Flora and Fauna Assessment for No 231 Pacific Highway Mount White

Enviro *Ecology*

Revision	Details	Date	Amended By
A	Flora & Fauna Assessment	22-07-2022	John Whyte

Author: .....John Whyte

Signed: 

Date: .....22nd of July 2022

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1. Introduction

Enviro Ecology has been engaged by White + Dickson Architects to carry out a Flora and Fauna Assessment over part of No 231 Pacific Highway Mount White NSW within the Central Coast LGA hereafter referred to as the subject property (Figure 1-1).

The proposed development is to rezone the subject property to allow for additional permitted uses. This report examines the terrestrial flora assemblages and faunal species and their habitats within the location of the future development area hereafter referred to as the subject site. The report then determines the impacts of future development upon local biodiversity. It summarises proposed mitigation measures as well as the assessment under the *Environmental Planning and Assessment Act 1979* and under the (Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999*.

1.1 Terminology

This report uses the following terminology:

- ***Subject site*** means the area directly affected by the proposal. The area of land which is to be directly or indirectly affected by the proposed development within No 231 Pacific Highway, Mount White (Figure 1-1)
- ***Study area*** means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all potential impacts into account. Study area is defined as the extent of the subject site boundary as shown on the aerial photograph see (Figure 1-1).
- ***Direct impacts*** are those that directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.
- ***Indirect impacts*** occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas.
- Subject property: Are defined as No 231 Pacific Highway, Mount White NSW
- BCA Act abbreviates the *Biodiversity Conservation Act 2016;*
- EPBC Act abbreviates the *Environment Protection and Biodiversity Conservation Act 1999;*
- EP&A Act abbreviates the *Environmental Planning and Assessment Act 1979*;
- IPA abbreviates Inner Protection Area
- OEH abbreviates Office of Environment & Heritage (OEH));

- OPA abbreviates Outer Protection Area
- LGA abbreviates Local Government Area;
- Threatened species refers to those flora and fauna species listed as vulnerable, endangered or critically endangered under the BC Act or EPBC Act
- EEC abbreviates Endangered Ecological Community; and
- WSUD abbreviates Water Sensitive Urban Design.

1.2 Legislative context

This report addresses the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The study area is located within the Wollondilly City Council, a Local Government Area (LGA).

All proposals assessed under the *Environmental Planning and Assessment Act 1979* must include an examination of the threatened biodiversity, or their habitats, that are likely to occur within the development area or that may be indirectly affected by the construction and operation of a proposal. In the event that threatened biodiversity is within the vicinity of a proposal, the application must also include an assessment of the potential impact.

1.3 Key Acts and Policies

1.3.1 NSW Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (NSW EP&A Act) forms the legal and policy platform for proposal assessment and approval in NSW and aims to 'encourage the proper management, development and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and EP&A Regulation 2000.

1.3.2 NSW Biodiversity Conservation Act 2016

The NSW Biodiversity Conservation Act 2016 (BC Act), the NSW Biodiversity Conservation Regulation 2017 (BC Regulation) and amendments to the Local Land Services Act 2013 (LLS Act) commenced on 25 August 2017. The legislation aims to deliver "a strategic approach to conservation in NSW whilst supporting improved farm productivity and sustainable development". The BC Act repeals several pre-existing Acts, most notably the Threatened Species Conservation Act 1995, the Nature Conservation Trust Act 2001 and the Native Vegetation Act 2003. Relevant provisions from each of the repealed Acts has been saved and incorporated into the new legislative framework. Transitional arrangements are in place to ensure a smooth transition from the repealed legislation to the BC Act.

1.3.3 NSW Biodiversity Values Map

Preparation of a BDAR is required for activities that impact areas identified as having high biodiversity value by the NSW Biodiversity Values Map (BV Map) (OEH, 2020d). EE reviewed the NSW Biodiversity Values Map (BC Map) on 1st of May 2022 found that the subject property is mapped as containing areas of high biodiversity value within the future rezoning area (Appendix H). Future development located within the NSW Biodiversity Values map will require the preparation of a biodiversity development assessment report or alternatively the site may be subject to a future bio certification proposal.

1.3.4 NSW Water Management Act

Controlled activities carried out in, on or under waterfront land are regulated by the NSW Water Management Act 2000 (WM Act). The NSW Office of Water (known as DPI Water) administers the WM Act and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to waterfront land as a consequence of carrying out the controlled activity. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary. This means that a controlled activity approval must be obtained from the Office of Water before commencing the controlled activity.

1.3.5 Environment Protection and Biodiversity Conservation Act 1999

The purpose of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a proposal, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Minister for the Environment.

The EPBC Act identifies matters of NES as:

- World heritage properties
- National heritage places
- Wetlands of international importance (Ramsar Wetlands)
- Threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development..

As part of the current investigation, matters of national environmental significance (and their habitats) that are predicted to occur within the locality (applying a 10 kilometre buffer) were obtained from the on-line Protected Matters Search Tool (DAWE, 2022a). The EPBC Act has been further addressed in this assessment through:

- Targeted field surveys for EPBC listed threatened biota and migratory species;
- Assessment of potential impacts on EPBC listed threatened species and migratory biota;
- Identification of suitable impact mitigation and environmental management measures for EPBC listed threatened species and migratory biota; and
- Identification of the need for an EPBC referral based on the EPBC Significant Impact Guidelines (DEWHA, 2013)

1.3.6 State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapter 4 Koala Habitat Protection)

State Environmental Planning Policy (Biodiversity and Conservation) chapter 4 Koala Habitat Protection aims to encourage the "proper conservation and management of areas of natural vegetation that provide habitat for Koalas (*Phascolarctos cinereus*) to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline". The SEPP is currently being amended by the NSW Department of Planning and Environment. Key changes to the amended SEPP relate to the following:

- Definitions of koala habitat;
- List of Koala feed tree species;
- List of councils to which the SEPP applies; and
- Various changes to the development assessment process.

Central Coast LGA is identified in Schedule 2 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 and therefore consideration of SEPP is required.

1.4 Site Description

The planning and cadastral details of the subject property are provided in (Table 1-1). The property is bordered by Elaine Close to the north and west and by rural residential to the south and east (Figure 1-1).

Table 1-1 Site details

Location	No 231 (Lot 1 DP 207158) Pacific Highway, Mount White
Topographic Map	Central Coast 1:25000
Local Government Area	Central Coast
Property size	3.45ha
Elevation	166-170m AHD
Slope	The subject property slopes in south-easterly direction
Aspect	North-south

1.5 Study objectives

The objectives of this report are to:

- Conduct a fauna survey and habitat assessments to determine the likelihood of occurrence of threatened or Migratory species of animal occurring within the subject site.
- Conduct a floral survey to identify any threatened species of plant present or considered likely to occur within the proposal area & determine and describe the characteristics and condition of the vegetation communities and flora.
- Determine the presence, or likelihood of occurrence, of threatened biodiversity listed under the *Biodiversity Conservation Act 2016*or *Environment Protection and Biodiversity Conservation Act 1999* occurring within the subject site.
- Describe and assess likely impacts of the project on biodiversity.
- Undertake significance assessments were required for threatened biodiversity that occur or have potential habitat within the subject site.
- Propose amelioration measures to mitigate or minimise impacts on the ecological values of the subject site.

Figure 1-1 Subject property & study area

Figure 1-1 Study Area, subject property and subject site.

- Subject Property
- Study Area
- Subject Site

Projected Coordinate System	GDA 2020 Zone 56
DATE : 22/07/2022	Map Version : 1.0

Aerial imagery - Nearmap 17/06/2022

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Figure 1-2 Proposed rezoning development

2. Methodology

This ecological assessment was based on the results of a desktop review and site inspections on the 28th of June & on the 7th of July 2022 by Mr John Whyte B.Bio.Sc (Majors Botany & Zoology). This assessment has been prepared to identify potential impacts as a result of the proposed activity upon biodiversity.

2.1 Licensing

All work was carried out under the appropriate licences, including a scientific licence as required under part 2 of the *Biodiversity Conservation Act 2016,* and an Animal Research Authority issued by the Department of Industries and Investment formerly the Department of Primary Industries (Agriculture).

2.2 Personnel

Table 2-1 Staff Roles and Qualifications

Staff Name	Project Role	Qualifications
Mr John Whyte Principal Ecologist	Project management and report review.	Bachelor of Biological Sciences, La Trobe University, Melbourne, Victoria. BioBanking accredited assessor (0113) BAM accredited assessor (BAAS17110)
Mr David Leggett	GIS Mapping (WiZarDTech Spatial Services)	BSc (Forestry)

2.3 Nomenclature

Names of plants used in this document follow Harden (Harden 1992; Harden 1993; Harden 2000; Harden 2002) with updates from PlantNet (Royal Botanic Gardens 2022). Scientific names are used in this report for species of plant. Scientific and common names of plants are listed in Appendices A and C. Names of vertebrates follow the Census of Australian Vertebrates (CAVS) database maintained by the Department of Agriculture, Fisheries and Forestry (Department of Agriculture, Fisheries and Forestry 2022). Common names are used in the report for species of animal. Scientific names are included in species lists found in Appendices B and D.

2.4 Database searches and literature review

This assessment included a review of:

- Concept Masterplan prepared by White + Dickson Architects
- Arborist report prepared for No 231 Pacific Highway, Mount White NSW (Enviro Ecology 2022)
- Topographic maps & Aerial photographs
- Vegetation Mapping of the area (Bell S 2009) The natural vegetation of the Gosford Local Government Area, Central Coast, New South Wales. Wyong, Unpublished report to Gosford Council, East Coast Flora Survey.
- State vegetation mapping (State Government of NSW and Department of Planning and Environment 2022)
- Biodiversity development assessment report for a proposed dwelling houses and bed and breakfast at No 231 Pacific Highway, Mount White (Conacher Consulting 2021)
- Database searches, as summarised in Table 2-1.

Table 2-2 Database searches

Database	Search date	Area searched	Reference
Bionet Atlas of NSW Wildlife	28th of June 2022	Locality (10 km)	(Department of Planning, Industry and Environment 2022)
PlantNet Database	28th of June 2022	Locality (10 km)	(Royal Botanic Gardens 2022)
Protected Matters Search Tool	22nd of July 2022	Locality (10 km)	(Department of Agriculture, Fisheries and Forestry 2022)

2.5 Field Survey

Field inspections of the site were undertaken on 28th of June & on the 7th of July 2022 by Mr John. This included:

- Two BAM plots and a random meander survey recording all native species of plant encountered within the study area (Figure 2-1)
- Searching for specialised fauna habitat resources such as roosting/nesting hollows, foraging resources e.g. feed trees
- Targeted surveys for flora and fauna (Sections 2)
- Opportunistic fauna surveys during the flora survey

2.6 Flora Surveys

A combination of quadrat and traverse flora surveys was used to assess native floral diversity, dominant species, condition of vegetation communities and search for Threatened species within the study area. The flora survey effort was determined to exceed the suggested minimum survey requirements of the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft)* (refer to table 3-2, Department of Environment and Conservation 2004).

Table 2-3 Suggested survey technique and effort for plant quadrats

Survey technique	Suggested minimum effort per stratification unit
Quadrat	▪ 1 quadrat for areas <2 ha
	▪ **2 quadrats for area 2-50 ha**
	▪ 3 quadrats for areas 51-250 ha
	▪ 5 quadrats for areas 251-500 ha
	▪ 10 quadrats for areas 5,001-1,000 ha, plus 1 additional quadrat for each extra 100 ha thereof
Random Meander	▪ 30 minutes for each quadrat sampled within the same stratification unit as the quadrat

Source: *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (Working Draft) (Department of Environment and Conservation 2004).

2.6.1 Vegetation Survey Plots (BAM Plots)

Following delineation of vegetation zones within the Rezoning area, 400m² floristic plot/transects (BAM Plots) were sampled. Plot/ transects were positioned to sample areas that were most representative of the floristic characteristics of each PCT vegetation zone. The number of plot/transects sampled in each vegetation zone was based on the requirements of the BAM (OEH, 2020b), which are presented in Table 2-6.

Table 2-4 Minimum number of plots and transects required per zone area

Vegetation Zone Area (ha)	Minimum number of plots/transects
<2	1 plot/transect
>2-5	**2 plot/transect**
>5-20	3 plot/transect
>20-50	4 plot/transect
>50-100	5 plot/transect
>100-250	6 plot/transect
>250-1000	7 plot/transect
>1000	8 plot/transect

Vegetation integrity was determined using data collected from vegetation survey plot/ transects (BAM Plots) by examining the vegetation composition, structure and function attributes as follows:

- The assessment of vegetation composition was based on the number of native plant species (richness) observed within the 400m² plot/transect (standard 20m x 20m BAM Plot);
- The assessment of vegetation structure was based on the % of foliage cover for each plant growth form group within the 400m² plot (standard 20m x 20m BAM plot); and
- The assessment of vegetation function was based on an assessment of the following attributes within the 1000m² plot (20m x 50m BAM Plot):
- Number of large trees
- Tree regeneration
- Tree stem size class
- Total length of fallen logs
- Litter cover (i.e. assessed using five 1m² quadrats along the 50m transect)
- High threat exotic vegetation cover
- Hollow bearing trees

2.6.2 Vegetation condition

The condition of vegetation communities is an important criterion to determine suitable habitats for Threatened species and the conservation status of certain ecological communities. Vegetation within the study area was assigned to one of the following condition classes (refer Table 2-5).

Table 2-5 Vegetation community condition classes

Condition Class	Criteria
Good	Vegetation still retains the species complement and structural characteristics of the pre-European equivalent. Such vegetation has usually changed very little over time and displays resilience to weed invasion due to intact groundcover.
Moderate	Vegetation generally still retains its structural integrity, but has been disturbed and has lost some component of its original species complement. Weed invasion can be significant in such remnants
Poor	Vegetation that has lost most of its species and is significantly modified structurally. Often such areas now have a discontinuous canopy of the original tree cover and very few shrubs. Exotic species, such as introduced pasture grasses or weeds, replace much of the indigenous ground cover. Environmental weeds are often co dominant with the original indigenous species.

2.7 Terrestrial fauna

2.7.1 Fauna habitats

Fauna habitat assessments were undertaken to assess the likelihood of Threatened species of animal (those species identified from the literature and database review) to occur within the study area. Fauna habitat characteristics assessed included the:

- Structure and floristics of the canopy, understorey and ground vegetation, including the presence of flowering and fruiting trees providing potential foraging resources
- Presence of hollow-bearing trees providing roosting and breeding habitat for arboreal mammals, birds and reptiles
- Composition of the ground cover vegetation, leaf litter, rocky outcrops and fallen timber to provide protection for ground-dwelling mammals, reptiles and amphibians
- Presence of waterways (ephemeral or permanent) and water bodies.

The assessment of these fauna habitat characteristics enabled an overall assessment of fauna habitat condition within the study area (refer Table 2-3).

Table 2-6 Fauna Habitat Condition Classes

Fauna habitat condition class	Description
Good	A full range of fauna habitat components are usually present (e.g. old growth trees, fallen timber, feeding and roosting resources) and habitat linkages to other remnant ecosystems in the landscape are intact.
Moderate	Some fauna habitat components may be missing (e.g. old growth trees, fallen timber), although linkages with other remnant habitats in the landscape are usually intact, but sometimes degraded.
Poor	Many fauna habitat elements in low quality remnants have been lost, including old growth trees (e.g. due to past timber harvesting or land clearing) and fallen timber, and tree canopies are often highly fragmented. Habitat linkages with other remnant ecosystems in the landscape have usually been severely compromised by extensive past clearing.

2.7.1 State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapter 4 Koala Habitat Protection)

State Environmental Planning Policy (Biodiversity and Conservation) chapter 4 Koala Habitat Protection aims to encourage the "proper conservation and management of areas of natural vegetation that provide habitat for Koalas (*Phascolarctos cinereus*) to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline". The SEPP is currently being amended by the NSW Department of Planning and Environment. Key changes to the amended SEPP relate to the following:

- Definitions of koala habitat.
- List of Koala feed tree species.
- List of councils to which the SEPP applies; and
- Various changes to the development assessment process.

Central Coast LGA is identified in Schedule 2 of State Environmental Planning Policy (Biodiversity and Conservation) 2021.

2.7.2 Fauna survey

The presence of faunal species within the study area was determined primarily through consideration of suitable habitats, with species of animal identified opportunistically during the vegetation survey, habitat assessments. Although recording Threatened species during field survey can confirm their presence in an area, a lack of Threatened species records does not necessarily indicate the absence of the species from the study area when suitable habitat is present. By the very nature of their rarity, Threatened species are often difficult to detect. Suitable habitat is, therefore, an important factor to consider when determining the potential presence of Threatened species.

Due to the lack of suitable fauna habitat: ground cover vegetation, leaf litter, rocky outcrops and fallen timber within the subject site, no intensive targeted surveys for ground-dwelling/arboreal mammals, reptiles, avian and amphibians were considered to be necessary.

The assessment of fauna habitats enabled an overall assessment of fauna habitat condition within the subject site.

Figure 2-1 Flora survey location within the study area

Figure 2-1 Flora survey locations	Projected Coordinate System	GDA 2020 Zone 56
Subject Property	DATE : 22/07/2022	Map Version : 1.0
BAM plot locations	Aerial imagery - Nearmap 17/06/2022	
	Although all care has been taken - WiZarDTech accepts no responsibility from the use or inaccuracies of this map and spatial data. Copyright © WiZarDTech Spatial Services 2022.	WiZarDTech Spatial Services

2.8 Likelihood of occurrence

Following collation of database records and species and community profiles, as returned by the Bionet Atlas of NSW (OEH, 2022a) and the EPBC Protected Matters Search Tool (DAWE, 2022a), a 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the Rezoning area (Appendices C & D). Likelihood of occurrence was based on species distribution and habitat preferences, and the quality of potential habitat present, as defined in Table 2-6.

Table 2-7 Key to Likelihood of Occurrence for Threatened Species

Likelihood	Criteria
Present	The species was observed in the proposal site during the current survey.
High	It is highly likely that a species inhabits the proposal site and is dependent on identified suitable habitat (ie for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10 km) and is known or likely to maintain resident populations in the proposal site. Also includes species known or likely to visit the proposal site during regular seasonal movements or migration.
Moderate	Potential habitat is present in the proposal site. Species unlikely to maintain sedentary populations; however, may seasonally use resources within the proposal site opportunistically or during migration. The species is unlikely to be dependent (ie for breeding or important life cycle periods such as winter flowering resources) on habitat within the proposal site, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the proposal site and has not been recorded recently in the locality (10 km). It may be an occasional visitor, but habitat similar to the proposal site is widely distributed in the local area, meaning that the species is not dependent (ie for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the proposal site or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent within the Rezoning area.

2.9 Limitations

Within the study area varying degrees of non-uniformity of flora and fauna habitats are encountered. Hence no sampling technique can entirely eliminate the possibility that a species is present within a study area (e.g. species of plant present in the seed bank). The conclusions in this report are based upon data acquired for the study area and the environmental field surveys and are, therefore, merely indicative of the environmental condition of the study area at the time of survey, including the presence or otherwise of species. It should also be recognised that conditions of the study area, including the presence of threatened species, can change with time.

Habitat assessments were completed for all threatened fauna species identified as a result of the database searches (Table 2-1) to determine whether or not suitable habitat for threatened fauna species occurred within the study area. This is a more conservative approach and is likely to include species that are difficult to detect.

3. Results

3.1 Vegetation Mapping

All plant species detected within the Rezoning area were identified to species level (Appendix A). Native vegetation types were identified based on dominant flora species present within each structural layer (i.e. canopy, shrub and ground layers). Exotic or highly modified native vegetation was defined based on structure and species composition. Boundaries of vegetation types and communities were marked with a hand-held GPS and mapped using geographical information system (GIS) software.

Vegetation types within the Rezoning area were assessed against identification criteria for State and Commonwealth listed threatened ecological communities (DAWE, 2020b; OEH, 2020f). Vegetation and habitats were compared with descriptions provided in the Bionet Vegetation Information System (OEH, 2020e) to identify Plant Community Types (PCTs).

3.2 Vegetation communities

Two vegetation communities: Plant Community Type 1627 Smooth-barked Apple – Turpentine – Sydney Peppermint Heathy Woodland on Sandstone Ranges of the Central Coast & Cleared Land with Exotic Plantings were recorded from the study area. Detailed descriptions of these communities have been provided below.

3.2.1 PCT 1627 Smooth-barked Apple – Turpentine – Sydney Peppermint Heathy Woodland on Sandstone Ranges of the Central Coast

The canopy was dominated by *Angophora costata* (Smooth-barked Apple), *Corymbia gummifera* (Red Bloodwood), *Eucalyptus haemastoma* (Scribbly Gum), *Eucalyptus piperita* (Sydney Peppermint), *Eucalyptus punctata* (Grey Gum) and *Eucalyptus sieberi* (Silvertop Ash). Canopy trees ranged in height from approximately 10-23m. The projected foliage cover of the canopy ranged from 15-35%.

The sub-canopy was primarily absent from this community with the occasional *Pittosporum undulatum* (Sweet Pittosporum). Sub-canopy trees were to a height of 7-13m. The projected foliage cover of the canopy ranged from 5-15%.

Native shrubs recorded from this community include: *Kunzea ambigua* (Tick Bush), *Leptospermum polygalifolium, Leptospermum trinervium* (Flaky Tea-tree) and *Acacia longifolia* shrubs were to a height of 1.5-3.5m with a PFC of >5-40%. The higher PFC of the shrub layer was recorded adjacent to the 1st order watercourse which is to be retained and protected. A native shrub layer adjacent to the 2nd order watercourse is primarily absent due to a high abundance of weeds.

Areas of this community surrounded by Cleared Land with Exotic Plantings were dominated by exotic ground species: *Pennisetum clandestinum* (Kikuyu), *Plantago lanceolata* (Lamb's Tongues), *Ehrharta erecta* (Panic Veldtgrass) & *Rumex crispus* (Curled Dock). Beneath the remnant trees small patches of *Pteridium esculentum* (Bracken Fern) and *Imperata cylindrica* (Blady Grass) were recorded.

Doryanthes excelsa (Gymea/Giant Lily) and formed small remnant patches of groundcover. Weed species frequently recorded from this community and at times were also dominant include: *Ageratina adenophora* (Crofton Weed), *Ligustrum sinense* (Small-leaved Privet) & Rubus moluccanus (Blackberry). The ground cover ranged in height from approximately 0.1-3.5 m tall with a projected foliage cover of 65-90%.

Photograph 3-1 PCT 1627 recorded from the northern portion of the study area

Photograph 3-2 PCT 1627 recorded from the northern portion of the study area

Photograph 3-3 PCT 1627 recorded from the northern portion of the study area

Photograph 3-4 PCT 1627 recorded from the northern portion of the study area

3.2.2 Cleared land with exotic plantings

The canopy was dominated by exotic plantings: *Erythrina x sykesii* (Coral Tree), *Populus alba* (White Poplar), *Cupressus sp*, *Pinus radiata* (Pine Tree), *Syagrus romanzoffiana* (Cocos Palm), *Cinnamomum camphora* (Camphor Laurel) & *Liquidambar styraciflua* (Liquidambar). Canopy trees ranged in height from approximately 13-32m. The projected foliage cover of the canopy ranged from >5- 20%.

A native subcanopy and shrub layer was absent from this community.

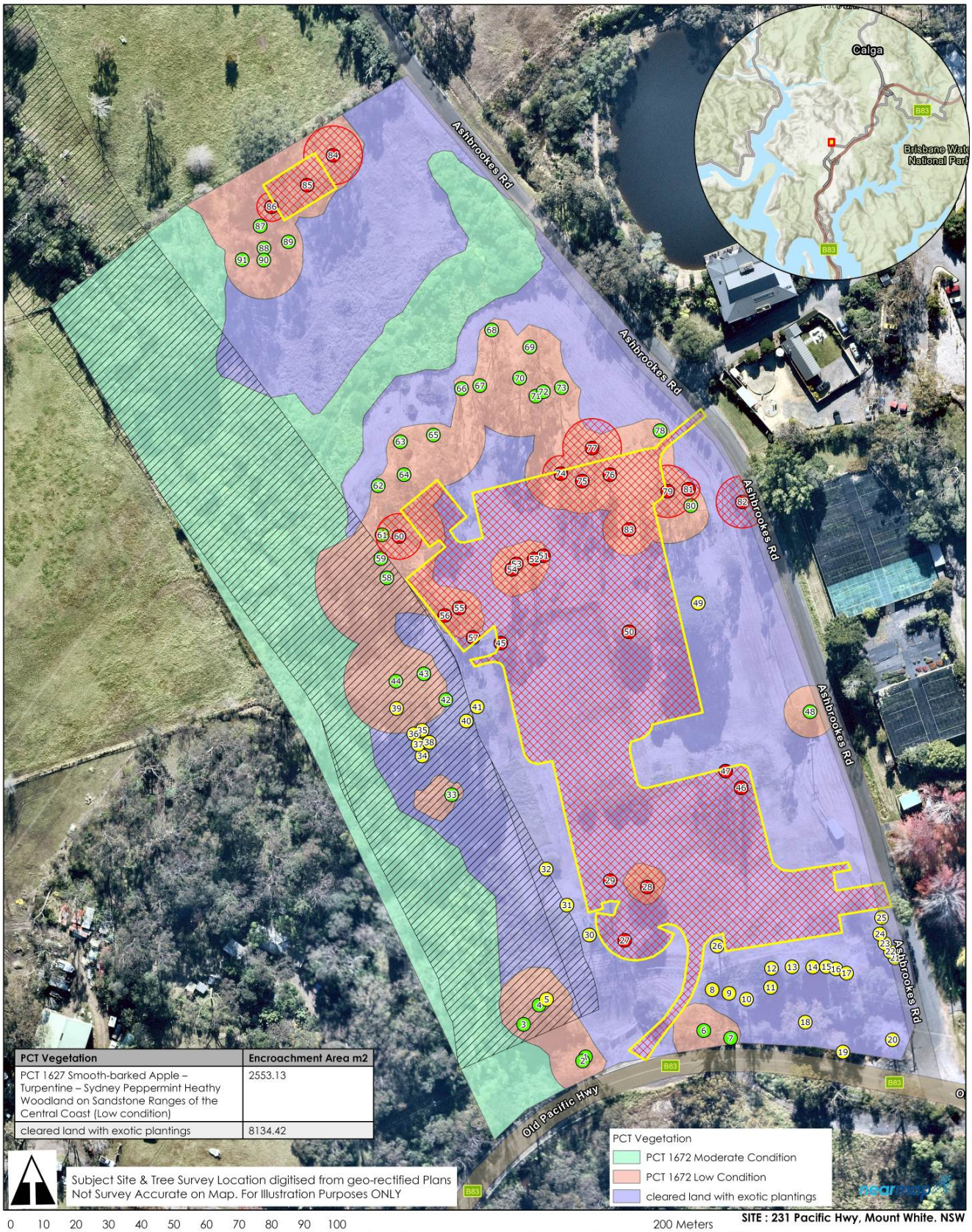
The groundcover was dominated by exotic ground species: *Pennisetum clandestinum* (Kikuyu), *Ehrharta erecta* (Panic Veldtgrass), Axonopus fissifolius (Narrow-leafed Carpet Grass), *Trifolium repens* (Hop Clover), *Plantago lanceolata,* (Lamb's Tongues) & *Rumex crispus* (Curled Dock). The ground cover ranged in height from approximately 0.1-0.5 m tall with a projected foliage cover of 80-90%.

Photograph 3-5 Cleared Land with Exotic Plantings

Photograph 3-6 Cleared Land with Exotic Plantings

Photograph 3-7 Cleared Land with Exotic Plantings

Figure 3-1 Field verified vegetation communities recorded from the subject property



PCT Vegetation	Encroachment Area m2
PCT 1627 Smooth-barked Apple – Turpentine – Sydney Peppermint Heathy Woodland on Sandstone Ranges of the Central Coast (Low condition)	2553.13
cleared land with exotic plantings	8134.42

0 10 20 30 40 50 60 70 80 90 100 200 Meters
Scale: 1:1,000

SITE : 231 Pacific Hwy, Mount White. NSW

Vegetation Survey

- Subject Site
- Native
- Exotic
- For Removal
- Biodiversity Values Map 07/2022
- EncroachmentArea

Projected Coordinate System	GDA 2020 Zone 56
DATE : 07/07/2022	Map Version : 1.2

Aerial imagery - Nearmap 17/06/2022

WiZarDTech Spatial Services

3.3 Species of plant

A total of 76 species of plant was recorded from within and adjacent to the study area, of which 46 species (61%) were native (Appendix A). The most diverse families recorded from the study area were Myrtaceae & Poaceae (Appendix A).

3.4 Species of animal

3.4.1 Amphibians

No threatened frogs listed under the BC or EPBC Acts were identified within the subject site and no suitable foraging or breeding habitat exists for the Red-crowned Toadlet or the Giant Burrowing Frog is to be impacted upon as a result of the proposed rezoning.

3.4.2 Reptiles

One species of reptile *Lampropholis guichenoti* (Garden Skink) was identified within the study area.

No suitable nesting sites for *Varanus rosenbergi* (Heath Monitor) were observed within the subject site.

3.4.3 Birds

Twenty-two species of bird were identified within the study area (Appendix B).

The vegetation within the study area provides a range of foraging opportunities for birds.

The diversity of tree and shrub species within the two vegetation communities ensures that nectar resources are available throughout much of the year as different species flower at different times. Large foraging areas for bird species occur outside of the subject property and are connected to the subject site.

No Glossy Black-cockatoo (*Calyptorhynchus lathami*) or Gang-gang Cockatoo (*Callocephalon fimbriatum*) feed trees (Allocasuarina sp) were identified from the subject site. Despite the presence of two *Allocasuarina littoralis* (Black She-oak) specimens within the study area no Glossy-black or Gang-gang Cockatoos were identified from the study area.

There is no evidence of Powerful Owl roosts or breeding hollows within the subject site, no whitewash, or regurgitated pellets were found despite targeted surveys. Notwithstanding an impact assessment has been prepared for this species.

3.4.4 Mammals

Native floral diversity was moderate across the vegetation communities and provides seasonal foraging opportunities e.g. flowering trees, shrubs and groundcovers which fauna species would utilise on a seasonal basis.

The blossoms of the canopy trees within the study area provide suitable foraging resources for the Grey-headed Flying-fox (*Pteropus poliocephalus*), this species was not however recorded from the study area during the fauna survey.

No suitable caves for threatened cave dwelling bats were recorded from the subject site.

No hollow-bearing trees are proposed for removal to accommodate future development within the rezone area.

3.4.5 Fauna habitat types

The suitability, size and configuration of the terrestrial fauna habitats were found to correlate broadly with the structure, floristics, connectivity and quality of the local vegetation community described above. These habitats mostly comprised of Cleared Land with exotic plantings and Plant Community Type 1627 Smooth-barked Apple – Turpentine – Sydney Peppermint Heathy Woodland on Sandstone Ranges of the Central Coast.

The condition class of the habitats within Cleared Land with Exotic Plantings Scattered Trees community was assessed as being in a low condition whilst the Plant Community Type 1627 Smooth-barked Apple – Turpentine – Sydney Peppermint Heathy Woodland on Sandstone Ranges of the Central Coast was assessed as being in low-moderate condition and provided a limited range of fauna habitat components e.g. fallen timber and feeding and roosting resources.

3.4.6 Fauna microhabitat features

Tree hollows

Hollows develop in *Eucalypts* when the tree is under some form of stress, heartwood decay is present and the tree is sufficiently large to persist when decayed (Gibbons and Lindenmayer 2002). As such, hollows are more likely to occur in older and larger trees; however the abundance and size of hollows may vary within and between species.

Tree hollows typically provide den and nesting habitat for a range of common birds and arboreal mammal species (Gibbons and Lindenmayer 2002), including providing potential habitat for a number of Threatened species including microchiropteran bats and large forest owls. Whether or not tree hollows are used by animals, and which species use them, depends on a number of factors, including hollow characteristics (diameter, height, depth), the number of hollows in a tree, tree health, size, location and spacing (Gibbons and Lindenmayer 2002).

No hollow-bearing trees are proposed for removal to accommodate future development within the rezone area.

Feeding resources

Fauna occurring in the project locality are likely to use a range of foraging resources including both native and exotic species. A number of floral feeding resources were found to be available that would provide some foraging resources for a range of fauna including many of the species of bird recorded and the Threatened Grey-headed Flying-fox.

Flora feeding resources can be divided into blossoms, fruits (casuals, berries and drupes) and seeds. The dominant families providing these resources within the study area include:

- Blossoms (nectar and pollen): Myrtaceae, Proteaceae and Fabaceae (Mimosoideae).
- Fruits: Araliaceae, Euphorbiaceae, Oleaceae, Pittosporaceae, Solanaceae, Rosaceae, Verbenaceae.
- Seed: Poaceae, Lomandraceae, Casuarinaceae, Myrtaceae, Fabaceae (Faboideae and Mimosoideae).

The diversity of species across these families provides floral feeding resources that would be available throughout each season for sedentary species. During spring and summer when floral resource availability peaks, it is likely that other migratory and more transient species also frequent the locality for foraging.

The floral resources outside of the subject site (including vegetative matter) are also likely to support a diverse community of invertebrates, which in-turn provide an addition foraging resource for insectivorous fauna (e.g. birds, small mammals and microbats).

3.5 State Environmental Planning Policy (Biodiversity and Conservation) 2021 chapter 4 (Koala Habitat Protection)

The site is located in the Central Coast Local Government Area, which is listed under Schedule 2 of State Environmental Planning Policy (Biodiversity and Conservation). The likelihood of the site to be 'potential koala habitat' or 'core koala habitat' was assessed. Under chapter 4 "(Koala Habitat Protection) 2021" of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 the following definitions apply:

'Koala Development Application Map'- means the State Environmental Planning Policy (Koala Habitat Protection) 2021— Koala Development Application Map.

'Core koala habitat' –

(a) an area of land where koalas are present, or

(b) an area of land—

(i) which has been assessed by a suitably qualified and experienced person in accordance with the Guideline as being highly suitable koala habitat, and

(ii) where koalas have been recorded as being present in the previous 18 years. Koala habitat was assessed by inspecting all feed trees to identify indicative scratches on the trunk and droppings around the bases of feed trees.

The subject property is located within lands mapped on the Koala Development Application Map "Central Coast Management Area".

The subject property does not form part of an approved Koala plan of management.

No Koalas were observed during the fauna survey and there was no evidence of previous Koala habitation in the area. The subject site is also not considered to be 'Core Koala Habitat' as defined by SEPP.

As such the subject site is not considered to comprise Potential Koala Habitat as defined under SEPP no further assessment under this Policy is required.

3.6 Threatened biodiversity

This section details the threatened biodiversity recorded or likely to occur within the study area. This is based on those species recorded or predicted to occur within the locality from database searches (Table 2-1) and the nature of the habitats observed within the vicinity of the proposed works during field surveys (Appendices C and D).

For those species, populations and communities with a low/medium, medium or high likelihood of occurrence within the study area, an impact of significance assessment has been prepared (Appendices E & F).

3.6.1 Threatened ecological communities

Eleven endangered ecological communities were identified from desktop review to occur within the locality of the subject site (Table 3-1).

Table 3-1 Endangered Ecological Communities known from the Locality

Scientific Name	Level of Threat
Blue Gum High Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	Endangered Ecological Community
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered Ecological Community
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community
Maroota Sands Swamp Forest	Endangered Ecological Community
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	Endangered Ecological Community
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered Ecological Community
Shale/Sandstone Transition Forest	Endangered Ecological Community
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered Ecological Community
Sydney Turpentine-Ironbark Forest	Endangered Ecological Community
Western Sydney Dry Rainforest in the Sydney Basin Bioregion	Endangered Ecological Community

No endangered ecological communities listed under the *Biodiversity Conservation Act 2016* or under the *Environment Protection and Biodiversity Conservation Act 1999* was recorded from the study area or immediately adjacent.

3.6.2 Endangered populations

One threatened populations were identified from the desktop review to occur within the locality of the study area:

- *Callocephalon fimbriatum* (Gang-gang Cockatoo)- endangered population; and

No endangered populations were identified within the study area.

3.6.3 Threatened Flora

Forty-five threatened species of plant listed under the *BC Act* and/or *EPBC Act* were predicted to occur within the locality of the study area based on database searches (refer Appendix B).

No threatened flora species were recorded during the targeted surveys within the subject site therefore no impact assessments are considered to be warranted for threatened flora species.

3.6.4 Threatened fauna

Fifty-one threatened fauna species were identified as a result of the database searches as occurring or having potential to occur within the locality of the study area (Appendix D).

Based on the habitat assessment and targeted surveys there is potential habitat within the subject site for eleven threatened fauna species that may be impacted through the removal of foraging habitat (Appendix D). Impact assessments have been prepared for these species (Appendix E).

3.6.5 Migratory species

Migratory species are protected under the international agreement to which Australia is a signatory, including the Japan-Australia Migratory Bird Agreement, the China-Australia Migratory Bird Agreement and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Migratory species are considered Matters of National Environmental Significance and are protected under the *Environment Protection and Biodiversity Conservation Act 1999*.Eleven migratory species were identified from the Department of Agriculture, Fisheries and Forestry (Department of Agriculture, Fisheries and Forestry 2022) within the locality (Appendix D). None were recorded during the site inspections. Two migratory species were considered to have suitable habitat within the subject site (Table 3-2).

Table 3-2 Migratory Species considered to have suitable habitat within the subject site

Scientific Name	Common Name	EPBC Act
Birds		
Monarcha melanopsis	Black-faced Monarch	M
Rhipidura rufifrons	Rufous Fantail	M

The subject site is not considered to be important habitat for any Migratory species in accordance with the EPBC Act.

3.7 Critical habitat

Critical habitat is listed under both the *Biodiversity Conservation Act 2016*and the *Environment Protection and Biodiversity Conservation Act 1999.* Critical habitat is the whole or any part or parts of an area or areas of land comprising the habitat of an endangered species, an endangered population or an endangered ecological community that is critical to the survival of the species, population or ecological community (Department of Environment and Conservation 2004).

The Directors-Generals of both the State and Federal departments of environment (Department of Planning, Industry and Environment and the Department of Agriculture, Fisheries and Forestry respectively) maintain a register of critical habitat. Habitat that is not listed on these register, however consistent with the definition above, may also be considered as critical habitat.

No listed critical habitat occurs within the study area and no critical habitat is likely to be affected by the proposal.

3.8 Biodiversity Offset Scheme (BOS) Entry Threshold

Native vegetation is defined as follows:

a. The native vegetation that comprises the groundcover is:

i) less than 50% of the cover of indigenous species of vegetation, and

ii) not less than 10% of the area is covered with vegetation (whether dead or alive); and

iii) the assessment is made at the time of year when the proportion of the amount of indigenous vegetation in the area to the amount of non-indigenous vegetation in the area is likely to be at its maximum.

A BOSET search was undertaken over the subject property (Appendix F) which identified the western portion of the subject property as being affected by the Biodiversity Values Map. An enquiry of the BOSET indicates that this area is mapped due to the presence of "riparian". The BV mapping has been overlayed onto Figure 3-1 above

It is important to note the use of the BOSET is a course methodology for calculating the loss of native vegetation. Detailed GIS mapping (Figure 3-1) above has been undertaken to calculate the loss of native vegetation which has been calculated at approximately 0.255ha which is well below the threshold of 5000m2 for entry into the biodiversity offset scheme (BOS).

The "subject site" is located outside of the BV mapped area and no native vegetation is proposed to be removed from the BV mapped area. The future development seeks to ensure development is located to the south and north of existing fenced area within existing managed land.

Table 3-3 Biodiversity Threshold Report

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	08/07/2022 3:01 PM	**BDAR Required***
Total Digitised Area	4,102.1 sqm	
Minimum Lot Size Method	LEP	
Minimum Lot Size 10,000sqm = 1ha	200,000 sqm	
Area Clearing Threshold 10,000sqm = 1ha	5,000 sqm	
Area clearing trigger Area of native vegetation cleared	no	no
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

No BDAR is deemed to be necessary in this instance.

3.9 Development or activity "likely to significantly affect threatened species"

(1) For the purposes of this Part, development or an activity is *likely to significantly affect threatened species* if:

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or

Significance assessments were carried out for threatened species, populations or communities listed under the *BC Act* that were known or predicted to occur in the project locality (10 kilometres from the study area) and that had a moderate to high likelihood of occurring within the study site based on suitable habitat or observation in the field.

(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or

The proposal will not result in clearing beyond the designated threshold of 0.5ha or 5000m. The BOSET tool was utilised to calculate the area of clearing of native vegetation although course the area mapped was approximately 2100m2. The entire study area

(c) it is carried out in a declared area of outstanding biodiversity value.

The Subject site has not been mapped as containing biodiversity value within the Biodiversity Value Map (NSW DoPE 2022).

3.9.1 Riparian

The usage of the riparian land within the study area will be guided by two key legislative requirements – the Fisheries Management Act 1994 (FM Act) and the Water Management Act 2000 (WM Act).

The FM Act lists threatened aquatic species which require consideration when addressing the potential impacts of a proposed development. If a proposed development is likely to significantly affect a threatened species, population, or their habitats, then a Species Impact Statement (SIS) is required to be prepared. The NSW Department of Primary Industries (DPI Water) administers the WM Act and is required to assess activities carried out on waterfront land. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 m of the highest bank of the river, lake or estuary. Certain activity within this land is defined as a 'controlled activity' and requires approval from DPI Water.

DPI Water requires a Vegetated Riparian Zone (VRZ) adjacent to a creek channel to provide a protective buffer between catchment land uses and aquatic habitat.

The study area supports a 1st & 2nd order watercourses. The 1st order watercourse requires a 10m setback defined from the top of bank a total vegetated riparian zone of 20m. The 2nd order requires a 20m setback defined from TOB. The proposal is consistent with the requirements of the Water Management Act 2005 (Table 3-4) in that future development will not encroach within the TOB. Asset protection zones are to be proposed only within existing managed land.

The proposed rezoning has been designed to retain and protect the onsite watercourses and is fully compliant with the WM Act.

Figure 3-2 The Strahler System

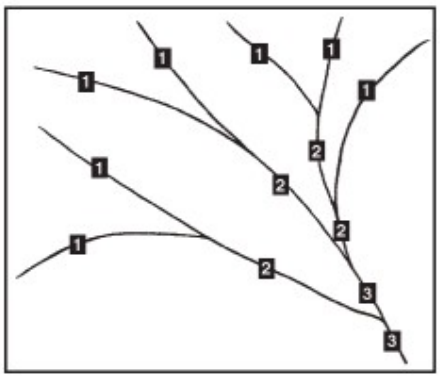


Table 3-4 Riparian Corridor Widths

Watercourse type	**VRZ width** (each side of watercourse)	**Total RC width**
1st order	10 metres	20 m + channel width
2nd order	20 metres	40 m + channel width
3rd order	30 metres	60 m + channel width
4th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters)	40 metres	80 m + channel width

4. Impacts

The following discussion presents an assessment of the potential impacts of the proposal on biodiversity within the subject site.

4.1 Impacts on threatened species, endangered populations and endangered ecological communities

Eleven threatened fauna species listed under the *BC Act* and/ or the *EPBC Act* were recorded, predicted to occur, or have habitat within the vicinity (10 km radius) of the study area. Impact assessments have been prepared for these species which has concluded that the proposal is not likely to have a significant impact upon threatened species, endangered populations or endangered ecological communities (Appendices E & F).

4.2 Key threatening processes

Key Threatening Process under the *Biodiversity Conservation Act 2016* that are likely to further increase within the subject site are:

- Clearing of native vegetation
- Invasion of native plant communities by exotic perennial grasses.
- Infection of native plants by *Phytophthora cinnamomi* - key threatening process listing. The proposal has potential to introduce or spread *Phytophthora cinnamomi* within the development area and into adjacent bushland. Mitigation measures are to be implemented to prevent spread of *Phytophthora cinnamomi*. Mitigation measures have been put in place to reduce the chance of infection of *Phytophthora cinnamomi* into the subject site.
- Human Caused Climate Change.

4.3 Mitigation measures to be implemented with future development over the subject property

4.3.1 Animal welfare

Animal injury has potential to occur throughout various construction operations. In the event that any sick, injured or orphaned native animals are located during construction, WIRES should be contacted to assist in capture, handling and welfare of the animal (contact No: 13000 WIRES or 1300 094 737).

A suitably qualified ecologist or wildlife handler should be on site during clearing of vegetation associated with the establishment future dwellings & asset protection zones. The qualified Ecologist is to hold a scientific licence issued by the Office of Environment & Heritage and a current Animal Ethics licence issued by the Department of Industries and Investment.

4.3.2 Truck and machine wash down areas

Vehicles and other equipment to be used in future construction works clearing within the subject site and general construction equipment (such as excavators etc) are to be received completely free of soil, seeds and plant material before entering the site to prevent the introduction of exotic plant species and pathogens, equipment failing inspection should be sent away for cleaning. Appropriate records of inspections shall be maintained.

Build-up of mud, soil and organic matter present on vehicles during wet and muddy conditions shall be manually removed prior to vehicles entering/leaving the construction site.

Works and vehicular movements shall cease if wet and muddy conditions develop/persist during construction zone clearing to limit the movement of soil and organic matter onto, through and from the study area, minimising the potential for the spread of weeds.

5. Significance Assessments

5.1 Background to the Five Part Test

No threatened flora are considered likely to be impacted upon as a result of the proposed development therefore no Significance assessments are considered to be required for those species identified as containing suitable habitat within the subject site (Table 5-1). The proposed development will not likely result in a significant impact to any Threatened species or community (Table 5-1).

Table 5-1 Suitable habitat from the subject site

Species Name		Conservation Status		Likely to be significantly affected
		State [1]	National [2]	
Threatened Fauna				
Bird				
Callocephalon fimbriatum	Gang-gang Cockatoo	V		No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		No
Glossopsitta pusilla	Little Lorikeet	V		No
Ninox strenua	Powerful Owl	V		No
Mammals				
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		No
Miniopterus schreibersii	Eastern Bent-wing Bat	V		No
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	No
Mormopterus norfolkensis	Eastern Freetail-bat	V		No
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V		No
Scoteanax rueppellii	Greater Broad-nosed Bat	V		No

Notes:

1. State conservation status: V= Vulnerable, E1 = Endangered, (*Biodiversity Conservation Act 2016* and *Fisheries Management Act 1994*). * indicates species listed under the *Fisheries Management Act 1994.*

2. National conservation status: V = Vulnerable, (*Environment Protection and Biodiversity Conservation Act 1999*)

6. Conclusions

Future development over the rezone area would likely result in of removal/modification of 0.26ha or 2600m2 of Plant Community Type 1627 Smooth-barked Apple – Turpentine – Sydney Peppermint Heathy Woodland on Sandstone Ranges of the Central Coast & the removal/modification of 0.81 or 8100m2 Cleared Land with Exotic Plantings.

Given the small area of vegetation to be removed/modified from within the locality and given the occurrence of larger areas of habitat consistent with that within the study area to the north, west, south-west & within the general locality of the area subject to disturbance the impact to the habitats for threatened flora and fauna species are not considered to be significant. Critical habitat will not be affected.

Targeted surveys did not identify any, threatened flora, endangered ecological communities; endangered population's listed under the *BC* or the *EPBC Acts* within the subject site.

The subject site was identified as containing suitable foraging habitat for eleven threatened fauna species the majority of these being microbats: Glossy-Black Cockatoo, Gang-gang Cockatoo, Powerful Owl, Little Lorikeet, Large-eared Pied Bat, Eastern False Pipistrelle, Eastern Bent-wing Bat, Grey-headed Flying-fox, Eastern Freetail-bat, Yellow-bellied Sheathtail Bat and the Greater Broad-nosed Bat.

Significance assessments were undertaken for these Threatened fauna species. These assessments concluded that the proposal was unlikely to have a significant impact on the majority of these species. This was based on the following criteria:

- Retention of majority of threatened fauna habitat within the subject property
- relatively small size of foraging habitat to be removed as part of the proposal
- larger areas of better-quality vegetation were noted at the time of the survey to the north of the subject site and to the north-west within reserves and retained elsewhere within the locality.
- all species are all highly mobile and would utilise vegetation within the locality and not the subject site exclusively

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Appendix A

Species of flora recorded

Table 7-1 Flora species recorded within the study area

Family Name	ENGLISH	NATIVE
Araceae		
Syagrus romanzoffiana	Coccus Palm	N
Zantedeschia aethiopica	Arum Lily	N
Altingiaceae		
Liquidambar styraciflua	Liquidambar	N
Araucariaceae		
Araucaria bidwillii	Bunya Pine	Y
Asparagaceae		
Asparagus aethiopicus	Asparagus Fern	N
Asparagus asparagoides		N
Asteraceae		
Ageratina adenophora	Crofton Weed	N
Gamochaeta americana	American Cudweed	N
Hypochaeris glabra	Smooth Catsear	N
Hypochaeris radicata	Catsear	N
Taraxacum officinale	Dandelion	N
Caprifoliaceae		
Lonicera japonica	Japanese Honeysuckle	N
Cupressaceae		
Cupressus sp.		N
Cyatheaceae		
Cyathea australis	Rough Treefern	Y
Cyperaceae		
Cyperus brevifolius		N
Cyperus eragrostis	Umbrella Sedge	N
Gahnia sieberiana		N
Dennstaedtiaceae		
Pteridium esculentum	Bracken	Y
Doryanthaceae		
Doryanthes excelsa	Gymea/Giant Lily	Y
Euphorbiaceae		
Glochidion ferdinandi	Cheese Tree	Y
Fabaceae (Faboideae)		
Erythrina X sykesii	Coral tree	N
Medicago polymorpha	Burr Medic	N
Trifolium campestre	Hop Clover	N
Trifolium repens	White Clover	N
Fabaceae (Mimosoideae)		
Acacia brownii	Heath Wattle	Y
Acacia decurrens	Black Wattle	Y
Acacia longifolia	Sydney Golden Wattle	Y
Acacia parramattensis	Parramatta Wattle	Y
Juncaceae		
Juncus cognatus		
Lauraceae		
Cinnamomum camphora	Camphor Laurel	N
Lobeliaceae		
Pratia purpurascens	Whiteroot	Y
Lomandraceae		
Lomandra longifolia	Spiny-headed Mat-rush	Y
Malvaceae		
Sida rhombifolia	Paddy's Lucerne	N

Family Name	ENGLISH	NATIVE
Myrtaceae		
Angophora costata	Sydney Red/Rusty Gum	Y
Callistemon salignus	Willow Bottlebrush	Y
Corymbia gummifera	Red Bloodwood	Y
Corymbia exima	Yellow Bloodwood	Y
Eucalyptus globoidea	White Stringybark	Y
Eucalyptus haemastoma	Broad-leaved Scribbly Gum	Y
Eucalyptus piperita	Sydney Peppermint	Y
Eucalyptus punctata	Grey Gum	Y
Eucalyptus sieberi	Silvertop Ash	Y
Eucalyptus tereticornis	Forest Red Gum	Y
Kunzea ambigua	Tick Bush	Y
Leptospermum polygalifolium		Y
Leptospermum trinervium		Y
Lophostemon confertus	Brush Box	Y
Syzygium paniculatum	Magenta Lilly Pilly	Y
Ochnaceae		
Ochna serrulata	Mickey Mouse Plant	N
Oleaceae		
Ligustrum lucidum	Large-leaved Privet	N
Ligustrum sinense	Small-leaved Privet	N
Phytolaccaceae		
Phytolacca octandra	Inkweed	N
Pinaceae		
Pinus radiata	Radiata Pine	N
Pittosporaceae		
Pittosporum undulatum	Sweet Pittosporum	Y
Plantaginaceae		
Plantago lanceolata	Lamb's Tongues	N
Poaceae		
Axonopus fissifolius	Narrow-leafed Carpet Grass	N
Cynodon dactylon	Common Couch	Y
Imperata cylindrica	Bladey Grass	Y
Paspalum dilatatum	Paspalum	N
Pennisetum clandestinum	Kikuyu Grass	N
Setaria gracilis	Slender Pigeon Grass	N
Sporobolus africanus	Parramatta Grass	N
Polygonaceae		
Rumex crispus	Curled Dock	N
Proteaceae		
Lambertia formosa	Mountain Devil	Y
Hakea dactylodies		Y
Banksia serrata	Serrated Banksia	Y
Banksia ericifolia	Candlesticks	Y
Ranunculaceae		
Clematis aristata		
Rosaceae		
Rubus moluccanus var.		N
Rubiaceae		
Richardia brasiliensis	Mexican Clover	N
Salicaceae		
Populus deltoides		N
Populus alba	White Poplar	N
Populus deltoides	Cottonwood	N

Family Name	ENGLISH	NATIVE
Populus nigra	'Italica' Italian Cypress	N
Salix babylonica	Weeping Willow	N
Solanaceae		
Solanum mauritianum	Wild Tobacco Bush	N
Ulmaceae		
Ulmus procera		N
Verbenaceae		
Lantana camara	Lantana	N

Appendix B

Species of animal recorded

Table 7-2 Fauna species recorded during surveys

Family Name	Common Name	Scientific Name	Conacher Environmental Group 2021	Enviro Ecology 2022	BC Act	EPBC Act
Hylidae	Bleating Tree Frog	*Litoria dentata*	O	O		
Myobatrachidae	Common Eastern Froglet	*Crinia signifera*	O	O		
Agamidae	Eastern Water Dragon	*Physignathus lesueurii*	O	-		
Scincidae	Garden Skink	*Lampropholis guichenoti*	O	O		
Artamidae	Australian Magpie	*Gymnorhina tibicen*	O	O		
Artamidae	Grey Butcherbird	*Cracticus torquatus*	O	O		
Cacatuidae	Galah	*Cacatua roseicapilla*	O	O		
Cacatuidae	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	O	O		
Dicruridae	Grey Fantail	*Rhipidura fuliginosa*	O	-		
Dicruridae	Leaden Flycatcher	*Myiagra rubecula*	O	-		
Dicruridae	Willie Wagtail	*Rhipidura leucophrys*	O	O		
Halcyonidae	Laughing Kookaburra	*Dacelo novaeguineae*	O	O		
Hirundinidae	Welcome Swallow	*Hirundo neoxena*	O	O		
Maluridae	Superb Fairy-wren	*Malurus cyaneus*	O	O		
Maluridae	Variegated Fairy-wren	*Malurus lamberti*	O	-		
Megapodiidae	Australian Brush-turkey	*Alectura lathami*		O		
Meliphagidae	Lewin's Honeyeater	*Meliphaga lewinii*	O	O		
Meliphagidae	Little Wattlebird	*Anthochaera chrysoptera*	O	O		
Meliphagidae	Noisy Miner	*Manorina melanocephala*	O	O		
Meliphagidae	Red Wattlebird	*Anthochaera carunculata*	O	O		
Meliphagidae	Yellow-faced Honeyeater	*Lichenostomus chrysops*	O	O		
Oriolidae	Olive-backed Oriole	*Oriolus sagittatus*	O	-		
Pardalotidae	Striated Thornbill	*Acanthiza lineata*	O	O		
Psittacidae	Crimson Rosella	*Platycercus elegans*		O		
Psittacidae	Eastern Rosella	*Platycercus eximius*	O	-		
Psittacidae	Rainbow Lorikeet	*Trichoglossus haematodus*	O	O		
Macropodidae	Swamp Wallaby	*Wallabia bicolor*	O	O		
Molossidae	White-striped freetail bat	*Austronomus australis*	O	-		
Phalangeridae	Common Brushtail Possum	*Trichosurus vulpecula*	O	-		
Vespertilionidae	Chocolate Wattled Bat	*Chalinolobus morio*	O	-		
Vespertilionidae	Greater Broad-nosed Bat	*Scoteanax rueppellii*	O	-	V	

Key:

A - Anabat II	C	-	Call Identification
D - Diggings	Sk	-	Skin
E - Elliot Trap	Fl	-	Flying over study area
O - Observation	P	-	Call Playback Response
F - Feather	S	-	Habitat Search
Sp - Spotlight	Sc	-	Scat, Track

Appendix C

Threatened flora species recorded in the locality

Appendix C Threatened Flora species recorded in the locality

This appendix details the Threatened species of plant that have either been recorded in the local area based on records the Bionet *Atlas of NSW Wildlife* Department of Planning, Industry and Environment 2022), data received 28th of June 2022 and records from the Royal Botanical Gardens. Threatened species with habitat likely to occur in the locality were also considered based on records from the *EPBC Protected Matters Search Tool* Department of Agriculture, Fisheries and Forestry, data received 22nd of July 2022.

Table 7-3 Threatened flora species recorded in the locality

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
Araliaceae	*Astrotricha crassifolia*	Thick-leaf Star-hair	V	V	2V	Occurs near Patonga and in the Royal National Park and inland to Glen Davis where it grows in dry sclerophyll woodland on sandstone {Harden, 1993 #4; Harden, 1992 #3; Department of Environment and Climate Change, 2007 #1653}.	**Low** No suitable habitat was recorded from the subject site for this species.
Asteraceae	*Olearia cordata*		V	V	2Ra	Occurs chiefly from Wiseman's Ferry to Wollombi where it grows on sandstone in dry sclerophyll forest and open shrubland {Harden, 1992 #3}. Specifically this species occurs on exposed Hawkesbury Sandstone ridges in shallow or skeletal soils. Occurs on Gymea and Hawkesbury soil types and may be associated with shale. Associated species include Angophora costata, A. bakeri, Eucalyptus punctata and Corymbia eximia with understorey including Allocasuarina torulosa, Acacia linifolia, Persoonia linearis, Leucopogon muticus and grasses. Also been recorded with E.eugenioides or near Wollemi with E. oblonga, E. notabilis and Leptospermum trinervium. Corymbia gummifera and Angophora euryphylla also noted in northern areas {NSW National Parks and Wildlife Service, 2000 #277}.	**Low** No suitable habitat was recorded from the subject site for this species.
Casuarinaceae	*Allocasuarina glareicola*		E1	E		Restricted to the Sydney basin where it occurs north east of Penrith in or near Castlereagh State Forest. Grows on lateritic soil in open forest {Harden, 2000 #2}.	**Low** No suitable habitat was recorded from the subject site for this species.
Dilleniaceae	*Hibbertia superans*		E1			Occurs from Castle Hill to South Maroota where it grows in ridgetop woodlands usually near Shale/Sandstone Transition Forest. It is often associated with other threatened flora including Pimelea curviflora var. curviflora, Darwinia biflora, Epacris purpurascens var. purpurascens, Leucopogon fletcheri subsp. Fletcheri, Acacia bynoeana, Eucalyptus sp. Cattai and Persoonia hirsuta (NSW Scientific Committee, 2001).	**Low** No suitable habitat was recorded from the subject site for this species.
Dilleniaceae	*Hibbertia puberula*		E1			Has not been seen for over 40 years. Early records of this species are from the Hawkesbury River area and	**Low** No suitable habitat

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
						Frenchs Forest in northern Sydney, South Coogee in eastern Sydney, the Hacking River area in southern Sydney, and the Blue Mountains {Department of Environment and Climate Change, 2008 #1913}.	was recorded from the subject site for this species.
Dilleniaceae	*Hibbertia procumbens*	Spreading Guinea Flower	E1			Recorded only from Mangrove Mtn and grows in heath on sandy soils {Harden, 2000 #2}.	**Low** Targeted surveys have been undertaken for this species which failed to detect this species within the subject site. No impact assessment is considered to be warranted for this species.
Epacridaceae	*Epacris purpurascens var. purpurascens*		V		2K	Occurs in Gosford and Sydney districts where it grows in sclerophyll forest, scrub and swamps {Harden, 1992 #3}. Usually found in sites with a strong shale influence {NSW National Parks and Wildlife Service, 2002 #67}.	**Low** Targeted surveys have been undertaken for this species which failed to detect this species within the subject site. No impact assessment is considered to be warranted for this species.
Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E1	V	3V	Occurs south of Dora Creek-Morisset area to Berrima and the Illawarra region and west to the Blue Mountains. It grows mainly in heath and dry sclerophyll forest on sandy soils {Harden, 2002 #5}. Seems to prefer open, sometimes disturbed sites such as trail margins and recently burnt areas. Typically occurs in association with Corymbia gummifera, Eucalyptus haemastoma, E. gummifera, E. parramattensis, E. sclerophylla, Banksia serrata and Angophora bakeri {NSW National Parks and Wildlife Service, 1999 #61}.	**Low** No suitable habitat was recorded from the subject site for this species.
Fabaceae (Mimosoideae)	*Acacia gordonii*		E1	E	2K	Occurs in the lower Blue Mountains from Bilpin to Faulconbridge and also in the Glenorie district. Grows on sandstone outcrops and amongst rock platforms in dry sclerophyll forest and heath {Harden, 2002 #5; NSW Scientific Committee, 1997 #298}. Specifically this species occurs in Sydney Sandstone Ridgetop Communities {James, 1997 #69}.	**Low** No suitable habitat was recorded from the subject site for this species.

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
Fabaceae (Mimosoideae)	*Acacia pubescens*	Downy Wattle	V	V	3Va	Restricted to the Sydney Region from Bilpin to the Georges River and also at Woodford where it usually grows in open sclerophyll forest and woodland on clay soils. Typically it occurs at the intergrade between shales and sandstones in gravely soils often with ironstones {Harden, 2002 #5;NSW National Parks and Wildlife Service, 2003 #14}.	**Low** No suitable habitat was recorded from the subject site for this species.
Grammitaceae	*Grammitis stenophylla*	Narrow-leaf Finger Fern	E1			Fern which occurs in coastal regions from Queensland to the NSW south coast where it grows on rocks in rainforest and in wet sclerophyll forest {Harden, 2000 #2}.	**Low** No suitable habitat was recorded from the subject site for this species.
Lamiaceae	*Prostanthera densa*	Villous Mint-bush	V	V	3V	Occurs from Nelson Bay to Beecroft Peninsula where it grows in sclerophyll forest and shrubland, on coastal headlands and near-coastal ranges, on sandstone {Harden, 1992 #3}.	**Low** No suitable habitat was recorded from the subject site for this species.
Lamiaceae	*Prostanthera junonis*	Somersby Mintbush	E1	E	2E	Grows in sclerophyll forest and woodland, usually near the coast, in sandy loamy soils, overlying sandstone. Occurs in Mangrove Mtn and Sydney districts {Harden, 1992 #3}.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V		2Ri	Occurs chiefly from Georges to the Hawkesbury River where it grows in dry sclerophyll forest, open forest, scrubland or woodland on sandstone. Found in damp places, usually in gullies {Robinson, 1994 #16;Fairley, 2002 #15;Harden, 2002 #5}. Within the Sydney region, recent records are limited to the Hornsby Plateau area near the Hawkesbury River {NSW Scientific Committee, 1999 #63}.	**Low** Targeted surveys have been undertaken for this species which failed to detect this species within the subject site. No impact assessment is considered to be warranted for this species.
Myrtaceae	*Darwinia biflora*		V	V	2Va	Occurs from Cheltenham to Hawkesbury River where it grows in heath on sandstone or in the understorey of woodland on shale-capped ridges {Harden, 2002 #5}. Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include Eucalyptus haemastoma, Corymbia gummifera and/or E. squamosa. The vegetation structure is usually woodland, open forest or scrub-heath {Department of Environment and Climate Change, 2008 #1913}.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Darwinia peduncularis*		V		3Ri	Occurs from Hornsby to Hawkesbury River and west to Glen Davies where it grows in dry sclerophyll forest	**Low**

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
						on sandstone hillsides and ridges {Harden, 2002 #5}. Known to occur along watercourses {Benson, 2001 #181}. Usually grows on or near rocky outcrops on sandy, well drained, low nutrient soil over sandstone {Department of Environment and Climate Change, 2007 #1653}.	No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Darwinia glaucophylla*				2Ra	Restricted to the Gosford LGA where it occurs between Gosford and the Hawkesbury River around Calga, Kariong and Mt Karing. It grows in sandy heath, scrub and woodlands and is often associated with sandstone rock platforms or near hanging swamps and friable sandstone shallow soils. Associated species include: Banksia ericifolia, Acacia terminalis, A. oxycedrus, Angophora hispida, Hakea teretifolia, Bauera rubioides, and in woodland: Corymbia gummifera, C. eximia, Eucalyptus haemastoma and E. punctata {Department of Environment and Climate Change, 2009 #2829}.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Eucalyptus camfieldii*	Heart-leaved Stringybark	V	V	2Vi	Occurs from Tomago to the Royal National Park where it grows in coastal shrub heath in sandy soils on sandstone {Harden, 2002 #5}.	**Low** Targeted surveys have been undertaken for this species which failed to detect this species within the subject site. No impact assessment is considered to be warranted for this species.
Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V	3V	Occurs from Niangala to Glenn Innes where it grows in grassy sclerophyll woodland on shallow relatively infertile soils on shales and slates (Harden, 1991; DLWC, 2001). Endemic on the NSW Northern Tablelands, of limited occurrence, particularly in the area from Walcha to Glen Innes; often on porphyry or granite (Brooker and Kleinig 1999).	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Eucalyptus sp. Cattai*		E1			Occurs in the area between Colo Heights and Castle Hill, historic records include the Royal Botanic Gardens, Sydney. It grows as an emergent tree in scrub, heath and low woodland on sandy soils, generally on flat ridge tops. It usually occurs as isolated individuals or occasionally in small clustered groups {Harden, 2002 #5}.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Kunzea rupestris*		V	V	2Va	Only known to occur between Glenorie and Maroota where it grows in heath on rock platforms {Harden, 2002 #5}.	**Low** No suitable habitat

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
							was recorded from the subject site for this species.
Myrtaceae	*Leptospermum deanei*		V	V	2V	Only occurs near the watershed of Lane Cove River where it grows on forested slopes {Harden, 2002 #5}.Woodland on lower hills and slopes or near creeks, sandy alluvial soil or sand over sandstone. Occurs in Riparian Scrub- e.g. Tristaniopsis laurina, Baechea myrtifolia, Woodland- e.g. Eucalyptus haemstoma and Open Forest - e.g. Angophora costata, Leptospermum trinervium and Banksia ercifolia.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Melaleuca biconvexa*	Biconvex Paperbark	V	V		Occurs as disjunct populations in coastal New South Wales from Jervis Bay to Port Macquarie, with the main concentration of records is in the Gosford/Wyong area {NSW Scientific Committee, 1998 #145}. Grows in damp places, often near streams, or low-lying areas on alluvial soils of low slopes or sheltered aspects {Harden, 2002 #5; Department of Environment and Climate Change, 2008 #1913}.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Melaleuca deanei*		V	V	3R	Occurs in coastal districts, including western Sydney (e.g. Baulkham Hills, Liverpool shires) from Berowra to Nowra where it grows in wet heath on sandstone and shallow/skeletal soils near streams or perched swamps {James, 1997 #69; Harden, 2002 #5}.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Micromyrtus blakelyi*		V	V	2V	Restricted to areas near the Hawkesbury River where it grows in heath in depressions on sandstone rock platforms {Harden, 2002 #5}.	**Low** No suitable habitat was recorded from the subject site for this species.
Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	CE	CE		Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	**Low** Targeted surveys have been undertaken for this species which failed to detect this species within the subject site. No impact assessment is considered to be warranted for this species.
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	V	V	3Ri	Occurs between Buladelah and St Georges Basin where it grows in subtropical and littoral rainforest on sandy soils or stabilized dunes near the sea {Harden,	**Low** No suitable habitat was recorded from

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
						2002 #5}. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities {Department of Environment and Climate Change, 2008 #1913}.	the subject site for this species.
Orchidaceae	*Caladenia tessellata*	Thick Lip Spider Orchid	E1	V	3V	Occurs south of Swansea where it grows on clay loam or sandy soils {Harden, 1993 #4}. Prefers low open forest with a heathy or sometimes grassy understorey {Bishop, 2000 #12}. Within NSW, currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Previously known also from Sydney and South Coast areas {NSW Scientific Committee, 2002 #292}.	**Low** No suitable habitat was recorded from the subject site for this species.
Orchidaceae	*Genoplesium baueri*		V		3R	Grows in sparse sclerophyll forest and moss gardens over sandstone; from the Hunter Valley to Nowra district {Royal Botanic Gardens, 2004 #9}.	**Low** No suitable habitat was recorded from the subject site for this species.
Orchidaceae	*Genoplesium plumosum*		E1	E		Known from two areas, immediately around Tallong township in the Sthn Highlands and Morton National Park. In Morton NP the site is 8.5 km south-east of Wingello and less than 0.2 ha in area {Department of Environment and Climate Change, 2008 #1913}. At Tallong the sites are all in remnant bushland but close to rural and residential development {NSW National Parks and Wildlife Service, 1999 #2109}. This species occurs in heathland with dominant species Kunzea parvifolia, Calytrix tetragona and Dillwynia spp. Microhabitat is very shallow soils, or within moss covered soils on sandstone conglomerate shelves {Department of Environment and Climate Change, 2008 #1913}. At Tallong, the species may also occur on the margins of dry sclerophyll forest in the same microhabitat {NSW National Parks and Wildlife Service, 1999 #2109}. Flower spike to 20 cm tall. Vulnerable to disturbance due to its small range and population size. Can only reproduce by seed and not vegetatively {Department of Environment and Climate Change, 2008 #1913}..	**Low** No suitable habitat was recorded from the subject site for this species.
Orchidaceae	*Microtis angusii*		E1	E		Known from few small populations at Sunny Corner near Bathurst, Ingleside and Warringah. Known to occur wihtin Duffy's Forest {Warringah Shire Council, 2004 #233}.	**Low** No suitable habitat was recorded from the subject site for

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
							this species.
Orchidaceae	*Rhizanthella slateri*	Eastern Australian Underground Orchid	V	E	3K	Highly cryptic as only the flowers may occur above ground. It is more frequent in areas of soil disturbance, but further habitat characteristics or associated vegetation types are poorly known, possibly occuring in sclerophyll forests (Department of Environment and Climate Change 2008).	**Low** No suitable habitat was recorded from the subject site for this species.
Poaceae	*Ancistrachne maidenii*		V		2K	Occurs north of Sydney where it grows on sandstone derived soils {Harden, 1993 #4}. Thought to have specific habitat requirements, with populations occurring in distinct bands in areas associated with a transitional geology between Hawkesbury and Watagan soil landscapes {NSW Scientific Committee, 1999 #62}.	**Low** No suitable habitat was recorded from the subject site for this species.
Proteaceae	*Grevillea caleyi*	Caley's Grevillea	E1	E	2Ei	Occurs in the Terrey Hills-Belrose area north of Sydney where it grows in woodland on laterized sandstone ridgetops {Harden, 2002 #5}.	**Low** No suitable habitat was recorded from the subject site for this species.
Proteaceae	*Grevillea parviflora ssp. parviflora*	Small-flower Grevillea	V	V		Mainly known from the Prospect area (but now extinct there) and lower Georges River to Camden, Appin and Cordeaux Dam areas, with a disjunct populations near Putty, Cessnock and Cooranbong. Grows in heath or shrubby woodland in sandy or light clay soils usually over thin shales {NSW Scientific Committee, 1998 #78; Harden, 2002 #5}.	**Low** No suitable habitat was recorded from the subject site for this species.
Proteaceae	*Grevillea shiressii*		V	V	2ViT	Grevillea shiressii is a tall shrub Grows along creek banks in wet sclerophyll forest with a moist understorey in alluvial sandy or loamy soils. The species is a fire sensitive obligate seeder that is highly susceptible to local extinction due to frequent fire. Known only from two populations near Gosford, on tributaries of the lower Hawkesbury River north of Sydney (Mooney Mooney Creek and Mullet Creek). Both populations occur within the Gosford Local Government Area (Department of Environment and Climate Change 2007).	**Low** No suitable habitat was recorded from the subject site for this species.
Proteaceae	*Macadamia integrifolia*	Macadamia Nut		V	3V	Occurs in rainforest at Mount Bauple and norht of Gympie to Beechman {Stanley, 1986 #972}.	**Low** No suitable habitat was recorded from the subject site for this species..
Proteaceae	*Persoonia hirsuta*		E1	E	3Ki	Occurs in central coast and central tableland districts where it grows in woodland to dry sclerophyll forest on sandstone {Harden, 2002 #5} and rarely shale {NSW Scientific Committee, 1998 #64}. Often occurs in areas with clay influence, in the ecotone between	**Low** No suitable habitat was recorded from the subject site for

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
						shale and sandstone {James, 1997 #69}.	this species.
Proteaceae	*Persoonia mollis ssp. maxima*		E1	E	2E	Restricted to the Hornsby Heights, Mt Colah area north of Sydney. It occurs on sheltered upper hillsides of narrow gullies of Hawkesbury sandstone characterised his by steep sideslopes, rocky benches and broken scarps, with creeks fed by small streams and intermittent drainage depressions. It grows in moist, tall forest (Angophora costata, Eucalyptus piperita, Corymbia gummifera), often with warm temperate rainforest influences (Syncarpia glomulifera, Ceratopetalum apetalum, Callicoma serratifolia). Sometimes recorded in low densities on the dry upper-hillsides of gullies and in more exposed aspects in association with E. haemastoma and E. punctata {NSW National Parks and Wildlife Service, 2000 #19}.	**Low** No suitable habitat was recorded from the subject site for this species.
Rhamnaceae	*Pomaderris brunnea*		V	V	2V	Confined to the Colo and Upper Nepean Rivers where it grows in open forest {Harden, 2000 #2}; in western Sydney (Camden to Picton area) known from sandy alluvium on levee and creek banks {James, 1997 #69}.	**Low** No suitable habitat was recorded from the subject site for this species.
Rutaceae	*Zieria involucrata*		E1	V	2Va	Occurs in the Blue Mountains where it grows in wet sclerophyll forest {Harden, 2002 #5}. Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium. Found primarily in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest, although some populations extend upslope into drier vegetation. Also known from at least two atypical ridgetop locations. The canopy typically includes Syncarpia glomulifera subsp. glomulifera (Turpentine), Angophora costata (Smooth-barked Apple), Eucalyptus agglomerata (Blue-leaved Stringybark) and Allocasuarina torulosa (Forest Oak) {Department of Environment and Climate Change, 2008 #1913}.	**Low** No suitable habitat was recorded from the subject site for this species.
Santalaceae	*Thesium australe*	Austral Toadflax	V	V	3Vi	Grows in grassland or woodland often in damp sites. It is a semi-parasitic herb and hosts are likely to be Themeda australis and Poa spp. {Harden, 1992 #3; Department of Environment and Climate Change, 2008 #1913}.	**Low** No suitable habitat was recorded from the subject site for this species.
Sterculiaceae	*Lasiopetalum joyceae*		V	V	2R	Occurs on lateritic to shaley ridgetops of the Hornsby Plateau where it grows in heath and open woodland in sandy soils on sandstone {NSW Scientific Committee, 1999 #18;Harden, 2000 #2;Fairley, 2002 #15}.	**Low** No suitable habitat was recorded from the subject site for this species.

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	ROTAP	Habitat	Likelihood of occurrence within the Subject site
Thymelaeaceae	*Pimelea curviflora var. curviflora*		V	V		Confined to coastal areas around Sydney where it grows on sandstone and laterite soils. It is found between South Maroota, Cowan, Narrabeen, Allambie Heights, Northmead and Kellyville, but its former range extended south to the Parramatta River and Port Jackson region including Five Dock, Bellevue Hill and Manly. Usually occurs in woodland in the transition between shale and sandstone, often on Lucas Heights soil landscape {NSW Scientific Committee, 1998 #65; James, 1997 #69; James, 1999 #68; Harden, 2000 #2}.	**Low** No suitable habitat was recorded from the subject site for this species.
Tremandraceae	*Tetratheca glandulosa*		V	V	2V	Occurs from Mangrove Mountain to the Blue Mountains where it grows in sandy or rocky heath or scrub {Harden, 1992 #3}. Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gymea, Lambert and Faulconbridge. Topographically, the plant occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils are generally shallow, consisting of a yellow, clayey/sandy loam. Stony lateritic fragments are also common in the soil profile on many of these ridgetops. Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest. Vegetation communities correspond broadly to Benson & Howell's Sydney Sandstone Ridgetop Woodland (Map Unit 10ar). Common woodland tree species include: Corymbia gummifera, C. eximia, Eucalyptus haemastoma, E. punctata, E. racemosa, and/or E. sparsifolia, with an understorey dominated by species from the families Proteaceae, Fabaceae, and Epacridaceae {Department of Environment and Climate Change, 2008 #1913}.	**Low** No suitable habitat was recorded from the subject site for this species.

1) V= Vulnerable, E1 = Endangered (BC Act) E2= Endangered Population **2)** ROTAP (Rare or Threatened Australian Plants, Briggs and Leigh 1996) is a conservation rating for Australian plants. 1 = Species only known from one collection. 2 = Species with a geographic range of less than 100km in Australia. 3 = Species with a geographic range of more than 100km in Australia, X = Species presumed extinct; no new collections for at least 50 years. E = Endangered species at risk of disappearing from the wild state if present land use and other causal factors continue to operate, V = Vulnerable species at risk of long-term disappearance through continued depletion. R = Rare, but not currently considered to be endangered. K = Poorly known species that are suspected to be threatened. C = Known to be represented within a conserved area. a = At least 1,000 plants are known to occur within a conservation reserve(s). i = Less than 1,000 plants are known to occur within a conservation reserve(s). The reserved population size is unknown. t = The total known population is reserved. + = The species has a natural occurrence overseas. **3)** V = Vulnerable, E = Endangered *(Environment Protection and Biodiversity Conservation Act 1999*).

Appendix D

Threatened fauna species recorded in the locality

Appendix D Threatened Fauna species recorded in the locality

This appendix details the Threatened species of plant that have either been recorded in the local area based on records the *Atlas of NSW Wildlife* Department of Planning, Industry and Environment, 2022, data received 28th of June 2022 and records from the Royal Botanical Gardens. Threatened species with habitat likely to occur in the locality were also considered based on records from the *EPBC Protected Matters Search Tool* Department of Agriculture, Fisheries and Forestry 2022, data received 22nd of July 2022.

Table 7-4 Threatened fauna species recorded in the locality

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
Amphibians					
Litoria aurea	Green and Golden Bell Frog	E1	V	Has a fragmented distribution of mainly near coastal locations from Lakes Entrance (Victoria) to south of the NSW-Queensland border;as far west as Bathurst in the more elevated southern tablelands and central slopes of NSW. Various types of habitat utilised has been documented. For breeding utilises a wide range of waterbodies, including both natural and man-made structures, such as marshes, dams and stream sides, and ephemeral locations that are more often dry than wet. Is found in various small pockets of habitat in otherwise developed areas and has the tendency of often turning up in highly disturbed sites. Lotic situations such as fast flowing streams appear to be one of the few water bodies not utilised, at least for breeding purposes. Habitat attributes associated with the various waterbodies occupied by the GGBF, and that appear to make such habitat more likely to be occupied, include that the water body is shallow, still or slow flowing, ephemeral and/or widely fluctuating, unpolluted and without heavy shading. Permanent waterbodies are also known to be used and there is historical evidence of occupation of large, often deep and permanent bodies of water. There is a clear preference shown by GGBF for sites with a complexity of vegetation structure and associated terrestrial habitat attributes that appear to favour the species include extensive grassy areas and an abundance of shelter sites such as rocks, logs, tussock forming vegetation and other cover, considered to be used for foraging and shelter. Over-wintering sites may be adjacent to or some distance away from breeding sites; such sites include the bases of dense vegetation tussocks, beneath rocks, timber, within logs or beneath ground debris, including human refuse such as sheet iron, but the full range of possible habitat used for this purpose is not yet well understood {Department of Environment and Conservation, 2004 #397; Department of Environment and Conservation, 2005 #398} .	**Low** No suitable habitat was recorded from the subject site for this species.
Heleioporus australiacus	Giant Burrowing Frog	V	V	Appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin, from Wollemi National Park in the north and extending south to Jervis Bay; and a southern population occurring in disjunct pockets from about Narooma south into eastern Victoria. In the northern population there is a marked preference for sandstone ridgetop habitat and broader upland valleys. In these locations the frog is associated with small headwater creeklines and along slow flowing to intermittent creeklines. The vegetation is typically woodland, open woodland and heath and may be associated	**Low** No suitable habitat was recorded from the subject site for this species.

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
				with 'hanging swamp' seepage lines and where small pools form from the collected water. They have also been observed occupying artificial ponded structures such as fire dams, gravel 'borrows', detention basins and box drains that have	
Litoria brevipalmata	Green Thighed Frog	V		The species inhabits coastal forest and bushland from south-east QLD to Ourimbah NSW and breeding takes place only after heavy summer rains when calling males gather around temporary or semi-permanent ponds and flooded ditches. Egg masses are often laid in temporary ponds and their survival may depend on subsequent rains around grassy semi-permanent ponds in late spring and summer (Cogger 2000).	**Low** No suitable habitat was recorded from the subject site for this species
Litoria littlejohni	Heath Frog	V	V	Distributed along the eastern slopes of the Great Dividing Range from Watagan State Forest near Wyong, south to Buchan in north-eastern Victoria. It appears to be restricted to sandstone woodland and heath communities at mid to high altitude. It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks on high exposed ridges during summer. It is not known from coastal habitats (NSW Scientific Committee 2000).	**Low** No suitable habitat was recorded from the subject site for this species.
Mixophyes balbus	Stuttering Frog	E1	V	Terrestrial species, found in rainforest, Antarctic beech forest or wet sclerophyll forest. The species depends on freshwater streams and riparian vegetation for breeding and habitation. No records are known from riparian habitat that has been disturbed (Cogger 2000; NSW Scientific Committee 2003).	**Low** No suitable habitat was recorded from the subject site for this species
Mixophyes iteratus	Giant Barred Frog	E1	E	Terrestrial species which occurs in rainforests, Antarctic beech or wet sclerophyll forests. Feeds on insects and smaller frogs (Cogger 2000). The species is associated with permanent flowing drainages, from shallow rocky rainforest streams to slow-moving rivers in lowland open forest. It is not known to utilise still water areas (NSW Scientific Committee 1999). More prevalent at lower altitudes and in larger streams than its congeners, although has been recorded up to 1000 metres asl. (NSW National Parks and Wildlife Service 1999).	**Low** No suitable habitat was recorded from the subject site for this species
Litoria brevipalmata	Green Thighed Frog	V		The species inhabits coastal forest and bushland from south-east QLD to Ourimbah NSW and breeding takes place only after heavy summer rains when calling males gather around temporary or semi-permanent ponds and flooded ditches. Egg masses are often laid in temporary ponds and their survival may depend on subsequent rains around grassy semi-permanent ponds in late spring and summer (Cogger 2000).	**Low** **Low** No suitable habitat was recorded from the subject site for this species
Pseudophryne australis	Red-crowned Toadlet	V		Occurs within 160 km of Sydney where it is restricted to Hawkesbury Sandstone. It breeds in deep grass and debris adjacent to ephemeral drainage lines. When not breeding individuals are found scattered on sandstone ridges under rocks and logs {Cogger, 2000 #20}.	**Low** No suitable habitat was recorded from the subject site for this species.
Fish					
Macquaria australasica	Macquarie Perch		E	The natural range of Macquarie Perch included the upper and middle reaches of the Murray-Darling basin as well as the Shoalhaven and Hawkesbury Rivers. However, this species has recenlty been sighted in	**Low** No suitable habitat was recorded from

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
				only a few locatilities within these river systems. Preffered habitat is deep holes covered with rocks, and spawning occurs above shallow running water. Macquarie Perch is a schooling species (Department of the Environment and Water Resources, 2007).	the subject site for this species
Prototroctes maraena	Australian Grayling		V	It is a mid-water, freshwater species, that occurs most commonly in clear, gravelly streams with a moderate flow. Prefers deep, slow flowing pools {NSW Fisheries, 2004 #213}.	**Low** No suitable habitat was recorded from the subject site for this species.
Snails					
Meridolum corneovirens	Cumberland Plain Land Snail	E1		Restricted to the Cumberland Plain and Castlereagh Woodlands of Western Sydney and also along the fringes of River Flat Forest, especially where it meets Cumberland Plain Woodland. It is typically found under logs and other debris, amongst leaf litter and bark around bases of trees. It is also sometimes found under grass clumps and where possible it will burrow into loose soil {NSW National Parks and Wildlife Service, 1999 #41}.	**Low** No suitable habitat was recorded from the subject site for this species.
Pommerhelix duralensis	Dural Land Snail	E		The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris. It favours sheltering under rocks or inside curled-up bark. It does not burrow nor climb. The species has also been observed resting in exposed areas, such as on exposed rock or leaf litter, however it will also shelter beneath leaves, rocks and light woody debris.	**Low** No suitable habitat was recorded from the subject site for this species.
Birds					
Artamus cyanopterus	Dusky Woodswallow	V		Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	**Low** A targeted survey was undertaken for this species which failed to detect this species within the subject site.
Callocephalon fimbriatum	Gang-gang Cockatoo	V		Occurs in wetter forests and woodland from sea level to an altitude over 2000 metres, timbered foothills and valleys, coastal scrubs, farmlands and suburban gardens {Pizzey, 1997 #24}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		Occurs in eucalypt woodland and forest with Casuarina/Allocasuarina spp. Characteristically inhabits forests on sites with low soil nutrient status, reflecting the distribution of key Allocasuarina species. The drier forest types with intact and less rugged landscapes are preferred by the species. Nests in tree hollows {Garnett, 2000 #21; NSW National Parks	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
				and Wildlife Service, 1999 #55}.	impact assessment has been prepared for this species.
Daphoenositta chrysoptera	Varied Sittella	V		Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.	**Low** A targeted survey was undertaken for this species which failed to detect this species within the subject site.
Dasyornis brachypterus	Eastern Bristlebird	E1	E	The habitat of the Eastern Bristlebird is characterised by low dense vegetation. Fire is a feature of all areas where known populations occur. Given the poor flight ability of the species it is though that few individuals survive the passage of fire, survival is dependant on the availability of fire refuges and recolonisation may be relatively slow. The bird is cryptic and camoflauged and rarely seen but may be detected by its distinctive, loud calls. Confined to NSW/Queensland border region, Illawarra region and NSW/Victorian border region {NSW National Parks and Wildlife Service, 1997 #148}.	**Low** No suitable habitat was recorded from the subject site for this species
Falco hypoleucos	Grey Falcon	V		Generally centred on inland drainage systems where the average rainfall is less than 500 millimetres. It is found in timbered lowland plains that are crossed by tree-lined water courses. Nests in the old nests of other birds, particularly raptors {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species
Glossopsitta pusilla	Little Lorikeet	V		Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophoras, Melaleucas and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards	**Low** A targeted survey was undertaken for this species which failed to detect this species within the subject site. An impact assessment has been prepared for this species.
Hieraaetus morphnoides	Little Eagle	V		Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used.	**Low** No suitable habitat was recorded from the subject site for this species.
Hirundapus caudacutus	White-throated Needletail	V	M	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April {Pizzey, 1997 #24}.	**Sub-optimal** exists above the study area for this species. The proposal will not

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
					impact upon important habitat for this species.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	M	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs. Builds a huge nest of sticks in tall trees near water, on the ground on islands or on remote coastal cliffs (Pizzey and Knight 1997).	**Low** No suitable habitat was recorded from the subject site for this species.
Ixobrychus flavicollis	Black Bittern	V		Usually found in dense vegetation in and fringing streams, swamps, tidal creeks and mudflats, particularly amongst swamp she-oaks and mangroves. Feeds on aquatic fauna along streams, in estuaries and beside billabongs and pools. Breeding occurs in summer in secluded places in densely vegetated wetlands. It nests in trees that overhang the water {NSW National Parks and Wildlife Service, 2002 #320; Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species.
Lathamus discolor	Swift Parrot	E1	E	Breeding occurs in Tasmania, majority migrates to mainland Australia in autumn, over-wintering, particularly in Victoria and central and eastern NSW, but also south-eastern Queensland as far north as Duaringa. Until recently it was believed that in New South Wales, swift parrots forage mostly in the western slopes region along the inland slopes of the Great Dividing Range but are patchily distributed along the north and south coasts including the Sydney region, but new evidence indicates that the forests on the coastal plains from southern to northern NSW are also extremely important. In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering Acacia pycnantha, is indicated. Sites used vary from year to year. {Garnett, 2000 #21},{Swift Parrot Recovery Team, 2001 #396}.	**Low** No suitable habitat was recorded from the subject site for this species
Lophoictinia isura	Square-tailed Kite	V		This species hunts primarily over open forest, woodland and mallee communities as well as over adjacent heaths and other low scrubby habitats in wooded towns. It feeds on small birds, their eggs and nestlings as well as insects. Seems to prefer structurally diverse landscapes {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species
Melithreptus gularis gularis	Black-chinned Honeyeater	V		Found in dry eucalypt woodland particularly those containing ironbark and box. Occurs within areas of annual rainfall between 400-700 mm. Feed on insects, nectar and lerps {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species
Neophema pulchella	Turquoise Parrot	V		Occurs in the foothills of the great dividing range in eucalypt woodlands and forests with a grassy or sparsely shrubby understorey. Nests in hollows in trees, stumps or even fence posts. It feeds on seeds of both native and introduced grass and herb species {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
Ninox connivens	Barking Owl	V		Occurs in dry sclerophyll woodland. In the south west it is often associated with riparian vegetation while in the south east it generally occurs on forest edges. It nests in large hollows in live eucalypts, often near open country. It feeds on insects in the non-breeding season and on birds and mammals in the breeding season {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species
Ninox strenua	Powerful Owl	V		A sedentary species with a home range of approximately 1000 hectares it occurs within open eucalypt, casuarina or callitris pine forest and woodland. It often roosts in denser vegetation including rainforest of exotic pine plantations. Generally feeds on medium-sized mammals such as possums and gliders but will also eat birds, flying-foxes, rats and insects. Prey are generally hollow dwelling and require a shrub layer and owls are more often found in areas with more old trees and hollows than average stands {Garnett, 2000 #21}.	**Low/Medium** Marginal foraging habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Petroica boodang	Scarlet Robin	V		The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	**Low** No suitable habitat was recorded from the subject site for this species.
Petroica rodinogaster	Pink Robin	V		Found in open forest and woodland including native tea-tree scrubs. Rarely found in open cleared areas. Breeds in dense gullies in temperate rainforests {Pizzey, 1997 #24}.	**Low** No suitable habitat was recorded from the subject site for this species
Polytelis swainsonii	Superb Parrot	V	V	Mainly found in the Riverina where they nest in loose colonies in riparian woodland on River Red Gum. On the inland slopes, Superb Parrots both forage and feed within box woodland, mostly nesting in dead trees {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species
P*terodroma leucoptera*	Gould's Petrel	E1	EM	A marine species, it nests on islands among rocks and debris of Cabbage Tree Palms. It feeds on fish, cephalopods and other marine animals (Garnett and Crowley 2000).	**Low** No suitable habitat was recorded from the subject site for this species
Ptilinopus superbus	Superb Fruit-Dove	V		Occurs in rainforests and fringes, scrubs, mangroves and wooded stream-margins, lantana thickets, isolated figs, pittosporums, lilly pillies and blackberries {Pizzey, 1997 #24}.	**Low** No suitable habitat was recorded from the subject site for this species
Stagonopleura guttata	Diamond Firetail	V		Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and mallee. Most populations occur on the inland slopes of the dividing range. Feed on seeds, mostly of grasses {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
					this species
Tyto novaehollandiae	Masked Owl	V		Occurs within a diverse range of wooded habitats including forests, remnants and almost treeless inland plains. This species requires large-hollow bearing trees for roosting and nesting and nearby open areas for foraging. They typically prey on terrestrial mammals including rodents and marsupials but will also take other species opportunistically. Also known to occasionally roost and nest in caves {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species
Xanthomyza phrygia	Regent Honeyeater	E1	EM	Occurs mostly in box-ironbark forests and woodland and prefers the wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with Casuarina cunninghamiana and Amyema cambagei are important for feeding and breeding. Important food trees include Eucalyptus sideroxylon (Mugga Ironbark), E. albens (White Box) , E. melliodora (Yellow Box) and E. leucoxylon (Yellow Gum) {Garnett, 2000 #21}.	**Low** No suitable habitat was recorded from the subject site for this species
Mammals					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Occurs in moderately wooded habitats and roosts in caves, mine tunnels and the abandoned, bottle-shaped mud nests of Fairy Martins. Thought to forage below the forest canopy for small flying insects {Churchill, 1998 #26}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Occurs from the Bundaberg area in south-east Queensland, south through NSW to western Victoria and Tasmania. In NSW, it occurs on both sides of the Great Dividing Range and north-east NSW represents a national stronghold {NSW National Parks and Wildlife Service, 1999 #502}. Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. Nests in rock caves and hollow logs or trees. Feeds on a variety of prey including birds, terrestrial and arboreal mammals, small macropods, reptiles and arthropods {NSW National Parks and Wildlife Service, 1999 #27; NSW National Parks and Wildlife Service, 1999 #502}.	**Low** No suitable habitat was recorded from the subject site for this species
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		Usually roosts in tree hollows in higher rainfall forests. Sometimes found in caves (Jenolan area) and abandoned buildings. Forages within the canopy of dry sclerophyll forest. It prefers wet habitats where trees are more than 20 metres high {Churchill, 1998 #26}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
Miniopterus australis	Little Bent-wing Bat	V		Feeds on small insects beneath the canopy of well timbered habitats including rainforest, Melaleuca swamps and dry sclerophyll forests. Roosts in caves and tunnels and has specific requirements for nursery sites. Distribution becomes coastal towards the southern limit of its range in NSW. Nesting sites are in areas where limestone mining is preferred {Strahan, 1995 #185}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Miniopterus schreibersii	Eastern Bent-wing Bat	V		Usually found in well timbered valleys where it forages on small insects above the canopy. Roosts in caves, old mines, stormwater channels and sometimes buildings and often return to a particular nursery cave each year {Churchill, 1998 #26}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Mormopterus norfolkensis	Eastern Freetail-bat	V		Thought to live in sclerophyll forest and woodland. Small colonies have been found in tree hollows or under loose bark. It feeds on insects above the forest canopy or in clearings at the forest edge {Churchill, 1998 #26}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Macropus parma	Parma Wallaby	V		Now extinct south of Gosford, and confined to high rainfall areas in the coast and ranges of central and northern NSW; from the Watagan Mountains to the Richmond and Border Ranges area, with the Washpool - Gibraltar Range and Bulga - Dingo Tops areas being areas of greatest importance. Occurs in wet sclerophyll forest and rainforest patches in moist sclerophyll forest, with a moist shrubby understorey, often associated with grassy areas. They are occasionally found in dry sclerophyll forest and rainforest edges are considered important refugia. Ecotones between open and closed forest are favoured, open areas are used for foraging, while areas of dense ground cover provide areas for shelter and protection from predators {NSW National Parks and Wildlife Service, 1999 #502}.	**Low** No suitable habitat was recorded from the subject site for this species
Cercartetus nanus	Eastern Pygmy-possum	V		Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. They may occupy small patches of vegetation in fragmented landscapes and although the species prefers habitat with a rich shrub understory, they are known to occur in grassy woodlands and the presence of Eucalypts alone is sufficient to support populations in low densities. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as	**Low** No suitable habitat was recorded from the subject site for this species.

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
				banksias; soft fruits are eaten when flowers are unavailable.	
Myotis adversus	Large-footed Myotis	V		Colonies occur in caves, mines, tunnels, under bridges and buildings. Colonies always occur close to bodies of water where this species feeds on aquatic insects {Churchill, 1998 #26}.	**Low** No suitable habitat was recorded from the subject site for this species.
Phascolarctos cinereus	Koala	V		Found in sclerophyll forest. Throughout New South Wales, Koalas have been observed to feed on the leaves of approximately 70 species of eucalypt and 30 non-eucalypt species. However, in any one area, Koalas will feed almost exclusively on a small number of preferred species. The preferred tree species vary widely on a regional and local basis. Some preferred species in NSW include Forest Red Gum Eucalyptus tereticornis, Grey Gum E. punctata, Monkey Gum E. cypellocarpa and Ribbon Gum E. viminalis. In coastal areas, Tallowwood E. microcorys and Swamp Mahogany E. robusta are important food species, while in inland areas White Box E. albens, Bimble Box E. populnea and River Red Gum E. camaldulensis are favoured {NSW National Parks and Wildlife Service, 1999 #43; NSW National Parks and Wildlife Service, 2003 #31}.	**Low** No suitable habitat was recorded from the subject site for this species
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species. Feeds on the flowers and nectar of eucalypts and native fruits including lilly pillies. It roosts in the branches of large trees in forests or mangroves {NSW National Parks and Wildlife Service, 2001 #56; Churchill, 1998 #26}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Petaurus australis	Yellow-bellied Glider	V		Restricted to tall, mature eucalypt forest in high rainfall areas of temperate to sub-tropical eastern Australia. Feeds on nectar, pollen, the sap of eucalypts and sometimes insects. Preferred habitats are productive, tall open sclerophyll forests where mature trees provide shelter and nesting hollows and year round food resources are available from a mixture of eucalypt species (NSW National Parks and Wildlife Service 1999; NSW National Parks and Wildlife Service 2003).	**Low** No suitable habitat was recorded from the subject site for this species.
Petaurus norfolcensis	Squirrel Glider	V		Found in dry sclerophyll forest and woodland but not found in dense coastal ranges. Nests in hollows and feeds on gum of acacias, eucalypt sap and invertebrates (NSW National Parks and Wildlife Service 1999).	**Low** No suitable habitat was recorded from the subject site for this species.
Petrogale penicillata	Brush-tailed Rock-wallaby	E1	V	Occurs in inland and sub-coastal south eastern Australia where it inhabits rock slopes. It has a preference for rocks which receive sunlight for a considerable part of the day. Windblown caves, rock cracks or tumbled boulders are used for shelter. Occur in small groups or "colonies" each usually separated by hundreds of metres (NSW National Parks and Wildlife Service 2003).	**Low** No suitable habitat was recorded from the subject site for this species.

Scientific Name	Common Name	BC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the subject site
Pseudomys novaehollandiae	New Holland Mouse		V	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes	**Low** No suitable habitat was recorded from the subject site for this species.
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V		Occurs in eucalypt forest where it feeds above the canopy and in mallee or open country where it feeds closer to the ground. Generally a solitary species but sometimes found in colonies of up to 10. It roosts in tree hollows. Thought to be a migratory species {Churchill, 1998 #26}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Scoteanax rueppellii	Greater Broad-nosed Bat	V		The preferred hunting areas of this species include tree-lined creeks and the ecotone of woodlands and cleared paddocks but it may also forage in rainforest. Typically it forages at a height of 3-6 metres but may fly as low as one metre above the surface of a creek. It feeds on beetles, other large, slow-flying insects and small vertebrates. It generally roosts in tree hollows but has also been found in the roof spaces of old buildings {Churchill, 1998 #26}.	**Low/Medium** Suitable habitat for this species was recorded from the subject site. An impact assessment has been prepared for this species.
Vespadelus troughtoni	Eastern Cave Bat	V		A cave-dwelling species found in eastern Australia from Cape York to NSW. They inhabit tropical mixed woodland and wet sclerophyll forests on the coast and the dividing range, but extend into drier forests on the western slopes {Churchill, 1998 #26}.	**Low** No suitable habitat was recorded from the subject site for this species
Invertebrates					
Petalura gigantea	Giant Dragonfly	E1		Found in permanent wetlands, both coastal and upland from moss Vale northwards to southern Queensland (Department of Environment and Conservation 2005).	Low No suitable habitat was recorded from the rezoning area for this species.

1) V= Vulnerable, E1 = Endangered (BC Act) E2= Endangered Population **2)** ROTAP (Rare or Threatened Australian Plants, Briggs and Leigh 1996) is a conservation rating for Australian plants. 1 = Species only known from one collection. 2 = Species with a geographic range of less than 100km in Australia. 3 = Species with a geographic range of more than 100km in Australia, X = Species presumed extinct; no new collections for at least 50 years. E = Endangered species at risk of disappearing from the wild state if present land use and other causal factors continue to operate, V = Vulnerable species at risk of long-term disappearance through continued depletion. R = Rare, but not currently considered to be endangered. K = Poorly known species that are suspected to be threatened. C = Known to be represented within a conserved area. a = At least 1,000 plants are known to occur within a conservation reserve(s). i = Less than 1,000 plants are known to occur within a conservation reserve(s). The reserved population size is unknown. t = The total known population is reserved. + = The species has a natural occurrence overseas. **3)** V = Vulnerable, E = Endangered *(Environment Protection and Biodiversity Conservation Act 1999*).

Appendix E

BC Assessments of Significance

Assessment of Significance

The threatened species test of significance is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. It is applied as part of the Biodiversity Offsets Scheme entry requirements and for Part 5 activities under the *Environmental Planning and Assessment Act 1979*.

The test of significance is set out in s.7.3 of the Biodiversity Conservation Act 2016.

If the activity is likely to have a significant impact,or will be carried out in a declared area of outstanding biodiversity value, the proponent must either apply the Biodiversity Offsets Scheme or prepare a species impact statement (SIS).

The environmental impact of activities that will not have a significant impact on threatened species will continue to be assessed under s.111 of the Environmental Planning and Assessment Act 1979.

If a proposed activity will have a significant impact or will be carried out in an area of outstanding biodiversity value, and the proponent does not opt in to the Biodiversity Offsets Scheme, a SIS must be prepared and agreement sought from the Chief Executive of Office of Environment and Heritage.

The requirements of an SIS are set out in s.7.6 of the Biodiversity Conservation Regulation 2017. The proponent must also seek and comply with the Office of Environment and Heritage Chief Executive's requirements for SIS preparation.

The "subject site" is defined as the area directly affected by the proposal.

The "study area" is the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area extends as far as is necessary to take all potential impacts into account.

The "local occurrence" of a community is that which occurs in the study area or beyond to include those areas where the movement of individuals and genetic exchange can be demonstrated

The "risk of extinction" is the likelihood that the local occurrence of the community will become extinct in either the short or long term as a result of direct or indirect impacts arising from the proposal.

The "composition" of the community includes both plant and animal species as well as its physical structure

The following 5 part test of significance relies on the ecological assessment provided in Sections 2 & 3, & Appendices C & D above and should be read as such. It is considered that the study area provides potential habitat for the following threatened species and will be assessed accordingly in the following seven-part test:

Species Name		Conservation Status		Likely to be significantly affected
		State [1]	National [2]	
Threatened Fauna				
Bird				
Callocephalon fimbriatum	Gang-gang Cockatoo	V		No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		No
Glossopsitta pusilla	Little Lorikeet	V		No
Ninox strenua	Powerful Owl	V		No
Mammals				
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		No
Miniopterus schreibersii	Eastern Bent-wing Bat	V		No
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	No
Mormopterus norfolkensis	Eastern Freetail-bat	V		No
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V		No
Scoteanax rueppellii	Greater Broad-nosed Bat	V		No

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

The '5 part test of significance' is as follows.

(1) 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,

Detailed flora investigations of the study area, together with habitat assessments and targeted surveys, have resulted in the identification of potential habitat for a variety of threatened species. An assessment of these species is as follows:

Gang-gang Cockatoo (*Callocephalon fimbriatum)*

The Gang-gang Cockatoo is associated with a variety of woodland and forest habitats, and occasionally more open areas in south–eastern New South Wales and Victoria. This species has been observed in eucalypt forests and exotic trees, and is known to feed on the seeds of native shrubs and trees, in addition to some exotic species such as the Hawthorn and Cupressus species. The Gang-gang Cockatoo nests in hollows in large, dead trees.

The subject site contains suitable foraging habitat for this species. This species was not recorded during the site survey. The surrounding area contains extensive amounts of high quality foraging habitat for this species. Therefore, it is considered that the proposal is not likely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

***Calyptorhynchus lathami* (Glossy Black-Cockatoo)**

The Glossy Black-cockatoo inhabits mountain forests, coastal woodland, open forest and trees bordering watercourses where there are substantial stands of *Allocasuarina*. They choose trees with larger cone crops but show no sign of selecting trees on the basis of cone size – concentrating foraging in trees with a high ratio of total seed weight to cone weight (Crowley and Garnett 2001). They breed in hollow trees or stumps usually in Eucalypts. It is considered that potential foraging habitat exists from the subject site due to the occurrence of *casuarina* sp. Despite the presence of potential habitat, this species was not recorded during the fauna survey. It is considered that the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Glossopsitta pusilla* (Little Lorikeet)**

Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. In south-east Queensland (McAlpine, Heyenga et al. 2007), Little Lorikeets were more likely to occupy forest sites with relatively short to intermediate logging rotations (15–23 years) and sites that have had short intervals (2.5– 4 years) between fires. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands White Box *Eucalyptus albens* and Yellow Box *E. melliodora* are particularly important food sources for pollen and nectar respectively. They are also reported as feeding on fruits, particularly those of mistletoes (Higgins and Peter 2002). Despite the presence of potential habitat, this species was not recorded during the fauna survey. It is considered that the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Ninox strenua* (Powerful Owl)**

The Powerful Owl inhabits mature rainforest and wet and dry eucalypt forest utilising Eucalypt forests and woodlands and adjacent cleared areas for foraging. Large trees with hollows at least 0.5m deep are required for shelter and breeding (Department of Environment and Conservation 2005). Mated pairs of Powerful Owl roost together or separately, maintaining several roost sites throughout their territory which are used in rotation shifting with the availability of prey. This species was not recorded during the targeted surveys. It is considered that the subject site provides marginal foraging habitat for this species. No suitable nesting/roosting sites are to be removed nor are there any hollows for hollow-dependent prey species to be removed as a result of the proposal. It is considered that the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Chalinolobus dwyeri* (Large-eared Pied Bat)**

It is probable that the Large-eared Pied Bat forages for insects below the forest canopy. During the day these bats may roost in caves, mine tunnels and the abandoned nests of Fairy Martins (Hoye and Dwyer 1998). The Large-eared Pied Bat may also utilise tree hollows (Schultz, Coles et al. 1999). The Large-eared Pied Bat is mainly found in drier habitat including dry sclerophyll and woodland, east and west of the Great Dividing Ranges. However Hoye (Hoye and Dwyer 1998) suggest that from records of the species in subalpine woodland, moist eucalypt forest and near rainforest, it may tolerate a greater range of habitats. The distribution of this bat ranges from inland and south-eastern QLD to central-eastern and north-eastern NSW. It is considered that the study area provides potential foraging habitat for this species. Despite the presence of potential habitat within the study area, the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Falsistrellus tasmaniensis* (Eastern False Pipistrelle)**

The Eastern False Pipistrelle usually roosts in tree hollows in higher rainfall forests. Sometimes found in caves (Jenolan area) and abandoned buildings. Forages within the canopy of dry sclerophyll forest. It prefers wet habitats where trees are more than 20 metres high. It is considered that the study area provides potential foraging habitat for this species. Despite the presence of potential habitat within the study area, the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Miniopterus schreibersii* (Eastern Bent-wing Bat)**

The Eastern Bentwing-bat is confined to areas where there are caves with potential temperature, humidity and physical dimensions to permit breeding. This species occupies a range of habitats, mainly near the coast and utilises caves, old mines, stormwater channels, under bridges and occasionally buildings for roosting. It is considered that the study area provides potential foraging habitat for this species. Despite the presence of potential habitat within the study area, the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Pteropus poliocephalus* (Grey-headed Flying-fox)**

The Grey-headed Flying-fox is found in a variety of habitats including rainforest, mangroves, paperbark swamps, wet and dry sclerophyll forests and cultivated areas (Churchill 2008). Grey-headed Flying Foxes congregate in large camps of up to 200,000 individuals, depending on availability of surrounding blossoming plants, from early until late summer (Churchill 2008). Camps are commonly formed in gullies, typically not far from water and in vegetation with a dense canopy. Roost sites are an important resource where mating, birth and rearing of young occurs as well as providing refuge (Strahan 1995) These bats eat the fruit or blossoms of more than 80 species of plants. Their major food source is eucalypt blossom and native fruits from a variety of tree species. Native figs (*Ficus spp*) account for a large percentage of the fruit eaten. They are also known to rain orchids of cultivated fruit. The Grey headed Flying-fox has a nightly feeding range of 20 to 50km from their camp (Churchill 2008).

The proposed development will retain the greater majority of foraging habitat for this highly mobile species. As such it is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

***Mormopterus norfolkensis* (Eastern Freetail-bat)**

The Eastern Freetail-bat forages above and within the canopy of open forests and woodlands, feeding on small insects. The Eastern Freetail-bat is thought to roost predominantly in tree hollows and occasionally in buildings. It is considered that the study area provides potential foraging habitat for this species. It is considered that the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat)**

The Yellow-bellied Sheathtail-bat inhabits open country, mallee, eucalypt forests, rainforests, heathland and water bodies. The Yellow-bellied Sheathtail-bat roosts in tree hollows and has been found inhabiting the abandoned nests of Sugar Gliders. It is considered that the study area provides potential foraging habitat for this species. It is considered that the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed at risk of extinction.

***Scoteanax rueppellii* (Greater Broad-nosed Bat)**

The Greater Broad-nosed Bat inhabits open forests and woodlands, foraging throughout these forest types and also along creeks and small river systems. This species roosts in tree hollows and occasionally old buildings. This species was recorded by Conacher Environmental Group in 2021, the proposal is unlikely to disrupt the life cycle of this species such that a viable local population would be placed 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

Response:

N/A,

(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,

N/A

(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

Response:

i.) Future development over the rezone area would likely result in of removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides marginal (habitat) for threatened species.

(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

Response:

Future development over the rezone area would likely result in of removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides marginal (habitat) for threatened species. Despite this the proposal will not fragment or isolate currently connected areas of habitat. Connectivity of vegetation across the study area will remain connected to surrounding lands.

All threatened fauna species which are potentially to be impacted upon are highly mobile and capable of flight and movement across large distances and would not utilise the habitats within the study area exclusively.

Therefore, it is considered that known habitat for a threatened species within the local area and the region are unlikely to become isolated or fragmented as a result of the proposal.

(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,

Response:

N/A

(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),

Response:

The proposed development or activity is not likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly) within the provisions of the *BC Act* (1995).

(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.

Response:

The proposal is likely to entail or perpetuate the following key threatening process under the *BC Act* within the site.

- Clearing of native vegetation.
- Infection of native plants by *Phytophthora cinnamomi*.
- Human Caused Climate Change.

Conclusion

Future development over the rezone area would likely result in of removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides marginal (habitat) for threatened species.

The loss of this habitat is unlikely to have an adverse effect on the extent of threatened species such that their local occurrence is likely to be placed at risk of extinction.

Critical habitat will not be affected and the proposal will not interfere with the recovery actions for threatened species. The impact to habitats for threatened species, endangered populations & endangered ecological communities from the locality is not considered to be significant.

Appendix F

BOSET

Biodiversity Values Map

198.1 0 99.07 198.1 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	08/07/2022 3:01 PM	**BDAR Required***
Total Digitised Area	4,102.1 sqm	
Minimum Lot Size Method	LEP	
Minimum Lot Size 10,000sqm = 1ha	200,000 sqm	
Area Clearing Threshold 10,000sqm = 1ha	5,000 sqm	
Area clearing trigger Area of native vegetation cleared	no	no
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

*If BDAR required has:

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

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

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

Disclaimer

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

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

Acknowledgement

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

Signature_____ Date:08/07/2022 03:01 PM

Appendix G

EPBC Protected Matters Search

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 22-Jul-2022

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	106
Listed Migratory Species:	59

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	7
Commonwealth Heritage Places:	None
Listed Marine Species:	79
Whales and Other Cetaceans:	10
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	8
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	3
Bioregional Assessments:	2
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Natural			
Ku-ring-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserves	NSW	Listed place	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In buffer area only
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community known to occur within area	In feature area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area	In feature area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In buffer area only
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche eremita			
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
FISH			
Epinephelus daemelii			
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Hippocampus whitei			
White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Macquaria australasica			
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
FROG			
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Endangered	Species or species habitat may occur within area	In buffer area only
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus			
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
OTHER			
Dendronephthya australis			
Cauliflower Soft Coral [90325]	Endangered	Species or species habitat may occur within area	In buffer area only
PLANT			
Acacia bynoeana			
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area	In feature area
Acacia terminalis subsp. terminalis MS			
Sunshine Wattle (Sydney region) [88882]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within area	In buffer area only
Asterolasia elegans [56780]	Endangered	Species or species habitat likely to occur within area	In feature area
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Baloskion longipes Dense Cord-rush [68511]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat may occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area	In feature area
Darwinia biflora [14619]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat known to occur within area	In feature area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat likely to occur within area	In feature area
Grevillea shiressii [19186]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat known to occur within area	In feature area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat may occur within area	In buffer area only
Kunzea rupestris [8798]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Lasiopetalum joyceae [20311]	Vulnerable	Species or species habitat known to occur within area	In feature area
Leptospermum deanei Deane's Tea-tree [21777]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area	In feature area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat known to occur within area	In feature area
Micromyrtus blakelyi [6870]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Olearia cordata [6710]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Persoonia mollis subsp. maxima [56075]	Endangered	Species or species habitat may occur within area	In buffer area only
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat known to occur within area	In feature area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat likely to occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Zieria involucrata [3087]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
REPTILE			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Hoplocephalus bungaroides			
Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
SHARK			
Carcharias taurus (east coast population)			
Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Anous stolidus](#) Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
[Ardenna carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Ardenna grisea](#) Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In buffer area only
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat known to occur within area	In buffer area only
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In buffer area only
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Dugong dugon Dugong [28]		Species or species habitat may occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat likely to occur within area	In buffer area only
Migratory Terrestrial Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [11738]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [11742]	NSW	In feature area
Commonwealth Land - Australian Telecommunications Commission [16081]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Australian Telecommunications Commission [14404]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11761]	NSW	In buffer area only
Transport and Regional Services - Airservices Australia		
Commonwealth Land - Airservices Australia [11743]	NSW	In buffer area only
Unknown		
Commonwealth Land - [15941]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea antipodensis gibsoni as Diomedea gibsoni](#) Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
[Neophema chrysostoma](#) Blue-winged Parrot [726]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pachyptila turtur](#) Fairy Prion [1066]		Species or species habitat known to occur within area	In buffer area only
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Sternula albifrons as Sterna albifrons](#) Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche bulleri platei as Thalassarche sp. nov.](#) Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche eremita](#) Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
[Acentronura tentaculata](#) Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In buffer area only
[Festucalex cinctus](#) Girdled Pipefish [66214]		Species or species habitat may occur within area	In buffer area only
[Filicampus tigris](#) Tiger Pipefish [66217]		Species or species habitat may occur within area	In buffer area only
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In buffer area only
[Hippichthys penicillus](#) Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In buffer area only
[Hippocampus whitei](#) White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Histiogamphelus briggsii](#) Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In buffer area only
[Lissocampus runa](#) Javelin Pipefish [66251]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In buffer area only
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In buffer area only
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In buffer area only
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In buffer area only
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In buffer area only
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Vanacampus margaritifer			
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only
Mammal			
Arctocephalus forsteri			
Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
Arctocephalus pusillus			
Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In buffer area only
Dugong dugon			
Dugong [28]		Species or species habitat may occur within area	In buffer area only
Reptile			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Pelamis platurus			
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			

Current Scientific Name	Status	Type of Presence	Buffer Status
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In buffer area only
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
[Sousa sahulensis as Sousa chinensis](#) Australian Humpback Dolphin [87942]		Species or species habitat likely to occur within area	In buffer area only
[Stenella attenuata](#) Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
[Tursiops aduncus](#) Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
[Tursiops truncatus s. str.](#) Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Brisbane Water	National Park	NSW	In buffer area only
Dharug	National Park	NSW	In buffer area only
Ku-ring-gai Chase	National Park	NSW	In buffer area only
Long Island	Nature Reserve	NSW	In buffer area only
Marramarra	National Park	NSW	In buffer area only
Muogamarra	Nature Reserve	NSW	In buffer area only
Popran	National Park	NSW	In buffer area only
Spectacle Island	Nature Reserve	NSW	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Somersby Industrial Estate, Stage 1	2002/548	Not Controlled Action	Completed	In buffer area only
Referral decision				
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Dolphins			
Tursiops aduncus			
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In buffer area only
Seabirds			
Ardenna pacifica			
Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In buffer area only
Sharks			

Scientific Name	Behaviour	Presence	Buffer Status
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur	In buffer area only

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Hunter	Northern Sydney Basin	BA website	In buffer area only
Sydney	Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix H

EPBC Assessments of Significance

EPBC Assessment of Significance (Grey-headed Flying-fox)

Under the *Environment Protection and Biodiversity Conservation Act 1999*, an action is likely to have a significant impact on a vulnerable species if it affects an important population of the species. Under the Principle Significant Impact Guidelines (Department of the Environment and Heritage 2006) an important population is a population that is necessary for a species' long-term survival and recovery. This may include populations identified in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity
- populations that are near the limit of the species range.

The animals that may use the site are not considered to be part of an important population.

Will the action lead to a long-term decrease in the size of an important population of a species?

Grey-headed Flying-fox utilising the site would not constitute an important population. Future development over the rezone area would likely result in of removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides suitable habitat for this species. Clearing of this habitat as result of the proposal represents a small loss of the local extent of similar habitat. No Grey-headed Flying-fox camps will be affected by the proposal. As such, the proposal is unlikely to lead to a long-term decrease in the size of the local population.

Will the action reduce the area of occupancy of an important population?

Grey-headed Flying-fox utilising the site would not be part of an important population. Future development over the rezone area would likely result in of removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which contains suitable foraging habitat for this species. The Grey-headed Flying-fox is a highly mobile and it may travel up to 50 km each night to forage. Therefore, the local population would not be restricted to habitat resources within the site only.

Will the action fragment an existing important population into two or more populations?

Grey-headed Flying-foxes using the site for foraging purposes would not be part of an important population.

Will the action adversely affect habitat critical to the survival of a species?

No critical habitat has been listed for Grey-headed Flying-fox under the *Environment Protection and Biodiversity Conservation Act 1999*. Known Grey-headed Flying-fox camps may however be considered critical to the survival of local populations. No camps were identified within or near the study area.

Will the action disrupt the breeding cycle of an important population?

Grey-headed Flying-foxes using the study area would not be part of an important population.

Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The study area contains suitable foraging resources for Grey-headed Flying-fox. The action is unlikely to significantly decrease the availability of foraging habitat in the locality as the proposal will result in the removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides marginal (habitat) for this species. The large home range of this species allows offsite foraging resources to be accessed and isolation of habitat would not result from the development.

It is unlikely that the development would isolate and decrease the availability of quality habitat to the extent that the species is likely to decline.

Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species´ habitat?

It is highly unlikely that invasive species (such as introduced predators) that are harmful to the Grey-headed Flying-fox would become more established as a result of the action.

Will the action introduce disease that may cause the species to decline?

The proposal would not increase the likelihood of a disease becoming established or proliferating in the local population that would result in a decline of the species.

Will the action interfere with the recovery of the species?

No recovery or threat abatement plans have been prepared for this species. Therefore it is considered that the proposal is unlikely to interfere within the recovery of the Grey-headed Flying-fox.

Conclusion

The Grey-headed Flying-fox is unlikely to be significantly affected by the proposal.

EPBC Assessment of Significance (Large-eared Pied Bat)

Under the *Environment Protection and Biodiversity Conservation Act 1999*, an action is likely to have a significant impact on a vulnerable species if it affects an important population of the species. Under the Principle Significant Impact Guidelines (Department of the Environment and Heritage 2006) an important population is a population that is necessary for a species' long-term survival and recovery. This may include populations identified in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity
- populations that are near the limit of the species range.

The animals that may use the site are not considered to be part of an important population.

Will the action lead to a long-term decrease in the size of an important population of a species?

Large-eared Pied Bats utilising the site would not constitute an important population. Future development over the rezone area would likely result in of removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides marginal (habitat) for this species. Clearing of this community for the proposal represents a small loss of the local extent of similar habitat. No Large-eared Pied Bat roosting sites will be affected by the proposal. As such, the proposal is unlikely to lead to a long-term decrease in the size of the local population.

Will the action reduce the area of occupancy of an important population?

Large-eared Pied Bats utilising the site would not be part of an important population. Future development over the rezone area would likely result in of removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides marginal (habitat), which contains sub-optimal foraging habitat for this species. The Large-eared Pied Bat is a highly mobile species. Therefore, the local population would not be restricted to habitat resources within the site only.

Will the action fragment an existing important population into two or more populations?

Large-eared Pied Bat using the site for foraging purposes would not be part of an important population.

Will the action adversely affect habitat critical to the survival of a species?

No critical habitat has been listed for Large-eared Pied Bat under the *Environment Protection and Biodiversity Conservation Act 1999*. Known Large-eared Pied Bat maternity caves may however be considered critical to the survival of local populations. No maternity caves were identified within or near the study area.

Will the action disrupt the breeding cycle of an important population?

Large-eared Pied Bats using the study area would not be part of an important population. The breeding patterns of the Large-eared Pied Bat are not likely to be disrupted as this species breeds within a maternity caves, which were absent

from the study area. As such it is considered that the proposal is unlikely to disrupt the breeding cycle of an important population of Large-eared Pied Bats.

Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The study area contains foraging resources for Large-eared Pied Bat. The action is unlikely to significantly decrease the availability of foraging habitat in the locality despite the removal/modification of 0.26ha/2600m2 of PCT 1627 & 0.81ha/8100m2 of Cleared Land with Exotic Plantings which provides marginal (habitat). The large-eared Pied Bat has a large home range as such this species would not feed exclusively within the study area.

It is unlikely that the development would isolate and decrease the availability of quality habitat to the extent that the species is likely to decline.

Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species´ habitat?

It is highly unlikely that invasive species (such as introduced predators) that are harmful to the Large-eared Pied Bat would become more established as a result of the action.

Will the action introduce disease that may cause the species to decline?

The proposal would not increase the likelihood of a disease becoming established or proliferating in the local population that would result in a decline of the species.

Will the action interfere with the recovery of the species?

No recovery or threat abatement plans have been prepared for this species. Therefore it is considered that the proposal is unlikely to interfere within the recovery of the Large-eared Pied Bat.

Conclusion

The Large-eared Pied Bat is unlikely to be significantly affected by the proposal.

Appendix I

BAM Plots