Boggabri and Coonabarabran (DPE 2022a). Foraging for small, flying insects occurs below the forest canopy. This species has been recorded approximately 8 km south of the Subject Land within a mountainous range that extends northwards to within 2 km of the Subject Land. Assuming roosting habitat is present in this mountainous range, the Large-eared Pied Bat may utilise woodland areas on the Subject Land for foraging.

Koalas are considered to potentially utilise the Subject Land for foraging due to the presence of key feed trees species (White Box and Tumbledown Red Gum). This species has a fragmented distribution throughout eastern Australia in eucalypt woodland and forest. Koalas spend most of their time in trees but will descend to move between trees in open areas (DPE 2022c). The size of their home range varies with habitat quality and home ranges of <2 ha have been recorded. Koalas are well known between Werris Creek and Boggabri with scattered records occurring near Currabubula. The Subject Land is connected to the heavily forested mountainous region <3 km west of the site via scattered trees. Therefore, Koalas may occasionally utilise suitable key feed trees on the site within their wider foraging range.

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

- a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

There are no known viable populations of any of the six threatened species on or adjacent to the Subject Land. Suitable breeding habitat for the threatened fauna species is absent from the Subject Land. Therefore, the assessment of whether the proposed development is likely to have an adverse effect on the life cycle of

the threatened species is based on the loss of potential foraging habitat. The proposed development will result in the loss of 0.5 ha of potential foraging habitat including 0.39 ha of native vegetation.

Woodland (0.18 ha) on the Subject Land may be utilised as foraging habitat by Regent Honeyeaters, Turquoise Parrots, Swift Parrots, Koalas and Large-eared Pied Bats, whereas Grey Falcons may utilise the open areas of the site including the DNG (0.21 ha) and Exotic Riparian Vegetation (0.10 ha) for foraging.

The Project is unlikely to have an adverse effect on the life cycle of the potentially occurring threatened species due to the size of the Subject Land which is likely to occupy a small area within the species' wider foraging range. Suitable foraging habitat is also widespread in the surrounding area in the form of large intact woodland and DNG which contain flowering eucalypts, plant seeds and mistletoe. Therefore, the loss of 0.5 ha of potential foraging habitat is unlikely to place any unknown viable local populations of the six threatened species at risk of extinction.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***

Not applicable.

- ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,***

Not applicable.

c. in relation to the habitat of a threatened species or ecological community:

- i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and***

The proposed development will result in the loss of 0.5 ha of potential foraging habitat for the six threatened species. This is unlikely to affect any of these threatened species due to the presence of more suitable foraging habitat in the surrounding area adjacent to the Subject Land.

- ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and***

The construction and operation of the water holding pond and access road will not fragment or isolate foraging habitat (DNG and Exotic Riparian Vegetation) for birds of prey such as the Grey Falcon as this species is highly mobile with large home ranges. Woodland habitat on the Subject Land is part of a large remnant woodland area extending west and north of the Subject Land. The loss of 0.18 ha of woodland including eighteen trees will not isolate or increase fragmentation in the surrounding landscape as the trees to be cleared occur at the southern extent of the large woodland patch which will remain connected and unfragmented. As a result, the loss of 0.18 ha of woodland is considered unlikely to impact the Regent Honeyeater, Turquoise Parrot, Swift Parrot, Large-eared Pied Bat and Koala which, if utilising the Subject Land for foraging, remain capable of dispersing to the larger woodland patch.

- iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,***

The foraging habitat to be removed would only form part of a much larger foraging range for these six threatened species, and the removal of 0.5 ha within the regional context will not affect the long-term survival of these species due to the presence of more suitable foraging habitat in the locality.

- d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),***

Not applicable.

- e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.***

Clearing of native vegetation:

The proposed development is the key threatened process 'clearing of native vegetation' as it will result in the loss of 0.37 ha of native vegetation (DPE 2022d). This threatening process affects all six threatened species but is unlikely to be exacerbated by the Project due to the small area of planned clearing, and lack of key breeding habitat features such as hollow-bearing trees. The loss of 0.37 ha of native vegetation is also unlikely to influence the persistence of the six threatened species in the locality as gene flow within and between local populations will not be limited due to the absence of suitable breeding habitat on the Subject Land and the presence of similar native vegetation in the surrounding locality.

5.3.1.1 CONCLUSION

The Project is not considered likely to have an adverse impact on the life cycle or habitat of any threatened species identified as having potential to occur on the Subject Land. A Species Impact Statement is not required under Section 7.8 of the BC Act, nor does the proposed activity trigger the Biodiversity Offsets Scheme under Section 7.2 of the BC Act.

5.4 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

Five threatened fauna species (Regent Honeyeater, Grey Falcon, Swift Parrot, Large-eared Pied Bat and Koala) considered likely to utilise the Subject Land for foraging are classified as Matters of National Environmental Significance (MNES) under the EPBC Act. Based on the Five Part Test, the Project is not anticipated to have a significant impact on any of these species. Therefore, no referral to the Commonwealth government is required.

5.5 SERIOUS AND IRREVERSIBLE IMPACTS (SAII)

Three species (Regent Honeyeater, Swift Parrot and Large-eared Pied Bat) considered likely to utilise the Subject Land for foraging are listed as species at risk of SAII species under the BC Act. However, as the native vegetation clearing associated with the Project is below the clearing threshold (<1 ha) for entry into the Biodiversity Offset Scheme, SAII do not apply.

5.6 STATE ENVIRONMENTAL PLANNING POLICY (Biodiversity and Conservation) 2021

The State Environment Planning Policy (Koala Habitat Protection) 2020 (K-SEPP 2020) now lies within Chapter 3 of the State Environment Planning Policy (Biodiversity and Conservation) 2021. The K-SEPP 2020 applies to this Project as the Subject Land lies within the Liverpool Plains Local Government Area (LGA) and is zoned as RU1 Primary Production. The K-SEPP 2020 aims to protect habitat utilised by the Koala which is known to occur in the North West Slopes of the New England region of NSW (DPE 2020). The Subject Land and adjoining land are owned by Boral Resources (Country) Pty Ltd. As this area is >1 ha, Part 2 of the K-SEPP

2020 applies to the Subject Land. An assessment of potential koala habitat and core koala habitat on the Subject Land is assessed below according to Part 2 of the K-SEPP 2020.

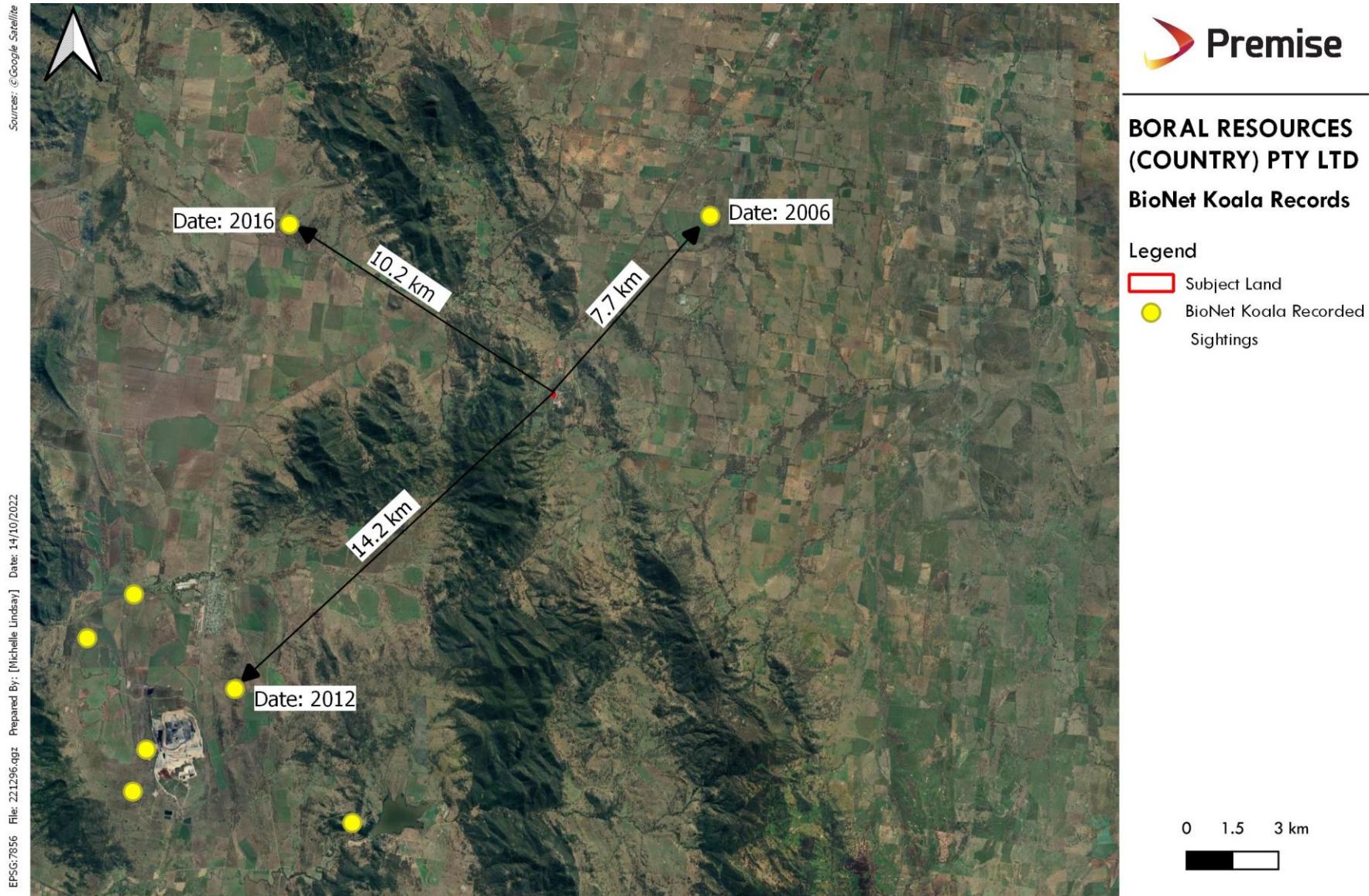
Step 1 – is the land potential koala habitat?

According to the K-SEPP 2020, 'Potential koala habitat means areas of native vegetation where tree of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component' (DPE 2020). The Subject Land contains nine White Cypress Pine, three White Box trees and seven Tumbledown Red Gum trees. White Box is listed in Schedule 2 and accounts for 16% of the total number of trees on the Subject Land. Therefore, the Subject Land is potential koala habitat.

Step 2 – is the land core koala habitat?

The K-SEPP 2020 defines core koala habitat as 'an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population' (DPE 2020). The presence of breeding females on the Subject Land is unknown as targeted searches have not been undertaken. However, according to BioNet, the closest recorded Koala sightings are 7 km north-east, 10 km north-west and 14 km south-west of the Subject Land (DPE 2022a) (**Figure 5**). Most Koala recorded sightings in the surrounding area occur between Quirindi (south of Werris Creek) and Kelvin (north of Gunnedah) (DPE 2022a). No recorded sightings occur in proximity to the Subject Land and breeding habitat is likely to be absent from the Subject Land or surrounds. Therefore, the Subject Land is not considered core koala habitat. Impact avoidance and minimisation methods for potential koalas on the Subject Land are identified in Section 5.1 of this report.

Figure 5. BioNet Koala Recorded Sightings



6. CONCLUSION

The proposal to construct a 3ML holding water pond and associated access track at the Currabubula Quarry will not disrupt the life cycle of threatened species or place them at risk of extinction and will not contribute to key threatening processes or increase the impact of a key threatened process.

The proposal is also not likely to have a significant impact on any threatened species, populations or ecological communities or their habitat, and accordingly, does not trigger the Biodiversity Offsets Scheme (BOS) and no referral to the Commonwealth Government is required.

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APPENDIX A

VEGETATION INTEGRITY PLOT RESULTS

Scientific Name	Common Name	N/E/HTW ³	BAM Growth Form Group ⁴	Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Acacia spp.</i>	Wattle	N	SG							0.1	5
<i>Acaena ovina</i>	Acaena	N	FG			0.1	5				
<i>Agrostis capillaris</i>	Browntop Bent	E/HTW				0.1	1	1	30		
<i>Amyema spp.</i>	Mistletoe	N	OG							1	5
<i>Anthosachne scabra</i>	Wheatgrass	N	GG	0.1	2	0.2	30			10	300
<i>Aristida ramosa</i>	Purple Wiregrass	N	GG	10	100	40	400			1	20
<i>Asperula conferta</i>	Common Woodruff	N	FG							0.1	100
<i>Austrostipa scabra</i>	Speargrass	N	GG	10	100	0.2	10				
<i>Bidens subalternans</i>	Greater Beggar's Ticks	E								2	100
<i>Boerhavia dominii</i>	Tarvine	N	FG	0.1	3	0.1	1				
<i>Bothriochloa spp.</i>	Redgrass	N	GG	0.2	5						
<i>Brachyscome spp.</i>	A Daisy	N	FG	0.1	1						
<i>Briza minor</i>	Shivery Grass	E				0.1	1				
<i>Bromus hordeaceus</i>	Soft Brome	E				10	1000	0.2	50		
<i>Bursaria spinosa</i>	Native Blackthorn	N	SG	0.5	3	0.5	4			0.5	6
<i>Callitris glaucophylla</i>	White Cypress Pine	N	TG							0.5	4
<i>Calotis lappulacea</i>	Yellow Burr-daisy	N	FG	30	100	0.2	20	0.1	1	0.1	2
<i>Carex spp.</i>	A Sedge	N	GG	0.1	20						
<i>Carthamus lanatus</i>	Saffron Thistle	E/HTW		0.2	300	1	500	0.2	10		
Caryophyllaceae		N	FG			0.1	30				
<i>Cenchrus clandestinus</i>	Kikuyu Grass	E						3	50		
<i>Cenchrus spp.</i>	Foxtail	E						0.1	3		
<i>Centaurium erythraea</i>	Common Centaury	E		0.1	200	0.1	5			0.1	1
<i>Cheilanthes sieberi</i>	Rock Fern	N	FG	0.1	50	0.1	2				
<i>Chloris truncata</i>	Windmill Grass	N	GG			0.1	1			0.1	10
<i>Chondrilla juncea</i>	Skeleton Weed	E		0.1	1						

Scientific Name	Common Name	N/E/HTW ³	BAM Growth Form Group ⁴	Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Cirsium arvense</i>	Perennial Thistle	E								0.1	10
<i>Cirsium vulgare</i>	Spear Thistle	E				0.1	5			0.2	5
<i>Convolvulus erubescens</i>	Pink Bindweed	N	OG	0.1	1						
<i>Conyza spp.</i>	A Fleabane	E		0.1	2	0.1	5			0.1	10
<i>Cymbonotus lawsonianus</i>	Bears-ear	N	FG	0.1	1						
<i>Cymbopogon refractus</i>	Barbed Wire Grass	N	GG	0.1	2	0.5	5			0.1	2
<i>Cyperus eragrostis</i>		E/HTW						80	200		
<i>Cyperus spp.</i>		N	GG			1	30				
<i>Cyperus spp.2</i>		N	GG			0.1	5	0.1	2		
<i>Daucus glochidiatus</i>	Native Carrot	N	FG	0.2	100	5	10000			0.1	50
<i>Desmodium varians</i>	Slender Tick-trefoil	N	OG	2	200	0.1	10			0.2	50
<i>Dianella revoluta</i>	Blueberry Lily	N	FG			0.2	2				
<i>Dianella spp.</i>	A Lily	N	FG			0.1	30				
<i>Dichanthium sericeum</i>	Queensland Bluegrass	N	GG	5	40	0.1	5				
<i>Dichelachne spp.</i>	Plumegrass	N	GG	0.1	10	0.1	3			0.1	1
<i>Dichondra sp. Inglewood</i>	Silky Kidney Weed	N	FG	2	500	3	2000			0.2	40
<i>Dichopogon spp.</i>	Chocolate Lily	N	FG	0.1	2						
<i>Einadia hastata</i>	Berry Saltbush	N	FG							1	100
<i>Enneapogon nigricans</i>	Niggerheads	N	GG			0.1	3				
<i>Eucalyptus albens</i>	White Box	N	TG	0.1	3						
<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	N	TG			0.1	1			50	2
<i>Euchiton sphaericus</i>	Star Cudweed	N	FG	0.1	1						
<i>Euphorbia spp.</i>		N	FG			0.5	50	0.5	15		
<i>Evolvulus alsinoides</i>	Bindweed	N	FG					0.1	1		
<i>Galium aparine</i>	Goosegrass	E				0.1	2	0.5	40		
<i>Geranium spp.</i>	A Geranium	N	FG	1	200	15	500	0.1	5	1	300

Scientific Name	Common Name	N/E/HTW ³	BAM Growth Form Group ⁴	Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Glycine tabacina</i>	Variable Glycine	N	OG	1	50	2	50			0.1	10
<i>Haloragis heterophylla</i>	Variable Raspwort	N	FG			0.1	10	0.1	20		
<i>Hirschfeldia incana</i>	Buchan Weed	E				0.2	10			0.1	3
<i>Holcus lanatus</i>	Yorkshire Fog	E						0.5	20		
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	N	FG	0.1	1	0.1	5			0.2	20
<i>Hypochaeris glabra</i>	Smooth Catsear	E		0.1	30						
<i>Hypochaeris radicata</i>	Catsear	E				0.2	50				
<i>Juncus spp.</i>	A Juncus	N	GG					5	20		
<i>Lactuca serriola</i>	Prickly Lettuce	E				0.1	2				
<i>Lolium rigidum</i>	Wimmera Ryegrass	E				0.1	1				
<i>Lomandra spp.</i>	Mat-rush	N	GG	0.1	3					0.1	1
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	E		0.1	10						
<i>Marrubium vulgare</i>	White Horehound	E				1	0.1			0.1	2
<i>Medicago minima</i>	Woolly Burr Medic	E				0.1	20	0.1	1		
<i>Microlaena stipoides</i>	Weeping Grass	N	GG			0.1	2				
<i>Microtis unifolia</i>	Common Onion Orchid	N	FG	0.1	5						
<i>Modiola caroliniana</i>	Red-flowered Mallow	E				0.1	1				
<i>Nasturtium officinale</i>	Water Cress	E						10	200		
<i>Notelaea microcarpa</i>	Native Olive	N	TG							40	100
<i>Onopordum spp.</i>		E				0.1	5				
<i>Opuntia aurantiaca</i>	Tiger Pear	E/HTW		0.1	1	0.1	5				
<i>Opuntia stricta</i>	Common Prickly Pear	E/HTW		0.1	1					0.1	1
<i>Oxalis perennans</i>	Grassland Wood-sorrel	N	FG							0.1	10
<i>Oxalis thompsoniae</i>	Fluffy-fruit Wood-sorrel	N	FG	0.1	5	0.1	10				
<i>Panicum spp.</i>	Panicum	N	GG	2	30						
<i>Paronychia brasiliana</i>	Chilean Whitlow Wort	E								0.1	1
<i>Paspalum dilatatum</i>	Paspalum	E/HTW				3	20	15	100		

Scientific Name	Common Name	N/E/HTW ³	BAM Growth Form Group ⁴	Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Petrorhagia dubia</i>	Velvet Pink	E		0.1	4	0.2	500			0.1	2
<i>Pimelea spp.</i>		N	SG	0.1	5	0.1	5			0.1	2
<i>Pimelea spp.2</i>		N	SG			0.1	10				
<i>Pimelea trichostachya</i>	Spiked Rice-flower	N	SG	0.1	20						
<i>Pittosporum angustifolium</i>	Butterbush	N	SG							1	5
<i>Plantago varia</i>	Variable Plantain	N	FG			0.1	1			0.1	2
<i>Ranunculus spp.</i>	A Buttercup	N	FG			0.1	1				
<i>Rumex brownii</i>	Swamp Dock	N	FG	0.1	5	0.1	5	0.5	50	0.1	5
<i>Rytidosperma racemosum</i>	Wallaby Grass	N	GG	0.1	3						
<i>Schoenus spp.</i>	A Bog-rush	N	GG					5	200		
<i>Sida corrugata</i>	Corrugated Sida	N	FG	0.1	2						
<i>Solanum nigrum</i>	Black-berry Nightshade	E								0.2	20
<i>Sonchus oleraceus</i>	Common Sowthistle	E		0.1	1	0.2	50	0.1	2	0.1	1
<i>Stellaria media</i>	Common Chickweed	E								0.2	50
<i>Swainsona queenslandica</i>	Smooth Darling Pea	N	FG							0.1	3
<i>Taraxacum officinale</i>	Dandelion	E				0.1	1				
<i>Trifolium arvense</i>	Haresfoot Clover	E		1	100	1	300	0.1	3	0.1	5
<i>Trifolium campestre</i>	Hop Clover	E				0.1	20			0.1	2
<i>Trifolium glomeratum</i>	Clustered Clover	E		0.1	10			0.1	1		
<i>Trifolium repens</i>	White Clover	E						0.1	2		
<i>Urtica incisa</i>	Stinging Nettle	N	FG							0.1	5
<i>Verbascum virgatum</i>	Twiggy Mullein	E				0.2	20				
<i>Verbena quadrangularis</i>	A Verbena	E		0.1	2	5	1000	1	100	0.1	10
<i>Vittadinia cuneata</i>	Woolly New Holland Daisy	N	FG			0.1	3				
<i>Vittadinia muelleri</i>	Mueller's Fuzz-weed	N	FG	3	100						

Scientific Name	Common Name	N/E/HTW ³	BAM Growth Form Group ⁴	Q1		Q2		Q3		Q4	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Vittadinia spp.</i>	Fuzzweed	N	FG	0.1	10						
<i>Wahlenbergia spp.</i>	Bluebell	N	FG	0.1	20			0.1	1	0.1	50
<i>Wahlenbergia stricta</i>	Tall Bluebell	N	FG			0.1	10				

³ N: Native, E: Exotic vegetation, HTW: High Threat Weeds

⁴ Growth Form Groups: TG: tree group, SG: shrub group, FG: forb group, EG: fern group, OG: other group



APPENDIX B

TREE ASSESSMENT RESULTS

ID	Scientific Name	Common Name	Eastings	Northings	Tree Hollows			Diameter at Breast Height (DBH)
					<5 cm	5-20 cm	>20 cm	
T1	<i>Eucalyptus albens</i>	White Box	287391	6536000				27
T2	<i>Callitris glaucophylla</i>	White Cypress Pine	287402	6536012				17
T3	<i>Eucalyptus albens</i>	White Box	287404	6535995	2	3		89
T4	<i>Eucalyptus albens</i>	White Box	287388	6535992				25
T5	<i>Eucalyptus albens</i>	White Box	287398	6535984				28
T6 ⁵	<i>Eucalyptus albens</i>	White Box	287429	6535992				34
T7	<i>Eucalyptus albens</i>	White Box	287433	6535991				22
T8	<i>Callitris glaucophylla</i>	White Cypress Pine	287431	6535997				5
T9	<i>Callitris glaucophylla</i>	White Cypress Pine	287425	6536002				18
T10	<i>Callitris glaucophylla</i>	White Cypress Pine	287423	6536005				9
T11	<i>Callitris glaucophylla</i>	White Cypress Pine	287426	6536010				25
T12	<i>Callitris glaucophylla</i>	White Cypress Pine	287422	6536015				8
T13	<i>Callitris glaucophylla</i>	White Cypress Pine	287430	6536016				6
T14	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287462	6536092		1		93
T15	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287454	6536072				52
T16	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287463	6536065				16
T17	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287452	6536067				13
T18	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287454	6536049	1			77
T19	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287450	6536050	1	1		27
T20	<i>Angophora floribunda</i>	Rough-barked Apple	287426	6536050				32
T21	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287426	6536042				30
T22	<i>Eucalyptus albens</i>	White Box	287420	6536054				36
T23	<i>Eucalyptus albens</i>	White Box	287416	6536053				25
T24	<i>Angophora floribunda</i>	Rough-barked Apple	287414	6536057				32

T25	<i>Angophora floribunda</i>	Rough-barked Apple	287401	6536065				119
T26	<i>Eucalyptus albens</i>	White Box	287402	6536069				89
T27	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287392	6536053				9
T28	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287391	6536053				13
T29	<i>Eucalyptus albens</i>	White Box	287385	6536050				19
T30	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287394	6536041				22
T31	<i>Angophora floribunda</i>	Rough-barked Apple	287405	6536051				24
T32	<i>Eucalyptus albens</i>	White Box	287405	6536049				6
T33	<i>Callitris glaucophylla</i>	White Cypress Pine	287416	6536044				6
T34	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287419	6536040				11
T35	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287441	6536037				24
T36	<i>Callitris glaucophylla</i>	White Cypress Pine	287449	6536037				9
T37	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287467	6536035				51
T38	<i>Eucalyptus albens</i>	White Box	287472	6536037				18
T39	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287476	6536028				18
T40	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287479	6536028				7
T41	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287476	6536026				25
T42	<i>Eucalyptus albens</i>	White Box	287483	6536027				23
T43	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287481	6536021				21
T44	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287483	6536029				8
T45	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287481	6536028				5
T46	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287483	6536029				14
T47	<i>Eucalyptus albens</i>	White Box	287489	6536045				63
T48	<i>Eucalyptus albens</i>	White Box	287484	6536042				16
T49	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287450	6536019				23
T50	<i>Callitris glaucophylla</i>	White Cypress Pine	287449	6536014				8

T51	<i>Callitris glaucophylla</i>	White Cypress Pine	287450	6536011				9
T52	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287456	6536006				16
T53	<i>Callitris glaucophylla</i>	White Cypress Pine	287449	6536000				12
T54	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287424	6535968				127
T55	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287421	6535980				19
T56	<i>Eucalyptus albens</i>	White Box	287406	6535979				8
T57	<i>Eucalyptus albens</i>	White Box	287400	6535978				7
T58	<i>Eucalyptus albens</i>	White Box	287399	6535977				20
T59	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287399	6535973				22
T60	<i>Eucalyptus albens</i>	White Box	287400	6535973				16
T61	<i>Callitris glaucophylla</i>	White Cypress Pine	287404	6535969				24
T62	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287412	6535967				6
T63	<i>Callitris glaucophylla</i>	White Cypress Pine	287414	6535965				5
T64	<i>Callitris glaucophylla</i>	White Cypress Pine	287413	6535953				5
T65	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287420	6535947				19
T66	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287435	6535946				13
T67	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287437	6535954				20
T68	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	287437	6535954				34
T69	<i>Callitris glaucophylla</i>	White Cypress Pine	287392	6535950				17

⁵ Blue categorized trees are those located within the Subject Land



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