

Flora and Fauna Assessment Report









St Michael's Public School

St Michaels's Public School

28 May 2020



Flora and Fauna Assessment Report

St Michaels's Public School 12 Sproule St, Nelson Bay NSW 2315

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Contents

1.	INTR	ODUCTION	1
	1.1	PROJECT BACKGROUND	1
	1.2	SITE DESCRIPTION	1
	1.3	PROPOSED DEVELOPMENT	2
2.	LEGI	SLATIVE CONTEXT	5
	2.1	FEDERAL LEGISLATION	5
		2.1.1 Environment Protection & Biodiversity Conservation Act 1999	5
	2.2	STATE LEGISLATION	6
		2.2.1 Environmental Planning and Assessment Act 1979	6
		2.2.2 Biodiversity Conservation Act 2016	7
		2.2.3 Biosecurity Act 2015	8
		2.2.4 National Parks and Wildlife Act 1974	9
		2.2.5 Coastal Management Act 2016	9
		2.2.6 Water Management Act	10
		2.2.7 State Environmental Planning Policy (Koala Habitat Protection) 2019	€ 10
	2.3	LOCAL PLANNING INSTRUMENTS	11
		2.3.1 Port Stephens Local Environmental Plan 2013 (Port Stephens LEP, 2013) 11	
		2.3.2 Port Stephens Development Control Plan 2014	12
3.	MATE	ERIALS AND METHODS	_14
	3.1	DESKTOP ASSESSMENT	14
	3.2	FIELD SURVEY	14
		3.2.1 Flora	15
		3.2.2 Fauna	16
	3.3	SURVEY LIMITATIONS	17
4.	RESU	JLTS	_20
	4.1	DESKTOP ASSESSMENT	20
	4.2	VEGETATION ASSESSMENT	20
		4.2.1 Plant Diversity	20
		4.2.2 Priority Weeds	20
		4.2.3 Plant Community Types	21
	4.3	THREATENED ECOLOGICAL COMMUNITIES	22
	4.4	THREATENED FLORA SPECIES	22
	4.5	FAUNA HABITAT ASSESSMENT	22



	4.6	BIRD SURVEYS	23	
	4.7	NOCTURNAL SURVEYS	23	
	5.1	KOALA SURVEYS	24	
	5.2	THREATENED SPECIES (BC ACT)	26	
	5.3	EPBC ACT PROTECTED MATTERS	26	
		5.3.1 Relevant Matters	26	
		5.3.2 Threatened Species	26	
		5.3.3 Threatened Ecological Communities	27	
		5.3.4 Migratory Species	27	
6.	DISCU			
	6.1	IMPACT ASSESSMENT	28	
		6.1.1 Removal of Trees and Native Vegetation	28	
		6.1.2 Impacts to Threatened Biota	28	
		6.1.3 Impacts to Resident Fauna	28	
		6.1.4 Cumulative Impacts	29	
6.2 IMPACT AMELIOF		IMPACT AMELIORATION	29	
		6.2.1 Avoidance Measures	29	
		6.2.2 Mitigation Measures	29	
		6.2.3 Offset Provisions	31	
	6.3	CONCLUSION	31	
REFE	RENCE	ES	32	

Tables

Table 1:	Flora species recorded during the assessment	38
Table 2:	Fauna species recorded during the assessment.	40

Figures

Locality	3
Study Area and Proposed Development	4
Survey Effort	19
Vegetation Communities	25
	Locality Study Area and Proposed Development Survey Effort Vegetation Communities

Plates

Plate 1	PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland
	(managed understorey)- eastern corner the study area33



Plate 2	PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland (Managed Understorey)– central area within the study area	33
Plate 3	PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland (Managed Understorey)– north-western corner of the study area	34
Plate 4	PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland (Managed Understorey)– western corner of the study area	34
Plate 5	Planted Vegetation (Native and Exotic Trees and Shrubs) southern boundary of the study area	35
Plate 6	Planted Vegetation (Native and Exotic Trees and Shrubs) south-eastern corner of the study area	35

Appendices

- Appendix 1: Site photographs
- Appendix 2: Flora & Fauna Species List
- Appendix 3: Threatened Species 'Likelihood of occurrence'
- Appendix 4: EPBC Act Protected Matters Search Report
- Appendix 5: Koala Habitat Assessment Report
- Appendix 6: Assessment of Significance
- Appendix 7: Licenses and Permits



1. INTRODUCTION

1.1 PROJECT BACKGROUND

Kleinfelder Australia was engaged by CKDS Architecture to prepare a Flora and Fauna Assessment Report for the future development of St Michaels Public School Located at 12 Sproule St, Nelson Bay NSW 2315 (**Figure 1**). The project will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The development is deemed to be a local development and Port Stephens Council (Council) will be the consent authority for the project.

The following terms are used throughout this report:

- Locality land within a 5 km radius of the study area (Figure 1).
- Study area 12 Sproule St, Nelson Bay NSW 2315 (Figure 2).
- Subject site (Proposed Development Area) areas of the study area proposed for development (Figure 2).

This report identifies the flora, fauna and threatened species and ecological communities present, or likely to occur within the study area based on species and/or habitats detected during field surveys. Threatened flora and fauna records from the locality have been considered to determine the "likelihood of occurrence" of these species. An assessment of the likely impacts on threatened species, habitat features, wildlife corridors and vegetation communities as a result of the proposed development is undertaken.

1.2 SITE DESCRIPTION

The study area covers approximately 2.12 ha of land. The site topography is relatively flat with a gradual increase in elevation to the north. The majority of the study area has been historically cleared for the current school development, which currently contains several buildings, managed gardens, managed grassland areas (playing fields), a basketball court, seating areas and other school facilities.

Small stands of native canopy and shrub vegetation have been retained in some areas of the school such as a grassy seating area in the central area. Several mature trees occur in even



aged rows along the site boundaries. Many of these trees are likely to have been planted when the school was first built. The vegetation throughout the school has been managed; therefore, native shrubs and groundcover species are predominantly absent.

Relevant site photographs are presented in **Appendix 1**.

1.3 PROPOSED DEVELOPMENT

The proposed development is to undertake a redevelopment of the existing St Michael Primary School with a refurbishment (alterations and some additions) of several existing buildings in order to provide a more contemporary learning environment, a new administration building and remove existing demountables. Concurrently with the School works it is proposed to construct a new two storey Early Education Centre to complement the use of the site and cater for the need for more early learning childcare.

The new administration building will be constructed adjacent to the existing school hall and address Wahgunyah Street. The development of the new administration building will clarify the existing entry arrangements by creating a single entry for the school.

The new Early Education Centre will be located at the rear of the site to tie in with the existing car park located off Sproule Street. There is a significant fall to the south from the car park that have developed the two storey built form that allow for the Early Education Centre to utilise the slope of the land for outdoor play, while the lower ground classrooms and Out of School Hour Care (OOSH) connect with the school grounds.

A layout of the proposed development is shown in Figure 2.



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2. LEGISLATIVE CONTEXT

This Flora and Fauna Assessment Report was undertaken in consideration of the following Acts, Policies and Guidelines:

- Commonwealth:
 - o Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- State:
 - o Biodiversity Conservation Act 2016 (NSW) (BC Act).
 - o Biodiversity Conservation Regulation 2017 (BC Regulation).
 - o Biodiversity Conservation (Savings and Transitional) Regulation 2017.
 - o National Parks and Wildlife Act 1974 (NP&W Act).
 - o Environmental Planning and Assessment Act 1979 (EP&A Act).
 - o Biosecurity Act 2015.
 - *Biodiversity Assessment Method (2017)* (Office of Environment and Heritage) (OEH, 2017)
 - o Coastal Management Act 2016.
 - State Environmental Planning Policy Coastal Management 2018 (SEPP Coastal Management).
 - State Environmental Planning Policy (Koala Habitat Protection) 2019 (Koala SEPP).
- Local:
 - o Port Stephens Local Environmental Plan 2013 (Port Stephens LEP, 2013)

2.1 FEDERAL LEGISLATION

2.1.1 Environment Protection & Biodiversity Conservation Act 1999

The purpose of the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a proposal, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. An action that 'has, will have or is likely to have a significant impact on a Matter of National Environmental Significance (MNES) is



deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Minister for the Environment.

The EPBC Act identifies nine MNES:

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

As part of the current assessment, MNES that are predicted to occur within the locality (applying a 10 kilometre buffer) were obtained from the on-line Protected Matters Search Tool (DAWE, 2020a). These records are discussed in **Section 4**. The EPBC Act has been further addressed in this assessment through:

- Field surveys for EPBC Act listed threatened biota and migratory species.
- Assessment of potential impacts on EPBC Act listed threatened species and migratory biota.
- Identification of suitable impact mitigation and environmental management measures for EPBC Act listed threatened species and migratory biota.

2.2 STATE LEGISLATION

2.2.1 Environmental Planning and Assessment Act 1979

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



Development activities that require consent are assessed and determined in accordance with Part 4 of the EP&A Act. The determining authority for the project is Gunnedah Shire Council.

2.2.2 Biodiversity Conservation Act 2016

The NSW BC Act, the NSW *Biodiversity Conservation Regulation 2017* (BC Regulation) and amendments to the NSW *Local Land Services Act 2013* (LLS Act) commenced on 25 August 2017. The legislation aims to deliver "a strategic approach to conservation in NSW whilst supporting improved farm productivity and sustainable development". The NSW BC Act repeals several pre-existing Acts, most notably the NSW *Threatened Species Conservation Act 1995*, the NSW *Nature Conservation Trust Act 2001* and the *NSW Native Vegetation Act 2003*. Schedules 1 and 2 of the BC Act contain lists of flora and fauna species and communities, which have been determined by the NSW Scientific Committee as being under threat of serious decline that could ultimately lead to extinction. The BC Act provides for a five-part *assessment of significance* and impact to be applied to any of these listed species or communities that are found in an area subject to proposed development. Schedule 4 of the BC Act contains a list of 'key threatening processes' that are deemed to have a negative impact on threatened species, populations or communities.

The Biodiversity Offset Scheme (BOS) has also been introduced under the BC Act. Where certain thresholds are triggered by a development, offsets are subsequently required. The triggers for the BOS are as follows:

- Clearing area thresholds Section 7.2 of the BC Regulation,
- Clearing of native vegetation, or other prescribed impacts under Part 6.1 of the BC Regulation, within an area mapped on the Biodiversity Values Map,
- Significant impact based on '*assessment of significance* (5-part Test) under Section 7.3 of the BC Act.

In accordance with the NSW BC Act, entry into the Biodiversity Offsets Scheme (BOS) is not required for the proposed development due to the following:

- The proposed development is not deemed to be 'State Significant' under the NSW EP&A Act.
- The proposed development will not impact an Area of Outstanding Biodiversity Value (AOBV) as listed under Part 3 of the BC Act.
- The proposed development is unlikely to cause a significant impact on a threatened species, population or ecological community, as listed under Schedules 1 and 2 of the BC



Act, as determined by application of an *assessment of significance* pursuant to Section 7.3 of the BC Act.

- The proposed development will not impact areas mapped as having 'high biodiversity value' as indicated by the NSW Biodiversity Values Map (BV Map viewed on 27/04/2020 indicates the nearest mapped area to the study area occurs over 600m to the east).
- The proposed development will not involve clearing of native vegetation that exceeds the Biodiversity Offset Scheme (BOS) clearing threshold. The minimum lot size for the site is 500m² (DPIE, 2020b). In accordance with the BC Regulation, the vegetation clearing threshold for the site is 0.25 ha. Based on the extent of native vegetation within the site (0.32 ha), it is likely that 0.13 ha of vegetation clearing would be required for the proposed development; hence the BOS threshold is unlikely to be exceeded.

In consideration of the criteria listed above, a Biodiversity Development Assessment Report (BDAR) is not required for the proposed development. As such, a Flora and Fauna Impact Assessment is necessary to determine the likely impact of the proposed development on biodiversity, as required under the EP&A Act. As part of the current assessment, threatened species and ecological communities as listed under the BC Act that have previously been recorded within the locality (applying a 10 kilometre buffer) were obtained from the on-line BioNet Atlas of NSW Wildlife (Department of Planning, Industry and Environment) (DPIE, 2020a). These records are discussed in **Section 4**. The BC Act has been further addressed in this assessment through:

- Field surveys to assess the presence of threatened species, populations and ecological communities, as listed under Schedules 1 and 2 of the BC Act, within the subject site.
- Assessment of potential impacts threatened species, populations and ecological communities, as listed under Schedules 1 and 2 of the BC Act, as determined by application of an *assessment of significance* pursuant to Section 7.3 of the BC Act.
- Identification of suitable impact mitigation and environmental management measures.

2.2.3 Biosecurity Act 2015

The *NSW Biosecurity Act 2015* provides a streamlined statutory framework to protect the NSW economy, environment and community from the negative impact of pests, diseases and weeds. The primary object of the Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.



In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

The Department of Primary Industries (DPI) provides guidance for the control and management of Priority Weed species. Lists of Priority Weeds are provided for each region of NSW. Priority Weed species recorded within the study area during the current investigation are discussed in **Section 4**.

2.2.4 National Parks and Wildlife Act 1974

The NSW *National Parks and Wildlife Act 1979* (NPWS Act) aims to conserve nature, objects, places or features (including biological diversity) of cultural value within the landscape. The Act also aims to foster public appreciation, understanding and enjoyment of nature and cultural heritage, and provides for the preservation and management of national parks, historic sites and certain other areas identified under the Act.

No areas of National Park estate occur within or adjacent to the subject site.

2.2.5 Coastal Management Act 2016

The Coastal Management Act (2016) promotes strategic and integrated management, use and development of the coast for the social, cultural and economic wellbeing of the people of NSW. The focus of the Act is on ecologically sustainable development that:

- Protects and enhances sensitive coastal environments, habitats and natural processes.
- Strategically manages risks from coastal hazards.
- Maintains and enhances public access to scenic areas, beaches and foreshores.
- Supports the objectives for our marine environments under the Marine Estate Management Act 2014.
- Protects and enhances the unique character, cultural and built heritage of our coastal areas, including Aboriginal cultural heritage.

The development is situated within the Coastal Environment Area, as identified under the Coastal Management SEPP. As such, any application must give consideration to clause 13 of this policy. The Coastal Management (SEPP 2018) mapping has been reviewed and the study



area is not located within a coastal zone under the *Coastal Management Act 2016*. The closest coastal wetland is located approximately 2kms to the east of the Subject site, within Tomaree National Park. The next closest Coastal Wetland is located approximately 3kms to the west, near Salamander Bay.

2.2.6 Water Management Act

Controlled activities carried out in, on or under waterfront land are regulated by the NSW *Water Management Act 2000* (WM Act). The NSW Natural Resource Asset Regulator (NRAR) administers the WM Act and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to 'waterfront land' as a consequence of carrying out the controlled activity. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary (NRAR, 2018).

A river is defined by the WM Act as:

- Any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved.
- Any tributary, branch or other watercourse into or from which a watercourse flows.
- Anything declared by the regulations to be a river, whether or not it also forms part of a lake or estuary but does not include anything declared by the regulations not to be a river.

No mapped waterways occur within the study area **(Figure 1)**. The proposed development will not directly impact waterfront land; therefore, referral of the Development Application to the NSW Natural Resources Access Regulator for further consideration is not required.

2.2.7 State Environmental Planning Policy (Koala Habitat Protection) 2019

The Koala SEPP aims to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to support a permanent free-living population over their present range and reverse the current trend of Koala population decline.



Where a Koala Plan of Management (KPoM) applies to the land, Clause 8 of the Koala SEPP applies to the development. The proposed development must be consistent with the approved KPoM that applies to the land.

Where a KPoM does not apply to the land, and the land is identified on the Koala Development Application Map, and has an area of at least 1 ha, the provisions of Clause 9 of the Koala SEPP applies to the development. As such, Council must take into account the requirements of the Guideline, or information prepared by a suitably qualified and experienced person in accordance with the guideline demonstrating that the land is not Highly Suitable Koala Habitat, or Core Koala Habitat.

Where no KPoM applies to the land, and it is not mapped on the Koala Development Application Map, Clause 10 of the Koala SEPP applies to the development. Council is not prevented from granting consent to the development if they are satisfied that the land is not identified on the Koala Development Application Map, does not have an approved KPoM applying to it, and is not Core Koala Habitat.

The Port Stephens - Comprehensive Koala Plan of Management (CKPoM) (PSC, 2002) covers land on which the development is proposed. All development applications in the Port Stephens LGA are required to comply with the provisions of Appendix 4 of the Port Stephens Council CKPoM to comply with State Environmental Planning Policy No. 44 – Koala Habitat Protection. The SEPP No. 44 has now been repealed, and the new SEPP (Koala Habitat Protection 2019) has now commenced as of 1 March 2019.

2.3 LOCAL PLANNING INSTRUMENTS

2.3.1 Port Stephens Local Environmental Plan 2013 (Port Stephens LEP, 2013)

The study area is located within the Port Stephens Council LGA. The Port Stephens Local Environmental Plan 2013 (Port Stephens LEP, 2012) controls development within the study area through zoning and development controls. The site is zoned predominately R2 - Low *Density Residential* under the Port Stephens LEP (2013). The site is located within a residential area within the Port Stephens Local Government Area (LGA). The site is surrounded on all sides by residential development and bordered by Sproule Street to the south (**Figure 2**).



The objectives of this zoning under the LEP are as follows:

- To provide for the housing needs of the community within a low-density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To protect and enhance the existing residential amenity and character of the area.
- To ensure that development is carried out in a way that is compatible with the flood risk of the area.

The current assessment has been prepared in consideration of the objectives of the LEP. Potential impacts associated with the project are addressed in **Section 5.1**. Mitigation measures are presented in **Section 5.2**.

2.3.2 Port Stephens Development Control Plan 2014

The Port Stephens Development Control Plan (DCP) provides specific, more comprehensive guidelines for certain types of development, or area specific requirements for the Port Stephens LGA (Port Stephens DCP, 2014). The DCP details general provisions applying to development requiring development consent in accordance with Part 4 Development Assessment of the Environmental Planning and Assessment Act 1979 (EP&A Act). General provisions include:

- Tree Management
- Natural Resources
- Environmental Management
- Drainage and Water Quality
- Flooding
- Essential services
- Heritage
- Road Network and Parking
- Social Impact

The majority of the above listed controls are not relevant to the current assessment; however, aspects of the first three provisions are considered.



It is noted in the DCP also provides development objectives and requirements that relate to a specific locality in which development is proposed. The development is situation within 'D6 – Nelson Bay West' as defined in Section D of the Port Stephens DCP. No additional environmental controls are relevant to this assessment.



3. MATERIALS AND METHODS

3.1 DESKTOP ASSESSMENT

Existing information on the flora and fauna of the subject site and the locality, including relevant threatened biota was obtained from:

- Lower Hunter and Central Coast Vegetation Community Mapping (DPIE, 2013) and
- Mid North Coast Headlands Vegetation (Wilson, 2006)
- The BioNet Atlas of NSW Wildlife (DPIE, 2020a) for previous records of threatened species, populations and ecological communities (as listed under the BC Act) within a 5-kilometre radius of the site (data retrieved 27/04/2020).
- The Department of Agriculture Water and Environment (DAWE, 2020a) Protected Matters Search Tool, which involved a search for matters of national environmental significance within a 10-kilometre radius of the site (conducted on 27/04/2020).

The results of the database searches were used to compile a list of threatened species, populations and communities, as listed under the BC Act and EPBC Act that could potentially occur on the site, and their likelihood of occurrence.

3.2 FIELD SURVEY

3.2.1 Summary

A field survey was undertaken by Kleinfelder Senior Ecologist (Botanist) Dr. Gilbert Whyte on 06 April 2020 and Senior Zoologist (Zoologist) Daniel O'Brien on 13 May 2020. The surveys comprised the following:

- A site inspection to identify and map PCTs present.
- Mapping and description of hollow-bearing trees and dead stags.
- A site walkover to identify potential threatened flora and fauna species habitat, subject to their seasonal detectability.
- Sampling of vegetation integrity plots within areas of native vegetation in accordance with the BAM (OEH, 2017).
- Standardised Bird survey (20min, 2ha)
- Koala Assessment SAT (Spot Assessment Technique)



• Nocturnal survey including spotlighting and call playback.

These surveys were undertaken to identify existing vegetation communities, flora and fauna species present and the likelihood of occurrence of threatened flora and fauna species and ecological communities within the study area. Any other potential ecological constraints to the proposed future development of the study area were also noted.

The flora and fauna survey methods were designed to satisfy standards established by the *Lower Hunter Central Coast Region Flora and Fauna Survey Guidelines 2002.* The following sections outline the methodologies undertaken.

3.2.2 Flora

3.2.1.1 Vegetation Identification and Mapping

The field survey included a walk over of the study area to identify vegetation and habitat types present. The identification of vegetation types was based on dominant species present in the overstorey, midstorey, shrub and ground layers as recorded, and included a comprehensive survey of all species potentially present.

The boundaries of each of the identified vegetation communities within the study area were mapped using a combination of on-site visual inspection and aerial photograph interpretation (API). The species associations recorded in the study area were compared to descriptions of vegetation communities published in Lower Hunter and Central Coast Vegetation Community Mapping (DPIE, 2013) and Mid North Coast Headlands Vegetation (Wilson, 2006) and their relevant PCT classifications (DPIE, 2020c).

Although the proposed development does not trigger the BOS, elements of the Biodiversity Assessment Method or 'BAM' are considered to be best practise for the assessment of vegetation composition, structure and function (OEH, 2017). Therefore, two 400 m² floristic plot/transect (BAM Plots) was sampled in accordance with Section 5.3.4 of the BAM. Percentage cover and relative abundance was recorded for all plant species within each BAM Plot. The Plot were positioned to sample an area that was most representative of the floristic characteristics of the PCT present. The locations of the floristic plot/ transect is presented in **Figure 3**.



3.2.1.2 Targeted Survey

Targeted searches were undertaken via a random meander to assess the occurrence of threatened flora species recorded previously within the locality (DPIE, 2020a). The survey effort targeted vegetation supporting native species (**Figure 3**).

Floristic identification and nomenclature was based on *The Flora of New South Wales* (Harden, 1993) with subsequent revisions as published on PlantNet (<u>http://plantnet.rbgsyd.nsw.gov.au</u>) (Botanic Gardens Trust, 2020).

3.2.3 Fauna

3.2.1.3 Habitat Assessment

The locations of any important habitat features, such as microbat roosting habitat, hollowbearing trees, terrestrial refugia and nests/burrows were captured with a handheld Trimble device and photographed where appropriate.

Searches for potential habitat for threatened fauna species included but were not limited to:

- Koala feed trees.
- Foraging trees for threatened birds.
- Hollow-bearing trees.
- Potential roosts for microbats.
- Vegetated ponds, riparian vegetation and drainage lines for frogs and waterbirds.
- Woody debris, leaf litter and bush rock.

The location of habitat features was recorded using a hand-held TrimbleTM GPS unit and the type of feature it contained was recorded. For hollow-bearing trees, the number and size of hollows was recorded. Hollow size was classified as either small (< 8 cm diameter), medium (8 - 20 cm diameter) or large (> 20 cm diameter) based on the size of the hollow entrance.

3.2.1.4 Bird surveys

Visual and auditory bird surveys were conducted at throughout the Study Area on 13 May 2020. Species were identified visually with the aid of binoculars, telephoto lens or aurally from call identification.



3.2.1.5 Koala Surveys

To comply with the Port Stephens KPoM, Core Koala habitat was assessed in accordance with the SEPP (Koala Habitat Protection) 2019. The Spot Assessment Technique (SAT) was conducted at two separate locations within the Study Area to assess Koala presence (Figure 3). The SAT test includes the assessment of Koala activity (scats) around the base of any tree that is likely been utilised by the species. In combination, nocturnal surveys were conducted including spotlighting and call playback.

Core Koala habitat was also assessed according to the presence of Koala records within 2.5km of the Study Area (within the previous 18 years) and the identification of Highly Suitable Koala. Native vegetation within the Study Area was sampled (quadrats) for the presence of koala use trees listed for the North Coast Koala Management Area (KMA) in Schedule 2 of the SEPP. Highly Suitable Habitat is determined when the proportion of Koala use trees Exceeds 15%.

3.2.1.6 Nocturnal Surveys

Nocturnal surveys for threatened fauna was conducted on 13 May 2020 comprising spotlighting and call playback. Spotlighting surveys were conducted throughout the Study Area for 1 hour (random meander) using high-powered headtorches to search for all types of nocturnal fauna. Fauna call playback was conducted where the calls of large forest owls (Powerful Owl and Masked Owl) and arboreal mammals (Koala and Squirrel Glider) were broadcasted through a megaphone to attract individuals or to incite a response, allowing for identification. Recorded calls of threatened species were played through a megaphone after dusk at two locations within the Study Area (15 mins at each location) (**Figure 3**).

3.3 SURVEY LIMITATIONS

The survey techniques and survey effort applied for this study were appropriate to the nature and condition of the site. Due to these limitations, priority was given to habitat identification and assessment for relevant threatened biota. Favourable habitat features and characteristics for relevant species were noted and used to further define the likelihood of occurrence of these species on the site.

The subject site is considered to be largely unsuitable for threatened plant species due to the extent of cleared areas and exotic vegetation.



No terrestrial or arboreal fauna trapping was conducted; however, given the limited availability of woody vegetation and ground cover species within the study area, the survey effort was considered adequate to detect the majority of the fauna species likely to be present.



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4. RESULTS

4.1 DESKTOP ASSESSMENT

Database searches returned a list of 44 threatened species (10 plants, 2 amphibians,19 birds and 13 mammals) and 22 migratory species previously recorded (DPIE, 2020a) or predicted to occur (DAWE, 2020) within 10km of the study area (**Appendix 3 and 4**). Due to a lack of suitable habitat within the Subject Site, only six species (one threatened bird, three mammals, and two migratory species) were assessed as having a moderate likelihood of occurrence. Justifications for this assessment are provided below.

4.2 VEGETATION ASSESSMENT

4.2.1 Plant Diversity

A total of 66 plant species were identified within the study area during the field assessment. These were comprised of 44 exotic plant species and 22 native species. The majority of the exotic plant species were comprised of herb and grass species associated with managed areas. The native species were mainly comprised of trees and shrubs associated with less disturbed areas such as in areas of forest adjacent to the site boundaries.

A complete list of all plant species identified within the study area is presented in **Appendix 2**.

4.2.2 **Priority Weeds**

The NSW Department of Primary Industries (DPI, 2020) lists Priority Weed species within the region that are to be prioritised for control due to their potential threat to both agriculture and the natural environment. Review of this list determined that of the 46 exotic plant species identified within the study area, the following species are Priority Weeds:

- Asparagus aethiopicus (Asparagus Fern)
- Lantana camara (Lantana)
- Senecio madagascariensis (Fireweed)



In accordance with the NSW *Biosecurity Act 2015*, the above listed species are to be managed to eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant of these species, who knows or ought to know of any biosecurity risk, has a duty to ensure that infestations are managed so far as is reasonably practicable.

The Priority Weed species previously discussed are also determined to be High Threat Exotic (HTE) species by the NSW Department of Planning Industry and Environment (DPIE, 2020b). These species are therefore recognised as having the potential to cause habitat degradation of native ecosystems. *Asparagus aethiopicus* (Asparagus Fern), *Lantana camara* (Lantana), *Senecio madagascariensis* (Fireweed) are also recognised as a Weed of National Significance (WONS) (DAWE, 2020c). Declared WONS are species identified by the Commonwealth a having the potential to cause major economic, environmental and social impacts in Australia.

No major infestations of weeds were identified within the subject site. As such, control of onsite weeds is not required. Mitigation measures are presented in **Section 5** to prevent the further spread of weeds and to reduce the risk of introducing new weed species to the study area during the construction phase of the project.

4.2.3 Plant Community Types

The field survey confirmed the presence of one native vegetation community within the study area. In accordance with the BioNet Vegetation Classification (DPIE, 2020c) the native vegetation is commensurate with a Plant Community Type (PCT) identified as *PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast.*

Due to management of vegetation within the study area, PCT 1646 exists in a modified state; however, key diagnostic species were present, including the following:

- Canopy Species
 - o Eucalyptus pilularis (Blackbutt)
 - o Angophora costata (Smooth-barked Apple)
 - o Corymbia gummifera (Red Bloodwood)
- Shrubs
 - o *Monotoca scoparia* (Tree Broom-heath)
 - o Banksia serrata (Oldman Banksia)
 - o Acacia ulicifolia (Prickly Moses)



- Groundcover
 - o Dianella caerulea var. producta (Blue-flax Lily)
 - o *Pteridium esculentum* (Bracken).

All other vegetation within the subject site is comprised of Plant Vegetation (Native and Exotic Trees and Shrubs) and managed areas (Lawns and Garden Beds) (**Appendix 1**). The extent of each vegetation type within the study area is shown in **Figure 4**.

4.3 THREATENED ECOLOGICAL COMMUNITIES

No Threatened Ecological Communities (TECs) were identified within the study area.

4.4 THREATENED FLORA SPECIES

No threatened species were detected during the assessment. The study area contains a low diversity of native species due to ongoing management practises such as tree pruning, mowing and slashing of vegetation. All vegetated areas contain a high prevalence of exotic flora such as introduced perennial grasses, which has also reduced native diversity through competition.

Ten threatened plant species have previously been recorded within a 10km radius of the subject site; however, the habitat is considered to be either unsuitable or too degraded to support a viable population of any of these species. Justifications are provided for this assessment in **Appendix 3**.

4.5 FAUNA HABITAT ASSESSMENT

The woody vegetation within the study area was assessed as having low to moderate value for the majority of the threatened fauna species previous recorded within the locality. The vegetation contains mature trees, which may provide a foraging resource for some threatened fauna species (nectar/pollen); however, no key habitat features such as hollow-bearing trees or refugia habitats (fallen timber or dense leaf litter) were detected. Additionally, the vegetation has been modified and lacks a complex structure typical of undisturbed bushland habitat. One small stick nest was observed in mature Blackbutt (*E. pilularis*).



The following fauna species are considered to have a moderate likelihood of occurrence based on the availability of foraging habitat:

- The Glossy Black Cockatoo
- The Koala
- The Squirrel Glider
- The Grey-headed Flying Fox.

The above listed species are likely to utilise the habitats within the study area as part of larger network of habitats within the locality. The habitat is not considered to be important to the long-term survival of these species.

4.6 BIRD SURVEYS

Bird surveys detected a total of 10 species, consisting of mainly parrots, cockatoos and lorikeets (Psittaciformes). Most species were observed feeding on Eucalypt blossoms in the upper canopy. One threatened species, White-bellied Sea-Eagle (*Haliaeetus leucogaster*) (Vulnerable, BC Act) was observed to fly over the site, however, it is unlikely the species utilised habitats within the Study Area for foraging or roosting (no large stick nests were observed).

4.7 NOCTURNAL SURVEYS

Nocturnal spotlighting and call playback detected a number of Grey-headed Flying-fox foraging within the upper canopy of flowering Blackbutt (*E. pilularis*). The Grey-headed Flying-fox foraging is listed as Vulnerable (BC Act and EPBC Act). The species is not expected to roost within the study area, with the closest known camp being located 3kms to the south-west (Flying-fox camp: Anna Bay 6) (DAWE, 2020). Additionally, one Common Ringtail Possum (*Pseudocheirus peregrinus*) was observed in the north-eastern section of Study Area. Due to the lack of hollow-bearing trees, it is unlikely that habitats within the Study Area provide nesting habitats for any species of threatened arboreal mammals.



4.8 KOALA SURVEYS

Two SATs were undertaken within the Study Area which included both patches of large mature trees within the north-eastern and south-eastern portions of the site. The vegetation where the north SAT was undertaken is comprised mostly of Blackbutt (*E. pilularis*) with some Red Bloodwood (*Corymbia gummifera*), Smooth-barked Apple (*Angophora costata*), and Christmas Bush (*Ceratopetalum gummiferum*). The vegetation where the southern SAT was undertaken is comprised mostly of Swamp Oak (*Casuarina glauca*), with some Christmas Bush (*Ceratopetalum gummiferum*), Red Bloodwood (*Corymbia gummifera*), Tuckeroo (*Cupaniopsis anacardioides*) and introduced trees Silky Oak (*Grevillea* robusta) and Norfolk Island Pine (*Araucaria heterophylla*). No Koala scats were detected during the SAT surveys; furthermore, no Koalas were detected during spotlighting or through call playback surveys.

Development applications in the Port Stephens LGA are required to comply with provisions of Appendix 4 of the Port Stephens KPoM (2002) and, as such, are to comply with the SEPP No. 44 (now Koala Protection SEPP 2019). It is noted that the Study Area is mapped as 'Mainly Cleared' under the Koala Habitat Planning Map for the Port Stephens LGA (Port Stephens KPoM 2002). Nonetheless, in accordance with the KPoM, the application of the SEPP 2019 has been reviewed.

The majority of the vegetated areas are mapped on the Koala Development Application map and the development is considered to be a Tier 2 Development which requires a Koala Assessment Report, which is presented in **Appendix 5, which determined the following key points:**

- Limited connectivity to areas of koala habitat outside the Study Area.
- Limited access for koalas into the Study Area due to existing public-school fencing.
- No koala faecal pellets and no koalas detected within the Study Area during targeted surveys.
- The development is unlikely to further directly or indirectly impact koala habitat and habitat function within the Study Area.



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4.9 THREATENED SPECIES (BC ACT)

One threatened fauna species was detected within the subject site, Grey-headed Flying-fox (Vulnerable). A White-bellied Sea-Eagle (Vulnerable) was observed to fly over the Study Area but did not perch.

A search of the BioNet Atlas of NSW Wildlife on the 01/05/2020 (DPIE, 2020a) returned a list of 44 threatened species that have previously been recorded within 10km of the subject site: A "likelihood of occurrence" assessment determined that the habitat is unlikely to support populations of any of these species (**Appendix 3**). The presence of a number of *Casuarina glauca* (Swamp Oak) may provide occasional foraging habitat for the Glossy Black-Cockatoo. Additionally, mature trees may provide foraging habitat for the Squirrel Glider and Grey-headed Flying-fox. Note, no hollow-bearing trees were identified. Despite fencing around the site preventing Koalas from accessing trees within the Study Area, mature trees may otherwise provide habitat for Koalas. Assessments of significance (in accordance with the BC Act) have been conducted for these species (**Appendix 6**)

4.10 EPBC ACT PROTECTED MATTERS

4.10.1 Relevant Matters

An EPBC Protected Matters Search (searched 27/05/2020) returned a list of MNES predicted to occur within a 10km radius of the study area (**Appendix 4**). This list included five (5) threatened ecological communities, forty (40) threatened species and thirty-one (31) migratory species. Note, pelagic and marine species have been excluded due to unsuitable habitats. A discussion of each of these groups in regard to the availability of habitat within the study area is presented below.

4.10.2 Threatened Species

The subject site contains little key habitat features for threatened species. No hollow-bearing trees or native vegetation with a complex structure occurs within the subject site; however, flowering Eucalypts may provide foraging habitat for some threatened species on occasion (e.g. Grey-headed Flying-fox). Despite fencing around the site preventing Koalas from accessing trees within the Study Area, mature trees may otherwise provide habitat for Koalas.



Potential impacts on the Koala have been assessed according to the EPBC Act referral guidelines for the Vulnerable Koala (**Appendix 6**).

4.10.3 Threatened Ecological Communities

No Threatened Ecological Communities (TEC) were identified within the study area. Given that the proposed development will not directly impact any EPBC Listed TECS, the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DEWHA, 2013) have not been applied.

4.10.4 Migratory Species

The Fork-tailed Swift (*Apus pacificus*) and the White-throated Needletail (*Hirundapus caudacutus*) were considered to have a moderate likelihood of occurrence. These bird species may forage aerially over a very wide range of habitats. The proposed development will remove some mature trees which is unlikely to impact on the foraging range of these species. Potential impacts have been assessed according to the Industry guidelines for 14 birds listed as migratory species under the EPBC (**Appendix 6**).



5. DISCUSSION

5.1 IMPACT ASSESSMENT

5.1.1 Removal of Trees and Native Vegetation

The subject site is comprised of mostly of cleared land with a number of mature trees (see **Figure 2 and 4**). The proposal development will require removal a small number of trees (approximately 15) consisting of mostly Blackbutt (*E. pilularis*), Swamp Oak (*C. glauca*), Christmas Bush (*C. gummiferum*) and Red Bloodwood (*C. gummifera*). None of these trees contain hollows suitable for fauna.

5.1.2 Impacts to Threatened Biota

The proposed development will have minor impacts on potential foraging habitat for a number of species, however, no key habitat features are to be removed (such as hollows). Additional areas containing Blackbutt (*E. pilularis*) and Red Bloodwood (*C. gummifera*) are to be retained onsite along the southern boundary and within the north-eastern corner. Due the requirement to have Public Schools fenced, there is little opportunity for Koalas to enter the site and utilise habitats. As such, loss of trees within the Subject Site is unlikely to impact the local koala population within Nelson Bay and Port Stephens, more broadly. therefore, the proposed development is unlikely to have a significant impact on any threatened biota.

The proposed action is unlikely to result in any habitat fragmentation or loss of connectivity at the local level which may hinder arboreal mammals from moving across the Study Area given poor connectivity with the residential areas and existing barriers to movement (impenetrable fences). However, the retention of trees on site will maintain connective for more mobile fauna species (birds, arboreal mammals; such as gliders, possums, and flying-foxes).

5.1.3 Impacts to Resident Fauna

No important habitat features for fauna species will be removed (i.e. hollow-bearing trees) by the proposed development. Clearing of vegetation is likely to result in loss of some foraging habitat for local fauna. The following potential indirect impacts of the proposed development to resident fauna have been identified:


- Noise and lighting during the construction phase may cause minor disturbance to resident fauna within the locality and disrupt their natural behaviour.
- Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of sediment. Sedimentation could adversely affect adjacent habitats such as native vegetation and downstream aquatic habitat.

Protection measures are presented in **Section 5.2** to reduce the potential for these impacts.

5.1.4 Cumulative Impacts

Cumulative impacts arise from the interaction of individual elements associated with the proposed development and the additive effects of other external projects. No other known projects within the locality are known to have relevance to this project that could exacerbate cumulative impacts.

5.2 IMPACT AMELIORATION

5.2.1 Avoidance Measures

Impacts on biodiversity values have been addressed through an iterative design process to avoid areas of higher biodiversity value within the subject site. The design of the development will ensure that the majority of the vegetation within the study area will be retained following the development. Trees to be removed do not contain hollows and are therefore unlikely to provide breeding habitat for fauna species such as arboreal mammals and birds.

5.2.2 Mitigation Measures

3.2.1.7 Weed Control

Priority weed species were identified within the study area. Measures to prevent the spread of these weeds should include the following weed hygiene procedures:

- All vehicles, equipment, footwear and clothing should be clean and free of weed propagules prior to entering the subject site.
- Any weeds that are removed during the proposed works should be disposed of appropriately.



3.2.1.8 Erosion Control

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

- Regular inspection of erosion and sediment control measures (if necessary), particularly following rainfall events to ensure their ongoing functionality.
- The immediate removal offsite of any excavated materials.
- Avoiding stockpiling of materials adjacent to native vegetation (unlikely to be required), but instead use areas that are already cleared/ disturbed.
- Undertake maintenance of silt fences and other mitigation measures to isolate runoff.

3.2.1.9 Chemical Spill Control

Specific measures to minimise the potential for chemical spills and associated impacts on adjacent natural environments should include the following:

- All chemicals must be kept in clearly marked bunded areas.
- Regularly inspect vehicles and mechanical plant for leakage of fuel or oil.
- No re-fuelling of vehicles, washing of vehicles or maintenance of vehicles and plant to be undertaken within 10 meters of native forest vegetation.

3.2.1.10 Noise and lighting Control

During the construction phase an increase of traffic to the site and the use of power tools and earth moving equipment may result in a temporary increase in noise. Due to the minor removal of native vegetation within the subject site it is unlikely that an increase in noise and lighting will have a significant impact on resident fauna.

3.2.1.11 Fauna Movement and Dispersal

The existing fencing currently provides barrier for the terrestrial movement of larger fauna species in the locality. The proposed development is unlikely to exacerbate fauna movement and dispersal.



5.2.3 Offset Provisions

As described previously in **Section 2.2.2**, entry into the Biodiversity Offsets Scheme (BOS) is not required for the proposed development. As such, a Biodiversity Development Assessment Report (BDAR) is not required to support the DA.

5.3 CONCLUSION

Impacts of the proposed development will be limited to areas of the subject site that have predominantly been cleared of native vegetation, however a number of mature trees are proposed to be removed (approximately fifteen). None of these trees contain hollows. Trees are likely to provide occasional foraging habitat for mobile species within the locality, such as flying foxes and birds. Existing fencing around the Public School is likely to prevent passage of Koalas into the site. No Koalas, or evidence thereof, were detected within the Study Area. As such, these native vegetation does not represent important habitat for any threatened species or ecological communities. In accordance with the BC Regulation, entry into the NSW BOS is not triggered by the proposed development due to the following:

- The BOS clearing threshold for the site will not be exceeded.
- The proposed development is unlikely to cause a significant impact to any threatened species, populations or ecological communities listed under the BC Act.

One EPBC listed species was identified foraging within the Subject Site (Grey-headed Flyingfox), however, the species is highly mobile and forages up to several kilometres from their roosts (camps). No other EPBC listed species, ecological communities, migratory species or important habitat for such biota was identified within the subject site. The assessment determined that impacts to MNES are therefore unlikely. An EPBC referral to the Commonwealth Minister for the Environment is not recommended.

Avoidance and mitigation measures have been presented to reduce potential impacts to biodiversity values within the subject site and the environment.



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APPENDIX 1: SITE PHOTOGRAPHS



Plate 1 PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland (managed understorey)– eastern corner the study area



Plate 2 PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland (Managed Understorey)– central area within the study area





Plate 3 PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland (Managed Understorey)- north-western corner of the study area



Plate 4 PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland (Managed Understorey)– western corner of the study area





Plate 5 Planted Vegetation (Native and Exotic Trees and Shrubs) southern boundary of the study area



Plate 6 Planted Vegetation (Native and Exotic Trees and Shrubs) south-eastern corner of the study area



APPENDIX 2: FLORA & FAUNA SPECIES LIST

		BAM	Plot 1	BAM Plot 2		
Growth Form	Species	Cov.	Abun.	Cov.	Abun.	
Exotic	Ambrosia tenuifolia (Lacy Ragweed)					
Exotic	Araucaria heterophylla (Norfolk Island Pine)					
Exotic	Bidens pilosa (Cobbler's Pegs)					
Exotic	Carpobrotus sp. (Ornamental)					
Exotic	Cenchrus clandestinus (Kikuyu)			10	5000	
Exotic	Chloris gayana (Rhodes Grass)	10	1000			
Exotic	Cinnamomum camphora (Camphor Laurel)					
Exotic	Conyza bonariensis (Flax-leaf Fleabane)					
Exotic	Cynodon incompletus			2	500	
Exotic	Cyperus aggregatus	1	50			
Exotic	<i>Cyperus eragrostis</i> (Umbrella Sedge)					
Exotic	Delairea odorata (Cape Ivy)					
Exotic	Ehrharta erecta (Panic Veldtgrass)			40	1000	
Exotic	Eleusine indica (Goosefoot Grass)					
Exotic	Eragrostis curvula (African Lovegrass)	5	1000			
Exotic	Fraxinus angustifolius (Ash)					
Exotic	Gamochaeta Americana (Cudweed)					
Exotic	Gomphrena celosioides (Gomphrena Weed)					
Exotic	Grevillea robusta (Silky Oak)					
Exotic	Hedychium gardnerianum (Ginger Lily)					
Exotic	Hydrocotyle bonariensis (Pennywort)					
Exotic	Hypochaeris radicata (Cat's Ear)	1	1000			
Exotic	Jacaranda mimosifolia (Jacaranda)					
Exotic	<i>Liquidambar styraciflua</i> (Liquidambar)					
Exotic	Megathyrsus maximum (Guinea Grass)	1	1000			
Exotic	Modiola caroliniana (Red Mallow)					
Exotic	Monstera deliciosa (Fruit Salad Plant)					
Exotic	Nephrolepis cordifolia (Fishweed)					
Exotic	Phytolacca octandra (Inkweed)					
Exotic	Plantago lanceolata (Lamb's Tongues)					
Exotic	Richardia humistrata					

Table 1: Flora species recorded during the assessment



		BAM	Plot 1	BAM Plot 2		
Growth Form	Species	Cov.	Abun.	Cov.	Abun.	
Exotic	Ruchia sp. (Exotic)	0.2	5			
Exotic	Schefflera actinophylla (Umbrella Tree)					
Exotic	Senna pendula (Senna)	0.2	2			
Exotic	Setaria parviflora (Pigeon Grass)					
Exotic	Sida rhombifolia (Paddy's Lucerne)	20	500			
Exotic	Solanum nigrum (Blackberry Nightshade)			1	5	
Exotic	Sonchus aspera (Prickly Sowthistle)	0.5	10			
Exotic	Sonchus oleraceus (Common Sowthistle)					
Exotic	Stellaria media (Chickweed)					
Exotic	Stenotaphrum secundatum (Buffalo Grass)			1	50	
Exotic	Tecoma capensis (Cape Honeysuckle)					
Exotic	Tradescantia fluminensis (Wandering Jew)					
Exotic (High Priority Weed)	Asparagus aethiopicus (Asparagus Fern)	1	20			
Exotic (High Priority Weed)	Lantana camara (Lantana)					
Exotic (High Priority Weed)	Senecio madagascariensis (Fireweed)					
Fern	Pteridium esculentum (Bracken)	1	20			
Forb	Commelina cyanea			1	20	
Forb	Dianella caerulea var. producta (Blue-flax Lily)	0.2	5			
Forb	Dichondra repens (Kidney Weed)	1	500	1	100	
Forb	Portulaca oleracea (Pigweed)					
Shrub	Acacia ulicifolia (Prickly Moses)					
Shrub	Elaeocarpus reticulatus (Blueberry Ash)					
Shrub	Leptospermum laevigatum (Coastal Teatree)					
Shrub	Monotoca elliptica (Tree Broom Heath)					
Shrub	Pittosporum undulatum (Sweet Pittosporum)					
Tree (Canopy)	Angophora costata (Smooth-barked Apple)					
Tree (Canopy)	Casuarina glauca (Swamp Oak)	20	6			
Tree (Canopy)	Corymbia gummifera (Red Bloodwood)	10	1			
Tree (Canopy)	Corymbia maculata (Spotted Gum)					
Tree (Canopy)	Eucalyptus pilularis (Blackbutt)			30	3	
Tree (Midstorey)	Banksia serrata (Oldman Banksia)					
Tree (Midstorey)	Ceratopetalum gummiferum (Christmas Bush)	5	5	60	15	
Tree (Midstorey)	Cupaniopsis anacardioides (Tuckeroo)					
Tree (Midstorey)	Glochidion ferdinandi (Cheese Tree)					



Notes:

- Abbreviations: Cover (Cov.), Abundance (Abun.), Random Meander (RM)
- Priority Weeds: Exotic Plant Species listed within the Berrigan LGA that are prioritised for management (DPI).
- High Threat exotics (HTE) are classified in accordance with the DPIE HTE List.
- Growth forms were classified in accordance with the DPIE growth forms data.

Table 2: Fauna species recorded during the assessment.

Order	Scientific Name	Common Name	Status
Birds			
Corvidae	Corvus coronoides	Australian Raven	Р
Meliphagidae	Entomyzon cyanotis	Blue-face Honeyeater	Р
Coraciiformes	Dacelo novaeguineae	Laughing Kookaburra	Р
Cacatuidae	Cacatua sanguinea	Little Corella	Р
Charadriiformes	Vanellus miles	Masked Lapwing	Р
Psittaciformes	Glossopsitta concinna	Musk Lorikeet	Р
Passeriformes	Manorina melanocephala	Noisy Miner	Р
Psittacidae	Trichoglossus haematodus	Rainbow Lorikeet	Р
Cacatuidae	Cacatua galerita	Sulphur-crested Cockatoo	Р
Falconiformes	Haliaeetus leucogaster	White-bellied Sea-eagle	V
Mammals	·		
Pseudocheiridae	Pseudocheirus peregrinus	Common Ringtail Possum	Р
Chiroptera	Pteropus poliocephalus	Grey-headed Flying-Fox	V
Phalangeridae	Trichosurus vulpecula	Common Brushtail Possum (scats)	Р

Notes: V = vulnerable under the BC Act; P = protected in NSW; EP = Endangered population under Division 4 of Schedule 1 of the BC Act; Exotic = introduced species.



APPENDIX 3:

THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE'



		Legal Status*		Number			l ikelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
	Flora						
1.	<i>Cryptostylis hunteriana</i> Leafless Tongue Orchid	V	v	12	BioNet Atlas	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. Occurs in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black Sheoak (<i>Allocasuarina littoralis</i>).	Low
						The groundcover within the majority of the study area has been managed for serval years (slashing and mowing). Unmanaged areas have low vegetation integrity. The habitat is therefore considered to be too degraded for this species.	
	<i>Diuris arenaria</i> Sand Doubletail		E -	4,649	BioNet Atlas	This species occurs in coastal heath and dry grassy eucalypt forest on sandy flats. Grows in gently undulating country in eucalypt forest with a grassy understorey on clay soil.	Low
2.		E				The groundcover within the majority of the study area has been managed for serval years (slashing and mowing). Unmanaged areas have low vegetation integrity. The habitat is therefore considered to be too degraded for this species.	
2	<i>Diuris praecox</i> Rough Doubletail	v v		2	BioNet Atlas	Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year. It produces leaves and flowering stems in winter.	Low
3.			V	3		The groundcover within the majority of the study area has been managed for serval years (slashing and mowing). Unmanaged areas have low vegetation integrity. The habitat is therefore considered to be too degraded for this species.	



		Legal Status*		Number	er		Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
4.	<i>Eucalyptus parramattensis subsp. decadens</i> Earp's Gum	V	V	3	BioNet Atlas	Occurs in low-lying, often swampy areas and in woodlands with associates such as <i>Eucalyptus racemosa, E. globoidea</i> and <i>Angophora bakeri.</i> In the regional vegetation classification of the National Parks and Wildlife Service Earp's Gum occurs in two vegetation communities: Tamago Sand Swamp and the Kurri Sands Swamp (Bell 2006) communities, both of which occur on poor sandy soils from either Pleistocene sands or Permian sediments. A readily identifiable species that was not detected during the assessment.	Nil
5.	<i>Syzygium paniculatum</i> Magenta Lilly Pilly	E	V	2	BioNet Atlas	On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. A readily identifiable species that was not detected during the assessment. No suitable habitat in study area.	Nil
6.	<i>Melaleuca groveana</i> Grove's Paperbark	V	-	14	BioNet Atlas	Grove's Paperbark grows in heath and shrubland, often in exposed sites, in low coastal hills, escarpment ranges and tablelands on outcropping granite, rhyolite and sandstone on rocky outcrops and cliffs. It also occurs in dry shrubby open forest and woodlands. A readily identifiable species that was not detected during the assessment. No suitable habitat in study area and low numbers of known records.	Nil
7.	<i>Callistemon linearifolius</i> Netted Bottlebrush	V	-	8	BioNet Atlas	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Grows in dry sclerophyll forest on the coast and adjacent ranges. A readily identifiable species that was not detected during the assessment. No suitable habitat in study area. Low number of known records.	Nil



		Legal Status*		Number	er		l ikelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	of Source [#] cords 0 km)	Habitat Preferences	of occurrence
8.	<i>Prostanthera densa</i> Villous Mint-bush	V	V	88	BioNet Atlas	This species has been recorded from the Currarong area in Jervis Bay, Royal National Park (Marley), Cronulla, Helensburgh and Port Stephens (Nelson Bay). <i>Prostanthera densa</i> generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea. A readily identifiable species that was not detected during the assessment.	Low
9.	Chamaesyce psammogeton Sand Spurge	E	-	3	BioNet Atlas	Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (Spinifex sericeus) and Prickly Couch (Zoysia macrantha). No suitable habitat present in study area. Low number of known records.	Low
10.	<i>Senecio spathulatus</i> Coast Groundsel	E	-	1	BioNet Atlas	Coast Groundsel occurs in Nadgee Nature Reserve (Cape Howe) and between Kurnell in Sydney and Myall Lakes National Park. Coast Groundsel grows on frontal dunes. No suitable habitat present in study area. Low number of known records.	Low
	Amphibians						
1.	<i>Crinia tinnula</i> Wallum Froglet	V	-	58	BioNet Atlas	Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests. No suitable habitat within the study area.	Nil



		Legal Status*		Number			Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
2.	<i>Uperoleia mahonyi</i> Mahony's Toadlet	E	-	1	BioNet Atlas	Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, Mahony's Toadlet also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. Known records are associated with shallow ephemeral/semi-permanent water bodies with limited flow of water. Aquatic vegetation at breeding sites includes sedges (<i>Schoenoplectus</i> spp., <i>Baumea</i> spp. and <i>Lepironia</i> <i>articulata</i>) and Broadleaf Cumbungi (Typha orientalis). No suitable habitat within study area. Only one known record from locality.	Nil
	Birds						
1.	<i>Artamus cyanopterus</i> Dusky Woodswallow	V	-	2	BioNet Atlas	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. Most breeding activity occurs on the western slopes of the Great Dividing Range. Marginal suitable habitat within study area. Low number of known records.	Nil
2.	<i>Botaurus poiciloptilus</i> Australasian Bittern	E	E	1	BioNet Atlas	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spike rushes (<i>Eleocharis</i> spp.). No Suitable habitat within the study area. Only one record.	Nil



		Legal Status*		Number			Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
3.	<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	V	-	3	BioNet Atlas	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts. Marginal suitable foraging habitat within study area. No suitable breeding habitat due to lack of hollows.	Low
4.	Calyptorhynchus lathami Glossy Black-Cockatoo	~	-	4	BioNet Atlas	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species). Dependent on large hollow-bearing eucalypts for nest sites. Potential foraging habitat present within the study area. No suitable breeding habitat due to lack of hollows. Low number of known records. Closest record to study area occurred in 2014.	Moderate
5.	<i>Esacus magnirostris</i> Beach Stone-curlew	E	-	1	BioNet Atlas	Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves. No Suitable habitat within the study area. Only one record.	Nil
6.	Daphoenositta chrysoptera Varied Sittella	V	-	3	BioNet Atlas	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and <i>Acacia</i> woodland. Marginal suitable habitat present within the study area. Low number records occur within the locality.	Low



		Legal Status*		Number	Number		Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
7.	Dromaius novaehollandiae	E	-	2	BioNet Atlas	On the NSW north coast, Emus occur in a range of predominantly open lowland habitats, including grasslands, heathland, shrubland, open and shrubby woodlands, forest, and swamp and sedgeland communities, as well as the ecotones between these habitats. They also occur in plantations of tea-tree and open farmland, and occasionally in littoral rainforest. No Suitable habitat within the study area. Only 2 known records, one of which is unlikely to be valid	Nil
8.	<i>Ephippiorhynchus asiaticus</i> Black-necked Stork	E	-	1	BioNet Atlas	Inhabits wetlands, such as floodplains of rivers with large shallow swamps and pools, and deeper permanent bodies of water. Occasionally individuals will stray into open grass, woodland areas or flooded paddocks in search of food. No suitable habitat present within the study area. Only one known record.	Nil
9.	<i>Glossopsitta pusilla</i> Little Lorikeet	V	-	5	BioNet Atlas	Forages primarily in the canopy of open <i>Eucalyptus</i> forest and woodland, yet also finds food in <i>Angophora</i> , <i>Melaleuca</i> and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Marginal suitable foraging habitat present within study area. Low number of known records.	Moderate
10.	Haematopus fuliginosus Sooty Oystercatcher	v	-	13	BioNet Atlas	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. No suitable habitat within the study area.	Nil
11.	Haematopus Iongirostris Pied Oystercatcher	E	-	13	BioNet Atlas	Favours intertidal flats of inlets and bays, open beaches and sandbanks. No suitable habitat the study area.	Nil



		Legal Status*		Number	per		Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
12.	<i>Haliaeetus leucogaster</i> White-bellied Sea- Eagle	V	-	115	BioNet Atlas	This species hunts for fish, turtles and sea snakes however will feed on carrion along the waterline. The White-bellied Sea-Eagle most often nests in trees 30 m above the ground. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Marginal roosting habitat present within the study area. Was observed flying over the study area. Two closest database records were from 1980s – 90s.	Present
13.	<i>Lathamus discolor</i> Swift Parrot	E	CE	2	BioNet Atlas	This migratory species has been recorded on the mainland from a variety of habitat types including dry and wet sclerophyll forest, forested wetlands, coastal swamp forests and heathlands. Known to use <i>E. pilularis</i> . This species breeds in Tasmania. Marginal foraging habitat present within study area. Database records are from 2002 and are not in the immediate vicinity of the study area.	Low
14.	<i>Ninox strenua</i> Powerful Owl	V	-	9	BioNet Atlas	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 <i>Syncarpia glomulifera</i> (Turpentine), <i>Allocasuarina</i> <i>littoralis</i> (Black She-oak), <i>Acacia melanoxylon</i> (Blackwood), <i>Angophora</i> <i>floribunda</i> (Rough-barked Apple), <i>Exocarpos cupressiformis</i> (Cherry Ballart) and a number of eucalypt species. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. Marginal suitable foraging habitat present within the study area. No suitable roosting habitat within study area due to lack of hollows.	Low



		Legal Status*		Number	er		
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
15.	<i>Pandion cristatus</i> Eastern Osprey	V	-	8	BioNet Atlas	 Favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. No suitable habitat present within the study area. Closest database record for this species occurred in 1991 within the locality. 	Low
16.	<i>Pterodroma leucoptera leucoptera</i> Gould's Petrel	v	E	2	BioNet Atlas	Breeds on both Cabbage Tree Island, 1.4 km offshore from Port Stephens and on nearby Boondelbah island. No suitable habitat on site.	Nil
17.	<i>Ptilinopus magnificus</i> Wompoo Fruit Dove	V	-	1	BioNet Atlas	Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests. Most often seen in mature forests, but also found in remnant and regenerating rainforest. Forages within the canopy layer. No suitable habitat present within the study area.	Nil
18.	<i>Ptilinopus superbus</i> Superb Fruit Dove	V	-	1	BioNet Atlas	The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya. Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. No suitable habitat present within the study area.	Nil
19.	<i>Tyto novaehollandiae</i> Masked Owl	V	-	3	BioNet Atlas	Lives in dry eucalypt forest and woodlands from sea level to 1100m. Optimal habitat includes an open understory and a mosaic of sparse (grassy) and dense (shrubby) ground cover on gentle terrain. Masked Owls nest in large hollow eucalypts (diameter at breast height at minimum 90 cm), with hollows greater than 40cm wide and 100cm deep and at least 3m above the ground. Marginal suitable foraging habitat present within the study area. No suitable breeding habitat due to lack of hollows. Closest known record 1996.	Low



		Legal	Status*	Number			Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
	Mammals						
1.	<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	V	V	1	BioNet Atlas	Found in well-timbered areas containing gullies. Prefers dry forest close to sandstone ridgelines. Roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. No suitable habitat present within study area.	Nil
2.	<i>Dasyurus maculatus</i> Spotted-tailed Quoll	V	E	4	BioNet Atlas	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub- alpine zone to the coastline. Potential foraging habitat. No suitable denning habitat present within the study area due to lack of hollows, logs and rocky outcrops.	Low
3.	<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	v	-	3	BioNet Atlas	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows but has also been found under loose bark on trees or in buildings. Marginal foraging habitat. No Suitable roosting habitat present within the study area.	Low
4.	<i>Miniopterus australis</i> Little Bentwing-bat	V	-	13	BioNet Atlas	Occupies moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, <i>Melaleuca</i> swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings. Marginal Suitable foraging habitat present within the study area with limited roosting habitat. Closest records to study area are of 1998 and 2000.	Low



		Legal	Status*	Number				l ikelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#] Habitat Preferences	Source [#] Habitat Preferences		
5.	<i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat	V	-	3	BioNet Atlas	Forages in forested habitats. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man- made structures. Marginal foraging habitat and limited roosting habitat present within the study area. Closest record to study area is 2003.	Low	
6.	<i>Micronomus norfolkensis</i> Eastern Freetail-bat	V	-	3	BioNet Atlas Tall open forest, <i>Melaleuca</i> , dry sclerophyll forest, River Red Gum and Yellow Box woodlands and riparian open forest. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Marginal suitable foraging habitat present within the study area. Marginal roosting habitat due to lack of hollows		Low	
7.	<i>Myotis macropus</i> Southern Myotis	V	-	2	BioNet Atlas	This species generally roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. No foraging habitat present within the study area. No Suitable roosting habitat present within the study area.	Low	
8.	<i>Petaurus norfolcensis</i> Squirrel Glider	V	-	30	BioNet Atlas	Inhabits mature or old growth Box, Box-Ironbark woodlands and <i>Eucalyptus tereticornis</i> (River Red Gum) forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Suitable foraging habitat present within the study area. No breeding habitat due to lack of hollows.	Moderate	
9.	Phascogale tapoatafa Brush-tailed Phascogale	V	-	7	BioNet Atlas	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Potential foraging habitat present within the study area. No breeding habitat due to lack of hollows.	Low	



		Legal	Status*	Number			Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
10.	Phascolarctos cinereus Koala	V	V	3, 841	BioNet Atlas	Found in a variety of forest types with suitable feed tree species. One species of Koala feed tree are present onsite (i.e. <i>Eucalyptus pilularis</i> [Blackbutt]). A large number of database records occur within the locality, including a number of records within the immediate vicinity of the study area.	Moderate
11.	<i>Pseudomys novaehollandiae</i> New Holland Mouse	-	V	6	BioNet Atlas	Inhabits open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. Suitable habitat present within the study area. Low number of known records within the locality. Closest record to study area was 1993.	Low
12.	<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	V	V	19	BioNet Atlas	Occurs across a wide range of habitat types along the eastern seaboard of Australia, depending on food availability. Fruit from myrtaceous trees and rainforest trees form the major components of their diet. Suitable foraging habitat present within the study area. Recorded foraging within the study area; however, the site is not a camp for this species.	Present
13.	<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	V	-	8	BioNet Atlas	This species occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. Roosts in tree hollows and occasionally buildings. Suitable foraging habitat present within the study area. No suitable roosting habitat.	Low
	Migratory Species						



		Legal	Status*	Number			l ikelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
1.	<i>Apus pacificus</i> Fork-tailed Swift	-	М	1	1Almost exclusively aerial. Mostly occur over inland plains but sometim above foothills or in coastal areas. Occurs over cliffs and beaches a over islands and sometimes well out to sea. Also occurs over sett areas, including towns, urban areas and cities. Mostly occur over dry open habitats, including riparian woodland and tea-tree swamps, scrub, heathland or saltmarsh. Also found at treeless grassland a sandplains covered with spinifex, open farmland and inland and coastand-dunes. Sometimes occur above rainforests, wet sclerophyll for or open forest or plantations of pines.May fly over study area however, no known records within locality.		Moderate
2.	<i>Ardea ibis</i> Cattle Egret	-	М	4	4 BioNet Atlas Atlas No suitable habitat within study area. Low number of know records.		Nil
3.	<i>Ardenna carneipes</i> Flesh-footed Shearwater	V	М	1	BioNet Atlas	The Flesh-footed Shearwater mainly occurs in the subtropics over continental shelves and slopes and occasionally inshore waters. The Flesh-footed Shearwater is a locally common visitor to waters of the continental shelf and continental slope off southern Australia (south-talas BioNet continental shelf and continental slope off southern Australia (south-western Western Australia to south-eastern Queensland) and around Lord Howe Island. No suitable habitat within the study area and no known records within the locality.	



		Legal	Status*	Number	r		Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
4.	<i>Ardenna grisea</i> Sooty Shearwater	Ρ	М	2	2BioNet AtlasThe Sooty Shearwater forages in pelagic (open ocean) s Antarctic and Antarctic waters. The species migrates a North Pacific and Atlantic Oceans during the non-breedi Shearwaters may forage inshore occasionally, especi- weather.2No suitable habitat within the study area.		Nil
5.	<i>Ardenna pacificus</i> Wedge-tailed Shearwater	Р	м	5	5BioNet AtlasThe Wedge-tailed Shearwater is a pelagic, marine bird known from tropical and subtropical waters. No suitable habitat within the study area.		Nil
6.	<i>Ardenna tenuirostris</i> Short-tailed Shearwater	-	М	20	20 BioNet Atlas The Short-tailed Shearwater forages in coastal waters. This species islands in Bass Strait and Tasmania and migrates to the Norther Hemisphere for the boreal summer. No suitable habitat within the study area. Recent records are from stranded individuals within the locality.		Nil
7.	<i>Calidris alba</i> Sanderling	V	М	1	BioNetIn Australia, the species is almost always found on the coast, mostly or open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave wash zone and amongst rotting seaweed. They roost on or behind coastal dunes, clumps of kelp, rocky reefs and ledges. No suitable habitat present within study area.		Nil
8.	<i>Calidris ruficollis</i> Red-necked Stint	-	М	1	BioNet Atlas	In Australasia, the Red-necked Stint is mostly found in coastal areas. The Red-necked Stint mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water. The Red-necked Stint roosts on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle, sometimes in saltmarsh or other vegetation. No suitable habitat present within study area.	Nil



		Legal	Status*	Number			l ikelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
9.	<i>Charadrius leschenaultii</i> Greater Sand-plover	V	М	1	Almost entirely restricted to coastal areas in NSW, occurring mainly or sheltered sandy, shelly or muddy beaches or estuaries with large BioNet intertidal mudflats or sandbanks. Roosts during high tide on sandy Atlas beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. No suitable habitat present within study area		Nil
10.	<i>Egretta sacra</i> Eastern Reef Egret	-	с	1	BioNet Atlas, Atlas of Living Australia	Forages on ocean-based fish, crustaceans and molluscs. Roosts alone or communally in trees, or on rocks, jetties or similar objects near water. Breeds either in a colony (typical in northern Australia) or alone (in southern Australia). No suitable habitat present within study area.	Nil
11.	<i>Gelochelidon nilotica</i> Gull-billed Tern	-	М	1	BioNet Atlas, Atlas of Living Australia	Gull-billed Terns primarily breed in dunes, on sandy barrier islands, or in coastal marshes. Gull-billed Terns may be observed flying above beaches and near-shore waters while catching prey. No suitable habitat present within study area.	Nil
12.	<i>Hirundapus caudacutus</i> White-throated Needletail	-	М	3	BioNet Atlas	In Australia, White-throated Needletails almost always forage aerially, at heights up to 'cloud level'. The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. The species breeds in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests. Species may forage aerially above the study area. Potential for suitable roosting habitat present within the study area. No breeding habitat present within the study area. Low number of known records are not located within the immediate vicinity to the study area.	Moderate
13.	<i>Hydroprogne caspia</i> Caspian Tern	-	м	2	BioNet Atlas	The Caspian Tern usually forages in open wetlands, including lakes and rivers. Breeds on variable types of sites including low islands, cays, spits, banks, ridges, beaches of sand or shell, terrestrial wetlands and stony or rocky islets or banks. No suitable habitat within the study area.	Nil



		Legal	Status*	Number	ner land land land land land land land land		l ikelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
14.	<i>Limosa lapponica</i> Bar-tailed Godwit	-	М	7	BioNet Atlas Inhabits and feeds in coastal habitats such as large intertidal sandflats banks, mudflats, estuaries, inlets, harbours, coastal lagoons and ba Roosts on sandy beaches, sandbars, spits and also in near-coast saltmarsh. No suitable habitat present within the study area and I number of known records within the locality.		Nil
15.	<i>Limosa limosa</i> Black-tailed Godwit	v	М	1	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars. No suitable habitat present within the study area.		Nil
16.	<i>Macronectes halli</i> Northern Giant Petrel	V	V	1	BioNet Atlas	BioNet Atlas Breeding in Australian territory is limited to Macquarie Island and occur during spring and summer. Feeds in the open ocean. No suitabl habitat present within the study area.	
17.	<i>Numenius madagascariensis</i> Eastern Curlew	-	М	8	BioNet Atlas	Occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on sandy spits and islets. No suitable habitat present within the study area.	Nil
18.	<i>Numenius phaeopus</i> Whimbrel	-	М	6	BioNet Atlas	The Whimbrel is often found on the intertidal mudflats of sheltered coasts. The Whimbrel generally forages on intertidal mudflats, along the muddy banks of estuaries and in coastal lagoons, either in open unvegetated areas or among mangroves. The Whimbrel nests in the branches of mangroves, around mudflats and in estuaries. No suitable habitat present within the study area.	Nil
19.	<i>Stercorarius parasiticus</i> Artic Jaeger	-	М	4	BioNet Atlas, Atlas of Living Australia	This species breeds in the north of Eurasia and North America, with significant populations as far south as northern Scotland. Parasitic jaegers migrate to the southern oceans and are common in eastern Australia. No suitable habitat within the study area.	Nil



		Legal Status*		Number			Likelihood
No.	Species	BC Act	EPBC Act	of records (10 km)	Source [#]	Habitat Preferences	of occurrence
20.	<i>Sternula albifrons</i> Little Tern	E	М	9	Almost exclusively coastal, preferring sheltered environmed may occur several kilometres from the sea in harbours, infeBioNet(with occasional offshore islands or coral cay records). N scattered colonies in low dunes or on sandy beaches just al mark near estuary mouths or adjacent to coastal lakes an suitable habitat within the study area.		Nil
21.	<i>Tringa brevipes</i> Grey-tailed Tattler	-	М	2	BioNet Atlas	The Grey-tailed Tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. The Grey-tailed Tattler usually forages in shallow water, on hard intertidal substrates, such as reefs and rock platforms, in rock pools and among rocks and coral rubble, over which water may surge. It has also been recorded foraging on exposed intertidal mudflats, especially with mangroves and possibly seagrass nearby. Mainly roosts in mangroves. No suitable habitat present within the study area.	Nil
22.	<i>Xenus cinereus</i> Terek Sandpiper	V	М	1	BioNet Atlas	he two main sites for the species in NSW are the Richmond River estuary and the Hunter River estuary. In Australia, has been recorded on coastal mudflats, lagoons, creeks and estuaries. Favours mudbanks and sandbanks located near mangroves but may also be observed on rocky pools and reefs, and occasionally up to 10 km inland around brackish pools. Generally, roosts communally amongst mangroves or dead trees, often with related wader species. No suitable habitat within study area.	Nil

Australian Government

Department of the Environment and Energy

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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about <u>Environment Assessments</u> and the EPBC Act including significance guidelines, forms and application process details.

Report created: 27/05/20 12:00:00

Summary Details Matters of NES Other Matters Protected by the EPBC Act Extra Information Caveat Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates Buffer: 10.0Km



Summary

Matters of National Environmental 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 <u>Administrative Guidelines on Significance</u>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	77
Listed Migratory Species:	75

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 http://www.environment.gov.au/heritage

A <u>permit</u> 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 Land:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	100
Whales and Other Cetaceans:	15
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	10
Regional Forest Agreements:	1
Invasive Species:	42
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Myall lakes	Within Ramsar site

Listed Threatened Ecological Communities

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.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological	Endangered	Community likely to occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area

Calidris ferruginea

Curlew Sandpiper [856]

Calidris tenuirostris Great Knot [862]

<u>Charadrius mongolus</u> Lesser Sand Plover, Mongolian Plover [879]

Dasyornis brachypterus Eastern Bristlebird [533]

Diomedea antipodensis Antipodean Albatross [64458]

Species or species habitat **Critically Endangered** known to occur within area Critically Endangered Roosting known to occur within area Endangered Roosting known to occur within area Species or species habitat Endangered likely to occur within area Vulnerable Foraging, feeding or related behaviour likely to occur within area

[Resource Information]

Name	Status	Type of Presence
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related
Diomedea epomophora		behaviour likely to occur within area
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
<u>Erythrotriorchis radiatus</u> Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White- bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
<u>Grantiella picta</u> Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Breeding known to occur within area
Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sternula nereis nereis		
Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta		
Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi	. <i>.</i>	
White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis		
Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Fish		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat

Frogs		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Insects		
Synemon plana		
Golden Sun Moth [25234]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely

Name	Status	Type of Presence
		to occur within area
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat
		known to occur within area
Dasyurus maculatus maculatus (SE mainland populati	<u>on)</u>	
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll	Endangered	Species or species habitat
(southeastern mainland population) [75184]		known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species of species nabitat
		likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat
		known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat
		likely to occur within area
Phascolarctos cinereus (combined populations of Qld,	<u>NSW and the ACT)</u>	
Koala (combined populations of Queensland, New	Vulnerable	Species or species habitat
South Wales and the Australian Capital Territory)		known to occur within area
[85104] Deterous tridectulus, tridectulus		
Potorous indactivus indactivus		Creation or or original habitat
Long-nosed Potoroo (SE Mainland) [66645]	vuinerable	Species of species habitat
		Known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat
	Vallerable	known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur
, , , , , , , , , , , , , , , , , , , ,		within area
		within area
Plants		
Plants Angophora inopina		
Plants <u>Angophora inopina</u> Charmhaven Apple [64832]	Vulnerable	Species or species habitat
Plants <u>Angophora inopina</u> Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area
Plants Angophora inopina Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area
Plants Angophora inopina Charmhaven Apple [64832] Arthraxon hispidus Unity init Orago [0229]	Vulnerable	Species or species habitat known to occur within area
PlantsAngophora inopinaCharmhaven Apple [64832]Arthraxon hispidusHairy-joint Grass [9338]	Vulnerable Vulnerable	Species or species habitat known to occur within area Species or species habitat
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Name	Status	Type of Presence
<u>Melaleuca biconvexa</u> Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat likely to occur within 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
<u>Tetratheca juncea</u> Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
<u>Thesium australe</u> Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
<u>Chelonia mydas</u> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on th	e EPBC Act - Threatened	Species list.
Name Migratory Marine Birds	Threatened	Type of Presence
Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species
Name	Threatened	Type of Presence
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		habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea		
Sooty Shearwater [82651]		Breeding known to occur within area
Ardenna pacifica		
Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Ardenna tenuirostris		
Short-tailed Shearwater [82652]		Breeding known to occur within area
Calonectris leucomelas		
Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel		
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor		
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus		
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat

Macronectes halli		
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca		
Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons		
Little Tern [82849]		Breeding likely to occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta		
Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
<u>Inalassaiche Impavida</u>		Charles or charles habitat
[64459]	vuinerable	may occur within

Name	Threatened	Type of Presence
		area
Thalassarche melanophris		• • • • • • • •
Black-browed Albatross [66472]	Vulnerable	Species or species habitat
		may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related
		behaviour likely to occur
		within area
<u>I halassarche steadi</u>	\/ I II \	
vvnite-capped Albatross [64462]	Vuinerable [*]	Foraging, reeding or related
		within area
Migratory Marine Species		
Balaena glacialis australis		
Southern Right Whale [75529]	Endangered*	Species or species habitat
		likely to occur within area
Dele su su teurs la sus elle		
Balaenoptera borealis Sei Mihele [24]	Vulnarabla	Foreging feeding or related
Ser whate [34]	vuinerable	behaviour likely to occur
		within area
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat
		may occur within area
Balaenoptera musculus	Fodoogovod	Creatian ar anasian habitat
Blue whale [36]	Endangered	Species of species nabitat
		may occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related
		behaviour likely to occur
		within area
<u>Caperea marginata</u>		Foreging fooding or related
Pygmy Right Whale [39]		Foraging, reeding or related
		area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur
		within area
<u>Caretta caretta</u>	En deu anne d	Fananing, faading, angelatad
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related
		within area
<u>Chelonia mydas</u>		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related
		behaviour known to occur
Demos electron en de con		within area
<u>Dermochelys corlacea</u>		Onaciae er enceiee hebitet
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species of species nabitat
Dugong dugon		
Dugong [28]		Species or species habitat
		may occur within area
Enstra scholus inchriste		
<u>Eretmocnelys Impricata</u>	Vulnarabla	Chapies or chapies hebitat
	vuinerable	species of species habitat
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat
		may occur within area
Monto alfradi		
IVIANIA AIII EUI Roof Monto Roy, Constal Manta Roy, Inchara Manta		Spacing or appeales het that
Rev Prince Alfred's Ray Resident Manta Ray [8/00/]		Species of species nabitat
(α_y, α_y) , (α_y, α_y) , (α_y, α_y) , (α_y) , $(\alpha_y$		may coon within alea
Manta birostris		

Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995] Species or species habitat may occur within area

Name	Threatened	Type of Presence
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<u>Orcinus orca</u>		
Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat
		likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus		Species or species habitat may occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] <u>Hirundapus caudacutus</u> White-throated Needletail [682] <u>Monarcha melanopsis</u>	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] <u>Hirundapus caudacutus</u> White-throated Needletail [682] <u>Monarcha melanopsis</u> Black-faced Monarch [609]	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat
Oriental Cuckoo, Horsfield's Cuckoo [86651] <u>Hirundapus caudacutus</u> White-throated Needletail [682] <u>Monarcha melanopsis</u> Black-faced Monarch [609]	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682] Monarcha melanopsis Black-faced Monarch [609] Monarcha trivirgatus	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682] Monarcha melanopsis Black-faced Monarch [609] Monarcha trivirgatus Spectacled Monarch [610]	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682] Monarcha melanopsis Black-faced Monarch [609] Monarcha trivirgatus Spectacled Monarch [610]	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682] Monarcha melanopsis Black-faced Monarch [609] Monarcha trivirgatus Spectacled Monarch [610] Myiagra cyanoleuca	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682] Monarcha melanopsis Black-faced Monarch [609] Monarcha trivirgatus Spectacled Monarch [610] Myiagra cyanoleuca Satin Flycatcher [612]	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area Species or species habitat
Oriental Cuckoo, Horsfield's Cuckoo [86651] <u>Hirundapus caudacutus</u> White-throated Needletail [682] <u>Monarcha melanopsis</u> Black-faced Monarch [609] <u>Monarcha trivirgatus</u> Spectacled Monarch [610] <u>Myiagra cyanoleuca</u> Satin Flycatcher [612]	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682] Monarcha melanopsis Black-faced Monarch [609] Monarcha trivirgatus Spectacled Monarch [610] Myiagra cyanoleuca Satin Flycatcher [612] Rhipidura rufifrons Pu (and Factorial 1992)	Vulnerable	Species or species habitat may occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area Species or species habitat known to occur within area
Oriental Cuckoo, Horsfield's Cuckoo [86651] Hirundapus caudacutus White-throated Needletail [682] Monarcha melanopsis Black-faced Monarch [609] Monarcha trivirgatus Spectacled Monarch [610] Myiagra cyanoleuca Satin Flycatcher [612] Rhipidura rufifrons Rufous Fantail [592]	Vulnerable	 Species or species habitat may occur within area Species or species habitat known to occur within area

Migratory Wetlands Species Actitis hypoleucos Common Sandpiper [59309]

Arenaria interpres Ruddy Turnstone [872]

Calidris acuminata Sharp-tailed Sandpiper [874]

Calidris canutus Red Knot, Knot [855]

Calidris ferruginea Curlew Sandpiper [856]

Calidris melanotos Pectoral Sandpiper [858]

Calidris ruficollis Red-necked Stint [860]

Calidris tenuirostris Great Knot [862]

Species or species habitat known to occur within area

Roosting known to occur within area

Roosting known to occur within area

Species or species habitat known to occur within area

Critically Endangered

Endangered

Species or species habitat known to occur within area

Species or species habitat may occur within area

Roosting known to occur within area

Critically Endangered Roosting known to occur

Nama	Threatened	Type of Presence
Name	meatened	i ype of Fresence
		within area
<u>Charadrius bicinctus</u>		
Double-banded Plover [895]		Roosting known to occur
		within area
Charadrius mongolus		
Lesser Sand Ployer, Mongolian Ployer [870]	Endangered	Poosting known to occur
	Lindangered	within area
		within area
Gallinago narowickii		
Latham's Snipe, Japanese Snipe [863]		Roosting may occur within
		area
<u>Gallinago megala</u>		
Swinhoe's Snipe [864]		Roosting likely to occur
		within area
Gallinago stenura		
Pin-tailed Spine [8/1]		Poosting likely to occur
		within area
		within area
Limosa iapponica		.
Bar-tailed Godwit [844]		Species or species habitat
		known to occur within area
<u>Limosa limosa</u>		
Black-tailed Godwit [845]		Roosting known to occur
		within area
Numenius madagascariensis		
Eastern Curley, Far Eastern Curley [847]	Critically Endangered	Species or species habitat
	Childrany Endangered	known to occur within area
		KIOWI to occur within area
Numenius minutus		
Little Curley, Little Whimphred [040]		Departing likely to easy
Lille Cunew, Lille Whimbrei [646]		Roosling likely to occur
		within area
Numenius pnaeopus		
Whimbrel [849]		Roosting known to occur
		within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur
		within area
Pluvialis fulva		
Pacific Golden Plover [25545]		Roosting known to occur
		within area
Pluvialis squatarola		
Grey Plover [865]		Roosting known to occur
		within area
<u>I ringa brevipes</u>		
Grey-tailed Tattler [851]		Roosting known to occur
		within area

Tringa nebularia Common Greenshank, Greenshank [832]

Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]

Xenus cinereus Terek Sandpiper [59300]

Other Matters Protected by the EPBC Act

Commonwealth Land

Species or species habitat known to occur within area

Roosting known to occur within area

Roosting known to occur within area

[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.

Name

Commonwealth Land -

Commonwealth Land - Australian Telecommunications Commission

Commonwealth Land - Defence Housing Authority

Commonwealth Land - Telstra Corporation Limited

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific r	name on the EPBC Act - Threate	ned Species list.
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Roosting known to occur within area
<u>Calidris canutus</u>	– , ,	
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis		
Red-necked Stint [860]		Roosting known to occur
Calidris tenuirostris		within area

Great Knot [862]	(not [862]
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Calonectris leucomelas Streaked Shearwater [1077]

Catharacta skua Great Skua [59472]

Charadrius bicinctus Double-banded Plover [895]

Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]

Charadrius ruficapillus Red-capped Plover [881]

Diomedea antipodensis Antipodean Albatross [64458]

Diomedea epomophora Southern Royal Albatross [89221] **Critically Endangered** Roosting known to occur within area Species or species habitat known to occur within area

> Species or species habitat may occur within area

Roosting known to occur within area

Roosting known to occur within area

Roosting known to occur within area

Foraging, feeding or related behaviour likely to occur within area

Foraging, feeding or related behaviour likely to occur within area

Vulnerable

Vulnerable

Endangered

Name	Threatened	Type of Presence
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni	\ / . . . *	
Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
<u>Diomedea santordi</u>		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor		
Little Penguin [1085]		Breeding known to occur within area
Lesser Frigatebird Least Frigatebird [1012]		Species or species habitat
		likely to occur within area
Fregata minor		
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Roosting may occur within area
<u>Gallinago megala</u>		
Swinhoe's Snipe [864]		Roosting likely to occur
Gallinago stenura		
Pin-tailed Snipe [841]		Roosting likely to occur
		within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes		
Grey-tailed Tattler [59311]		Roosting known to occur within area
<u>Filmantopus nimantopus</u>		Departing known to serve
Fieu Suit, Diack-winged Suit [870]		within area
Hirundapus caudacutus		

White-throated Needletail [682]

Vulnerable

Species or species habitat known to occur within area

Lathamus discolor Swift Parrot [744]

Limosa lapponica Bar-tailed Godwit [844]

Limosa limosa Black-tailed Godwit [845]

Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]

Macronectes halli Northern Giant Petrel [1061]

Merops ornatus Rainbow Bee-eater [670]

Monarcha melanopsis Black-faced Monarch [609] Critically Endangered

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Roosting known to occur within area

Species or species habitat may occur within area

Vulnerable

Endangered

Species or species habitat may occur within area

Species or species habitat may occur within area

Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus		
Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus		
Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur		
Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Pelagodroma marina		
White-faced Storm-Petrel [1016]		Breeding known to occur within area
Phoebetria fusca		
Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialia fulva		
Pacific Golden Plover [25545]		Roosting known to occur
Pluvialis squatarola		Within area
Grey Plover [865]		Roosting known to occur within area
Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus ariseus		
Sooty Shearwater [1024]		Breeding known to occur within area

Puttinus pacificus Wedge-tailed Shearwater [1027]

Puffinus tenuirostris Short-tailed Shearwater [1029]

Recurvirostra novaehollandiae Red-necked Avocet [871]

<u>Rhipidura rufifrons</u> Rufous Fantail [592]

Rostratula benghalensis (sensu lato) Painted Snipe [889]

Sterna albifrons Little Tern [813]

<u>Thalassarche bulleri</u> Buller's Albatross, Pacific Albatross [64460]

Thalassarche cauta Shy Albatross [89224] Vulnerable

Endangered*

Vulnerable*

Breeding known to occur within area

Breeding known to occur within area

Roosting known to occur within area

Species or species habitat known to occur within area

Species or species habitat likely to occur within area

Breeding likely to occur within area

Species or species habitat may occur within area

Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov.		
Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis		
Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus		
Terek Sandpiper [59300]		Roosting known to occur within area
Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area

Species or species habitat

Festucalex cinctus Girdled Pipefish [66214]

may occur within area

Filicampus tigris Tiger Pipefish [66217]

Heraldia nocturna

Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]

Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]

<u>Hippocampus abdominalis</u> Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]

<u>Hippocampus whitei</u> White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]

Histiogamphelus briggsii

Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]

Lissocampus runa Javelin Pipefish [66251] Species or species habitat may occur within area

Species or species habitat known to occur within area

Species or species habitat may occur within area

Species or species

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

Species or species habitat may occur within area

Vanacampus margaritifer Mother-of-pearl Pipefish [66283]

Urocampus carinirostris

Hairy Pipefish [66282]

Mammals

Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]

<u>Arctocephalus pusillus</u> Australian Fur-seal, Australo-African Fur-seal [21]

Dugong dugon Dugong [28]

Species or species habitat may occur within area

Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus		
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera borealis		
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Delphinus delphis		.

Common Dophin, Short-beaked Common Dolphin [60]

Eubalaena australis Southern Right Whale [40]

<u>Grampus griseus</u> Risso's Dolphin, Grampus [64]

Megaptera novaeangliae Humpback Whale [38]

Orcinus orca Killer Whale, Orca [46]

<u>Sousa chinensis</u> Indo-Pacific Humpback Dolphin [50]

Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51] Species or species habitat may occur within area

 Endangered
 Species or species habitat likely to occur within area
 Species or species habitat may occur within area
 Vulnerable
 Species or species habitat known to occur within area
 Species or species habitat may occur within area

Species or species habitat likely to occur within area

Species or species habitat may occur within area

Name	Status	Type of Presence
Tursiops aduncus		
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str.		
Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Boondelbah	NSW
Bushy Island	NSW
Corrie Island	NSW
Gir-um-bit	NSW
Myall Lakes	NSW
One Tree Island	NSW
Shark Island	NSW
Tilligerry	NSW
Tomaree	NSW
Worimi	NSW

Regional Forest Agreements

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

[Resource Information]

[Resource Information]

Nan	1e	Status	Type of Presence
Bird	S		
Acri	dotheres tristis		
Con	וmon Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alau	ıda arvensis		
Sky	ark [656]		Species or species habitat likely to occur within area
Ana	s platvrhvnchos		
Mall	ard [974]		Species or species habitat likely to occur within area
Car	duelis carduelis		
Euro	ppean Goldfinch [403]		Species or species habitat likely to occur within area
Colu	umba livia		
Roc	k Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lon	chura punctulata		
Nutr	neg Mannikin [399]		Species or species habitat likely to occur within area

Passer domesticusSpecies or species habitat likely to occur within areaHouse Sparrow [405]Species or species habitat likely to occur within areaPasser montanusSpecies or species habitat likely to occur within areaPycnonotus jocosus Red-whiskered Bulbul [631]Species or species habitat likely to occur within areaStreptopelia chinensis Spotted Turtle-Dove [780]Species or species habitat likely to occur within areaSturnus vulgaris Common Starling [389]Species or species habitat likely to occur within areaTurdus merula Common Blackbird, Eurasian Blackbird [596]Species or species habitat likely to occur within areaFrogs Bostaurus Domestic Cattle [16]Species or species habitat likely to occur within areaCane Toad [83218]Species or species habitat likely to occur within areaCanis lupus familiaris Domestic Cattle [16]Species or species habitat likely to occur within areaFelis catus Cat House Cat Domestic Cat 1191Species or species habitat likely to occur within area	Name	Status	Type of Presence
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Species or species habitat likely to occur within area

Lepus capensis Brown Hare [127]

Feral deer

Mus musculus House Mouse [120]

Oryctolagus cuniculus Rabbit, European Rabbit [128]

Feral deer species in Australia [85733]

Rattus norvegicus Brown Rat, Norway Rat [83]

Rattus rattus Black Rat, Ship Rat [84]

Sus scrofa Pig [6]

Vulpes vulpes Red Fox, Fox [18] Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Alternanthera philoxeroides		
Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia		
Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643] Asparagus aethiopicus		Species or species habitat likely to occur within area
Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425] Asparagus asparagoides		Species or species habitat likely to occur within area
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus		
Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] Chrysanthemoides monilifera		Species or species habitat likely to occur within area
Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata		
Bitou Bush [16332]		Species or species habitat likely to occur within area
Eichhornia crassipes		
Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana		
Broom [67538]		Species or species habitat may occur within area
Lantana camara		

Lantana, Common Lantana, Kamara Lantana, Largeleaf Lantana, Pink Flowered Lantana, Red Flowered

Species or species habitat likely to occur within area

Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Opuntia spp. Prickly Pears [82753]

Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]

Rubus fruticosus aggregate Blackberry, European Blackberry [68406]

Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]

Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]

Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]

Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Species or species habitat likely to occur within area

Species or species habitat may occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species

Name	Status	Type of Presence
Groundsel [2624]		habitat likely to occur within area
Nationally Important Wetlands		[Resource Information]
Name		State
Port Stephens Estuary		NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-32.7229 152.13692

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 5: KOALA HABITAT ASSESSMENT REPORT

Introduction

Describe the nature of the proposed development.

The proposed development includes the St Michaels Public School, located at 12 Sproule St, Nelson Bay NSW 2315. The proposed development includes new facilities to existing structures.

Define how the SEPP applies to the proposed development.

The proposed development is mapped as Koala Development Application on the Koala Habitat Protection Map. The developments level of impact is considered to be a Tier 2 Development.

Koala habitat values – addressing criteria 1 and 2

Describe the site area, including the general environment and condition, location and extent of the development area and any other areas that may be directly or indirectly impacted by the proposed development.

The Study Area occurs within the Port Stephens Council local government area (LGA). The Development Site is zoned R2 – Low Density Residential under the Port Stephens Local Environmental Plan 2014. The site is a mapped as 'mostly cleared' under the Port Stephens Koala Habitat Planning Map. The Study Area comprises a number of mature trees including, Blackbutt, Red Bloodwood, Christmas Bush, Smooth-bark Apple and Swamp She-oak. Most of the Study Area is devoid of shrub and mid-story layers. The Study Area contains one native vegetation community - PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast. The Study Area is also encircled by high fencing, as the site is Public School. The proposal plans to remove a small number of trees (approximately 15) consisting of mostly Blackbutt, Christmas Bush and Red Bloodwood (Figure 2).

No preferred koala food trees (listed in the Port Stephens KPoM) exist on site.

Provide details of koala survey as undertaken in accordance with core koala habitat survey guidelines. This should include details of the results of the koala surveys, including how the site area meets the definition of core koala habitat and mapping that shows habitat areas and koala records within the site area and adjoining areas.

Two SATs were undertaken within the Study Area which included both patches of large mature trees within the north-eastern and south-eastern portions of the site. The north SAT comprises mostly Blackbutt (*E. pilularis*) with some Red Bloodwood (*Corymbia gummifera*), Smooth-barked Apple (Angophora costata), and Christmas Bush (*Ceratopetalum gummiferum*). The southern Sat comprised mostly Swamp She-oak (*Casuarina glauca*), with some Christmas Bush (*Ceratopetalum gummiferum*), Red Bloodwood (*Corymbia gummifera*), Tuckeroo (*Cupaniopsis anacardioides*) and introduced trees (Silky Oak and Norfolk Island Pine). No Koala scats were detected during the SAT surveys. Furthermore, no Koalas were detected during spotlighting or through call playback surveys.

Field survey findings do not meet the first definition of Core Koala Habitat under the SEPP – no koalas are present or evidence, thereof, were detected within the Study Area. However, given that *Eucalyptus pilularis* (Blackbutt) (koala use tree as defined by the SEPP) comprises greater than 15% of all trees within the Study Area (meeting the determination of 'Highly Suitable Habitat'); and there are Koala records within 2.5kms over the past 18 years, the native vegetation within the Study Area meets the second definition of Core Koala Habitat (under the SEPP).

Describe the site context (including mapping showing habitat that might be associated with vegetation in the adjoining landscape and records within the vicinity of the site area) and provide an analysis of the koala habitat values (including how koalas might use the site area and the relative importance of the site area to a local koala population).



The proposed development is located within a residential area that is mostly cleared of native vegetation. Poor connectivity exists to the south-east to Tomaree National Park; however, records of Koala exist directly adjacent to the Subject Site and throughout residential zones.

Measures taken to avoid impacts to koalas – addressing criteria 3, 4, 5, 6, 7 and 8

Describe the site selection process, including how koala habitat was taken into account and any avoidance outcomes achieved through this process.

Impacts on koala use trees have been addressed through an iterative design process to avoid areas of higher biodiversity value within the subject site, however, some mature trees will require removal. The design of the development will ensure that the majority of the vegetation within the study area will be retained following the development.

Describe how the proposed development avoids or minimises direct impacts to koala habitat and habitat function within the site area.

Due to the fencing surrounding the site (Public School), it is unlikely that koalas are able to enter the Study Area in the recent past. Therefore, the proposed development is unlikely to further impact koala habitat and habitat function with the Study Area.

Analysis of potential impacts – addressing criteria 9

Identify the residual direct impacts to koalas and koala habitat within the site area, including the nature and extent of impacts and the likely implications for the viability of a local koala population.

As detailed above, Koalas are unlikely to be able to access vegetation with the site and therefore, the proposed removal of trees within he Study Area is unlikely to lead to residual direct impacts to koalas and koala habitat. Identify the relevant potential indirect impacts to koalas and koala habitat within the site area and adjacent habitat areas, including the nature and extent of potential indirect impacts and the likely implications for the viability of a local koala population.

The proposed development is unlikely to lead to any additional indirect impacts or further contribute to any existing indirect impacts.

Plan to manage and protect koalas and their habitat - addressing criteria 10, 11, 12 and 13

Describe the management measures that will be implemented as part of proposed construction and operations to manage the direct and indirect impacts identified. These measures should be outcomes focussed and include performance targets.

No direct or indirect impacts are expected as Koalas are currently excluded from the Subject site. As the site is a Public School, changes to fencing options is not considered.

Describe any compensatory measures that will be delivered, including an analysis of the suitability of these measures against criteria 9 and 10.

No compensatory measure will be used within the study area at this stage.

Outline a plan for monitoring, adaptive management and reporting against the key outcomes and performance targets.

Koala monitoring will continue within the subject site, including any death or injuries within the vicinity of the subject site. However, no formal reporting is deemed necessary as the proposed development will not lead to any direct or indirect impacts on areas that Koalas currently have access to.

References

Include a list of all references cited in the report.

Department of Planning, Industry and Environment (DPIE) 2019 Koala Habitat Protection Guideline, Implementing State Environmental Planning Policy (Koala Habitat Protection) 2019.

Appendices

Include any additional information or supplementary material pertinent to the DA proposal. Port Stephens Comprehensive Koala Plan of Management

DECC. 2008. Recovery plan for the koala (Phascolarctos cinereus). Department of Environment and Climate Change

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011. Survey Guidelines for Australia's Threatened Mammals.

Koala Development Application Map 2020 https://webmap.environment.nsw.gov.au/Html5Viewer291/index.html?viewer=KoalaSEPP.htm5

Phillips, S, & Callaghan, J. 2011. The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. *Australian Zoologist, 35*(3), 774-780. Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011



Suitably qualified person	
Name	Daniel O'Brien (Senior Zoologist)
Tertiary qualification in ecology, environmental management, forestry	Bachelor of Environmental Science and Management (hons). Ph.D. (in review).
Experience in flora and fauna identification, survey and management, including experience in conducting koala surveys	 Has routinely conducted Koala Surveys within the Port Stephens LGA and more broadly within NSW over the past 10 years. Has undertaken hundreds of Spot Assessment Technique surveys in various vegetation communities and is familiar with the identification of Koala Scats. Has extensive experience identifying Koala feed trees and mapping koala habitat.



APPENDIX 6: ASSESSMENT OF SIGNIFICANCE

Biodiversity Conservation Act 2016

Factors of Assessment

The five factors considered in the test of significance under s.7.3 of BC Act are shown in the table below. The tests of significance for all threatened species, populations and ecological communities considered likely to occur within the Study Area are provided in the proceeding sub-sections.

Factors addressed in the test of significance

Factor		Population	Ecological Community
(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.	x		
 (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 			
 (c) in relation to the habitat of a threatened species, population 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, population or ecological community in the locality 	x		
(d) whether the proposed development or activity is likely to have an adverse effect any declared area of outstanding biodiversity value (either directly or indirectly).	NA	NA	NA
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of, a key threatening process.	x		

NA = Not applicable.



Threatened Fauna Species

• Squirrel Glider (*Petaurus norfolcensis*)

The Squirrel Glider is widely though sparsely distributed across eastern Australia, from northern Queensland to western Victoria. Often confused with the common Sugar Glider, the species are up to twice the size, with more distinct facial markings and nest in bowl-shaped, leaf lined nests in tree hollows.

Squirrel Gliders inhabit mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. They prefer mixed species stands with a shrub or *Acacia* midstorey. Their diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein. Squirrel Gliders require abundant tree hollows for refuge and nest sites (Davy, 1984; Suckling, 1995; Menkhorst and Knight, 2001; OEH, 2019).

(a) Effect on life cycle	Approximately 15 trees would be removed as a result of the proposed action. These trees largely comprise Blackbutt, Red Bloodwood, Christmas Bush, Swamp She-oak and Smooth-barked Apple. These trees may provide foraging habitat for the species; however, no hollows are present within these trees and no individuals were detected surveying surveys. The proposed action is unlikely to have a significant impact upon the life cycle of any potentially occurring individuals in the Study Area, as the area to be modified is relatively small and lack key habitat features preferred by the species (hollows, shrub or acacia midstorey). Additionally, as retained areas of similar vegetation exist in the north-eastern and south-eastern portions of the Subject Site.
(b) Effect on Ecological Community	Not applicable.
(c) (i) Habitat Removal	The proposal would result in the removal of approximately 15 mature trees. These trees largely comprise Blackbutt, Red Bloodwood, Christmas Bush, Swamp She-oak and Smooth-barked Apple. These trees may provide foraging habitat for the species, on occasion. No nesting habitat is to be removed. The area to be impacted is relatively minor as retained areas of similar vegetation exist in the north-eastern and south-eastern portions of the Study Area, and in the broader locality. Therefore, the area to be modified is unlikely to significantly impact upon the species.
(c) (ii) Habitat Fragmentation	The proposal would result in the removal of approximately 15 mature trees within an urban/residential area. While some connectivity exists throughout the locality, the removal of 15 trees is unlikely to increase habitat fragmentation for these species. Retained trees will continue to allow arboreal passage through the Study Area, particularly to the north and south.
(c) (iii) Habitat importance	The habitat to be modified is not considered to be important habitat (no hollows), such that its removal would result in the local extinction of any of the species. Intact areas along the coastline to the north and within Tomaree National Park are likely to provide suitable habitat for the species that is important for the survival of the local population.
(d) Effect on biodiversity value	The proposed action is not within or in close proximity to any mapped Areas of Outstanding Biodiversity Value.



	The proposal will contribute to one key threatening process relevant to these species:
	Clearing of native vegetation.
	The proposal also has the potential to contribute to:
(g) Key threatening process	 Anthropogenic climate change Infection of native plants by <i>Phytophthora cinnamomi</i> Introduction and establishment of Exotic Rust Fungi of the order <i>Pucciniales</i> pathogenic on plants of the family <i>Myrtaceae;</i> and The mitigation measures outlined in Section 5 would avoid and minimise the risk of these key threatening processes as a result of the proposed action.
Conclusion	The proposed action would remove approximately 15 trees that potential provides foraging habitat for this species in the Study Area. No hollow-bearing trees are to be removed. Portions of vegetation are to be retained within the Study Area. Trees to be removed are not considered significant to the survival of the local population. Together with the proposed mitigation measures outlined in Section 5, the potential impact (both direct and indirect) on this species is expected to be minor.

References

Davy, S. (1984) *Habitat preferences of arboreal marsupials within a coastal forest in southern NSW.* Pp. 509-16 in Smith, A.P. and Hume, I.D. (eds.) Possums and Gliders. Surrey Beatty and Sons, Sydney.

Menkhorst, P. and Knight, F. (2001) *A Field Guide to the Mammals of Australia*. Oxford Uni Press, Melbourne.

Suckling, G.C. (1995) *Squirrel Glider Petaurus norfolcensis*. Pp. 234-5 in Strahan, R. (ed.) The Mammals of Australia. Reed Books, Chatswood.

Office of Environment and Heritage (2019). *Threatened Species App.* Website: https://www.environment.nsw.gov.au/threatenedSpeciesApp/

• Koala (*Phascolarctos cinereus*)

The Koala generally occurs from the Townsville district in northern Queensland, south along the coast and ranges into Victoria and part of South Australia. Within New South Wales and Queensland, this distribution extends into the western slopes and plains. The Koala lives entirely on a diet of leaves of both eucalypt and non-eucalypt trees and it has been shown that within its range there are local and regional preferences for the tree species used for feeding. Examples of preferred feed trees within the Port Stephens LGA are *Eucalyptus robusta*, *E. parramattensis* and *E. tereticornis*. Non-eucalypts recorded have been *Allocasuarina torulosa* and *Melaleuca quinquenervia*. Throughout its range the Koala suffers population decline,



however, severe over-population can occur in some isolated areas leading to eye disease and reproductive tract bacterial disease caused by Chlamydia psittaci become prevalent (Martin & Handasyde 1995; Moore & Foley 2000; Phillips & Callaghan 2000; Phillips et al. 2000).

(a) Effect on life cycle	The Study Area occurs within the Port Stephens Council local government area (LGA). The Development Site is zoned R2 – Low Density Residential under the Port Stephens Local Environmental Plan 2014. The site is a mapped as 'mostly cleared' under the Port Stephens Koala Habitat Planning Map. The Study Area comprises a number of mature trees including, Blackbutt, Red Bloodwood, Christmas Bush, Smooth-nark Apple and Swamp She-oak. Most of the Study Area is devoid of shrub and mid-story layers. The Study Area contains one native vegetation community - PCT 1646 - Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast. The Study Area is also encircled by high fencing, as the site is Public School. The proposal plans to remove a small number of trees (approximately 15) consisting of mostly Blackbutt, Christmas Bush and Red Bloodwood (Figure 2). These trees may provide foraging habitat for the species. Blackbutt (<i>E. pilularis</i>) is a listed koala use tree under the SEPP (2019). However, none of the trees are considered to be preferred koala food trees as listed in the Port Stephens CKPoM.			
	in the locality. As such, their removal is unlikely to have a significant impact upon the life cycle of any potentially occurring individuals in the study area. A Koala Assessment report has been conducted (Appendix 5).			
(b) Effect on Ecological Community	Not applicable.			
(c) (i) Habitat Removal	The proposal plans to remove a small number of trees (approximately 15) consisting of mostly Blackbutt, Christmas Bush and Red Bloodwood. No preferred trees species are present. Blackbutt is listed as a koala use tree under the Koala Habitat Protection SEPP. The site is a mapped as 'mostly cleared' under the Port Stephens Koala Habitat Planning Map. Habitat is understood to be isolated from local population due to fencing around the Subject Site.			
	I herefore, removal of habitat is unlikely to significantly impact upon the species.			
(d) (ii) Habitat Fragmentation	The proposal would result in the removal of approximately 15 mature trees within an urban/residential area. While some connectivity exists throughout the locality, the removal of 15 trees is unlikely to increase habitat fragmentation for these species. Furthermore, connectivity of habitats within the site to adjacent areas is limited due to fencing. Removal of trees within the Subject Site is unlikely to further fragment habitats with the locality.			
(d) (iii) Habitat importance	The habitat to be modified is not considered to be important habitat, such that its removal would result in the local extinction of any of the species. While some areas of suitable habitat are to be retained within the subject site, larger areas of high-quality habitat exist within the locality (e.g. Tomaree National Park).			
(d) Effect on biodiversity value	The proposed development is not within or in close proximity to any mapped Areas of Outstanding Biodiversity Value.			
(g) Key threatening process	The proposal will contribute to one key threatening process relevant to these species:			
	Clearing of native vegetation.			
	The proposal also has the potential to contribute to:			
	 Anthropogenic climate change Infection of native plants by <i>Phytophthora cinnamomi</i> Introduction and establishment of Exotic Rust Fungi of the order <i>Pucciniales</i> pathogenic on plants of the family <i>Myrtaceae</i>. 			



Conclusion	The proposed activity would result in the modification of up to 0.17 ha of disturbed vegetation mapped as Supplementary Habitat and containing one koala feed tree. The surrounding area will still contain habitat and linkage corridors. Additionally, the species is fairly mobile and able to travel between other suitable habitat in the locality. Together with the proposed mitigation measures outlined in Section 5, the potential impact (both direct and indirect) on this species is therefore expected to be minor.
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References

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Phillips, S., Callaghan, J. & Thompson, V. (2000). The tree species preferences of koalas (*Phascolarctos cinereus*) inhabiting forest and woodland communities on Quaternary deposits in the Port Stephens area, New South Wales. *Wildlife Research* 27: 1-10.

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

The Grey-headed Flying-fox occurs along the eastern seaboard of Australia roosting in large communal aggregations known as 'camps'. These camps are used permanently, annually, or occasionally, varying in size from hundreds to many thousands of individuals, fluctuating according to food resources (Eby and Law, 2008; Parry-Jones and Augee, 1991; Tidemann, 1995). This species forages on nectar and pollen from flowers of canopy trees (particularly *Eucalyptus, Melaleuca* and *Banksia*) and fleshy fruits from rainforest trees and vines. This species is highly mobile, dispersing to sites as far as 40 km to forage and returning to the camp in one night, and seasonally they may move hundreds of kilometres in response to variation in food resource productivity which largely explains the extensive migration movement of this species (Eby and Law, 2008). Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of *Melaleuca*, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas.

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(a) Effect on life cycle	No Grey-headed Flying-fox camps were detected within the Study Area. Approximately 15 trees would be removed as a result of the proposed action. These trees largely comprise Blackbutt, Red Bloodwood, Christmas Bush, Swamp She-oak and Smooth-barked Apple. These trees may provide occasional foraging habitat for the species. The proposed action is unlikely to have a significant impact upon the life cycle of any potentially occurring individuals in the Study Area, as the area to be cleared is relatively small. The species has a wide foraging range and is unlikely to be impacted by the loss of trees within the Subject Site. Additionally, as retained areas of similar vegetation exist in the north-eastern and south-eastern portions of the Subject Site.		
(b) Effect on Ecological Community	Not applicable.		
(c) (i) Habitat Removal	The proposal would result in the removal of approximately 15 trees that provides occasional foraging habitat for this species. No breeding habitat is to be impacted. Trees to be removed are considered to be of minor significance to the greater availability of foraging habitat with the locality. Therefore, the area to be cleared is unlikely to significantly impact upon the species.		
(c) (ii) Habitat Fragmentation	The proposed action would remove approximately 15 trees which may provide foraging habitat for the species on occasion. The proposed action would not increase habitat fragmentation for this species given that the development exists within a moderately fragmented area (residential/urban). While some connective vegetation exists within the locality, the proposed development is unlikely to further fragment habitats, particularly given the high mobility of the species		
(c) (iii) Habitat importance	The habitat to be removed is not considered to be important habitat, such that its removal would result in the local extinction of the species. The species is highly mobile and extensive areas of foraging resources existing within the locality.		
(d) Effect on biodiversity value	The proposed action is not within or in close proximity to any mapped Areas of Outstanding Biodiversity Value.		
	The proposal will contribute to one key threatening process relevant to these species:		
	Clearing of native vegetation.		
	The proposal also has the potential to contribute to:		
(g) Key threatening process	 Anthropogenic climate change; Infection of native plants by <i>Phytophthora cinnamomi;</i> Introduction and establishment of Exotic Rust Fungi of the order <i>Pucciniales</i> pathogenic on plants of the family <i>Myrtaceae</i>. 		
	The mitigation measures outlined in Section 5 would avoid and minimise the risk of these key threatening processes as a result of the proposed action.		
Conclusion	The proposed action would remove approximately 15 trees that potential provides foraging habitat for this species in the Study Area. No breeding habitats are to be impacted. Portions of vegetation are to be retained within the Study Area. Trees to be removed are not considered significant to the survival of the local population. Together with the proposed mitigation measures outlined in Section 5, the potential impact (both direct and indirect) on this species is expected to be minor.		

References

Department of Environment, Climate Change and Water (2009). *Draft National Recovery Plan for the Grey-headed Flying-fox <u>Pteropus poliocephalus</u>, Prepared by Dr Peggy Eby, NSW Department of Environment, Climate Change and Water, Sydney.*



Eby, P. and Law, B. (2008). *Ranking the feeding habitats of Grey-headed flying foxes for conservation management,* a report for The Department of Environment and Climate Change and The Department of Environment, Water, Heritage and the Arts.

Parry-Jones, K.A. and Augee, M. (1991). Food selection in Grey-headed flying foxes (*Pteropus poliocephalus*) occupying a summer colony site near Gosford, NSW. *Wildlife Research* 18: pp 111-124.

Tidemann, C.R. (1995). Grey-headed flying fox, *Pteropus poliocephalus* (Temminck, 1825), *The Mammals of Australia*, Ronald Strahan (ed), Reed New Holland.

• Glossy Black-Cockatoo (Calyptorhynchus lathami)

The Glossy Black-Cockatoo is a small brown-black cockatoo, with a red/orange undertail. Females have a pale-yellow crescent on their cheek. They are usually seen in pairs or small groups feeding quietly in she-oaks. The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. They mainly inhabit open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur. Black She-oak (*Allocasuarina littoralis*) and Forest She-oak (*A. torulosa*) are important foods. However, the species feeds on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. The species is dependent on large-hollow bearing eucalypts for nesting.

(a) Effect on life cycle	Approximately nine Swamp Oak (<i>Casuarina glauca</i>) will be removed as a result of the proposed action. These trees may provide foraging habitat for the species; however, no hollows are present within any of the trees proposed for removal and no individuals were detected surveying surveys. The proposed action is unlikely to have a significant impact upon the life cycle of any potentially occurring individuals in the Study Area, as the area to be modified is relatively small and lack key habitat features preferred by the species (hollows).	
(b) Effect on Ecological Community	Not applicable.	
(c) (i) Habitat Removal	The proposal would result in the removal of nine trees that potentially provide foraging habitat (She-oaks). These trees may provide foraging habitat for the species, on occasion. No nesting habitat is to be removed (no hollow-bearing trees). The area to be impacted is relatively minor as retained areas of similar vegetation exist in the north-eastern and south-eastern portions of the Study Area, and in the broader locality. Therefore, the area to be modified is unlikely to significantly impact upon the species.	
(c) (ii) Habitat Fragmentation	The proposal would result in the removal of approximately nine she-oaks within an urban/residential area. While some connectivity exists throughout the locality, the removal of nine trees is unlikely to increase habitat fragmentation for these species.	

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(c) (iii) Habitat importance	The habitat to be modified is not considered to be important habitat (no hollows), such that its removal would result in the local extinction of any of the species. Intact areas along the coastline to the north and within Tomaree National Park are likely to provide suitable habitat for the species that is important for the survival of the local population.		
(d) Effect on biodiversity value	The proposed action is not within or in close proximity to any mapped Areas of Outstanding Biodiversity Value.		
	The proposal will contribute to one key threatening process relevant to these species:		
	Clearing of native vegetation.		
	The proposal also has the potential to contribute to:		
(g) Key threatening process	 Anthropogenic climate change Infection of native plants by <i>Phytophthora cinnamomi</i> Introduction and establishment of Exotic Rust Fungi of the order <i>Pucciniales</i> pathogenic on plants of the family <i>Myrtaceae;</i> and 		
	The mitigation measures outlined in Section 5 would avoid and minimise the risk of these key threatening processes as a result of the proposed action.		
Conclusion	The proposed action would remove approximately nine she-oaks that potential provides foraging habitat for this species in the Study Area. No hollow-bearing trees are to be removed. Portions of vegetation are to be retained within the Study Area. Trees to be removed are not considered significant to the survival of the local population. Together with the proposed mitigation measures outlined in Section 5, the potential impact (both direct and indirect) on this species is expected to be minor.		

Environment Protection and Biodiversity Conservation Act 1999

• Koala (*Phascolarctos cinereus*)

Assessing whether an action is likely to have a significant impact on a Vulnerable species includes assessing whether habitat critical to the survival of the species will be adversely impacted. For some EPBC Act listed species, critical habitat has been identified or clearly defined.

Critical koala habitat is defined as habitat that is important for the species' long-term survival and recovery. The *EPBC Act referral guidelines for the Vulnerable Koala* (DotE 2014) aim to provide guidance on whether habitat is critical to the survival of the species and on how to determine whether an action is likely to have an adverse impact on critical habitat. An impact area that scores 5 or more using the habitat assessment tool contained in the guidelines is considered highly likely to contain critical koala habitat.

Attribute	Score	Habitat Appraisal
Koala occurrence	+2 (high)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 2 years
		92 koalas have been recorded in a 5km radius of the study area on the Atlas of NSW Wildlife in the past 2 years.

Koala Habitat Assessment Tool (Section 6) – Coastal Context



Attribute	Score	Habitat Appraisal
Vegetation composition	0 (low)	No Koala feed trees (Port Stephens KPoM). One Koala use tree under the SEPP (2019) – Blackbutt (E. pilularis)
Habitat connectivity	0 (low)	Subject site is within a residential zone with low-moderate habitat connectivity. However, fencing around the Public School restricts movement into the Subject Site. Therefore, there is very low connectivity to adjacent habitats.
Key existing threats	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present. Koalas are regularly hit by cars with the Port Stephens LGA.
Recovery value	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context given the low connectivity of habitats and location with residential area. Improvement of habitats within the school is unlikely to benefit the local population.
Total	2	Habitat not critical to the survival of the koala. Assessment of adverse effects on critical koala habitat is not required

Conclusion

Based on the assessment above, the proposed development is unlikely to have a significant adverse impact on a local population of koalas such that their local occurrence would be placed at risk.

References

DotE (2014). EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory), Department of the Environment (DotE), Canberra.

DECC (2008). Recovery Plan for the Koala (Phascolarctos cinereus), Department of Environment and Climate Change NSW (DECC), Sydney.

Migratory Species

- White-throated Needletail (*Hirundapus caudacutus*).
- Fork-tailed Swift (*Apus pacificus*)

The White-throated Needletail is a large swift with a thickset, cigar-shaped body, stubby tail and long pointed wings. Sexes are alike, with no seasonal variation, and juveniles are separable with good visibility (Higgins, 1999). The White-throated Needletail is generally gregarious when in Australia, sometimes occurring in large flocks, comprising hundreds or thousands of birds, though they are occasionally seen singly, and occasionally occur in mixed flocks with other aerial insectivores. The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of



Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (Barrett *et al.*, 2003; Blakers *et al.*, 1984; Higgins, 1999). The White-throated Needletail breeds in Asia (Chantler, 1999; de Schauensee, 1984; Dement'ev and Gladkov, 1951; Ornithological Society of Japan, 2000). In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground (Coventry, 1989; Watson, 1955).

The Fork-tailed Swift is a medium to large member of the Apodidae Family. It is a mediumsized Swift, with a slim body with long scythe-shaped wings that taper to finely pointed tips. It is characterized by a long and deeply forked tail. The Fork-tailed Swift is a non-breeding visitor to all states and territories of Australia (Higgins 1999). In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide; however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton.

Will the action substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species?

The White-throated Needletail and Fork-tailed Swift almost exclusively aerial and unlikely to utilise the terrestrial vegetation onsite. These species are also highly transitory and able to move between different habitats easily. As such, the proposed removal of approximately 15 trees is unlikely to substantially modify important habitat for the species.

Will the action result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?

No. The proposed action is unlikely to cause an increase in introduced species that are harmful to this migratory species, especially considering that these birds are unlikely to occupy or utilise the Study Area itself. There is the minor potential for an increase in weed species as a result of ground disturbance and equipment brought on to site; however, this risk would be avoided and minimised through implementation of the measures outlined in Section 5.

Will the action seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?



No. The White-throated Needletail and Fork-tailed Swift do not breed in Australia.

Conclusion:

The proposed action is unlikely to have a significant impact on these migratory bird species due to the small area of habitat removal (approximately 15 trees), their unlikeness to occupy or utilise the Study Area, the lack of breeding habitat and their aerial transitory nature.

References

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Blakers, M., Davies, S.J.J.F., and Reilly, P.N. (1984). *The Atlas of Australian Birds*. Melbourne, Victoria: Melbourne University Press.

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APPENDIX 7: LICENSES AND PERMITS

Kleinfelder employees involved in the current study are licensed or approved under the *National Parks and Wildlife Act 1974* (License Number: SL100730, Expiry: 31 March 2021) and the *Animal Research Act 1985* to harm/trap/release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.