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Environmental & Social Consultants

MAITLAND MENTAL HEALTH REHABILITATION PROJECT

Review of Environmental Factors (REF) – Flora and Fauna Assessment Report

FINAL

December 2024

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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Ethos Urban for Health Infrastructure NSW

Project Director: Naomi Buchhorn
Project Manager: James Garnham
Report No. 22640_R05
Date: December 2024

Environmental & Social Consultants

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Draft	Naomi Buchhorn	30 August 2024	Naomi Buchhorn	30 August 2024
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1.0 Introduction

1.1 Introduction

The Maitland Mental Health Rehabilitation Project (the Project) has been prepared by Umwelt on behalf of Health Infrastructure (HI) to assess the potential environmental impacts that could arise from infrastructure works at 51 Metford Rd, Metford NSW 2323 (the Project Area). The Project is seeking approval for a Development Without Consent application under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report has been prepared to assess the potential environmental impacts of the Project. This report accompanies a Review of Environmental Factors (REF) for the construction and operation of a new mental health services building within the Maitland Hospital campus.

1.2 Summary of the Activity

The Project involves the following works at the Maitland Mental Health Hospital:

- Site establishment
- Site preparation including earthworks
- Construction of internal roads and addition of at-grade car parks
- Constructions of 2 storey mental health facility
- 20 Medium Secure Forensic beds' 24 Low Secure Forensic beds; 20 High Support General beds (including high risk civil consumers) (64 beds total)
- Inground building services works and utility adjustments, including service diversion
- Building foundation works
- Tree removal
- Associated landscaping
- Bioretention basin.

Refer to the REF prepared by Ethos Urban for a full description of works.

1.3 Project Area Description

The Project Area is located at the Maitland Hospital Campus on Metford Road, Maitland, approximately 6.4 kilometres (km) from the Central Business District of Maitland. The site is located within the development parcel, legally described as Lot 73 DP1256781 and Lot 41 DP1274253. The site is located to the east of the recently constructed Maitland Hospital.

An image of the site is shown at **Figure 1.1**.

Figure 1.1 Site Plan

Source: Bates Smart.

1.4 Statement of Significance

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the Project, it is determined that:

- The extent and nature of potential impacts are negligible and will not have significant adverse effects on the locality, community and the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal effect on the locality, community and the environment.

1.5 Statutory Considerations

The approval pathway for the Project is Part 5, Division 5.1 of the EP&A Act. The biodiversity assessment has considered the impact of the Project on threatened species, communities and their habitat as listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Under Division 5.1 of the EP&A Act, the application does not trigger the Biodiversity Offset Scheme (BOS) established under the BC Act, unless the assessment of the impact of the Project (Section 7.3 of the BC Act) determines that a significant impact to threatened species, communities or their habitat is likely. **Section 3.0** describes biodiversity values in the Project Area. If the Project is determined to have a significant impact, under Section 7.8 of the BC Act a Species Impact Statement or a Biodiversity Development Assessment Report may be prepared. An assessment of the impact of the Project considering the five part test as set out in Section 7.3 of the BC Act (refer to **Section 4.3.1** and **Appendix B**) has determined that the Project is not likely to have a significant impact on threatened species and communities.

State Environmental Planning Policy (Biodiversity and Conservation) 2021 includes a number of previous planning policies including Koala Habitat Protection 2019 and Koala Habitat Protection 2021, Chapter 3 and Chapter 4, respectively. Schedule 2 identifies those local government areas where the provisions of Chapter 3 and/or Chapter 4 apply. City of Maitland is included in Schedule 2. For all RU1 (Primary Production), RU2 (Rural Landscape) or RU3 (Forestry) zoned land outside of the Sydney Metropolitan Area and Central Coast, Chapter 3 Koala Habitat Protection 2020 applies. The site is zoned RU2 Rural Landscape under the Maitland Local Environmental Plan 2011 and accordingly the objectives and definitions of koala habitat in Chapter 3 have been considered.

Chapter 3 (SEPP (Koala Habitat Protection) 2020) aims to encourage the proper conservation and management of areas of natural vegetation that may provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. This is to be achieved through identifying areas of core koala habitat, including these areas in environment protection zones and where required managing development consent in relation to areas of core koala habitat. Chapter 3 defines:

- Potential koala habitat as an area of native vegetation where preferred koala feed as listed in Schedule 1 constitute at least 15 per cent of the total number of trees. The preferred koala feed trees for Chapter 3 are limited to 10 tree species.
- Core koala habitat supports a resident population of koala.

The Project Area includes natural and regrowth vegetation. An assessment of whether the Project Area supports potential koala habitat is provided in **Section 3.4**.

The EPBC Act is the Commonwealth Government's primary piece of environmental legislation and is administered by the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW). It includes provisions to protect matters of national environmental significance (MNES), including threatened species, threatened ecological communities, and migratory species, as well as other protected matters. It defines the categories of threat for threatened flora and fauna, identifies key threatening processes and provides for the preparation of recovery plans for threatened flora, fauna, and communities. Consideration of the likely occurrence of MNES in the Project Area is provided in **Section 3.5** and **Section 3.6**.

Actions that may adversely affect MNES may be deemed to be a controlled action under the EPBC Act. The significance of the impact of the proposed action (the Project) on MNES can be determined through self-assessment using *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (DoE 2013). A referral is required for proposed actions that may affect nationally listed threatened species, threatened ecological communities, and migratory species. The Project will not affect MNES and accordingly a referral of the action to DCCEEW is not warranted.

2.0 Methodology

As part of master planning and environmental impact assessment for development of the Maitland Mental Health (MMH) service, Umwelt has undertaken desktop assessment, vegetation mapping and surveys between late-2022 and mid-2024. These are described in detail in the following sections.

2.1 Desktop Assessment

The desktop assessment included a review of relevant public databases and literature to identify threatened and migratory species, endangered populations, threatened ecological communities (TECs) as listed under the BC Act and EPBC Act, and their habitats that have previously been recorded within the locality (a 10-kilometre radius around the Project Area). Threatened species, migratory species, endangered populations and TECs that have the potential to occur within the locality were also considered based on the type of habitat present and the NSW bioregion within which the Project occurs.

Databases and literature reviewed as part of this ecological assessment include:

- Review of previous surveys completed by Pitt&Sherry (2018) and Sclerophyll Flora Surveys and Research (2019) for the new Maitland Hospital in the Maitland Hospital Campus
- a search of the NSW BioNet Atlas (DPE 2024a) based on a 10 km radius around the Project Area
- a search of the Commonwealth DCCEEW Protected Matters Search Tool (PMST) based on a 10 km radius around the Project Area (see **Appendix A**)
- Threatened Biodiversity Data Collection (TBDC) (DPE 2024a)
- VIS Classification Database (DPE 2024a)
- NSW State Vegetation Type Map (SVTM) (DCCEEW 2023).

The information obtained was used to inform survey design where required and was also used to assist in the assessment of potentially occurring threatened species.

2.2 Vegetation Mapping

The NSW State Vegetation Type Map (SVTM) Extent (DPE 2024) and previous mapping by Pitt&Sherry (2018) were considered to inform the assessment of the vegetation communities present within the Project Area. The SVTM classifies vegetation to Plant Community Type (PCT) and was therefore adopted as baseline mapping.

For each vegetation community described, the dominant and characteristic species were entered into the online plant community identification tab and an initial list of PCTs was generated. The profiles for each of the possible PCTs were then interrogated and the most appropriate match assigned based on floristic, structure and distribution details, which was then verified in the field.

Vegetation mapping involved the following key steps:

- review of aerial imagery to assess vegetation distribution patterns as dictated by change in canopy texture, tone, and colour, as well as topography
- review of the modelled distribution of vegetation communities within broader scale regional based vegetation mapping
- preparation of a draft plant community type map based on interpretation of digital aerial imagery
- field-based ground-truthing of the draft plant community type mapping
- confirmation of vegetation community floristic delineations based on plot data.

Vegetation communities were delineated through the identification of repeating patterns of plant species assemblages in each of the identified strata. Slight variations in species composition are typical across the extent of a community and are often associated with microhabitats or ecotones with other communities.

2.3 Field Surveys

Five Umwelt ecologists conducted field surveys on four separate occasions totalling five days from 28 September 2022 and 9 August 2024. These surveys were designed to meet the requirements of the NSW Biodiversity Assessment Method (BAM) (DPIE 2020a). Survey methods and coverage are shown in **Figure 2.1.**

2.3.1 Initial Survey

The initial survey was a preliminary inspection to inform biodiversity constraints assessment and master planning development. The surveys aimed to verify the baseline vegetation mapping and record observations of any Threatened Ecological Communities (TECs) and any threatened and migratory species habitat. Threatened flora searches (10 m parallel transects) for species that can be surveyed for in October and incidentally observed threatened species and general ecological features – such as waterbodies – were also recorded.

Eight (8) vegetation integrity plots (refer to Section **2.3.2** for detailed description) and 32 rapid data assessments were undertaken across the Maitland Health Campus to:

- Record the flora species occurring and to capture the structural variation in PCTs.
- Record the variation in species diversity across PCTs.
- Define changes in abiotic conditions (the occurrence of creek lines and past disturbances).

The presence of fauna habitat within the Project Area was also noted. Specific attention was paid to the potential occurrence of semi-permanent waterbodies, creek lines, rocky outcrops, and presence of hollow bearing trees. Searches for stick nests for threatened raptors and suitable tree hollows for threatened cockatoos and owls were conducted.

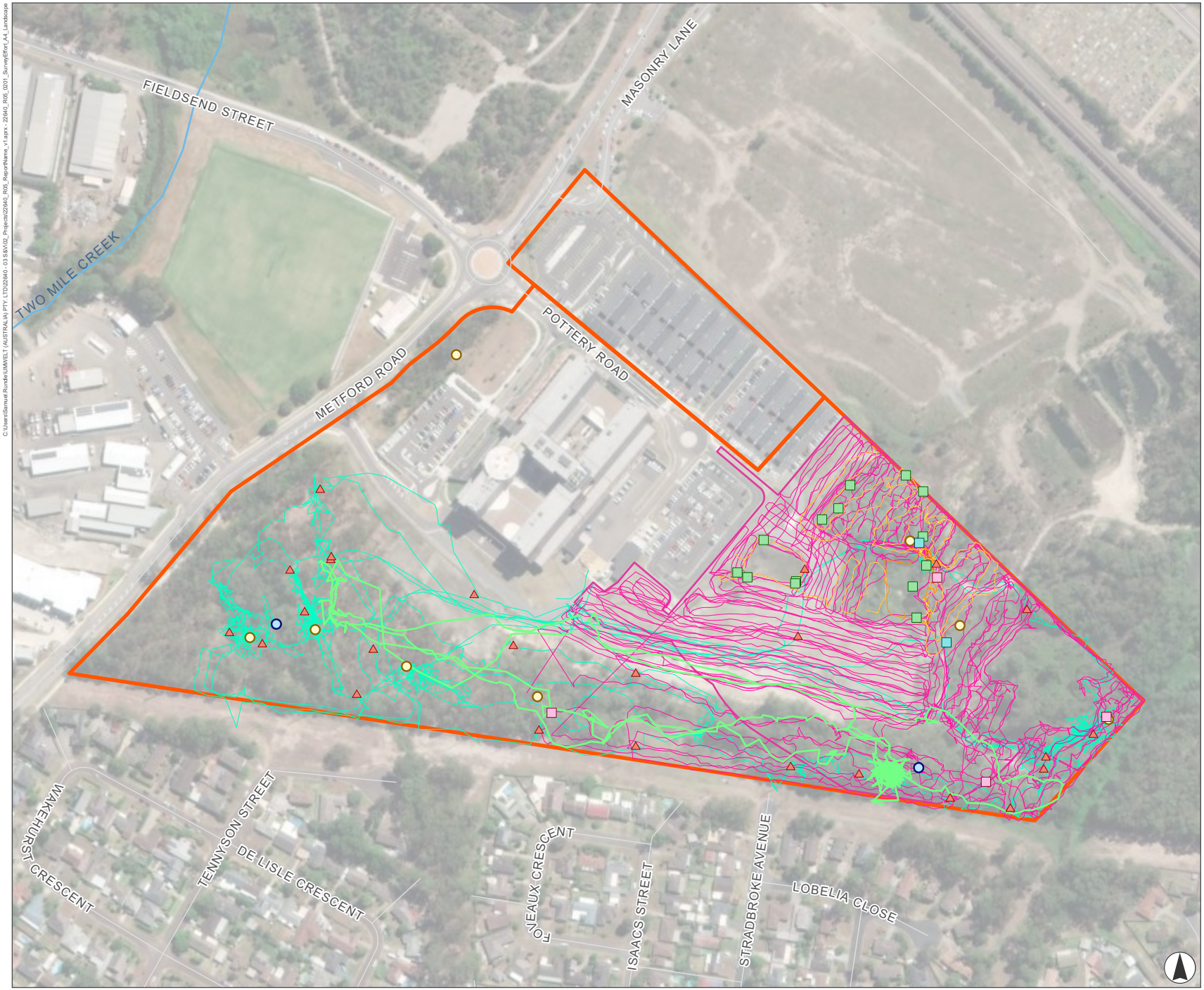
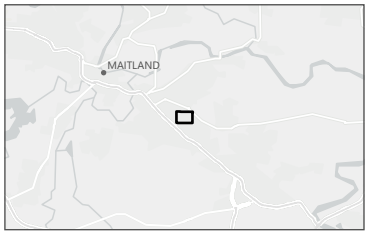


FIGURE 2.1

Survey Effort

Legend

- Anabat Locations
- Remote Camera Locations
- Call Playback (December 2022)
- Rapid Locations
- Call playback (July 2023)
- Plot Locations
- Stag watch (July 2023)
- Threatened Flora Transects (December 2022)
- General Survey Tracks (September 2022)
- Threatened Flora Transects (October 2022)
- General Survey Tracks (October 2022)
- Watercourse
- Assessment Area
- Project Area



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GDA 1994 MGA Zone 56

Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

2.3.2 Floristic and Vegetation Integrity Survey

A total of eight BAM floristic plots and 32 rapid assessments were conducted within the Project Area during the surveys undertaken for this assessment by Umwelt (shown on **Figure 2.1**). Floristic and vegetation integrity data was collected in accordance with the requirements under the BAM (DPIE 2020a). **Table 2.1** outlines the floristic survey effort in the Project Area.

Table 2.1 Number of Floristic and Vegetation Integrity Plots in the Project Area

Veg. Zone	Plant Community Type (PCT)	Number of Floristic Plots
1	3975 Southern Lower Floodplain Freshwater Wetland – moderate-good	0
2	3975 Southern Lower Floodplain Freshwater Wetland – thinned/disturbed	1
3	3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest – weedy understory	3
4	3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest – moderate-good	2
5	3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest – thinned/disturbed	1
6	3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest - regenerating	0
7	3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest - regrowth	1
	TOTAL	**8**

At each floristic and vegetation integrity plot, data were recorded according to Section 5 of the BAM (DPIE 2020a). This involved setting out 20 x 50 m, 20 x 20 m and 1 x 1m plots. The location of each plot was recorded using a hand-held GPS with accuracy of ± 5 m. The Map Grid of Australia (MGA) coordinate system was used.

At each plot/transect, roughly 45 to 60 minutes was spent searching for all vascular flora species present within the 20 m x 20 m plot. Searches of each 20 x 20 m plot were generally undertaken through parallel transects from one side of the plot to another. Most effort was spent on examining the groundcover, which usually supported well over half of the species present, however the composition of any shrub, mid-storey, canopy and emergent layers were also thoroughly examined.

For each flora species recorded in the plot, the following data was collected in accordance with Table 2 of the BAM (DPIE 2020a):

- stratum/layer in which the species occurs
- growth form
- scientific name and common name
- cover and
- abundance.

At each vegetation integrity plot the following attributes were recorded in accordance with the BAM (DPIE 2020a) to determine the condition of the vegetation zone:

- ***Composition*** – native plant species richness by growth form (within the 20 m x 20 m plot).
- ***Structure*** – estimate foliage cover of native and exotic species by growth form (within the 20 x 20 m plot).
- ***Function*** (within the 20 x 50 m plot) including, number of large trees, presence or otherwise of tree stem size classes, presence or otherwise of canopy species regeneration, length of fallen logs, percentage cover for litter (recorded from five 1 x 1 m plots), number of trees with hollows and high threat exotic cover.

2.3.3 Targeted Threatened Flora Survey

Targeted surveys for species-credit flora species predicted to occur with the PCTs mapped in the Project Area were completed with consideration of the *Surveying guidelines for threatened plants and their habitats* (DPIE 2020b). In such circumstances, the width between the parallel transects varied depending on the species life form (e.g., tree, shrub, grass, etc.) being surveyed for and the particular type of habitat (e.g., open or dense vegetation) being surveyed. The width between survey transects ranged between 5 m and 10 m apart. Targeted flora surveys were completed over two days in October 2022 and December 2022. Survey effort for flora surveys is shown in **Figure 2.1.**

2.3.4 Fauna Survey

A range of fauna surveys were completed within the Project Area, targeting threatened species. Details of fauna surveys are provided in the following sections. Survey locations are highlighted in **Figure 2.1**. A summary of the surveys completed are provided in **Table 2.2.**

2.3.4.1 Habitat searches

General habitat searches were completed within the Project Area during all survey periods, concurrently with other survey methods. These searches involved recording any habitat features that may be considered important for threatened species roosting or breeding such as large stick nests, hollow-bearing trees, waterbodies, rocky outcrops and man-made structures.

2.3.4.2 Amphibian surveys

Surveys targeting the threatened green and golden bell frog (*Litoria aurea*) and green-thighed frog (*Litoria brevipalmata*) were conducted around the wetland of PCT 3975. Surveys were conducted over two nights and included broadcasting the calls of both species followed by a listening period to detect any responses, after which spotlighting surveys were undertaken. Diurnal dip netting surveys were completed over two days to detect the tadpoles of either species. Amphibian surveys were generally conducted in accordance with the NSW survey guide for threatened frogs (DPIE 2020c).

2.3.4.3 Nocturnal owl and mammal surveys

Surveys were completed over two nights in July 2023 targeting masked owl (*Tyto novaehollandiae*), powerful owl (*Ninox strenua*) and barking owl (*Ninox connivens*). These surveys included stag watching two hollow-bearing trees in the Project Area, which were identified as potential breeding habitat for threatened

owls. Stag watching was completed over 10 minutes before dusk and 20 minutes after dusk. Call playback was completed at each site following the stag watching which consisted of an initial listening period of 10 minutes preceded by call-broadcast of each species for approximately five minutes, with a listening period of five minutes in between species. Following call-broadcasts, spotlighting and listening were conducted in the vicinity for up to 30 minutes. On each survey night call-playback was conducted at two sites at least 800 metres apart, with spotlighting conducted in between and afterwards. Spotlighting surveys also were used to target threatened arboreal mammals including squirrel glider (*Petaurus norfolcensis*), brush-tailed phascogale (*Phascogale tapoatafa*) and koala (*Phascolarctos cinereus*).

2.3.4.4 Motion-sensing remote camera

Motion-sensing cameras were used to target arboreal fauna species in the Project Area. Arboreal cameras were attached to a tree trunk or branch and aimed at a bait tube (peanut butter/oats/honey bait mix) secured to a branch or adjacent tree. Four arboreal cameras and baits were set approximately two metres above the ground and the bait tree was sprayed with a honey water solution. Cameras were left in-situ between 5 December 2022 and 13 January 2023 (38 nights). Total survey effort was 152 trap nights for arboreal cameras.

2.3.4.5 Ultrasonic bat call detection

Ultrasonic bat call detectors were used to record call activity of bats in the Project Area. Each unit was set to record continuously from 8 pm till 6 am the following morning. A total of two bat call detectors were set across the Project Area in December 2022 for 38 nights each, totalling 76 trap nights of survey effort. Calls were analysed by Dr Anna McConville of EchoEcology.

Table 2.2 Details of Threatened Fauna Surveys

Survey Date	Survey Method	Species Targeted
28 September 2022	Searches for stick-nests and active hollows General meandering transects	glossy black-cockatoo (*Calyptorhynchus lathami*) wallum froglet (*Crinia tinnula*) white-bellied sea-eagle (*Haliaeetus leucogaster*) eastern osprey (*Pandion cristatus*) little bent-winged bat (*Miniopterus australis*) large bent-winged bat (*Miniopterus oceanensis schreibersii*) southern myotis (*Myotis macropus*) koala (*Phascolarctos cinereus*) grey-headed flying-fox (*Pteropus poliocephalus*)
10 October 2022 **9 August 2024**	Habitat assessments Searches for stick-nests and active hollows General meandering transects	curlew sandpiper (*Calidris ferruginea*) great knot (*Calidris tenuirostris*) glossy black-cockatoo (*Calyptorhynchus lathami*) wallum froglet (*Crinia tinnula*) white-bellied sea-eagle (*Haliaeetus leucogaster*) broad-billed sandpiper (*Limicola falcinellus*) black-tailed godwit (*Limosa limosa*) green and golden bell frog (*Litoria aurea*) green-thighed frog (*Litoria brevipalmata*)

Survey Date	Survey Method	Species Targeted
		eastern osprey (*Pandion cristatus*) little bent-winged bat (*Miniopterus australis*) large bent-winged bat (*Miniopterus oceanensis schreibersii)* southern myotis (*Myotis macropus*) koala (*Phascolarctos cinereus*) grey-headed flying-fox (*Pteropus poliocephalus*)
5–7 December 2022	Call playback Spotlighting Diurnal dip-netting for tadpoles	green and golden bell frog (*Litoria aurea*) green-thighed frog (*Litoria bevipalata*)
5 December 2022 – 13 January 2023	Anabat	little bent-winged bat (*Miniopterus australis*) large bent-winged bat (*Miniopterus oceanensis schreibersii*) southern myotis (*Myotis macropus*)
5 December 2022 – 13 January 2023	Remote cameras	squirrel glider (*Petaurus norfolcensis*) koala (*Phascolarctos cinereus*) brush-tailed phascogale (*Phascogale tapoatafa*)
3–4 July 2023	Call playback Stag watch Spotlighting	powerful owl (*Ninox strenua*) barking owl (*Ninox connivens*) squirrel glider (*Petaurus norfolcensis*) koala (*Phascolarctos cinereus*) masked owl (*Tyto novahollandiae*)

2.4 Assessment Limitations

Surveys were conducted over a number of years and seasons increasing the likelihood of detection of species.

Surveys have been completed generally in accordance with the NSW BAM (DPIE 2020a) and NSW survey guidelines with a focus on targeted species surveys for species assessed under the BAM as species-credit species. Under the BAM, species assessed as ecosystem species are assumed present, based on associations with plant community types, and targeted surveys are not required and have not been undertaken. Where the plant community types and microhabitat requirements are present and there are recent reliable records by others in the locality, the ecosystem species are assumed present. However, it is noted that surveys completed may not have detected these species.

3.0 Existing Environment

3.1 Landscape Context

The landscape context which describes attributes that are potentially relevant to the biodiversity occurring in the Project Area are outlined in **Table 3.1**.

Table 3.1 Landscape Features of the Project Area

Landscape features	Landscape context
IBRA region	Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Region.
IBRA subregion	Hunter IBRA Sub-region.
NSW (Mitchell) Landscapes	Newcastle Coastal Ramp.
Biodiversity Values Map	Maitland Health Campus is not mapped as biodiversity values mapped land.
National parks and reserves	There are no National Parks or reserves within the Maitland Health Campus.
Rivers, stream and estuaries	Within the Project Area is an artificial wetland associated with a former watercourse. The former watercourse and catchment of same have been modified by previous quarrying activities and/or residential development upslope of the Project Area. Downstream of the Project Area the former watercourse has been extensively modified. Downstream of Raymond Terrace Road the watercourse is natural and characterised by a large freshwater wetland associated with the confluence of Two Mile, Three Mile and Four Mile Creeks which eventually discharge to the Hunter River via constructed drains.
Wetlands (within, adjacent to and downstream) and Ground Dependent Ecosystems	The DCCEEW's PMST has identified one wetland of international importance within 10 kilometres. This area is listed as 'Ramsar Site Number 24 – Hunter Estuary'. There are no areas of groundwater dependent ecosystems in the Project Area.
Areas of geological significance or soil hazard features	There are no karsts or areas of geological significance within the Project Area.
Connectivity	The Project Area and Maitland Hospital Campus support patches of intact and regenerating woodland that are largely fragmented from nearby remnants. Several of these patches follow the contours of watercourses and may provide connectivity between fragmented terrestrial habitat. However, the locality has been extensively cleared for residential, recreational, light industrial and infrastructure development as part of East Maitland and Metford area. While no mapped environmental corridors from existing datasets were identified, the forested area along the southern boundary and in the east of the Maitland Hospital Campus is considered to form part of a corridor for wildlife movements in the locality. Fauna may move through this area to access the moderately patchy vegetation areas to the north east. Larger remnants of native vegetation occur east of Metford with connectivity to the south of New England Highway.

3.2 Survey Results

3.2.1 Verified Plant Community Types

There were three PCTs identified during field surveys, being:

- 3975 Southern Lower Floodplain Freshwater Wetland
- 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
- 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest.

The total extent of PCTs recorded in the Project Area are based on verified vegetation mapping and is shown in **Table 3.2.**

Table 3.2 Extent of PCTs within the Project Area

Plant Community Type (PCT)	Condition	Vegetation Zone	Area within Project Area (ha)
3975 Southern Lower Floodplain Freshwater Wetland	Moderate-Good	1	0.17
	Thinned/disturbed	2	0.74
3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	Weedy understory	3	3.78
	Moderate-Good	4	2.96
	Thinned/disturbed	5	0.25
	Regenerating	6	0.19
3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest	Regrowth	7	0.73
		Total	**8.82**

The following sections provide a description of each PCT. The distribution of the PCTs in the Project Area are shown in **Figure 3.1.**

FIGURE 3.1

Plant Community Types, Threatened Ecological Communities and Threatened Species recorded in the project area

Legend

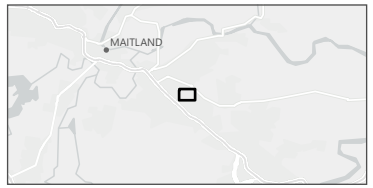
- Hollow-bearing tree
- Squirrel glider
- Watercourse
- Assessment Area
- Project Area

Threatened Ecological Communities

- Freshwater wetlands on coastal floodplains of the NSW North Coast| Sydney Basin and South East Corner bioregions EEC
- Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC
- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregion EEC

Plant Community Types

- 3975 Southern Lower Floodplain Freshwater Wetland - moderate-good
- 3975 Southern Lower Floodplain Freshwater Wetland thinned/disturbed
- 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest - weedy understorey
- 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest - moderate-good
- 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest - thinned/disturbed
- 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest - regenerating
- 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest - regrowth



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Metres

Scale 1:3,978 at A4
GDA 1994 MGA Zone 56

Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

3.2.1.1 PCT 3975 Southern Lower Floodplain Freshwater Wetland – Moderate Good

Vegetation Zone	1		
Vegetation formation	Freshwater Wetlands		
Vegetation class	Coastal Freshwater Lagoons		
Other mapping sources	SVTM		
Conservation status	Freshwater wetlands on coastal floodplains of the NSW North Coast| Sydney Basin and South East Corner bioregions EEC as listed under the BC Act		
Estimate of percent cleared	93 per cent		
Condition	Moderate Good		
Extent in Project Area	0.17 ha		
Total number of plots in the survey area	No vegetation integrity plots were conducted for this zone due to safety considerations		
Structure	**Height range**	**Average cover (%)**	**Typical species**
Trees	n/a	0	Absent
Shrubs	n/a	0	Absent
Ground covers	0.5-2 m	60	Dominated by broad-leaved cumbungi (*Typha orientalis*) and common reed (*Phragmites australis*). Additional ground cover species within the vegetation zone include slender knotweed (*Persicaria decipiens*), sea rush (*Juncus usitatus*) and jointed twig-rush (*Baumea articulata*).
Ferns and Other	0	0	Absent

Vegetation description: PCT 3975 is described in the BioNet Vegetation Classification database as a tall to very tall freshwater sedgeland or forbland occurring in depressions on Quaternary alluvial deposits on coastal floodplains of the Central Coast and South Coast botanical divisions at elevations below 10 m above sea level. This community often occurs in disturbed environments and may include derived states. In the Project Area it is likely that this Vegetation Zone has been modified and/or formed by previous quarrying operations.

Photo 3.1 depicts Vegetation Zone 1 in the Project Area.

This PCT is mapped as occurring downstream of the Project Area and dominates the large wetland south of Morpeth associated with Two Mile, Three Mile and Four Mile Creeks.

Photo 3.1 PCT 3975 Southern Lower Floodplain Freshwater Wetland – Moderate-Good

3.2.1.2 PCT 3975 Southern Lower Floodplain Freshwater Wetland – Thinned/disturbed

Vegetation Zone	2		
Vegetation formation	Freshwater Wetlands		
Vegetation class	Coastal Freshwater Lagoons		
Other mapping sources	SVTM		
Conservation status	Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregion EEC as listed under the BC Act		
Estimate of percent cleared	93 per cent		
Condition	Thinned/ disturbed		
Extent in Project Area	0.74 ha		
Total number of plots in the survey area	One (P_22640_005)		
Structure	**Height range**	**Average cover (%)**	**Typical species**
Trees	3–6 m	12	Swamp Oak (*Casuarina glauca*) and Forest Red Gum (*Eucalyptus tereticornis*).

Vegetation Zone	2		
Shrubs	0.5–2.5 m	<1	*Melaleuca nodosa*, Green Wattle (*Acacia irrorate*), *Acacia falcata*, Prickly Beard-heath (*Leucopogon juniperinus*) and Hoary Guinea Flower (*Hibbertia obtusifolia*).
Ground covers	0–0.1	3	Common Couch (*Cynodon dactylon*), Weeping Grass (*Microlaena stipoides* var. *stipoides*), Common Reed (*Phragmites australis*), whiteroot (*Lobelia purpurascens),* Kidney Weed (*Dichondra repens*), Ivy-leaved Violet (*Viola hederacea*), Shade Plantain (*Plantago debilis*) and Mallow (*Malva* spp.).
Ferns and Other	0.1	<1	Harsh Ground Fern (*Hypolepis muelleri*).

Vegetation description: Vegetation Zone 2 is a woody form of PCT 3975. While the BioNet Vegetation Classification database describes the PCT as non-woody freshwater wetlands it notes that rarely a very sparse emergent tree layer is present, which may include swamp oak (*Casuarina glauca*), Melaleuca species or very rarely Eucalypts. This vegetation zone was dominated by swamp oak (*Casuarina glauca*) in the canopy with the exotic Lantana (*Lantana camara*) dominated the midstory. The groundcover was dominated by weeping grass (*Microlaena stipoides* var. *stipoides*). This vegetation zone was located adjacent to Vegetation Zone 1 to the north of the Project Area. Given the history of disturbance of the area this vegetation zone has been assigned to PCT 3975 based on presence of species and association with Vegetation Zone 1. **Photo 3.2** illustrates Vegetation Zone 2 in the Project Area.

Photo 3.2 PCT 3975 Southern Lower Floodplain Freshwater Wetland – Moderate Good

3.2.1.3 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Weedy Understory

Vegetation Zone	3		
Vegetation formation	Dry Sclerophyll Forest (shrub/grass sub-formation)		
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests		
Other mapping sources	SVTM		
Conservation status	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC as listed under the BC Act		
Estimate of percent cleared	68.6 per cent		
Condition	Weedy understorey		
Extent in Project Area	3.78 ha		
Total number of plots in the survey area	Three (P1, P2 and P_22640_007)		
Structure	**Height range**	**Average cover (%)**	**Typical species**
Trees	5–15 m	13	Dominated by Spotted Gum (*Corymbia maculata*) and Grey Gum (*Eucalyptus punctata*) with Red Ironbark (*Eucalyptus fibrosa*) and Narrow-leaved Wattle (*Acacia linearifolia*).
Shrubs	1–3 m	4	Native Blackthorn (*Bursaria spinosa*), Rough Fruit Pittosporum (*Pittosporum revolutum*), Cotton Bush (*Maireana aphylla*), White Dogwood (*Ozothamnus diosmifolius*), Green Wattle (*Acacia irrorata*), *Acacia falcata*, Grey Myrtle (*Backhousia myrtifolia*), and Coffee Bush (*Breynia oblongifolia*).
Ground covers	0.1–0.5 m	4	Dominated by Wiry Panic (*Entolasia stricta*) with additional ground cover species including Weeping Grass (*Microlaena stipoides*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *Multiflora*), Blue Flax-lily (*Dianella caerulea),* Tufted Hedgehog Grass (*Echinopogon caespitosus* var. *caespitosus*), *Juncus* spp., Native Wandering Jew (*Commelina cyanea*), *Lomandra multiflora* subsp. *Dura*, whiteroot (*Lobelia purpurascens*), Ivy Goodenia (*Goodenia hederacea*), *Thelymitra* spp., Trailing Speedwell (*Veronica plebeian*) and *Carex* spp.
Ferns and Other	0.1–0.5 m	1	False Sarsaparilla (*Hardenbergia violacea*), Rock Fern (*Cheilanthes sieberi*), Common Silkpod (*Parsonsia straminea*), Bracken (*Pteridium esculentum*), Mistletoe (*amyema* spp.), Wonga Wonga Vine (*Pandorea pandorana*), Climbing Guinea Flower (*Hibbertia scandens*) and Variable Glycine (*Glycine tabacina*).

Vegetation description: PCT 3433 is described in the BioNet Vegetation Classification database as a tall to very tall sclerophyll open forest with dry and soft-leaved shrubs and a grassy ground cover on undulating foothills. This community often occurs in disturbed environments and may include derived states. In the south and eastern portion of the Project Area PCT 3433 – weedy understory Vegetation Zone has a modified midstory with lantana (*Lantana camara*) being the dominant species in this stratum, whereas in the south western portion of the Project Area, lantana is still present but the midstory is dominated by small-leaved privet (*Ligustrum sinense*). The native canopy is still intact and is comprised mostly of spotted gum (*Corymbia maculata*) and red ironbark (*Eucalyptus fibrosa*), with occasional occurrences from grey gum (*Eucalyptus punctata*), white mahogany (*Eucalyptus acmenoides*) and forest red gum (*Eucalyptus teretecornis*).

Photo 3.3 depicts Vegetation Zone 3 in the Project Area.

This PCT is mapped as occurring to the east and south of the Project Area.

Photo 3.3 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Weedy Understory

3.2.1.4 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Moderate Good

Vegetation Zone	4		
Vegetation formation	Dry Sclerophyll Forest (shrub/grass sub-formation)		
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests		
Other mapping sources	SVTM		
Conservation status	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC as listed under the BC Act		
Estimate of percent cleared	68.6 per cent		
Condition	Moderate-Good		
Extent in Project Area	2.96 ha		
Total number of plots in the survey area	Two (P3 and P4)		
Structure	**Height range**	**Average cover (%)**	**Typical species**
Trees	8–20 m	6	Spotted Gum (*Corymbia maculata*), Grey Gum (*Eucalyptus punctata)* and Red Ironbark (*Eucalyptus fibrosa*).
Shrubs	1–3 m	3	Dominant species is *Leptospermum polyanthum*, surrounded by White Wattle (*Acacia linifolia*), *Cassinia quinquefaria,* Stiff Bottlebrush (*Callistemon rigidus*), Native Blackthorn (*Bursaria spinosa*), Gorse Bitter Pea (*Daviesia ulicifolia*), Prickly Beard-heath (*Leucopogon juniperinus*), *Boronia* spp., *Acacia falcata, Cassinia quinquefaria* and *Dillwynia retorta*.
Ground covers	0.1–0.5 m	5	Most prominent species are Wiry Panic (*Entolasia stricta*), Barbed Wire Grass (*Cymbopogon refractus*), Purple Wiregrass (*Aristida ramosa*) and Brown's Lovegrass (*Eragrostis brownii*), with scatterings of Spiny-headed Mat-rush (*lomandra longifolia*), Pomax (*Pomax umbellate*), Pink Fingers (*Caladenia carnea*) *cyperus* spp., Kidney Weed (*Dichondra repens*), Frogsmouth (*Philydrum lanuginosum*), *Goodenia rotundifolia*, *Juncus usitatus*, Many-flowered Mat-rush (*Lomandra multiflora* subsp. *Multiflora*), whiteroot (*Lobelia purpurascens*) and *Goodenia rotundifolia*.
Ferns and Other	0.1 m	1	Wonga Wonga Vine (*Pandorea pandorana*), Twining glycine (*glycine clandestine*), False Sarsaparilla (*Hardenbergia violacea*) and Rock Fern (*Cheilanthes sieberi*).

Vegetation description: PCT 3433 is described in the BioNet Vegetation Classification database as a tall to very tall sclerophyll open forest with dry and soft-leaved shrubs and a grassy ground cover on undulating foothills. This community often occurs in disturbed environments and may include derived states. This Vegetation Zone (PCT 3433 moderate-good) is located within the southern portion of the Project Area and is primarily dominated by native species among each stratum. The ground cover is dominated by native grasses consisting of wiry panic (*Entolasia stricta*), barbed wire grass (*Cymbopogon refractus*), and purple wiregrass (*Aristida ramosa*). The shrub layer is generally open and comprises of *Leptospermum polyanthum*, Acacias (i.e. *Acacia linifolia, Acaica falcata*) and native blackthorn (*Bursaria spinosa*). The native canopy is intact and is comprised mostly of spotted gum (*Corymbia maculata*) and red ironbark (*Eucalyptus fibrosa*), with occasional occurrences of grey gum (*Eucalyptus punctata*), white mahogany (*Eucalyptus acmenoides*) and forest red gum (*Eucalyptus teretecornis*).

Photo 3.4 depicts Vegetation Zone 4 in the Project Area.

Photo 3.4 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Moderate-Good

3.2.1.5 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Thinned/disturbed

Vegetation Zone	5		
Vegetation formation	Dry Sclerophyll Forest (shrub/grass sub-formation)		
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests		
Other mapping sources	SVTM		
Conservation status	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC as listed under the BC Act		
Estimate of percent cleared	68.6 per cent		
Condition	Thinned/disturbed		
Extent in Project Area	0.25 ha		
Total number of plots in the survey area	Once (P_22640_008)		
Structure	**Height range**	**Average cover (%)**	**Typical species**
Trees	4–15 m	32	Dominated by Spotted Gum (*Corymbia maculata),* Red Ironbark (*Eucalyptus fibrosa*) and Cheese Tree (*Glochidion ferdinandi*).
Shrubs	0.5–3 m	2	Native shrubs including *Dillwynia* spp., Green Wattle (*Acacia irrorata*), *Acacia falcata*, Native Blackthorn (*Bursaria spinosa*), Cotton Bush (M*aireana aphylla*), White Sally (*Acacia floribunda*) and Prickly Beard-heath (*Leucopogon juniperinus*).
Ground covers	0.1–0.5 m	2	Scattered native forbs and grasses including *Themeda triandra*, Blue Flax-lily (*Dianella careulea),* whiteroot (*Lobelia purpurascens*), Redanther Wallaby Grass (*Rytidosperma pallidum),* Tufted Hedgehog Grass (*Echinopogon caespitosus* var. *caespitosus*), Wiry Panic (*Entolasia stricta*), *Juncus* spp. And Kidney Weed (*Dichondra repens*).
Ferns and Other	0.1 m	1	False Sarsaparilla (*Hardenbergia violacea*), *Clematis* spp. and Variable Glycine (*Glycine tabacina*).

Vegetation description: PCT 3433 is described in the BioNet Vegetation Classification database as a tall to very tall sclerophyll open forest with dry and soft-leaved shrubs and a grassy ground cover on undulating foothills. This community often occurs in disturbed environments and may include derived states. This Vegetation Zone (PCT 3433 thinned/disturbed) occurs as a small isolated patch at the western boundary of the Project Area bounded by the nMH car park to the east and north, and Metford Road to the west. This vegetation zone is primarily dominated by native species among each stratum however evidence of past disturbances in the form of clearing or under scrubbing is present. The ground cover is dominated by native grasses consisting of wiry panic (*Entolasia stricta*), kangaroo grass (*Themeda triandra*) and redanther

wallaby grass (*Rytidosperma pallidum*). The shrub layer is generally open and comprises of Acacias (i.e. *Acacia irrorate, Acacia floribunda* and *Acaica falcata*) and native blackthorn (*Bursaria spinosa*). The native canopy is intact and is comprised mostly of spotted gum (*Corymbia maculata*) and red ironbark (*Eucalyptus fibrosa*), with occasional occurrences of cheese tree (*Glochidion ferdinandi*).

Photo 3.5 depicts Vegetation Zone 5 in the Project Area.

Photo 3.5 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter –Thinned/disturbed

3.2.1.6 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Regenerating

Vegetation Zone	6
Vegetation formation	Dry Sclerophyll Forest (shrub/grass sub-formation)
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests
Other mapping sources	SVTM
Conservation status	Does not confirm to any State or Commonwealth listed TEC
Estimate of percent cleared	68.6 per cent
Condition	Regenerating

Vegetation Zone	6		
Extent in Project Area	0.19 ha		
Total number of plots in the survey area	No plots were completed for this vegetation zone		
Structure	**Height range**	**Average cover (%)**	**Typical species**
Trees	0.5–1 m	<1	Regenerating *Eucalyptus* sp.
Shrubs	1–2 m	5	Native shrubs including Green Wattle (*Acacia irrorata*), coastal wattle (*Acacia longifolia*) and *Acacia falcata*
Ground covers	0.1 m	20	Patches of native forbs and grasses including couch (*Cynodon dactylon*) and *Juncus* sp. Areas of exotic vegetation dominated by catsear (*Hypochaeris radicata*)

Vegetation description: Regenerating eucalypts and *Acacia* sp. downslope of intact patch of PCT 3433. Patches of groundcover dominated by couch (*Cynodon dactylon*). Sparse groundcover with areas of bare ground. **Photo 3.6** illustrates Vegetation Zone 6 in the Project Area.

Photo 3.6 PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Regenerating

3.2.1.7 PCT 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest – Regrowth

Vegetation Zone	7		
Vegetation formation	Dry Sclerophyll Forest (shrub/grass sub-formation)		
Vegetation class	Hunter-Macleay Dry Sclerophyll Forests		
Other mapping sources	SVTM		
Conservation status	Consistent with the Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC listed under the BC Act		
Estimate of percent cleared	68.6 per cent		
Condition	Regrowth		
Extent in Project Area	0.73 ha		
Total number of plots in the survey area	One (P_22640_006)		
Structure	**Height range**	**Average cover (%)**	**Typical species**
Trees	5–10 m	8	Forest Red Gum (*Eucalyptus tereticornis*) and Cheese Tree (*Glochidion ferdinandi*).
Shrubs	0.5–3 m	2	Dolly Bush (*Cassinia aculeata*), Prickly Beard-heath (*Leucopogon juniperinus*), Hoary Guinea Flower (*Hibbertia obtusifolia*), *Acacia falcata*, Tantoon (*Leptospermum polygalifolium*), Green Wattle (*Acacia irrorata),* Native Blackthorn (*Bursaria spinosa*), White Wattle (*Acacia linifolia*), *Dillwynia retorta* and Gorse Bitter Pea (*Daviesia ulicifolia*).
Ground covers	0.1–0.5 m	2	Common Couch (*Cynodon dactylon*), Slender Bamboo Grass (*Austrostipa verticillata*), Wiry Panic (*Entolasia stricta),* Blady Grass (*Imperata cylindrica*), *Juncus usitatus*, whiteroot (*Lobelia purpurascens*), Spiny-headed Mat-rush (*Lomandra longifolia*), Kidney Weed (*Dichondra repens*), Many-flowered Mat-rush (*Lomandra multiflora* subsp. *multiflora*), Blue Flax-lily (*Dianella caerulea*), Native Wandering Jew (*Commelina cyanea*), Shade Plantain (*Plantago debilis*), Mallow (*Malva* spp.), *Microtis* spp. and *Geranium homeanum*.
Ferns and Other	0.1 m	<1	False Sarsaparilla (*Hardenbergia violacea*), Variable Glycine (*Glycine tabacina*), Harsh Ground Fern (*Hypolepis muelleri*), Slender Tick-trefoil (*Desmodium varians*) and Rock Fern (*Cheilanthes sieberi* subsp. *sieberi*).

Vegetation description: This vegetation zone is aligned with PCT 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest given the dominance of forest red gum (*Eucalyptus tereticornis*) in the canopy and presence of several characteristic understory species. Evidence of past clearing is present in this vegetation zone as the tree species are relatively young with a height of 5 to 10 m, suggesting that this vegetation zone is in a phase of regrowth. It is noted that this vegetation zone is associated with the upper reaches of an unnamed drainage line and lower slopes transitioning to floodplain. This vegetation zone is confined to a drainage line within the Project Area.

Photo 3.7 depicts Vegetation Zone 7 in the Project Area.

Photo 3.7 PCT 3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest – Regrowth

3.3 Threatened Ecological Communities

The following TEC are present on within the Project Area:

- Freshwater wetlands on coastal floodplains of the NSW North Coast| Sydney Basin and South East Corner bioregions EEC (under the BC Act).
- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC (under the BC Act).
- Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC (under the BC Act).

- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregion EEC (under the BC Act).

The distribution of TECs is shown in **Figure 3.1**. The extent of the TEC in the Project Area.

The vegetation on site did not conform to any TEC listed under the EPBC Act.

Table 3.3 Vegetation Zones conforming to TECs under the BC Act

TEC listed under the BC Act	Conforming Vegetation Zones	Extent in the Project Area
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC.	VZ1	0.17
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregion EEC.	VZ2	0.74
Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC.	VZ3, VZ4 and VZ5	6.99
Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC.	VZ7	0.73
Total (ha)		**8.63**

3.4 Flora and Fauna Habitat Features

The majority of the Project Area has been previously cleared or modified for quarrying operations and is now characterised by regrowth vegetation.

An artificial wetland that joins an adjacent natural wetland downstream was identified that may represent potential wetland habitat. There are also occasional depressions that, when filled with water after substantial rainfall, form ephemeral waterbodies.

Remnant dry sclerophyll forest occurs along the southern boundary with the transmission line. Two hollow-bearing trees were identified in the west and south of the Project Area within the remnant forest. Several artificial nest boxes occur within remnant vegetation within the south-west of the Project Area. These may provide roosting and/or breeding habitat for hollow nesting bird species and arboreal mammals.

Some small instances of rock outcropping occur within the Project Area.

The site contains tree species in the form of flowering eucalypts that may provide foraging habitat for threatened species such as grey-headed flying-fox, and also contains two preferred koala feed trees listed under Chapter 3 Koala Habitat Protection under State Environmental Planning Policy (Biodiversity and Conservation) 2021, being forest red gum (*Eucalyptus teretecornis*) and grey gum (*Eucalyptus punctata*).

Areas of regrowth adjacent to intact native vegetation contain dense patches of *Acacia* sp. including (*Acacia longifolia*), green wattle (*Acacia irrorata*), silver-stemmed wattle (*Acacia parvipinnula*) and swamp wattle (*Acacia elongata*), which range in height from 1 – 3 m. These may provide an important winter foraging resource for gliding possums including the threatened squirrel glider.

3.5 Threatened Species

One threatened species was recorded within the Project Area during surveys, being the squirrel glider (*Petaurus norfolcensis*). Additionally, the likelihood of threatened species occurrence prepared from the desktop assessment identified a further two threatened species that have potential to use the habitats in the Project Area; these require further assessment. Many of the species identified in the desktop assessment are likely to be excluded on the basis of lack of habitat and conditions within the Project Area.

Table 3.4 provides the rating for threatened species occurrence within the Project Ara which has been applied to the likelihood of occurrence for threatened flora (**Table 3.5**) and fauna (**Table 3.6**).

Table 3.4 Likelihood Rating for Threatened Species

Likelihood Rating	Threatened Species Criteria
Known	Recorded within the Project Area in recent surveys.
Likely	It is likely that a species inhabits or utilises habitat within the Project Area.
Potential	Potential habitat for a species occurs on the site. Adequate field survey would determine if there is a 'high' or 'low' likelihood of occurrence for the species within the Project Area.
Unlikely	It is unlikely that the species inhabits the Project Area.
None	The habitat within the Project Area is unsuitable for the species.

3.5.1 Threatened Flora

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 30 threatened flora species within a 10 km radius of the Project Area. Of these, 30 threatened flora species, 11 species are assessed as having a potential chance of occurrence in the Project Area, none a likely and none have been recorded (refer to **Table 3.5**).

Targeted surveys completed in the Project Area have not identified any of the species assessed as having potential to occur and none of the threatened flora species have been retained for further assessment of impact of the Project.

Table 3.5 Threatened Flora Potentially Occurring in the Project Area

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required
Acacia bynoeana	Bynoe's wattle, tiny wattle	E	V	Potential	No
Angophora inopina	Charmhaven apple	V	V	Unlikely	No
Arthraxon hispidus	hairy-joint grass	V	V	Unlikely	No
Asperula asthenes	trailing woodruff	V	V	Potential	No
Caladenia tessellata	thick-lipped spider-orchid	V	V	Unlikely	No
Callistemon linearifolius	netted bottle brush	V	-	Potential	No
Commersonia prostrata	dwarf kerrawang	E	E	Unlikely	No
Cryptostylis hunteriana	leafless tongue-orchid	V	V	Unlikely	No

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required
Cymbidium canaliculatum	*Cymbidium canaliculatum*	E	-	Unlikely	No
Cynanchum elegans	white-flowered wax plant	E	E	Unlikely	No
Eucalyptus camaldulensis	*Eucalyptus camaldulensis*	Endangered population	-	Potential	No
Eucalyptus glaucina	slaty red gum	V	V	Unlikely	No
Eucalyptus parramattensis* subsp. *decadens	Earp's gum	V	V	Potential	No
Euphrasia arguta	null	CE	CE	Unlikely	No
Grevillea parviflora* subsp. *parviflora	small-flower grevillea	V	V	Potential	No
Maundia triglochinoides	-	V	-	Potential	No
Melaleuca biconvexa	biconvex paperbark	V	V	Unlikely	No
Persicaria elatior	tall knotweed	V	V	Potential	No
Pomaderris brunnea	brown pomaderris	E	V	Unlikely	No
Prasophyllum sp. Wybong	a leek-orchid	-	CE	Unlikely	No
Pterostylis chaetophora	-	V	-	Potential	No
Pterostylis gibbosa	Illawarra greenhood	E	E	Unlikely	No
Rhizanthella slateri	eastern underground orchid	V	E	Unlikely	No
Rhodamnia rubescens	scrub turpentine	CE	CE	Unlikely	No
Rhodomyrtus psidioides	native guava	CE	CE	Unlikely	No
Rutidosis heterogama	heath wrinklewort	V	V	Potential	No
Syzygium paniculatum	magenta lilly pilly	E	V	Unlikely	No
Tetratheca juncea	black-eyed Susan	V	V	Potential	No
Thesium australe	austral toadflax	V	V	Unlikely	No

3.5.2 Threatened Fauna

The NSW BioNet Wildlife Atlas search and Commonwealth PMST search identified records for 94 threatened fauna species within a 10-kilometre radius of the Project Area. Of these, one amphibian species, two reptile species, five mammal species and 18 bird species are assessed as having potential or likely chance of occurrence in the Project Area (refer to **Table 3.6**).

Threatened marine species were excluded from this report as they were not relevant to the scope of this project.

Table 3.6 Threatened Fauna Potentially Occurring in the Project Area

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required
Anseranas semipalmata	magpie goose	V		Low	No
Anthochaera phrygia	regent honeyeater	E	CE	No important habitat mapped.	No
Aprasia parapulchella	pink-tailed worm-lizard	V	V	Potential	No
Ardenna pacifica	wedge-tailed shearwater	-	Migratory	None	No
Artamus cyanopterus cyanopterus	dusky woodswallow	V	-	Potential	No
Botaurus poiciloptilus	Australasian bittern	E	E	Low	No
Calidris acuminata	sharp-tailed sandpiper	-	Migratory	None	No
Calidris ferruginea	curlew sandpiper	E	CE	None	No
Calidris melanotos	pectoral sandpiper	-	Migratory	None	No
Calidris canutus	red knot	-	Migratory V	None	No
Calidris ruficollis	red-necked stint	-	Migratory	None	No
Calidris tenuirostris	great knot	-	Migratory V	None	No
Callocephalon fimbriatum	gang-gang cockatoo	E	E	Potential	No
Calyptorhynchus lathami lathami	glossy black-cockatoo	V	V	Potential	No
Chalinolobus dwyeri	large-eared pied bat	V	E	Unlikely	No
Charadrius leschenaultii	greater sand plover	V	Migratory V	None	No
Charadrius mongolus	lesser sand plover	V	Migratory E	None	No
Charadrius veredus	oriental plover	-	Migratory	None	No
Chlidonias leucopterus	white-winged black tern	-	Migratory	None	No
Circus assimilis	spotted harrier	V	-	Potential	No
Climacteris picumnus victoriae	brown treecreeper	V	V	Potential	No
Cuculus optatus	oriental cuckoo	-	Migratory	Unlikely	No
Daphoenositta chrysoptera	varied sittella	E	-	Potential	No
Dasyurus maculatus	spotted-tailed quoll	V	E	Unlikely	No
Delma impar	striped legless lizard, striped snake-lizard	V	V	None	No
Delma vescolineata	Hunter Valley delma	-	E	Potential	No
Ephippiorhynchus asiaticus	black-necked stork	E	-	Unlikely	No

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required
Epthianura albifrons	white-fronted chat	V	-	Unlikely	No
Erythrotriorchis radiatus	red goshawk	E	E	Unlikely	No
Falco hypoleucos	grey falcon	V	V	Unlikely	No
Falco subniger	black falcon	V	-	Potential	No
Falsistrellus tasmaniensis	eastern false pipistrelle	V	-	Potential	No
Gallinago hardwickii	Latham's snipe	V	Migratory V	None	No
Gelochelidon nilotica	gull-billed tern	-	Migratory	None	No
Glossopsitta pusilla	little lorikeet	V	-	Likely	No
Grantiella picta	painted honeyeater	V	V	Unlikely	No
Haliaeetus leucogaster	white-bellied sea-eagle	V	-	Unlikely	No
Hieraaetus morphnoides	little eagle	V	-	Potential	No
Hirundapus caudacutus	white-throated needletail	V	Migratory V	Potential	No
Hydroprogne caspia	Caspian tern	-	Migratory	None	No
Irediparra gallinacean	comb-crested jacana	V	-	Unlikely	No
Lathamus discolor	swift parrot	E	CE	No important habitat mapped Unlikely	No
Limosa lapponica baueri	Nunivak bar-tailed godwit	-	E	None	No
Limosa limosa	black-tailed godwit	V	Migratory E	None	No
Litoria aurea	green and golden bell frog	E	V	Potential	**Yes**
Lophoictinia isura	square-tailed kite	V	-	Potential	No
Melanodryas cucullate cuculatta	south-eastern hooded robin	E	E	Unlikely	No
Melithreptus gularis gularis	black-chinned honeyeater (eastern subspecies)	V	-	Unlikely	No
Micronomus norfolkensis	eastern coastal free-tailed bat	V	-	Potential	No
Miniopterus australis	little bent-winged bat	V	-	Unlikely	No
Miniopterus orianae oceanensis	large bent-winged bat	V	-	Unlikely	No
Mixophyes balbus	stuttering frog	E	V	None	No

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required
Mixophyes iteratus	giant barred frog	V	V	None	No
Myotis macropus	southern myotis	V	-	Likely	**Yes**
Neophema chrystoma	blue-winged parrot	V	V	Unlikely	No
Neophema pulchella	turquoise parrot	V	-	Unlikely	No
Ninox strenua	powerful owl	V	-	Potential	No
Notamacropus parma	parma wallaby	V	V	None	No
Numenius madagascariensis	eastern curlew	-	Migratory, CE	None	No
Oxyura australis	blue-billed duck	V	-	Unlikely	No
Pandion cristatus	eastern osprey	V	-	Unlikely	No
Pachyptila turtur subantarctica	fairy prion (southern)	-	V	None	No
Petauroides volans	greater glider (southern and central)	E	E	None	No
Petaurus australis australis	yellow-bellied glider (south-eastern)	V	V	None	No
Petaurus norfolcensis	squirrel glider	V	-	**Known**	**Yes**
Petrogale penicillata	brush-tailed rock-wallaby	E	V	None	No
Petroica boodang	scarlet robin	V	-	Potential	No
Phascogale tapoatafa	brush-tailed phascogale	V	-	Potential	No
Phascolarctos cinereus	koala	E	E	Unlikely	No
Pluvialis fulva	pacific golden plover	-	Migratory	None	No
Pluvialis squatarola	grey plover	-	Migratory V	None	No
Pomatostomus temporalis temporalis	grey-crowned babbler (eastern subspecies)	V	-	Potential	No
Potorous tridactylus tridactylus	long-nosed potoroo (northern)	V	V	None	No
Pseudomys novaehollandiae	New Holland mouse, pookila	-	V	Unlikely	No
Pteropus poliocephalus	grey-headed flying-fox	V	V	Potential	No
Ptilinopus magnificus	wompoo fruit-dove	V	-	Unlikely	No
Pycnoptilus floccosus	pilotbird	V	V	Unlikely	No
Rostratula australis	Australian painted snipe	E	E	None	No
Saccolaimus flaviventris	yellow-bellied sheathtail-bat	V	-	Unlikely	No
Scoteanax rueppellii	greater broad-nosed bat	V	-	Unlikely	No

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required
Stagonopleura guttata	diamond firetail	V	V	Potential	No
Sternula hirundo	common tern	-	Migratory	None	No
Sternula nereis nereis	Australian fairy tern	-	V	None	No
Stictonetta naevosa	freckled duck	V		Unlikely	No
Thalasseus bergii	crested tern	-	Migratory	None	No
Tringa glareola	wood sandpiper	-	Migratory	None	No
Tringa nebularia	common greenshank	-	Migratory, E	None	No
Tringa stagnatilis	marsh sandpiper	-	Migratory	None	No
Tyto novaehollandiae	masked owl	V	-	Potential	No
Uperoleia mahonyi	Mahony's toadlet	E	-	Unlikely	No
Vespadelus troughtoni	eastern cave bat	V	-	Unlikely	No
Xenus cinereus	terek sandpiper	V	Migratory V	None	No

3.6 Matters of National Environmental Significance

The Protected Matters Search (refer to **Appendix A**) identified that MNES predicted to occur in the locality are:

- Nine threatened ecological communities.
- 93 threatened species including 24 flora, 10 mammals, three frogs, 46 birds, eight reptiles, one shark and one fish.
- 55 listed migratory species.

None of the TECs have been recorded in the Maitland Hospital Campus.

An assessment of likelihood of occurrence of threatened species is provided in **Table 3.5** and **Table 3.6** . One threatened species has the potential to occur in the Project Area, being the green and golden bell frog (*Litoria aurea*). An Assessment of Significance under the EPBC Act was completed for the green and golden bell frog (refer to **Appendix C**).

4.0 Impact Assessment

4.1 Impact Assessment Area

For the purposes of this Flora and Fauna Report, the area being assessed for impacts associated to the Project (hereafter Assessment Area) is identified in the Architectural Plan provided by Turner and Townsend on 24 September 2024. Specifically, the Assessment Area is defined as the areas within the 50 m Asset Protection Zone (APZ), which is shown as the blue outline displayed in **Figure 4.1**. Following consultation with Turner and Townsend on 14 November 2024, the extent of clearing is entirely within the APZ, however as per the Aboricultural Impact Assessment report (Active Green Services 2024), the Project will retain some trees in the APZ where practicable.

Figure 4.1 Architectural Plan

Source: Bate Smart.

A range of biodiversity impacts are likely to result from the Project during the construction and operational phases. The Project will remove approximately 2.13 hectares of native vegetation and threatened fauna habitat during construction phase, which has the potential to result in disturbance, injury and mortality of fauna. The vegetation within the south-north corridor will be narrowed as a result of the Project, however the intact vegetation along the east-west corridor will be retained along the boundary of the Maitland Health Campus.

The long-term effects of these impacts during the operation phase include the fragmentation of fauna habitat and resulting loss of wildlife connectivity corridors in the locality. Invasion and spread of weeds, pests and pathogens, and changes to surface hydrology may occur as a result of the changed landscape.

The following sections discuss these impacts and identify relevant key threatening processes that may be exacerbated by the Project. Cumulative impacts from other projects in the region have been considered, and assessments of significance conducted for threatened entities based on the impacts identified.

4.2 Project Impacts

4.2.1 Direct Impacts

4.2.1.1 Removal of native vegetation

The Assessment Area encompasses approximately 4.03 ha and includes a cleared area of 1.79 ha that was previously modified by a former quarry and brickwork facility and native vegetation in various conditions ranging from regenerating to intact (refer to **Table 4.1**). Approximately 2.13 ha of native vegetation will be impacted by the Project.

Table 4.1 Areas of Native Vegetation within the Assessment Area to be impacted by the Project

Plant Community Type (PCT) and condition	TEC Status		Area in Project Area (ha)	Area in Assessment Area (ha)
	BC Act	EPBC Act		
PCT 3975 Southern Lower Floodplain Freshwater Wetland – Moderate Good	Freshwater wetlands on coastal floodplains of the NSW North Coast| Sydney Basin and South East Corner bioregions EEC	Not listed	0.17	0.17
PCT 3975 Southern Lower Floodplain Freshwater Wetland – Thinned/disturbed	Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregion EEC	Does not conform	0.74	0.75
PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Weedy understory	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC	Does not conform	3.78	0.57

Plant Community Type (PCT) and condition	TEC Status		Area in Project Area (ha)	Area in Assessment Area (ha)
	BC Act	EPBC Act		
PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Moderate Good	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC	Does not conform	2.96	0
PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Thinned/disturbed	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC	Does not conform	0.25	0
PCT 3433 Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter – Regenerating	Does not conform	Does not conform	0.19	0
3446 Lower North Foothills Ironbark-Box-Gum Grassy Forest - Regrowth	Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC	Does not conform	0.73	0.64
		Total (ha)	**8.82**	**2.13**

There are three known and three potential key threatening processes (KTPs) under the BC Act relevant to the removal of native vegetation. These are outlined in Table 4.2.

Table 4.2 KTPs relevant to native vegetation removal

Key Threatening Process	Type of Threat	Relevance to Project
Known		
Clearing of native vegetation	Habitat loss/change	Project will result in the direct removal of 2.13 ha of native vegetation.
Removal of dead wood and dead trees	Habitat loss/change	Project will result in the removal of dead wood.
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Habitat loss/change	Project will result in operation of this KTP.
Potential		
Invasion of native plant communities by exotic perennial grasses	Weed	Exotic perennial grasses are present in the Project Area. Weed management required to avoid/reduce impact of this KTP.
Invasion, establishment and spread of Lantana (Lantana camara L. sens. Lat)	Weed	Lantana occurs in the southern and eastern portion of the Project Area. Weed management required to avoid/reduce impact of this KTP.
infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Disease	Likely risk of chytrid in freshwater wetland habitat for frogs.

Based on the Assessments of Significance (**Appendix B**) the implications of the known KTPs are not considered to be significant. Safeguards and mitigation measures for the potential KTPs are provided in Section 5.

4.2.1.2 Removal of threatened fauna habitat

The 2.13 hectares of native vegetation which occurs within the Assessment Area provides potential foraging and/or breeding habitat for fauna species, including the known presence of threatened squirrel glider. The Project would not remove any known hollow-bearing tree. The hollow-bearing tree identified in the Project Area, which contains a hollow diameter of more than 20 cm and is a suitable size for threatened owl species, will not be cleared.

There are two known and four low potential KTPs under the BC Act relevant to the removal of threatened fauna habitat. These are outlined in **Table 4.3.**

Table 4.3 KTPs relevant to removal of threatened fauna habitat

Key Threatening Process	Type of Threat	Relevance to the Project
Known		
Clearing of native vegetation	Habitat loss/change	The Project will result in the direct removal of 2.13 hectares of native vegetation.
Removal of dead wood and dead trees	Habitat loss/change	The Project will result in the direct removal of dead wood.
Low Potential		
Competition and grazing by the feral European rabbit	Pest animal	European rabbit is present in the Assessment Area. Pest animal management may be required to avoid/reduce impact of this KTP.
Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	Pest animal	Feral dogs are potentially present in the Assessment Area. Pest animal management may be required to avoid/reduce impact of this KTP.
Predation by feral cats	Pest animal	Feral cats are likely to be present in the Assessment Area. Pest animal management may be required to avoid/reduce impact of this KTP.
Predation by the European red fox	Pest animal	European red foxes are present in the Assessment Area. Pest animal management may be required to avoid/reduce impact of this KTP.

4.2.1.3 Injury and mortality

During construction, 2.13 hectares of native vegetation would require removal. This may result in injury or mortality to local native fauna during felling. Traffic flow would also increase in the area due to the presence of construction traffic during work hours. The presence of construction traffic may cause injury or mortality to fauna through vehicle strikes. Given the low speed that vehicle movements would be traveling on site, the likelihood of significantly increased fauna injury/mortality rates as a result of the Project is considered low.

Safeguards and mitigation measures for the prevention of fauna injury and mortality are provided in **Section 5.0**.

4.2.2 Indirect Impacts

There will be minimal indirect impacts on the receiving environment from construction and operation of the Project, including:

- Potential changes to surface water flows. This potential indirect impact will be mitigated via the implementation of sedimentation and erosion controls, and surface water management.
- Temporary noise and light impacts during construction. These impacts can be minimised by directing lighting away from the remnant vegetation.

4.2.2.1 Wildlife connectivity and fragmentation

Vegetation occurring within the Assessment Area is relatively fragmented as a result of historic quarry practices and surrounding urbanisation. It contains areas of remnant native vegetation in the south and east. The Project will increase the fragmentation of habitats through the removal of native vegetation and increase the level of fragmentation already present in the locality.

While no mapped environmental corridors from existing datasets were identified, the forested area in the south and eastern portion of the Assessment Area is considered to form part of a corridor for wildlife movements in the locality. Fauna may move through this area to access the moderately patchy vegetation areas to the north east of the Assessment Area.

The Project will result in edge effects to fauna including increased light, noise and vibration impacts during both the construction and operational phases. These will temporarily impact fauna species during construction by changes in foraging behaviours (i.e. avoidance of the impact area) and communication (i.e. potential reduced calling due to increased construction noise). The urban area surrounding the Assessment Area, including the nMH currently has moderate traffic volumes, and fauna in the locality are currently not known to be substantially affected by these operational impacts. Fauna injury or mortality may occur where species attempt to cross the road. The implementation of the mitigation measures listed in **Section 5** would reduce the likelihood of this occurring.

Pollinator and seed dispersal vectors for flora species are likely to include birds, mammals, insects and micro bats. The Project is unlikely to result in a more substantial barrier for flora species pollinators than already is occurring.

4.2.2.2 Edge effects on adjacent native vegetation

While the Project will result in direct impacts to native vegetation through removal and modification within the Assessment Area, native vegetation and habitat occurring adjacent to these areas will be subject to edge effects including:

- Modification of microclimate (i.e. increased light and wind penetration)
- Physical disturbance of vegetation
- Changes in surface drainage including increased runoff.

Due to historical land practices in the Project Area, much of the vegetation within the Assessment Area has been subject to modified microclimates, physical disturbance and altered drainage. Areas of vegetation and habitat already occurring in adjacent residential areas, in particular, are already subject to these effects, and the Project is not expected to exacerbate these effects to a substantial degree.

4.2.2.3 Invasion and spread of weeds

The Assessment Area is located in predominantly disturbed land that was cleared as a result of historic quarrying and to build the nMH. Areas containing native vegetation have been recorded with low to high abundances of exotic understorey species including three priority weeds listed identified by the Department of Primary Industries and listed under the Biosecurity Act 2015. These include:

- Common prickly pear (*Opuntia stricta*)
- Fireweed (Senecio madagascariensis)
- Lantana (Lantana camara).

Safeguards and mitigation measures for the potential invasion and spread of weeds are provided in **Section 5**. It is not expected that the Project would exacerbate the invasion and spread of weeds within or outside of the Assessment Area.

4.2.2.4 Invasion and spread of pests

The Assessment Area is located in predominantly disturbed land proximal to residential and agricultural areas, with fragmented patches of habitat within which European rabbits (*Oryctolagus cuniculus*), European red foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) occur. Safeguards and mitigation measures for the potential invasion and spread of pests are provided in **Section 5.0**.

It is not expected that the Project would exacerbate the invasion and spread of pests in the area.

4.2.2.5 Invasion and spread of pathogens and disease

The Project will involve the movement of people, vehicles and organic material (e.g. soil) into and out of the Assessment Area. While pathogens were not observed or tested for in the Assessment Area, the potential for pathogens to occur should be treated as a risk during construction. Safeguards and mitigation measures for the potential introduction and spread of pathogens are provided in **Section 5.0**.

It is not expected that the Project would exacerbate the invasion and spread of pathogens and disease in the area.

4.2.2.6 Noise, light and vibration

The Project will result in an increase of noise, light and vibration impacts within the Assessment Area and adjacent areas during the construction and operation phases. These impacts have the potential to adversely affect fauna species through disturbance of roosting and foraging behaviour and reducing the occupancy of areas of suitable habitat.

The Assessment Area occur adjacent to the urban centres of Metford and East Maitland, and these areas are already subject to light, noise and vibration impacts from the nMH, adjacent railway and the New England Highway. While the Project will increase these impacts, it is not expected that the Project would significantly affect the behaviour of fauna in the surrounding locality.

4.3 Statutory Considerations

4.3.1 Biodiversity Conservation Act 2016

Under the BC Act, an assessment of whether the Project will have a significant impact on threatened species, communities or their habitats must consider the matters as set out in Section 7.3 of the BC Act or the 'five part test'. Assessments have been provided in **Appendix B.**

4.3.2 Environment Protection and Biodiversity Conservation Act 1999

The significance of the impact of the proposed action (the Project) on MNES can be determined through self-assessment using Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DoE 2013). A referral is required for proposed actions that may affect nationally listed threatened species, threatened ecological communities, and migratory species.

The Project Area provides potential habitat for the threatened green and golden bell frog and an assessment of the impact of the Project is provided in **Appendix C**.

4.4 Impact Summary

Table 4.4 provides details of the potential impacts to biodiversity values that have been considered in this assessment.

Table 4.4 Summary of Impacts

Impact	Biodiversity values	Nature of impact	Extent of impact	Duration	Does the proposal constitute or exacerbate a key threatening process?	Confidence in assessment
Removal of native vegetation	Native vegetation	Direct	Site based	Long term	Clearing of native vegetation (2.13 hectares) would be exacerbated by the Project.	Known
	Freshwater wetlands on coastal floodplains of the NSW North Coast| Sydney Basin and South East Corner bioregions EEC (BC Act)	Direct	Site based	Long term	Clearing of this community (0.17 hectares) would be exacerbated by the Project.	Known
	Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregion EEC (BC Act)	Direct	Site based	Long term	Clearing of this community (0.75 hectares) would be exacerbated by the Project.	Known
	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC (BC Act)	Direct	Site based	Long term	Clearing of this community (0.57 hectares) would be exacerbated by the Project.	Known
	Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions EEC (BC Act)	Direct	Site based	Long term	Clearing of this community (0.64 hectares) would be exacerbated by the Project.	Known

Impact	Biodiversity values	Nature of impact	Extent of impact	Duration	Does the proposal constitute or exacerbate a key threatening process?	Confidence in assessment
Removal of threatened fauna habitat	Species as assessed in **Appendix B** and **Appendix C**	Direct	Site based	Long term	Clearing of native vegetation (2.13 hectares) Removal of dead wood and dead trees. These KTPs would be exacerbated by the Project.	Known
Injury and mortality of fauna	Threatened fauna	Direct	Site based	Short term Long term	The following KTPs would be exacerbated by the Project: • Clearing of native vegetation.	Unknown
Fragmentation of identified biodiversity links and habitat corridors	Threatened fauna	Direct/ indirect	Site-based	Short term Long Term	The following KTPs would be exacerbated by the Project: • Clearing of native vegetation (2.13 ha) • Removal of dead wood and dead trees.	Known
Edge effects on adjacent native vegetation and habitat	Threatened flora Threatened fauna	Indirect	Site-based	Long term	N/A – edge effects are not expected to exacerbate KTPs.	Known
Invasion and spread of weeds	TECs	Indirect	Site based	Long term	The following KTPs have low potential to be exacerbated by the Project: • Invasion of native plant communities by Lantana (*Lantana camara*) • Invasion of native plant communities by exotic perennial grasses.	Known

Impact	Biodiversity values	Nature of impact	Extent of impact	Duration	Does the proposal constitute or exacerbate a key threatening process?	Confidence in assessment
Invasion and spread of pests	Threatened fauna	Indirect	Site based	Long term	The following KTPs have low potential to be exacerbated by the Project: • Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*) • Predation and hybridisation of feral dogs (*Canis lupus familiaris*) • Predation by the European red fox (*Vulpes vulpes*) • Predation by the feral cat (*Felis catus*).	Unknown
Invasion and spread of pathogens and disease	Threatened fauna and TECs	Indirect	Site based	Long term	N/A – the Project is not expected to lead to the invasion and spread of pathogens and disease exacerbate KTPs.	N/A
Noise, light and vibration	Threatened fauna	Direct/ indirect	Local	Short term Long term	N/A – noise, light and vibration are not expected to exacerbate KTPs.	N/A

5.0 Avoidance, Minimise and Mitigate Impacts

5.1 Avoidance and Minimisation

Impacts on biodiversity values have been addressed through an iterative design process to avoid areas of higher biodiversity value in the Maitland Hospital Campus site towards Metford Road.

The footprint of the proposed Maitland Mental Health Rehabilitation Project has been designed to maximise development of previously cleared and/or regenerating vegetation in the Project Area. However, the Project has identified a footprint including the Maitland Mental Health Rehabilitation Project, car parking, bioretention basins, access roads and construction laydown areas, 50 metre APZ that will require clearance of native vegetation within 50 m of the Maitland Mental Health Rehabilitation Project footprint. Where possible, trees will be retained within the APZ.

As shown in **Table 4.1** the Project will clear 2.13 ha of native vegetation or 63 per cent of native vegetation in the Project Area. This is mainly in the area previously disturbed and areas of moderate-good Spotted Gum - Red Ironbark - Grey Gum Shrub - Grassy Open Forest of the Lower Hunter have been avoided.

5.2 Mitigation Measures

A range of mitigation measures are recommended to reduce the impacts to native biodiversity and are provided in the following sections and summarised in **Table 5.1.**

Table 5.1 Mitigation Measures

Project Stage *Design (D) Construction (C) Operation (O)*	Mitigation Measures	Relevant Section of Report
D/C	A Flora and Fauna Management Plan will be prepared and implemented as part of the CEMP.	**Section 5.2.1**
D	Implementation of measures to further avoid and minimise the construction footprint and native vegetation or habitat removal.	**Section 5.2.2**
D	Management of native vegetation clearing	**Section 5.2.3**
C	Pre-clearance surveys and development of unexpected finds procedure.	**Section 5.2.4**
C	Develop a nest box strategy if hollows are identified during pre-clearance survey	**Section 5.2.5**
D/C	Develop a wildlife connectivity strategy	**Section 5.2.6**
C	Develop mitigation measures to reduce soil erosion and pollutant run-off	**Section 5.2.7**
C	Develop dust control strategy	**Section 5.2.8**
C	Management of chemical spills	**Section 5.2.9**
C	Management of weeds	**Section 5.2.10**

5.2.1 Preparation of Flora and Fauna Management Plan

A Flora and Fauna Management Plan will be prepared and implemented as part of the CEMP. It will include, but not necessarily be limited to:

- Plans for the construction site and adjoining area showing native vegetation, flora and fauna habitat, and threatened species.
- Plans showing areas to be cleared and areas to be protected, including exclusion zones and protected habitat features (e.g. hollow-bearing trees), and areas for rehabilitation or re-establishment of native vegetation. The limits of clearing within the construction site and protected habitat features will be clearly delineated using appropriate signage, barriers, fencing or markings.
- Pre-clearing, including the outcomes of final flora and fauna species checks, establishment of exclusion zones and on-ground identification of specific habitat features to be retained (such as hollow-bearing trees).
- Vegetation clearing and bush rock removal, including staged habitat removal and any specified seasonal limits on clearing activities.
- Fauna handling and unexpected threatened species finds.
- Rehabilitation, revegetation, re-use of soils, woody debris and bush rock, and other habitat management actions.
- Weed, pathogen and pest management.
- Monitoring during construction and post-construction.

Adaptive management measures to be applied if monitoring indicates unexpected adverse impacts.

5.2.2 Further avoidance and minimisation of disturbance

Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be considered during the detailed design stage and implemented where practicable and feasible. Measures to avoid and minimise impacts should be prioritised in the following order:

- critical habitat
- threatened species or their habitat
- native vegetation and habitat supporting flora and fauna connectivity and/or that supports other environmental objectives such as protecting water quality, hydrology or erosion and sediment controls
- native vegetation of higher quality condition
- other native vegetation.

5.2.3 Management of vegetation clearing

Consistent with any specific requirements of the approved Flora and Fauna Management Plan, management arrangements will be implemented to ensure unavoidable vegetation and bush rock removal minimises biodiversity impacts as far as practicable. As a minimum that will include:

- no vegetation clearing or bush rock removal beyond limits identified in this REF
- avoiding identified exclusion zones and protected habitat features.
- avoiding mixing of topsoil with woody debris materials
- separation of woody vegetation suitable for re-use during construction and rehabilitation or revegetation works
- implementation of staged clearing
- trimming and pruning to be undertaken in accordance with relevant Australian Standards.
- no clearing should occur within the Project Area in the early evening/evening.
- clearing should be carried out in a manner that allows fauna species residing within areas of dense vegetation to relocate without human intervention.
- vegetation and soil removed from the Project Area during the construction phase is likely to contain a partially exotic seed bank. Topsoil removed during this period should be stored and disposed of appropriately.
- Where possible it is recommended that mature trees are retained in the south of the Maitland Health Campus to provide for connectivity along the property boundary.

5.2.4 Pre-clearance surveys and unexpected finds

Prior to commencement of construction, undertake:

- targeted surveys to confirm threatened species and/or their habitat within the construction area
- identification of hollow-bearing trees required for removal including the details of all hollows (e.g. diameter, height)
- an unexpected finds procedure is to be adopted if threatened ecological communities or species, not assessed in the biodiversity assessment, are identified in the Assessment Area.

Where threatened ecological communities, species and/or their habitats are identified, these are to be electronically (GIS) and physically demarcated and appropriate controls established to minimise the impact to these biodiversity values as much as practicable.

5.2.5 Nest box strategy

If hollows are identified during the pre-clearance survey, a nest box strategy will be implemented prior to construction to include the installation of nest boxes to offset the removal of hollow-bearing trees.

Nest boxes are to be installed prior to the removal of any native vegetation and habitat features. Reference is to be made to the Maitland Development Control Plan (MCC 2011) which notes:

- two replacement hollows are to be provided for each hollow tree identified in the pre-clearance assessment
- consider using salvaged hollows over artificial nest boxes as a preference
- Details of nest box types, installation methods and monitoring are to be included in the Flora and Fauna Management Plan.

5.2.6 Wildlife connectivity strategy

Develop a wildlife connectivity strategy for maintaining connectivity in areas adjacent to the Assessment Area within the Project Area. This strategy is to include, but not be limited to:

- identification of trees suitable for retention within the 50 m APZ to provide for connectivity and minimise fragmentation impacts particularly for the squirrel glider
- consideration of the type and extent of associated landscaping or structures to facilitate fauna connectivity such as fencing or fauna infrastructure.

5.2.7 Erosion management

Mitigation measures to reduce soil erosion and pollutant run-off during construction activities should include:

- installation of erosion and sediment control structures prior to any construction works and in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004).
- regular inspection of erosion and sediment control measures, particularly following rainfall events, to ensure ongoing functionality.
- prompt removal of any excavated material offsite for adequate disposal.
- undertake maintenance of silt fences and other mitigation measures to isolate run-off, particularly on the northern boundary of the Project Area.

5.2.8 Dust control

Specific measures to minimise the generation of dust and associated impacts on adjacent natural environments should include:

- establishing appropriate speed limits for all traffic in the Project Area to limit dust generation.

- use of a water tanker to spray unpaved access tracks during construction where required.
- application of dust suppressants or covers on soil stockpiles.

5.2.9 Chemical spills

Develop specific measures to minimise the potential for chemical and fuel spills and associated impacts on adjacent natural environments, including, but not limited to:

- Adequate storage of chemicals in clearly marked bunded areas.
- Regular inspection of vehicles and mechanical plant for leakage of fuel or oil.
- No re-fuelling, washing or maintenance of vehicles and plant to be undertaken within 20 m of natural drainage lines or aquatic habitats and wetlands.

5.2.10 Management of weeds

Weed management to be implemented within the Assessment Area during and after construction to minimise weed incursions into surrounding intact native vegetation, including, but not limited to:

- Prioritising the control of Weeds of National Significance such as Lantana (*Lantana camara*), which was detected within the Project Area.
- Undertake weed removal within the Assessment Area prior to the construction phase of the Project. This will reduce the capacity of exotic plant species to spread into the locality. Organic matter and soil removed during construction should be disposed of appropriately.
- All vehicles and plant machinery should be cleaned before entering and leaving the Project Area in order to prevent the introduction of new exotic species, as well as the spread of existing species.

6.0 Conclusion

The Project is construction of Maitland Mental Health Rehabilitation Project within the Maitland Hospital campus. The Project is being assessed under Part 5, Division 5.1 of the EP&A Act.

The Project Area has been disturbed during past quarrying operations and more recently during construction of the Maitland Hospital and accordingly native vegetation has been previously cleared or modified with remnant vegetation retained along the southern boundary of the Maitland Health Campus.

While the Project Area has a history of disturbance it does support PCTs that are associated with four TECs as listed under the BC Act:

- Freshwater wetlands on coastal floodplains of the NSW North Coast| Sydney Basin and South East Corner bioregions EEC (0.17 ha)
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregion EEC (0.75 ha)
- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC (0.57 ha)
- Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC (0.64 ha).

No EPBC listed TECs were recorded in the Project Area.

One threatened species was recorded during the surveys being the squirrel glider (*Petaurs norfolcensis*) which was recorded on two occasions in the Project Area. This species is listed as Vulnerable under the BC Act.

The potential impact to ecological values as a result of the Project include the removal of approximately 2.13 ha of native vegetation. While the Project footprint is limited to the required 50 m APZ, it is recommended that where possible mature trees are retained in this area to minimise fragmentation of habitats and risk of isolation for the threatened squirrel glider known to occur in forested habitat in the Maitland Hospital campus.

Assessments of Significance tests were completed for the four TECs listed above and six threatened species, being:

- Squirrel glider
- Threatened forest owls (powerful owl, barking owl and masked owl)
- Green and golden bell frog
- Southern myotis.

These assessments found that the Project is unlikely to have a significant impact on these known or predicted threatened species and TECs listed under the BC Act or EPBC Act. The assessment has assumed that mature trees have been retained where possible in the required 50m APZ to provide connectivity and avoid isolation of the known population of the squirrel glider.

Indirect impacts on native vegetation and habitats in the receiving environment can be managed through implementation of sedimentation and erosion controls, and surface water management; and directing lighting away from retained vegetation.

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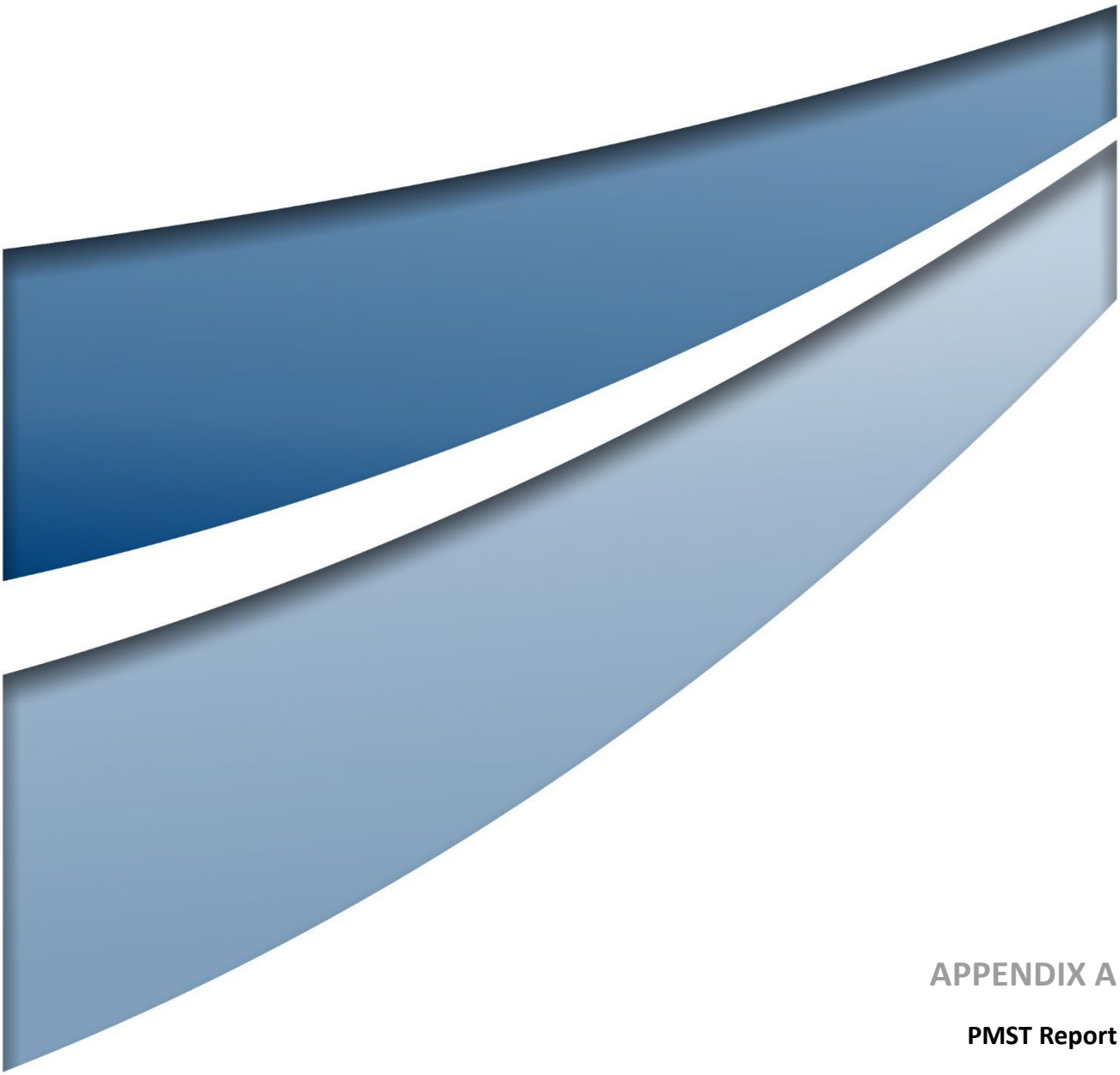

APPENDIX A

PMST Report

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: 05-Aug-2024

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:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	93
Listed Migratory Species:	55

Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/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:	16
Commonwealth Heritage Places:	1
Listed Marine Species:	67
Whales and Other Cetaceans:	None
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:	3
Regional Forest Agreements:	1
Nationally Important Wetlands:	2
EPBC Act Referrals:	30
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Hunter estuary wetlands	Within 10km of Ramsar site	In feature area

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
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area	In feature area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community likely to occur within area	In feature area
Kurri sand swamp woodland of the Sydney Basin bioregion	Endangered	Community likely to occur within area	In feature area
Lowland Rainforest of Subtropical 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
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may 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
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known 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
Calidris tenuirostris Great Knot [862]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	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 likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
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
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely 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]	Endangered	Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	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
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within 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 subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pluvialis squatarola Grey Plover [865]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	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 bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may 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 may 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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	Species or species habitat may occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Xenus cinereus			
Terek Sandpiper [59300]	Vulnerable	Species or species habitat 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
FROG			
Litoria aurea			
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area	In feature area
Mixophyes balbus			
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Mixophyes iteratus			
Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat known 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Notamacropus parma](#)			
Parma Wallaby [89289]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Petauroides volans](#)			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known 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 may occur within area	In buffer area only
[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 may 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	Roosting known to occur within area	In feature area
PLANT			
[Acacia bynoeana](#)			
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Angophora inopina](#)			
Charmhaven Apple [64832]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Arthraxon hispidus](#)			
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat likely to occur within area	In buffer area only
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 buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus glaucina Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus parramattensis subsp. decadens Earp's Gum, Earp's Dirty Gum [56148]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area	In buffer area only
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may 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
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	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
Tetratheca juncea Black-eyed Susan [21407]	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
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In buffer area only

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	Species or species habitat known to occur within area	In buffer area only
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Delma vescolineata Hunter Valley Delma [92599]	Endangered	Species or species habitat likely 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	Species or species habitat known to occur within area	In buffer area only
SHARK			
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			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
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
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may 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 may 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	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
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	Species or species habitat 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
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
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	Species or species habitat known to occur within area	In buffer area only
Migratory Terrestrial Species			
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 known 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 known to 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
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known 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
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Species or species habitat known to occur within area	In buffer area only
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area	In buffer area only
Calidris tenuirostris Great Knot [862]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		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 likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	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
Numenius phaeopus Whimbrel [849]		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
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area	In buffer area only
Pluvialis squatarola Grey Plover [865]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area	In buffer area only
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

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
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [11609]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [11627]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [11608]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11605]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11604]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11619]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11623]	NSW	In buffer area only
Defence		
Commonwealth Land - Director of Defence Service Homes [11621]	NSW	In buffer area only
Defence - SCOBIE BARRACKS ; 2/17 RNSWR RUTHERFORD ; RUTHERFORD GRES DEPOT [10055]	NSW	In buffer area only
Defence - Defence Housing Authority		
Commonwealth Land - Defence Housing Authority [11626]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [11628]	NSW	In buffer area only
Commonwealth Land - Director of War Service Homes [11620]	NSW	In buffer area only
Transport and Regional Services - Airservices Australia		
Commonwealth Land - Airservices Australia [11629]	NSW	In buffer area only
Unknown		
Commonwealth Land - [11624]	NSW	In buffer area only
Commonwealth Land - [11625]	NSW	In feature area
Commonwealth Land - [16528]	NSW	In buffer area only

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			

Name	State	Status	Buffer Status
Maitland Post Office	NSW	Listed place	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
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within 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
Calidris pugnax as Philomachus pugnax Ruff [91256]		Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Calidris tenuirostris Great Knot [862]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known 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
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In buffer area only
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
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa limosa Black-tailed Godwit [845]	Endangered	Species or species habitat known to occur within area overfly marine 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
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 known 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]	Vulnerable	Species or species habitat may 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
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pachyptila turtur](#) Fairy Prion [1066]		Species or species habitat likely 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
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Species or species habitat known to occur within area overfly marine area	In buffer area only
[Pluvialis squatarola](#) Grey Plover [865]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In buffer area only
[Pterodroma cervicalis](#) White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
[Recurvirostra novaehollandiae](#) Red-necked Avocet [871]		Species or species habitat known to occur within area overfly marine 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 known to occur within area overfly marine area	In feature area
[Sterna striata](#) White-fronted Tern [799]		Migration route may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Symposiachrus trivirgatus as Monarcha trivirgatus			
Spectacled Monarch [83946]		Species or species habitat known to 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 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 may 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	Species or species habitat may occur within area	In buffer area only
Tringa brevipes as Heteroscelus brevipes			
Grey-tailed Tattler [851]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Species or species habitat known to occur within area overfly marine 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	Species or species habitat 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	Species or species habitat known to occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Hexham Swamp	NRS Addition - Gazettal in Progress	NSW	In buffer area only
Hunter Wetlands	National Park	NSW	In buffer area only
Pambalong	Nature Reserve	NSW	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

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

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Hexham Swamp	NSW	In buffer area only
Shortland Wetlands Centre	NSW	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Kurri Kurri Lateral Pipeline Project	2021/9113		Post-Approval	In buffer area only
M1 Motorway extension to Raymond Terrace, NSW	2018/8288		Post-Approval	In buffer area only
Regrowth Kurri Kurri - Residential and Employment Rezoning	2023/09572		Approval	In buffer area only
Controlled action				
F3 to Branxton Link Electricity Adjustments	2007/3814	Controlled Action	Post-Approval	In buffer area only
Gas Transmission Pipeline	2011/5917	Controlled Action	Completed	In buffer area only
Gloucester Coal Seam Methane Gas Project	2008/4432	Controlled Action	Post-Approval	In buffer area only
Newcastle gas storage facility project	2010/5752	Controlled Action	Post-Approval	In buffer area only
New dual carriageway from F3 Fwy to Branxton Link	2007/3431	Controlled Action	Post-Approval	In buffer area only
Port Site and Materials Handling Development	2001/242	Controlled Action	Completed	In buffer area only
Protech Cold Mill Facility	2001/274	Controlled Action	Post-Approval	In buffer area only
Queensland Hunter Gas Pipeline, approximately 825 km in length	2008/4483	Controlled Action	Completed	In buffer area only
River Dredging Operations	2001/249	Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Upgrade of approx 32km of Main Northern Railway, including construction of 3rd track	2009/4897	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Abel Coal Project	2007/3695	Not Controlled Action	Completed	In buffer area only
Bloomfield Colliery - Life of Mine Extension - 20km northwest of Newcastle, NSW	2017/8132	Not Controlled Action	Completed	In buffer area only
Freeway North Business Park Sub-division and Industrial Development	2008/4569	Not Controlled Action	Completed	In buffer area only
Green & Golden Bell Frog Habitat Enhancement Project	2004/1795	Not Controlled Action	Completed	In buffer area only
Hebburn No 2 Colliery	2001/301	Not Controlled Action	Completed	In buffer area only
Hexam Train Support Facility	2012/6285	Not Controlled Action	Completed	In buffer area only
Hexham Relief Roads Project	2012/6309	Not Controlled Action	Completed	In buffer area only
Hunter Natural Gas Pipeline	2004/1902	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Industrial and Residential Subdivision, Minmi and Black Hill, Lower Hunter	2008/4603	Not Controlled Action	Completed	In buffer area only
Queensland Hunter Gas Pipeline, approximately 833 km in length	2008/4620	Not Controlled Action	Completed	In buffer area only
Revised alignment Hunter Natural Gas Pipeline	2005/2470	Not Controlled Action	Completed	In buffer area only
Richmond Vale Rail Trail	2019/8568	Not Controlled Action	Completed	In buffer area only
Sandgate Rail Grade Separation	2005/1948	Not Controlled Action	Completed	In buffer area only
Tomago to Tomaree Electricity Supply Upgrade	2003/1023	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Rehabilitation of Hexham Swamp	2003/1244	Not Controlled Action (Particular	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
		Manner)		
Rezoning and Residential Development of Avery's Village, Cessnock, NSW	2007/3880	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Bioregional Assessments

[Resource Information]

SubRegion	BioRegion	Website	Buffer Status
Hunter	Northern 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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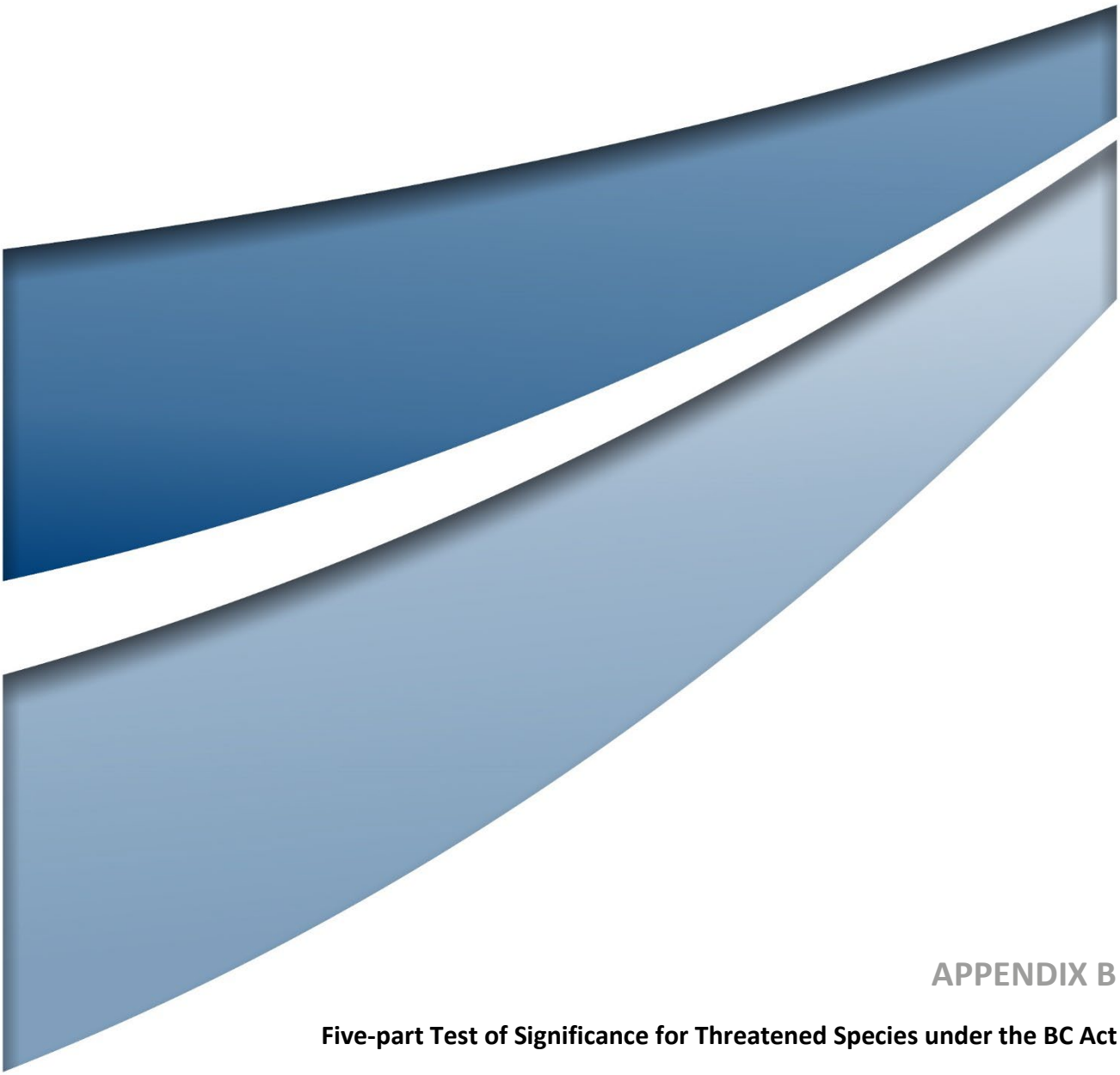


APPENDIX B

Five-part Test of Significance for Threatened Species under the BC Act

The following Five-Part Tests of Significance have addressed the questions provided in Section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act) for the threatened ecological communities and species identified as recorded and potentially occurring within the Project Area and includes:

- Freshwater wetlands on coastal floodplains of the NSW North Coast| Sydney Basin and South East Corner bioregions EEC
- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC
- Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregion EEC
- Squirrel glider (Petaurus norfolcensis)
- Forest owls – powerful owl (*Ninox strenua*), barking owl (*Ninox connivens*) and masked owl (*Tyto novaehollandiae*)
- Southern myotis (*Myotis macropus*)
- Green and golden bell frog (*Litoria aurea*).

For the purposes of the of the Tests of Significance, the following definitions of the terms: Project Area, locality, life cycle, viable, local population and risk of extinction have been defined below according to the main report and in accordance with the Threatened Species Test of Significance Guidelines (OEH 2018).

Project Area: legally described as Lot 73 DP1256781 and Lot 41 DP1274253 and includes the existing Maitland Hospital Campus and associated infrastructure, proposed Maitland Mental Health Rehabilitation Project footprint and a 50 m Asset Protection Zone and the Construction Works Zone works.

Assessment Area: encompasses the extent of the APZ which is the area of impact for Construction Zone works.

Project: the construction of the Maitland Mental Health Rehabilitation Project. The Project impact area is 4.03 ha and includes a cleared area (1.79 ha) that was previously modified by a former quarry and brickwork facility and native vegetation in various conditions ranging from regenerating to intact. Approximately 2.13 ha of native vegetation will be impacted by the Project.

Life cycle: the series or stages of reproduction, growth, development, ageing and death of an organism.

Viable: the capacity to successfully complete each stage of the life cycle under normal conditions.

Local occurrence: the ecological community that occurs within the Project Area and/or may include the occurrence in adjacent areas where the ecological community in the Project Area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the Project Area can be clearly demonstrated.

Local population: the population that occurs in the Project Area. The assessment of the local population may be extended to include individuals beyond the Project Area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the Project Area, according to the following definitions.

- The local population of a threatened plant species comprises those individuals occurring in the Project Area or the cluster of individuals that extend into habitat adjoining and contiguous with the Project Area that could reasonably be expected to be cross-pollinating with those in the Project Area.
- The local population of resident fauna species comprises those individuals known or likely to occur in the Project Area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the Project Area.
- The local population of nomadic fauna species comprises those individuals that are likely to occur in the Project Area from time to time.

Risk of extinction: the likelihood that the local population will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the viability of that population.

Areas of outstanding biodiversity value: is an area declared to be of outstanding biodiversity value under Part 3 of the BC Act. There are currently two declared areas of outstanding biodiversity value listed in Biodiversity Conservation Regulation 2017 being Little Penguin declared area at North Harbour and Wollemi Pine declared area.

7.1 Threatened Ecological Communities

The plant community types mapped in the Project Area are representative of four threatened ecological communities (TECs) as listed under the BC Act. Vegetation zones aligned with the TECs are listed in **Table B.1** and a description of each TEC based on the final determinations is provided below.

Table B.1 TECs in the Project Area

TEC listed under the BC Act	Conforming Vegetation Zones	Extent in the Project Area	Extent in the Assessment Area
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC.	VZ1	0.17	0.17
Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions EEC.	VZ3, VZ4 and VZ5	6.99	0.57
Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC.	VZ7	0.73	0.64
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregion EEC.	VZ2	0.75	0.75
Total (ha)		**8.63**	**2.13**

Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC is an ecological community associated with periodic or semi-permanent inundated by freshwater; typically occurring on silts, muds or humic loams in depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains generally below 20 m. The community is dominated by herbaceous plants and very few woody species and typically intergrade with several other EECs including Swamp Oak Floodplain Forest on NSW North Coast, Sydney Basin and South East Corner Bioregion EEC as occurs in the Project Area. At the time of listing of the EEC, about 3500 ha of the EEC occurs in the lower Hunter – central Hunter region. Locally this EEC is conserved in Hexham Swamp now part of the Hunter Estuary Wetlands National Park.

Freshwater Wetlands on Coastal Floodplains EEC is associated with PCT Southern Lower Floodplain Freshwater Wetland Moderate-Good condition Vegetation Zone 1 in the Project Area and covers approximately 0.17 ha.

Lower Hunter spotted gum – ironbark forest in the Sydney Basin and North Coast Bioregion EEC is found in the central to lower Hunter Valley of NSW and is strongly associated with yellow podzolic and solodic soils (NSW TSSC 2019). This community is typically an open forest, with a canopy dominated by spotted gum (*Corymbia maculata*) and broad-leaved ironbark (*Eucalyptus fibrosa*), with grey gum (*Eucalyptus punctata*) occurring less frequently. The understorey is comprised predominately of *Acacia parvipinnula, Bursaria spinosa, Daviesia ulicifolia, Lissanthe strigosa, Melaleuca nodosa* and *Persoonia linearis*. Ground cover is typically diverse, made up of herbs, ferns, grasses and leaf litter (NSW TSSC 2019).

Within the Project Area, Lower Hunter spotted gum – ironbark forest EEC is associated with PCT Vegetation Zones 3, 4 and 5. The EEC is in moderate good condition (Vegetation Zone 4), weedy understorey (Vegetation Zone 3) and regrowth (Vegetation Zone 6). Vegetation Zone 4 will not be impacted by the Project.

Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions EEC is found on gentle slopes arising from depressions and drainage flats on Permian sediments of the Hunter Valley floor between Muswellbrook and Beresfield (NSW TSSC 2011a). The community is generally an open forest with an open shrub layer. Modelling in 2000 predicts that much of the EEC has been cleared with only 27 per cent of the original distribution remaining (NSW TSSC 2011a). The remnants are disturbed and highly fragmented. The EEC in the Project Area is regrowth, covers a small area and is fragmented. Locally PCT 3446 is mapped in the SVTM as occurring downstream of the Main North Railway, Raymond Terrace Road and associated with gullies and drainage lines in Chisholm and Metford.

Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregion EEC is associated with grey-black clay-loams and sandy loams where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains (NSW TSSC 2011b). Very few examples of Swamp Oak Floodplain Fores EEC remain unaffected by weeds. In the Project Area the Swamp Oak Floodplain Forest EEC is associated with those parts of PCT 3975 characterised by swamp oaks. A review of SVTM of the local area indicates that this EEC occurs locally in Woodberry Swamp, Hexham Swamp and Hunter Wetlands National Park.

Table B.2 Threatened Ecological Communities

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
Not applicable
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 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
The Project will clear: • 0.17 ha or all of the Freshwater Wetland on Coastal Floodplain in the Project Area. This EEC occurs in more natural state downstream of the Maitland Hospital Campus, in Woodberry Swamp and Hexham Swamp in the locality. While the Project will clear all of the EEC in the Assessment Area its local occurrence is not likely to be placed a risk of extinction. • 0.57 ha or 8 per cent of the Lower Hunter spotted gum – ironbark forest EEC. The Assessment Area is all within Vegetation Zone 3 where the understorey is dominated by weed species. Moderate-good condition and regrowth forms have been avoided. The local occurrence is not likely to be placed at risk of extinction • 0.64 ha or the majority of Hunter Lowland Redgum Forest EEC in the Assessment Area. While the Project will clear all of the TEC in the Assessment Area its local occurrence is not likely to be placed a risk of extinction • 0.75 ha or all of Swamp Oak Floodplain Forest EEC in thinned/disturbed condition. This EEC occurs associated with fringes of coastal floodplain of the Hunter River and wetlands in the conservation reserves in the lower Hunter. While the Project will clear all of the TEC in the Assessment Area its local occurrence is not likely to be placed a risk of extinction.
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 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 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.
As noted above the Project will clear all of the Freshwater Wetland on Coastal Floodplain EEC, most of the Hunter Lowland Redgum Forest EEC in the Assessment Area and all of the Swamp Oak Floodplain Forest EEC in the Assessment Area. The Project will reduce the extent of weedy condition Lower Hunter spotted gum – ironbark forest EEC. The Project will avoid moderate-good condition EEC. Overall, the Assessment Area has limited connectivity with other nearby remnants of native vegetation due to infrastructure and residential development. Further, the communities within the Assessment Area are generally small areas of regrowth in poor condition and are unlikely to have importance to the long-term survival of any of the four EECs in the locality.
d. whether the proposed development or activity is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly)
No declared areas of outstanding biodiversity value are located in, or near, the Assessment Area. The proposed works will not impact any declared areas of outstanding biodiversity value.

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:
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 threating process.
There are two key threatening process for the TECs that are known to occur with the Project: • Clearing of native vegetation. • Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands. There are two key threatening processes for the TECs that have potential to occur with the Project: • Invasion of native plant communities by exotic perennial grasses • Invasion, establishment and spread of Lantana (Lantana camara L. sens. Lat).
Conclusion
The Project is unlikely to have a significant impact on the four assessed EECs.

7.2 Threatened Species

7.2.1 Squirrel glider

The squirrel glider (*Petaurus norfolcensis*) is a medium sized glider, obligate hollow users, occurring in coastal dry eucalypt forests and woodlands, usually at lower elevations in Queensland and NSW. Important habitat components appear to be a sufficient density of hollow-bearing trees and a degree of floristic diversity, including the presence of smooth-barked and winter/spring flowering tree species to provide shelter and a diversity of food resources. Although the squirrel glider has an extensive distribution, its populations are patchy and it is generally uncommon throughout its range. The squirrel glider is able to utilise a variety of landscape habitat elements including large continuous patches, smaller patches in urban and agricultural settings. Squirrel gliders move through their habitats by gliding between trees and are restricted to areas where trees are within gliding distance, making them vulnerable to habitat fragmentation and reduced genetic diversity (Goldingay et al. 2013). Launch (i.e. tree or pole) height and glide angle can be used to determine the ability of gliders to cross gaps of various widths. Goldingay and Taylor (2009) estimated a mean angle of 28.5 degrees ± 0.8 (n = 85) for the squirrel glider. Gaps greater than 30 m wide where tree height is less than 20 m will limit movement.

The squirrel glider has been recorded in the forest along the southern boundary of the Maitland Hospital Campus and is known to be using nestboxes that have been installed in the west of the Maitland Hospital Campus. The assessment has assumed that mature trees are retained where possible within the Assessment Area to provide connectivity and allow for gliding to minimise risk of fragmentation and isolation of the known population in the Maitland Hospital Campus.

Table B.3 Squirrel glider

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
The Project will result in the removal of approximately 1.21 hectares of native vegetation which forms foraging and breeding habitat for the squirrel glider recorded in the Maitland Hospital Campus. The squirrel glider lives in family groups within a home range between 3 to 10 ha (van der Ree & Bennett 2003; Sharpe & Goldingay 2007; Goldingay et al. 2010) depending on habitat quality and typically live for 3 to 4 years. Two hollow-bearing trees were recorded directly adjoining the Assessment Area which form potential habitat for these species, however these are not to be impacted by the Project. Nest boxes installed in the Maitland Hospital campus are known to provide dens sites for the squirrel glider. The loss of 1.21 hectares of native vegetation will not result in a significant reduction in foraging or breeding habitat for these species however it will fragment existing connectivity in known habitat forest. Population size is the most important contributor to population viability. Lake Macquarie City Council's (2015) squirrel glider planning management guidelines identify that a remnant patch needs to exceed 400 ha to ensure continued survival of a viable population. It is likely that for the squirrel glider population on site while reliant on habitats in the Maitland Hospital Campus, the viability of this local population is dependent on dispersal to the east towards remnant vegetation east of Metford towards Thornton. Assuming that mature trees are retained where possible in the area of the required 50 m APZ to provide connectivity between remnants, the Project is not likely to have an impact on the squirrel glider such that a viable local population is 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 ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
Not applicable
c. in relation to the habitat of a threatened species or ecological community: i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and 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 iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.
The Project will result in the removal of approximately 1.21 hectares of native vegetation which forms foraging and breeding habitat for the squirrel glider. While habitat within the Maitland Hospital Campus is currently fragmented, it is unlikely that the Project will result in fragmentation of habitats within the Maitland Hospital Campus, with the retention of mature vegetation along the southern boundary and the retention of mature trees within the APZ where practicable. Tree retention will reduce the risk of fragmentation to existing areas of known habitat in the west of the site. Clearing up to the 50 m APZ will create gaps in vegetation corridors, however these will not be greater than 70 m and will not result in isolation of remnant vegetation in the west of the Maitland Hospital Campus. It is recommended that mature trees are retained throughout the area between the 50 m APZ where practicable to allow for gliding and minimise risk of fragmentation and isolation.
d. whether the proposed development or activity is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly)
No declared areas of outstanding biodiversity value are located in, or near, the Project Area. The proposed works will not impact any declared areas of outstanding biodiversity value.

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:
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 threating process.
Three key threatening processes are relevant to the Project, being: • Clearing of native vegetation • Removal of dead wood and dead trees.
Conclusion
The Project will result in the removal of approximately 1.21 hectares of native vegetation which forms foraging and potential breeding habitat for the squirrel gliders identified in forest in the Maitland Hospital Campus. While habitat within the Maitland Hospital Campus is currently fragmented the Project, is unlikely to result in fragmentation of habitats within the Maitland Hospital Campus as mature vegetation along the southern boundary will be retained. The retention of mature trees within the APZ, where practicable, will further minimise the risk of fragmentation for this species.

7.2.2 Forest owls

The barking owl is a medium-sized owl with core populations on the western slopes and plains of NSW and in some northeast coastal and escarpment forests. They inhabit woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. The species roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. A potential habitat tree was identified in the Project Area, however no barking owl or signs of barking owl activity were observed during field surveys.

The powerful owl is a large forest owl endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. The powerful owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The powerful owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as turpentine (*Syncarpia glomulifera*), black she-oak (*Allocasuarina littoralis*), blackwood (*Acacia melanoxylon*), rough-barked apple (Angophora floribunda), cherry ballart (*Exocarpus cupressiformis*), and a number of eucalypt species. Two potential habitat trees were identified in the Project Area, however these occur outside the area of impact and no powerful owl or signs of powerful owl activity were observed during field surveys.

In NSW masked owls are distributed from the coast, where they are most abundant, to the western plains. They occur in dry eucalypt forests and woodlands, often foraging along the forest edges and roadsides. The species has a large home-range of 500 to 1,000 hectares and is known to breed in large tree hollows or sometimes caves (OEH 2017f). A potential habitat tree was identified in the Project Area, however no masked owl or signs of masked owl activity were observed during field surveys.

Table B.4 Forest Owls

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
The Project will result in the removal of approximately 2.13 hectares of native vegetation which forms potential foraging habitat for the masked owl, powerful owl and barking owl. While no evidence of breeding was observed during field surveys, a hollow-bearing trees potentially suitable for nesting (hollows greater than 30 centimetres) occur in the forest along the southern boundary of the Project Area to the south of the 50 m asset protection zone. This tree will be retained within the forest along the southern boundary. All of the owls have large home ranges and are likely to forage over remnant vegetation in the Project Area and east of the Project Area. The loss of native vegetation associated with the Project will not result in a significant reduction in foraging habitat, and the proposal is not 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.
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 ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
Not applicable
c. in relation to the habitat of a threatened species or ecological community: i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and 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 iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.
The Project will result in the removal of approximately 2.13 ha of native vegetation. Vegetation in the impact area is highly modified and fragmented as a result of past quarrying activity, residential, recreational and infrastructure. Within the locality vegetation in the Maitland Hospital land holding provides a small remnant of foraging habitat for large forest owls with larger tracts of native vegetation occurring to the east of Metford, continue south through mining land holdings west of the motor way. The removal of a small area of foraging habitat is not likely to cause fragmentation or isolation of habitat important to the long-term survival of any of these large forest owls.
d. whether the proposed development or activity is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly)
No declared areas of outstanding biodiversity value are located in, or near, the Project Area. The proposed works will not impact any declared areas of outstanding biodiversity value.
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 threating process.
Three key threatening processes are relevant to the Project, being: • Clearing of native vegetation • Removal of dead wood and dead trees.
Conclusion
The Project is unlikely to have a significant impact on the barking owl, powerful owl or masked owl.

7.2.3 Southern myotis

The southern myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 kilometres inland, except along major rivers. This species generally roosts close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. The southern myotis forages over streams and pools, catching insects and small fish by raking their feet across the water surface (OEH 2017).

Table B.5 Southern myotis

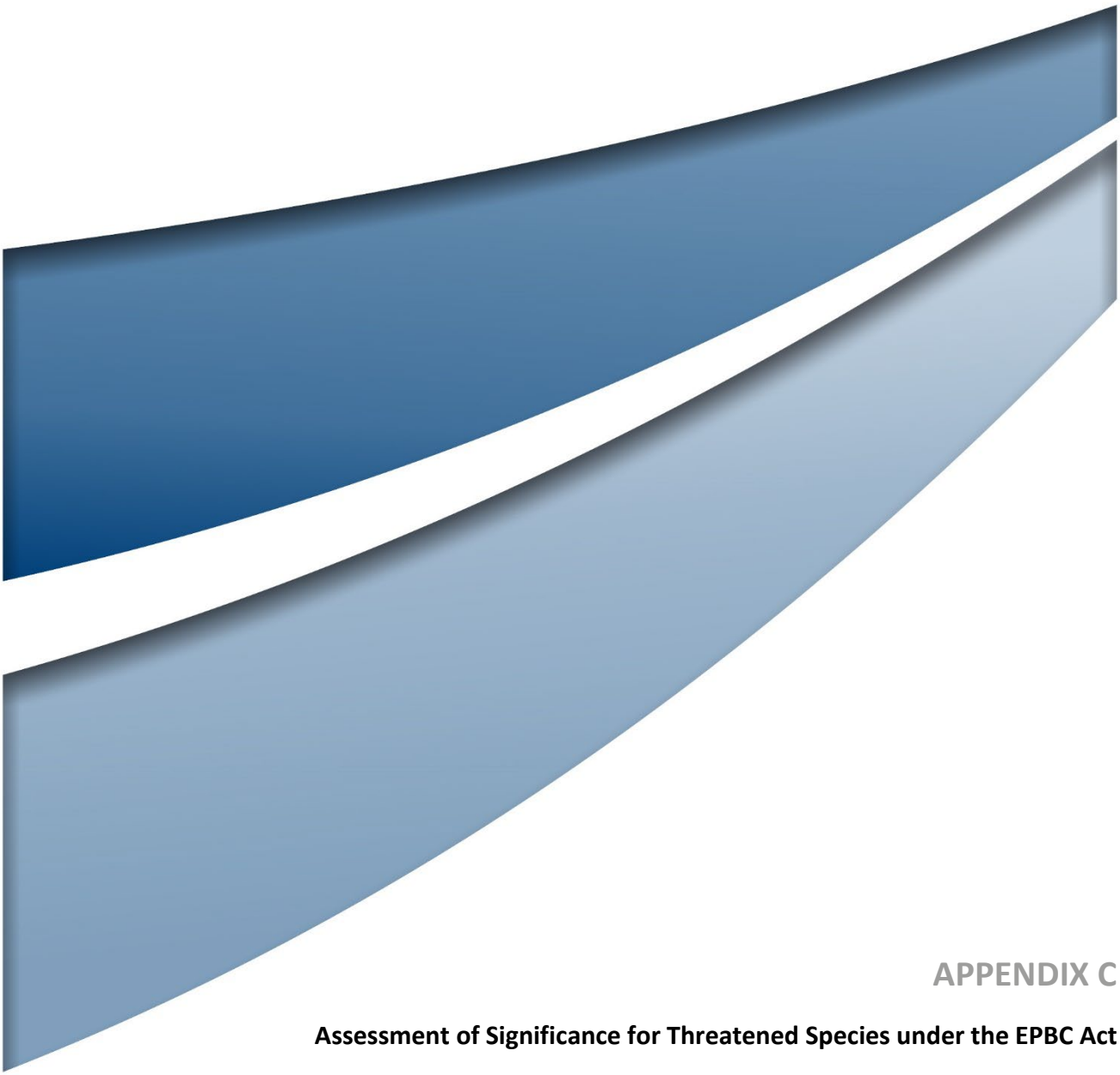
The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:
a. in the case of a threatened species, whether the proposed development or activity 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
The southern myotis was not recorded in the Project Area however the species is known from the locality and may forage over areas of open water in Vegetation Zone 1. No evidence of structures that may provide breeding habitat was identified in the Project Area. The species may roost in hollow bearing trees however these are limited in the vegetation in the Project Area. While the Project will remove potential foraging habitat no evidence of the presence of the species has been identified and the Project is not likely to have an adverse effect on the life cycle of the species.
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 ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
Not applicable
c. in relation to the habitat of a threatened species or ecological community: i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and 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 iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.
The southern myotis is likely to forage over open water in the Project Area and may roost in trees in the Project Area. No artificial structure habitats have been identified in the Project Area. The Project will clear about 0.17 ha of foraging habitat. The southern myotis is known to roost in artificial structures in the lower Hunter Valley. It is likely that the species will forage over the larger areas open water associated with freshwater wetlands on the Hunter Valley downstream of the Project Area.
d. whether the proposed development or activity is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly)
No declared areas of outstanding biodiversity value are located in, or near, the Project Area. The proposed works will not impact any declared areas of outstanding biodiversity value.
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 threating process.
Three key threatening processes are relevant to the Project, being: • Clearing of native vegetation • Removal of dead wood and dead trees.
Conclusion
The Project is unlikely to have a significant impact on southern myotis.

7.2.4 Green and Golden Bell Frog

Table B.6 Green and Golden Bell Frog

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
The green and golden bell frog is highly dependent on its breeding sites for long term survival. The freshwater wetland in the Project Area may provide habitat. There is one record of the species located approximately 400 m to the north of the Project Area. Despite the proximity of this record to the Project Area, the record is historic, being from 1976 (DPE 2024a). No other records of the species occur within 10 km of the Project Area. Targeted surveys were completed within the Project Area and these did not record the species. It is unlikely that the species occurs within the Project Area therefore the Project is not expected to have an impact on life cycle of the species.
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 ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
Not applicable
c. in relation to the habitat of a threatened species or ecological community: i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and 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 iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.
The Project will remove approximately 0.17 hectares of freshwater wetlands in the form of a modified dam. The species has not been recorded in the Project Area. There is one historic (1976) record located approximately 400 m to the north of the Project Area (DPE 2024a). The Project Area consists of marginal habitat and is unlikely to be used as breeding habitat for the species. As such, no direct impacts are expected as part of the Project, which includes the removal of approximately 0.17 hectares of marginal habitat. The green and golden bell frog uses terrestrial habitat for dispersal, foraging and shelter. Potential routes of dispersal are not known within the Project Area, and it is assumed that any potentially occurring frogs would move on wet nights to avoid desiccation, and that they would move along moisture gradients in the environment. These would include along the edge of large waterbodies such as dams and creek lines. The middle Hunter important population occurs within a highly fragmented landscape that is dominated by agricultural and residential land uses. The Project is therefore considered unlikely to further fragment potentially occurring population.
d. whether the proposed development or activity is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly)
No declared areas of outstanding biodiversity value are located in, or near, the Project Area. The proposed works will not impact any declared areas of outstanding biodiversity value.

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:
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 threating process.
Key threatening processes relevant to the green and golden bell frog and the Project include: • clearing of native vegetation – the Project will clear 0.17ha of marginal potential habitat • infection of frogs by amphibian chytrid causing the disease chytridiomycosis. • alternation of natural flow regimes of rivers and stream and their floodplains and wetlands.
Conclusion
The Project is unlikely to have a significant impact on the green and golden bell frog



APPENDIX C

Assessment of Significance for Threatened Species under the EPBC Act

The EPBC Act requires an Assessment of Significance relating to the potential impacts of the proposed work on listed Matters of National Environmental Significance (MNES). Assessments have been conducted in accordance with the Significant Impact Guidelines 1.1 (DoE 2013), which define a significant impact as '*an impact which is important, notable, or of consequence, having regard to its context or intensity*' (DoE 2013 p. 2). When determining whether a proposed action may result in a significant impact, consideration is given to the sensitivity, value, and quality of the environment which it impacts, and upon the intensity, duration, magnitude, and geographic extent of the impacts. The 'Significant Impact Guidelines 1.1' outlines specific criteria to use when making such an assessment, based on the MNES that are being considered, which are to be complemented by additional guidelines that have been prepared for specific MNES (as available). These criteria are used as relevant in the following sections.

The **Action** referred to throughout this assessment related to the proposed work described in **Section 1.0** and includes all direct and indirect impacts from the proposed work.

The significance of the potential impacts of the proposed work on listed MNES has been prepared in keeping with the self-assessment process described in *Significant Impact Guidelines 1.1* (DoE 2013) against the significant impact criteria for each MNES.

Definitions and concepts as outlined in the Significant Impact Guidelines 1.1 (DoE 2013) have been applied in these assessments. In particular:

A *significant impact* is an impact which is important, notable, or of consequence, having regard to its context or intensity. When determining whether a Project may result in a significant impact, consideration is given to the sensitivity, value, and quality of the environment which is impacted; and upon the intensity, duration, magnitude, and geographic extend of the impacts.

A significant impact is *likely* if there is a real or not remote chance or possibility of happening.

A *population* of a species is an occurrence of the species in a particular area.

Occurrences of the species are not limited to:

- A geographically distinct regional population, or collection of local populations, or
- A population, or collection of local populations, that occurs within a particular bioregion.

In the case of a vulnerable species, an *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

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

As outlined in **Table 3.6**, the green and golden bell frog (*Litoria aurea*) is listed as Vulnerable under the EPBC Act and considered to have the potential to occur or be impacted by the Project, based on previous records or suitable habitat. An Assessment of Significance has been prepared for the green and golden bell frog (*Litoria aurea*).

The following vulnerable species are considered in this assessment:

- green and golden bell frog (*Litoria aurea*)

Species descriptions, in the Significant Impact Assessments, are referenced from the Threatened Biodiversity Profiles (DPE 2024a) and Department of Climate Change, Energy, the Environment and Water (DCCEEW 2024) online species profiles, unless otherwise noted.

In this case, an *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations 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 green and golden bell frog key population in the middle Hunter, which includes the Project Area, is considered to represent an *important population*.

An action has, will have, or is likely to have a significant impact on threatened species if it does, will, or is likely to:
Lead to a long-term decrease in the size of an important population of a species;
No direct impacts on the important population are expected as part of the Project. The Project will remove approximately 0.17 hectares of freshwater wetlands in the form of a modified dam. One record of the species which is located approximately 400 m to the north of the Project Area. Despite the proximity of this record however it is historic, being from 1976 (DPE 2024a). No other records of the species occur within 10 km of the Project Area. Targeted surveys were completed within the Project Area and these did not record the species. It is unlikely that the species occurs within the Project Area therefore the Project is not expected to have any direct impacts on the important population and is unlikely to lead to a long-term decrease in the size of the middle Hunter important population of the green and golden bell frog.
Reduce the area of occupancy of an important population, or;
There is one historic (1976) record located approximately 400 m to the north of the Project Area (DPE 2024a). The Project Area consists of marginal habitat and is unlikely to be used as breeding habitat for the species. As such, no direct impacts on the important population are expected as part of the Project, which includes the removal of approximately 0.17 hectares of marginal habitat.
Fragment an existing important population into two or more populations, or;
The green and golden bell frog uses terrestrial habitat for dispersal, foraging and shelter. Potential routes of dispersal are not known within the Project Area, and it is assumed that any potentially occurring frogs would move on wet nights to avoid desiccation, and that they would move along moisture gradients in the environment. These would include along the edge of large waterbodies such as dams and creek lines. The middle Hunter important population occurs within a highly fragmented landscape that is dominated by agricultural and residential land uses. The Project is therefore considered unlikely to further fragment the potentially occurring important population.

An action has, will have, or is likely to have a significant impact on threatened species if it does, will, or is likely to:
Adversely affect habitat critical to the survival of a species, or;
The middle Hunter important population is considered to contain only a few adult individuals and is therefore more susceptible to stochastic impacts. The middle Hunter population is considered disjunct from the larger more secure populations on the coast of NSW at locations such as Kooragang Island, Sydney and Nowra. Dams and associated terrestrial habitat in this declining and small population may be critical for the survival of the important population, however it is unlikely to adversely affect habitat critical to the survival of the species throughout its wider range in NSW. The removal of 0.17 hectares of marginal habitat is unlikely to adversely affect habitat critical to the survival of the green and golden bell frog.
Disrupt the breeding cycle of an important population, or;
The species is not known to occur in the Project Area and there have been no confirmed recordings within 10 km of the Project Area since 1976 (DPE 2024a). The loss of 0.17 ha of marginal habitat within the Project Area in the bounds of the middle Hunter important population is not likely to substantially disrupt the breeding cycle of the important population as known breeding habitat will not be impacted.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or;
The loss of 0.17 ha of marginal habitat within the Project Area in the bounds of the middle Hunter important population is not likely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Substantial potential habitat in the way of wetlands, farm dams, water and courses occurs in proximity to the Project Area in the agricultural landscapes in surrounding lands.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
The plague minnow (*Gambusia holbrooki*) is an invasive species that has been associated with the decline of the green and golden bell frog. The presence of the plague minnow has been identified as a major threatening process for the green and golden bell frog and the presence of the plague minnow has been demonstrated to reduce the breeding success of the species (Goldingay 2008). The plague minnow was detected during dip netting surveys in the aquatic habitat within the Project Area. It is unlikely that the Project will result in the establishment of further invasive species.
Introduce disease that may cause the species to decline; or
Green and golden bell frog populations are commonly affected by the amphibian chytrid fungus *Batrachochytrium dendrobatidis*. The 'infection of amphibians with chytrid fungus resulting in chytridiomycosis' is listed under the EPBC Act as a key threatening process for amphibian species. The green and golden bell frog is highly susceptible to infection by the chytrid fungus, which is likely to occur within the middle Hunter important population. The effect of the Project on the rate of infection by *B. dendrobatidis* is not known. However, the chytrid fungus is considered likely to be contributing to the decline of the green and golden bell frog across NSW (Mahony et al 2013). A decline in population numbers as a result of habitat reduction may increase the susceptibility of the population to the disease. The Project will not result in the introduction of a disease that may cause the species to decline.
Interfere substantially with the recovery of the species
The following draft recovery plan has been prepared: • Draft Green and Golden Bell Frog (*Litoria aurea*) Recovery Plan (DEC 2005). The Project will approximately 0.17 ha of potential aquatic habitat for the green and golden bell frog. The middle Hunter important population is likely in decline or no longer present as it has not been positively recorded within 10 km of the Project Area since 1976 (DCCEEW 2024a). If persisting, the population likely consists of only a few adult individuals across a broad area in the Maitland locality. It is possible that the middle Hunter important population is not recoverable due to the impacts of amphibian chytrid fungus and critically low population numbers. The habitat loss and impacts associated with the Project are not likely to interfere substantially with the recovery of this species.

An action has, will have, or is likely to have a significant impact on threatened species if it does, will, or is likely to:
Conclusion
The green and golden bell frog has not been recorded in the Project Area and has not been positively recorded within 10 km of the Project Area since 1976 (DCCEEW 2024a). It is considered highly likely that the precipitous state of the middle Hunter important population is directly due to the impact of disease rather than habitat loss or other ecological factors. The loss of 0.17 ha of potential habitat as a result of the Project is therefore not considered likely to result in a significant impact on the species.

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