Flora and Fauna Assessment Report: Broadwater Public School

9 Byrnes Street, Broadwater, Northern NSW

24001279

10 November 2023

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9 Byrnes Street, Broadwater, Northern NSW

Kleinfelder Project: 24001279

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Kevin Wormington	Howard Rogers	Howard Rogers

EXECUTIVE SUMMARY

Kleinfelder Australia Pty Ltd were engaged by ADCO Constructions Pty Ltd, on behalf of School Infrastructure New South Wales, to prepare a Flora and Fauna Assessment Report to support a Development Application under Part 4 of the EP&A Act and Section 3.36 of the T&I SEPP for Broadwater Public School. The works under Broadwater Public School are part of the Northern Rivers Flood Recovery Program.

The desktop research determined that there was no Plant Community Types (PCTs) within the Subject Site but there were a wide range Threatened Ecological Communities (TECs), and threatened flora and fauna within 5 km of the subject site (Locality). However, a large percentage of the Threatened fauna were marine and freshwater wetland species that would not occur in the Subject Site or Development Site due to the lack of those habitats.

The field survey determined that trees, shrubs, groundcover, and the managed lawns and playing fields were planted vegetation and did not represent any PCTs or TECs that occur within the Locality. There was no threatened flora observed within the Subject Site that could be significantly impacted. The vegetation did not contain any microhabitat features such as hollow-bearing trees, logs, rocks, burrows or nests. The vegetation could provide marginal foraging habitat for threatened fauna but there was no threatened fauna observed within the Subject Site.

Analysis of the Development Site determined that here would be a new disturbance area of 0.2520 ha that would mostly be on the managed lawns. Due to the BWPS being surrounded by sugarcane fields, buildings and a road on the other side close to the Richmond River, it was determined that all the threatened terrestrial fauna would have a nil or low likelihood of using habitat in the Construction Site. In addition, the lack of any suitable habitat or microhabitat in the Construction Site means that no threatened fauna would be significantly impacted.

The conclusions were that no threatened communities, flora or fauna species were recorded within the Subject Site or are considered to have a moderate to high likelihood of occurrence. As such, the proposed development is unlikely to cause a significant impact to any threatened communities, species or populations listed under the NSW BC Act or EPBC Act.

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

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Kleinfelder Australia Pty Ltd (Kleinfelder) were engaged by ADCO Constructions Pty Ltd (ADCO), on behalf of School Infrastructure New South Wales (SINSW), to prepare a Flora and Fauna Assessment Report (FFAR) to support a Development Application under Part 4 of EP&A Act and Section 3.36 of the T&I SEPP for Broadwater Public School. The works under Broadwater Public School are part of the Northern Rivers Flood Recovery Program. The proposed development is located entirely within the grounds of 9 Byrnes Street, Broadwater, New South Wales (NSW) 2478 (Lot 501 DP755624 and Lots 4 - 5 DP1043232) (hereafter referred to as the "Subject Site") (**Figure 1**). The Subject Site is located in Bundjalung Country.

The following terms are used throughout this report to describe geographical areas (**Figure 2**).

- **Subject Site** – 9 Byrnes Street, Broadwater, NSW 2478 (Lot 501 DP755624 and Lots 4 - 5 DP1043232)
- **Development Site** – area within the Subject Site proposed for development of the new school construction and landscaping.
- **Locality** – land within a 5 km radius of the Subject Site.

This report identifies flora, fauna and threatened species present, or likely to occur within the Subject Site based on species and/or habitats detected during field surveys and threatened flora and fauna records from the locality. An assessment of the likely impacts on identified threatened species, habitat features, wildlife corridors and vegetation communities as a result of the proposed development is also undertaken.

1.2 SITE LOCATION

The site is located in Bundjalung Country at 9 Byrnes Street, Broadwater, NSW 2478, and is legally described as Lot 501 DP755624 and Lots 4 - 5 DP1043232 (**Figure 1**). The Subject Site is located within the Richmond Valley Local Government Area and has an area of approximately 0.87 ha and falls from the western boundary (3.0 m Australian Height Datum (AHD)) to the eastern boundary (1.6 m AHD).

The Subject Site has two street frontages:

- Baraang Drive (western boundary).
- Byrnes Street (southern boundary).

The site is primarily cleared land, with the exception of the existing groups of linear trees and gardens that have been planted around the boundary and between buildings (**Figure 2**).

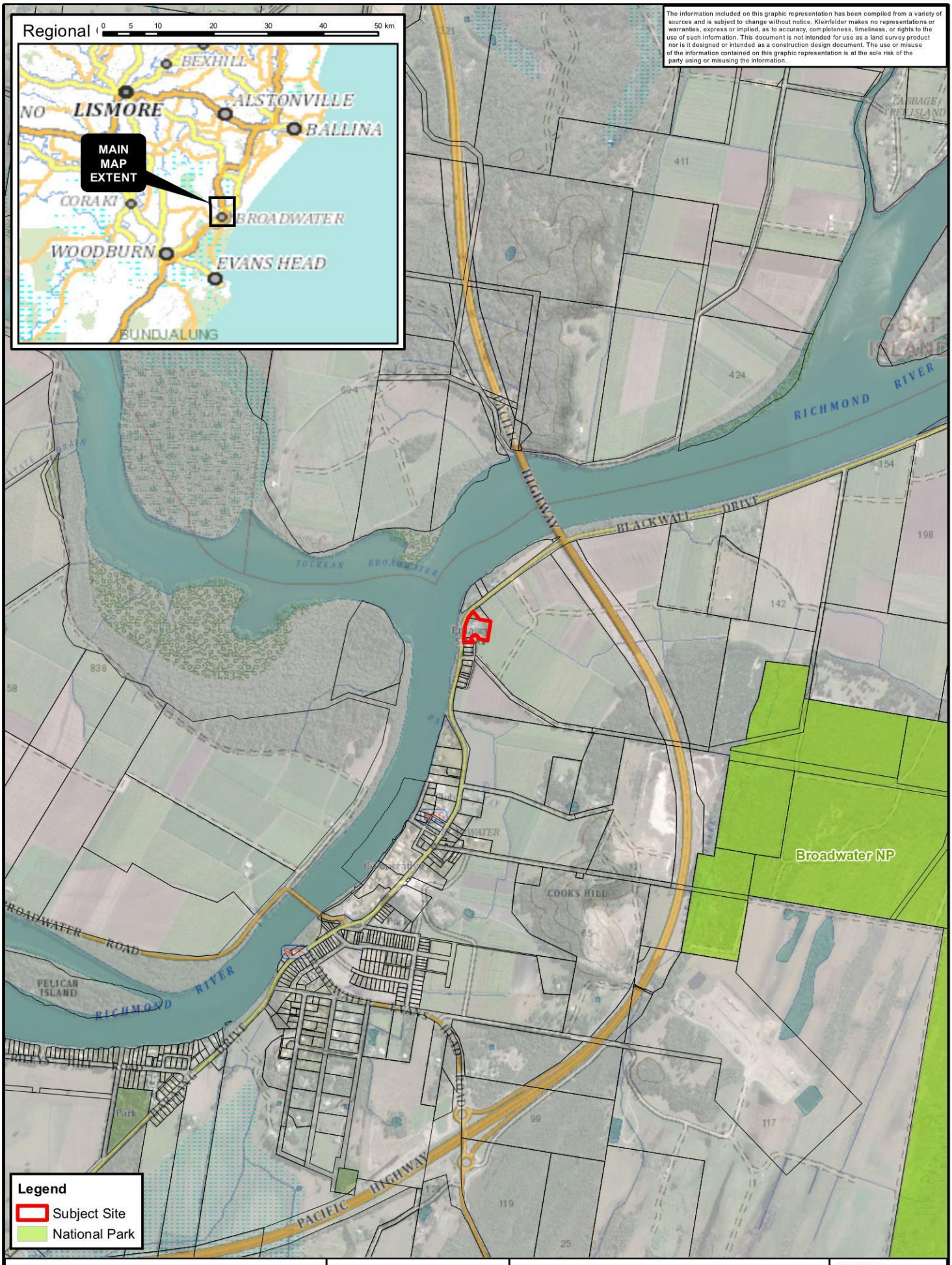
1.3 SITE DESCRIPTION

The site has the existing school and infrastructure and planted vegetation, including lawns and playing fields. The Subject Site is located within the Clarence - Richmond Barriers and Beaches Landscape (Mitchell 2002), which is associated with beaches, dunes, swamps and lagoons on Quaternary coastal sands, with inner and outer barrier dune sequences with a general elevation 0 to 25m and local relief to 10m. There are no mapped watercourses within the Subject Site. The nearest watercourse is the Richmond River located approximately 25 m to the west of the Subject Site.

The Subject Site has been cleared of the original native vegetation and replanted with a mixture of native and exotic vegetation including lawns and playing fields.

1.4 SURROUNDING DEVELOPMENT

The Subject Site and areas surrounding the Subject Site are zoned as RU1 (Rural Primary Production) with some residential properties along Byrnes Streets and Paringa Drive and farmland to the east. The Deferred Matter land is associated with the Richmond River.



PROJECT REFERENCE:	24001279
DATE DRAWN:	2/08/2023 Version 1
DRAWN BY:	RHourigan
DATA SOURCE:	NSW DFSI - 2020 Nearmap - 2021

Locality

FIGURE: **1**

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Broadwater PS:
Northern NSW
Flood Recovery – Ecological Assessment
SINSW03370-22

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PROJECT REFERENCE:	24001279
DATE DRAWN:	8/7/2023 Version 1
DRAWN BY:	KWormington
DATA SOURCE:	NSW DFSI - 2020 Nearmap - 2021

Subject Site

Broadwater PS:
Northern NSW
Flood Recovery – Ecological Assessment
SINSW03370-22

FIGURE:

2

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1.5 PROJECT DESCRIPTION

The existing buildings at Broadwater Public School, 9 Byrnes Street, Broadwater (Lot 4 & 5, Deposited Plan (DP) 1043232 and Lot 501 DP 755624) were significantly inundated during the February 2022 floods and most of the structures are no longer habitable due to the damages caused by the flood waters. As a result, the NSW Department of Education is proposing to demolish the existing school buildings and construct a new elevated school building to replace it. The floor level of the new building will be located above the design flood level to increase flood resistance and create useable undercroft spaces.

A development application will be submitted to Richmond Valley Council for these works.

Works will comprise the following:

- Site preparation including site establishment works, earthworks and relocation of heritage bell.
- Demolition of existing school buildings.
- Construction of a new elevated school building, with at-grade (undercroft) amenities and storage, including:
    - Ground Level:
        - Open undercroft space for covered outdoor learning and play.
        - Male and female amenities and accessible toilet / change room facility.
        - Cleaners' store.
        - Sports Store
        - Equipment and general store.
    - Elevated Level:
        - New administration comprising interview room, clerical spaces, Principal's office, staff room, sick bay, store and male, female and accessible amenities.
        - School library with computer room, store, main communications room and library office.
        - Three (3) General Learning Spaces (GLS) with learning commons and multi-purpose space.
        - Canteen with open servery space.
        - Store.
        - Male, female and accessible amenities.
        - Mechanical plant.
- New and hard soft landscaping including replacement playing field, playground, half games court and vegetable garden and new yarning circle.

It is not proposed to increase staff or student numbers as a result of these works.

1.6 REPORT OBJECTIVES

The objectives of the combined assessment include:

- Complete a desktop assessment including relevant threatened biota and regional vegetation mapping.
- Describe the flora and fauna (and their habitats) present on, or likely to occur on the Subject Site.
- Identification of native vegetation, noting the extent and condition of plant community types, as well as the presence, condition and extent of any threatened ecological communities.
- Assess the relevance and value of the Subject Site for threatened species and ecological communities (and their habitats) listed under the NSW Biodiversity Conservation Act 2016 (BC Act).
- Assess the potential impacts of the proposed development on threatened species and ecological communities, pursuant to Section 7.3 of the BC Act (5-part test).
- Assess the potential requirements of a species impact statement or a biodiversity development assessment report if the proposed development significantly affect threatened species, pursuant to Section 7.8 of the BC Act.
- Assess that the likely significant effect on threatened species, populations or ecological communities is the only likely significant effect on the environment, a species impact statement may be obtained under Part 4 of the EP&A Act instead of an environmental impact statement, pursuant to Section 221ZX of the FM Act.

- Comment on the likely occurrence and relevance of matters of national environmental significance listed under the Commonwealth Environment Planning and Biodiversity Conservation Act 1999 (EPBC Act).
- Describe steps to avoid and mitigate any identified impacts on flora and fauna and to protect the natural environment of the Subject Site.

2 LEGISLATIVE CONTEXT

2.1 COMMONWEALTH LEGISLATION

2.1.1 *Environment Protection & Biodiversity Conservation Act 1999*

The purpose of the 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.

MNESs 4 and 5 are relevant to this assessment. As part of the current assessment, MNES that are predicted to occur within the locality (applying a 10 km buffer) were obtained from the on-line Protected Matters Search Tool (DAWE 2021a). 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 *Environmental Planning and Assessment Act 1979* (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 EP&A Regulation 2021.

The project will be assessed under Part 4 of the EP&A Act.

2.2.2 *Biodiversity Conservation Act 2016*

2.2.2.1 Overview

The *Biodiversity Conservation Act 2016* (BC Act), the *Biodiversity Conservation Regulation 2017* (NSW BC Regulation) and amendments to the NSW *Local Land Services Act 2013* (LLS Act) commenced on 25 August 2017. The legislation aims to "maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development". The BC Act repeals several pre-existing Acts, most notably the NSW *Threatened Species Conservation Act 1995* (TSC), the NSW *Nature Conservation Trust Act 2001* and the NSW *Native Vegetation Act 2003*.

The BC Act together with the BC Regulation outlines the framework for addressing impacts on biodiversity from development and clearing. The framework details a pathway to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offset Scheme (The BOS).

2.2.2.2 Entry into the Biodiversity Offset Scheme

Entry into the BOS is triggered by developments, projects and activities that meet criteria or certain thresholds for significant impacts on biodiversity in accordance with Section 6.3 of the BC Act. Alternatively, the BOS can be entered into on an opt-in basis.

Criteria to which the BOS applies includes the following:

- Local Development (assessed under Part 4 of the EP&A Act) that triggers the BOS Threshold or is "likely to significantly affect threatened species" (based on a test of significance pursuant to Section 7.3 of the BC Act). The BOS Threshold has two parts, and is triggered by the following:
    - Clearing of vegetation that exceeds an area threshold (based on the minimum lot size), or
    - Impacts are predicted to occur within an area mapped on the Biodiversity Values Map (the BV Map).
    - State Significant Development (SSD) and State Significant Infrastructure projects (SSI), unless "the Secretary of the Department of Planning, Industry and Environment and the environment agency head determine that the project is not likely to have a significant impact".
    - Biodiversity certification proposals.
    - Clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the BOS threshold and does not require development consent.
    - Clearing of native vegetation that requires approval by the Native Vegetation Panel under the Local Land Services Act 2013.
    - Activities assessed and determined under Part 4 of the *Environmental Planning and Assessment Act 1979* (generally, proposals by government entities) if proponents choose to 'opt in' to the Scheme.

The new Disturbance Area within the Development Site will be 2,520 m^2 of planted vegetation made up of some planted tree but mostly lawn areas. 0.374 ha will be returned to Managed Lawns. The proposed development at BWPS will result in no clearing or impacts to native vegetation communities, but has an area clearing threshold of 1 ha based on the Subject Site's minimum lot size of 40 ha. There are no areas mapped on the BV Map within the Subject Site. As such, the proposed development does not trigger entry into the BOS, thus a Biodiversity Development Assessment Report (BDAR) is not required to support the DA under this criteria.

The current assessment has considered the likelihood of occurrence of threatened species and ecological communities listed under the BC Act in **Section 4** and **Appendix A** of this report.

2.2.3 Biosecurity Act 2015

Under the *Biosecurity Act 2015* (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." Under the Act, a biosecurity impact "is an adverse effect on the economy, environment, or the community that arises, or has the potential to arise, from a biosecurity matter." This legislation is addressed in **Section 4.1.3.**

2.2.4 Coastal Management Act 2016

The *Coastal Management Act 2016* establishes a strategic framework and objectives for managing coastal issues in NSW. The Act promotes a focus on ecologically sustainable development in relation to the 'coastal zone' as defined by the Act comprising of four coastal management areas:

- Coastal Wetlands and Littoral Rainforests Area – areas which display the characteristics of coastal wetlands or littoral rainforests.
- Coastal Vulnerability Area – areas subject to coastal hazards such as coastal erosion and tidal inundation.
- Coastal Environment Area – areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included.

- Coastal Use Area – land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) officially commenced on 1 March 2022 and Chapter 2 covers how development proposals are assessed if they are in a coastal zone, and is supported by detailed mapping. Chapter 2 was the previously the Coastal Management SEPP 2018.

Chapter 2 gives effect to the objectives of the *Coastal Management Act 2016* from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone. It defines the four coastal management areas in the Act through detailed mapping and specifies assessment criteria that are tailored for each coastal management area. Councils and other consent authorities must apply these criteria when assessing proposals for development that fall within one or more of the mapped areas.

The Subject Site does contain Proximity Area for Coastal Use Areas and Coastal Environment Map Area. As such, the *Coastal Management Act 2016* does apply to this development.

2.2.5 Fisheries Management Act 1994

The FM Act outlines the framework to conserve fish stocks and key habitats by conserving threatened species, populations and ecological communities of fish and marine vegetation, and promote ecologically sustainable development.

The current assessment has considered the likelihood significant effects on threatened species and communities in regard to Section 221ZX of the Act.

2.2.6 Water Management Act 2000

Controlled activities carried out in, on or under waterfront land are regulated by the *Water Management Act 2000* ("WM Act"). 'Waterfront land' is defined as the bed of any river, lake or estuary, and the land within 40 m of the river bank, lake shore or estuary mean high water mark. No mapped waterways exist within the Subject Site. The Richmond River high water mark is approximately 25 m to the west of the Subject Site, 35 m from the existing infrastructure, and 75 m from BWPS new construction footprint. However, since the existing infrastructure will be disturbed, the new construction does constitute a 'controlled activity' in accordance with the WM Act.

Consideration of direct or indirect impacts to aquatic and riparian habitat is provided in **Section 5.1.4**. Mitigation measures are detailed in **Section 5.2.2.**

2.2.7 State Environmental Planning Policy (Biodiversity & Conservation) 2021 - Koala.

The State Environmental Planning Policy (Biodiversity & Conservation) 2021 (B&C SEPP) aims (see Chapter 3) to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas (*Phascolarctos cinereus*) to support a permanent free-living population over their present range and reverse the current trend of Koala population decline. Where an approved Koala Plan of Management (KPoM) applies to the land, council's determination of the development application must be consistent with the approved KPoM that applies to the land.

The B&C SEPP does apply to land zoned RU1 in LGAs listed in Schedule 1 of the SEPP (Koala Habitat protection) 2021, which includes the Ballina LGA. Therefore the B&C SEPP does apply to the Subject Site. The Richmond Valley Council does not have a Koala management Plan, therefore Koala habitat within the Locality of the Subject Site was determined from the Richmond Valley Koala Habitat Atlas (Mitchell, D 2008) and State Vegetation Type Map NSW Extant PCT mapping. This showed that there was Secondary Koala Habitat 700 m to the east containing the Koala food trees; Swamp Mahogany, *Eucalyptus bancroftii* and *E. tindaliae*.

The Subject Site is separated from the Secondary Koala Habitat by sugar cane crops. It is possible that Koalas could use the Subject site for foraging but it is unlikely.

2.3 LOCAL PLANNING INSTRUMENTS

2.3.1 Richmond Valley Local Environmental Plan 2012

The Subject Site is located within the Richmond Valley LGA. The Richmond Valley Local Environmental Plan 2012 (Richmond Valley LEP) controls development within the Subject Site through zoning and development controls. The objective for the environment associated with Land zoned RU1 (Primary Production) are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- Education Establishments are permitted with consent.

These controls are described in greater detail by the supporting Richmond Valley Development Control Plan 2021 (Richmond Valley DCP), described below.

2.3.2 Richmond Valley Development Control Plan 2021

The Richmond Valley DCP Chapter A-2.1 supports the Richmond Valley LEP by providing additional detail and guidance on addressing vegetation management issues associated with development. Vegetation management activities in the RU1 zone should be undertaken in accordance with the provisions of the *Local Land Services Act 2013* and the *Biodiversity Conservation Act 2016*.

3 MATERIALS AND METHODS

3.1 DESKTOP ASSESSMENT

3.1.1 Aerial Imagery

Historical aerial imagery was reviewed to assess the extent of vegetation clearing that has previously occurred within the Subject Site. Aerial imagery from 1954 was retrieved from NSW Globe (2022).

3.1.2 Database Searches

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

- The SVTM NSW Extant PCT mapping through the SEED portal (Geocortex Viewer for HTML5 (nsw.gov.au)) was used to determine the vegetation mapping for the Subject Site.
- The NSW State Vegetation Type Map: Plant Communities Release C1.1.M1 (DPE 2022).
- The BioNet Atlas of NSW Wildlife (Dept of Planning and Environment 2023) for previous records of threatened species, populations and ecological communities (as listed under the BC Act) within a 5 km radius of the Subject Site.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW 2023a) Protected Matters Search Tool (5 km buffer).
- State Environmental Planning Policy (Resilience and Hazards) 2021 – Map (http://webmap.environment.nsw.gov.au/PlanningHtml5Viewer/?viewer=SEPP_CoastalManagement) was used to determine if any Coastal Wetlands or Littoral Rainforest are mapped within the Subject Site.
- The Biodiversity Values Map and Threshold Tool (Biodiversity Values Map and Threshold tool (nsw.gov.au)) was used to generate a Biodiversity Values Map and Threshold Report to determine if any areas of the Subject Site are mapped as having high biodiversity value.
- The occurrence of regulated waterways within the Subject Site was reviewed by obtaining Hydroline Mapping from NSW Land and Property Information (Water Management (General) Regulation 2018 Hydro Line spatial data | Water (nsw.gov.au)).
- Relevant published literature on threatened biota (see References).

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 Subject Site, and their likelihood of occurrence (**Appendix A**).

3.2 FIELD SURVEY

3.2.1 Vegetation Assessment

A diurnal inspection of the Subject Site and surrounds was undertaken on 11 August 2022 to provide specific observations for this report and the broader BWPS project.

Native vegetation types were identified based on dominant flora species present within each structural layer (i.e. canopy, shrub and ground layers). Exotic or highly modified native vegetation was defined based on structure and species composition. Where required, boundaries of vegetation types and communities were marked with a hand-held GPS and mapped using geographical information system (GIS) software.

Vegetation and habitats were compared with descriptions provided in the BioNet Vegetation Classification to identify PCTs. Vegetation types were also assessed against identification criteria for State and Commonwealth listed threatened ecological communities (DCCEEW 2023b; Office of Environment and Heritage 2023).

One (BWPS1) 400 m² floristic plot/transects was sampled across the Subject Site in accordance with Section 5.3.4 of the NSW Biodiversity Assessment Method (BAM) (DPIE 2020a) (**Figure 3**). Plot/transects were positioned to sample areas that were most representative of the floristic characteristics of potential PCTs. Percentage cover and relative abundance was recorded for all plant species. A list of plant species within other planted vegetation areas of the Subject Site was also recorded.

Plant identification and nomenclature were based on species descriptions presented within The Flora of New South Wales Volumes 1 to 4 (Harden, G (ed.) 1993) and with reference to taxonomic updates in PlantNET - The Plant Information Network System of Botanic Gardens Trust, Sydney, Australia (National Herbarium of NSW 2023).

3.2.2 Fauna and Habitat Assessment

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

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

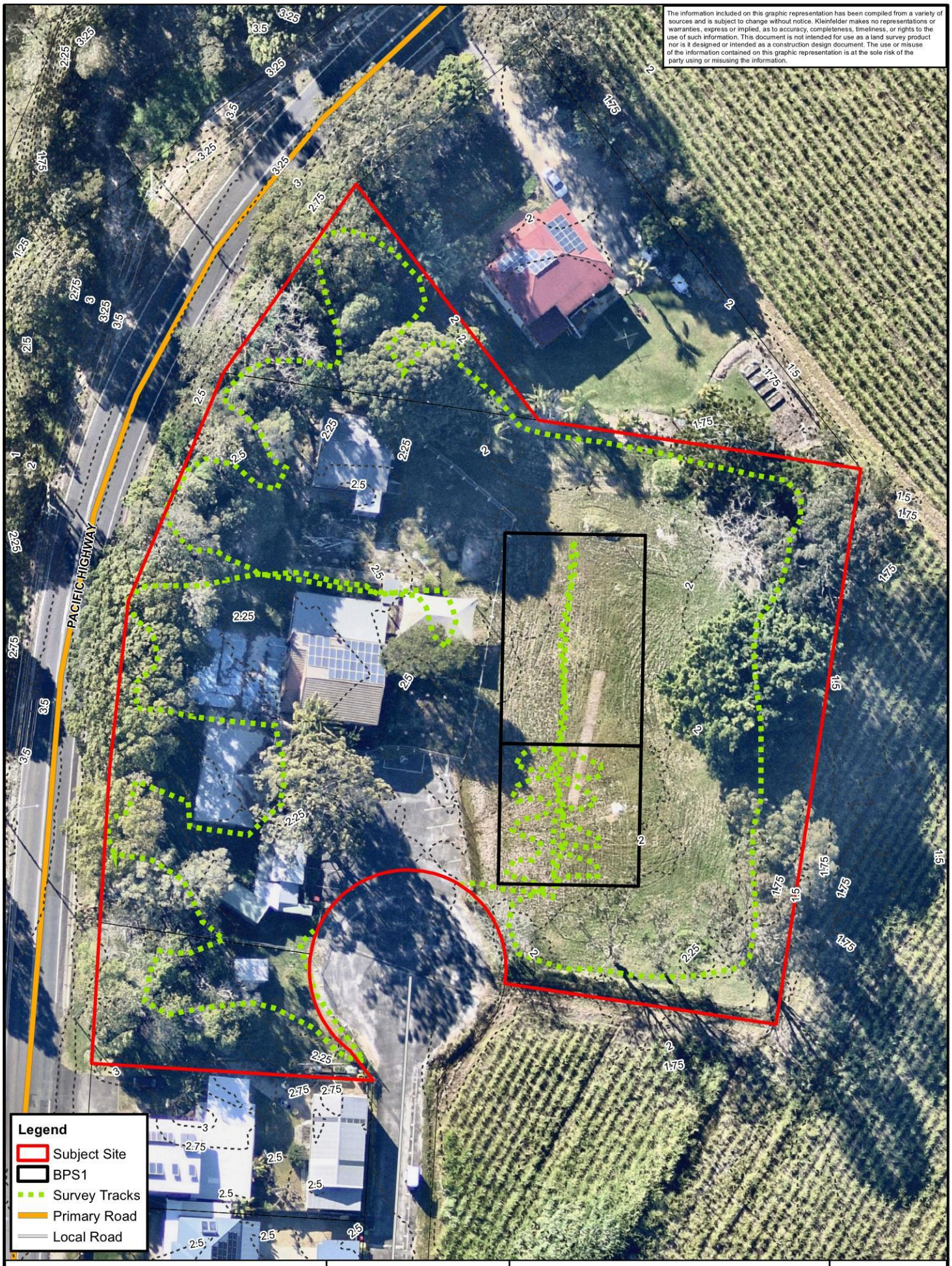
- Koala feed trees.
- Foraging trees for threatened birds.
- Hollow-bearing trees.
- Potential roosts for microbats.
- Vegetated ponds, riparian vegetation and drainage lines for frogs and waterbirds.
- Woody debris, leaf litter and bush rock.

Diurnal opportunistic and incidental observations of fauna species were recorded during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces. A full survey following *Threatened Species Survey and Assessment: Guidelines* was not required due to all the vegetation being planted.

3.3 Survey Limitations

The survey techniques and survey effort applied for this study were commensurate with the nature and condition of the Subject Site. Due to these limitations, priority was given to habitat assessment for relevant threatened biota. A 'likelihood of occurrence' assessment was applied to all species previously recorded or predicted to occur within the locality based on State and Commonwealth information sources. No fauna trapping, nocturnal surveys or targeted surveys following NSW Threatened Biodiversity Survey and Assessment: Guidelines for developments and activities (working draft) (DEC 2004) for threatened fauna species were deemed appropriate given the nature of the site.

While a minimal diversity of native and exotic flora species was recorded, a longer survey duration or multiple seasonal surveys may have resulted in the detection of a greater diversity of species. The whole of the small Subject Site is considered to be planted vegetation and unsuitable for most threatened plant species known to occur in the locality; therefore, the survey effort that is recommended in the NSW Guide to Surveying Threatened Plants (DPIE 2020b) was not considered to be applicable.



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PROJECT REFERENCE:	24001279
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DATA SOURCE:	NSW DFSI - 2020 Nearmap - 2021

Survey Effort

Broadwater PS:
Northern NSW
Flood Recovery – Ecological Assessment
SINSW03370-22

FIGURE:

3

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4 RESULTS

4.1 DESKTOP

4.1.1 Aerial Imagery

Historical aerial imagery for the Subject Site is presented in **Plate 1**. This imagery indicates that the woody vegetation within the Subject Site was cleared prior to 1966 with linear tree lines around the boundary. The Nearmap aerial imagery from 2023 (downloaded August 2023) shows that some of the vegetation present in 1966 has been cleared for infrastructure and most vegetation was planted throughout the subject after 1966 (**Figure 2**). The trees on the western boundary, which are still present, are non-native Camphor Laurels (*Cinnamomum camphora)* (**Plate 5)**.

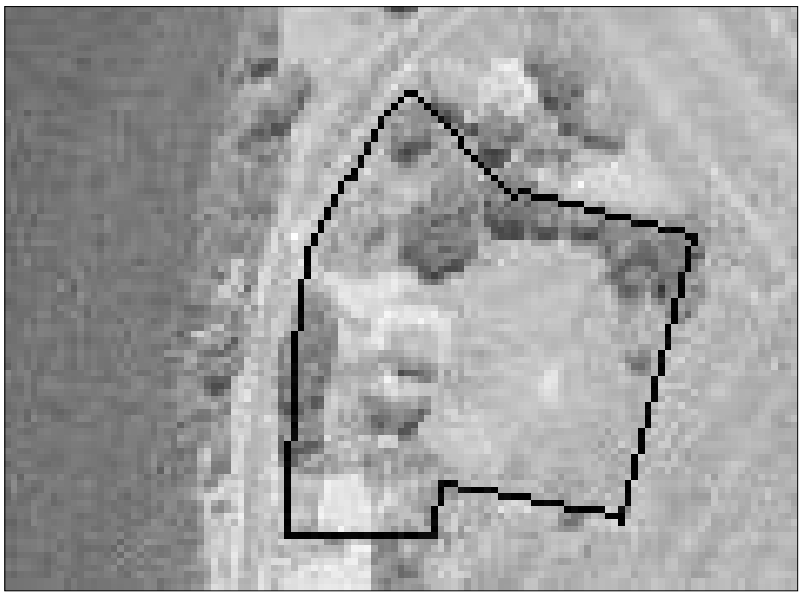

Plate 1: Aerial photograph of Broadwater Public School (NSW Globe 1966)

4.1.2 Database Searches

The results from the database searches are in **Appendix H**.

4.1.3 Threatened Communities, Flora and Fauna

A search of the NSW Bionet Atlas for records of threatened communities, flora and fauna species within 5 km of the Subject Site returned a list of 12 communities, 14 threatened flora species, 41 birds, 13 mammals, 2 reptiles and 2 amphibians. A search of the Department of Environment and Energy Protected Matter Search Tool returned a list of 4 threatened ecological communities, 31 threatened plants, 37 threatened birds, 11 mammals, 6 reptiles, 2 amphibians, 5 fish, 1 lamprey, 5 sharks, 1 mollusc and 2 insects. There were another 29 migratory species that could occur within a 5 km radius of the Subject Site**.**

The results from the above searches were entered into the Likelihood of Occurrence (LoO) table in **Appendix A**. There were not any Biodiversity Values or PCTs mapped within the Subject Site (**Figure 2** and **Section 4.3**). The above threatened species are discussed in **Sections 4.5 and 4.6**.

Due to the Subject Site being a terrestrial area only; marine and freshwater wetland mammals, birds, reptiles and fish have not been included in the LoO table.

4.1.4 Coastal Management Area

The Subject Site occurs within a Proximity Area for Coastal Wetlands Proximity Area, Coastal Use Areas, and Coastal Environment Map Area, but is outside of the Coastal Wetlands associated with the Richmond River. The Coastal Management SEPP (2018) is relevant to future development.

4.1.5 Waterways

There were no regulated waterways associated with the Subject Site, however, the Richmond River is 25 m from the western boundary. Therefore, the new construction does constitute a 'controlled activity' in accordance with the WM Act. Consideration of direct or indirect impacts to aquatic and riparian habitat is provided in **Section 5.1.4**. Mitigation measures are detailed in **Section 5.2.2.**

4.2 VEGETATION ASSESSMENT

4.2.1 Flora Diversity

A total of 70 flora species were recorded within the Subject Site, including 33 exotic species of which 3 are considered 'High Threat Exotics" or listed Priority Weeds for the North Coast Local Land Services Region under the Biosecurity Act 2015 (NSW) (NCLLS 2021). No threatened flora species were identified within the Subject Site during field surveys. A list of the flora species identified within the Subject Site is provided in **Appendix B Table 6**. There were a large number of exotic garden plants that were not included.

A total of 28 plant species were identified during the assessment in BAM BWPS 1. These consisted of 15 native species and 5 exotic species. Plant species comprised of the following growth forms:

- 0 Trees (TG)
- 0 Shrubs (SG)
- 14 Grass and grasslike (GG) species
- 13 Forbs (FG)
- 1 "Other" growth forms

4.2.2 Priority Weeds

Three priority weed species were identified for the North Coast Local Land Services (LLS) Region (Department of Primary Industries 2023).

Table 1: Weed species requiring control within the Subject Site

Family	Scientific Name	Common Name	Weeds of National Significance (WONS)	Priority weeds of the North Coast LLS (Biosecurity Act)	High Threat Weeds (BAM)
Asparagaceae	*Asparagus asparagoides*	Bridal Creeper	✓	✓	✓
Asteraceae	*Senecio madagascariensis*	Fireweed	✓	✓	✓
Pontederiaceae	*Eichhornia crassipes*	Water Hyacinth	✓	✓	✓

Mitigation measures to prevent the spread of weeds are presented in **Section 5.2.**

4.3 PLANT COMMUNITY TYPES

4.3.1 Overview

The vegetation within the Development Site was assigned to vegetation zones based on floristics and vegetation condition (**Figure 4**). Vegetation Zones comprised the following:

- **Vegetation Zone 1**: Planted Vegetation – includes native/exotic trees and shrubs with understorey plants.
- **Vegetation Zone 2**: Managed Lawns - planted native/exotic grasses and exotic forbs.

There were no Plant Community Types (PCTs) identified at BWPS.

The vegetation communities within the Subject Site (**Figure 4**) were characterised by Planted Vegetation (**Plate 2 - Plate 7**) and Managed Lawns, also planted **(Plate 8** and **Plate 9)**. A summary of vegetation communities is provided in **Table 2**. Full descriptions of each vegetation zone are provided in the following sub-sections. Floristic and structural plot data is provided in **Appendix C**. The extent of each vegetation zone is illustrated on **Figure 4**.

None of the vegetation communities identified with any Plant Community Types (PCTs). There were no Threatened Ecological Communities (TECs) identified within the Subject Site.

Table 2: Vegetation Communities within the Subject Site

Vegetation Community	Vegetation Formation	Vegetation Class	Area (ha) within Subject Site	Area (ha) within Development Site
Vegetation Zone 1: Planted Vegetation	NA	NA	0.3477 ha	0.0335 ha
Vegetation Zone 2: Managed Lawns	NA	NA	0.3428 ha	0.2185 ha
Total			**0.6905 ha**	**0.2520 ha**
Fauna Habitat				
Hollow-bearing trees (HBTs)	None		None	None
Woody debris, leaf litter and bush rock.	None		None	None
Nests	None		None	None
Waterbodies/watercourses	None		None	None

In addition to the 0.0335 ha of Planted vegetation that will be removed, including 9 trees, there will one native tree removed to allow the school to connect to the power transmission lines on the western side of the Subject Site (Northern Tree Care 2023). None of the trees are threatened species and 1 is an exotic species (Camphor Laurel). There will also be 12 dead trees removed from the Planted Vegetation in the southwestern corner of the Subject Site. These trees died because of flood inundation in early 2022 and are being removed for safety reasons due to hazards associated with falling dead branches and trees. Other vegetation and canopy trees associated with the dead trees will not be disturbed.

4.3.2 Vegetation Zone 1

Table 3: Planted Vegetation

PCT	Vegetation Formation
Vegetation Formation and Class	N/A
Area within Development Site	0.0335 ha (0.3477 ha within the Subject Site)
Survey Effort	Meander
Floristic description	The vegetation within this zone is characterised by a canopy, a shrub layer and ground layer comprising of a mix of planted native/exotic species. The groundcover is predominantly exotic (**Plate 2 - Plate 7**).
Condition within Development Site	The vegetation within this zone is characterised by a mix of planted native/exotic trees and shrubs, the majority of which are not locally indigenous.
Justification for PCT selection	Vegetation within this zone is not representative of a PCT.
Status	**BC Act:** N/A **EPBC Act:** N/A
PCT % Cleared	N/A

Plate 2: **Planted Native/Exotic trees and Gardens within the Subject Site**

Plate 3: **Planted Native/Exotic trees and gardens within the Subject Site**

Plate 4 **Planted Native/Exotic trees and gardens within the Subject Site**

Plate 5: **Planted Native/Exotic trees and gardens within the Subject Site**

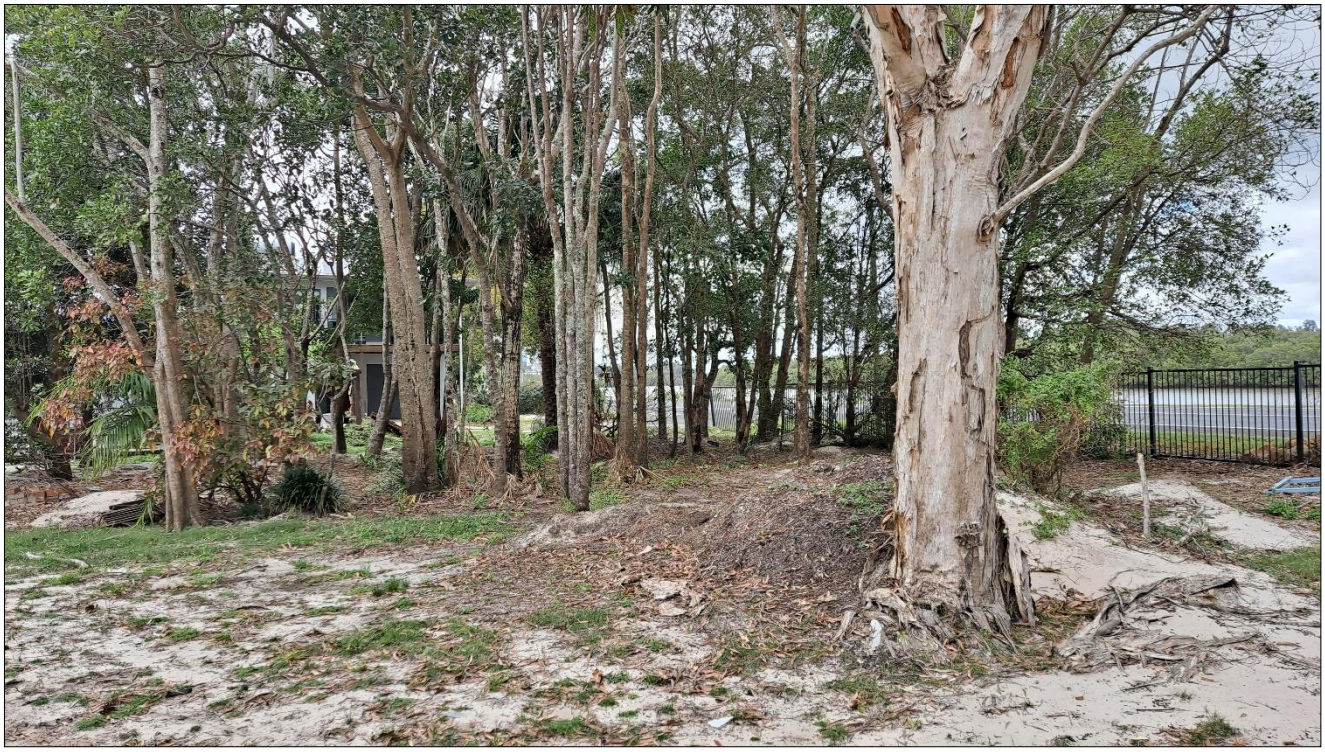

Plate 6: **Planted Native/Exotic trees and gardens within the Subject Site**

Plate 7: **Planted Native/Exotic trees and gardens within the Subject Site**

4.3.3 Vegetation Zone 2

Table 4: Managed Lawns

PCT	Vegetation Formation
Vegetation Formation and Class	N/A
Area within Development Site	0.2185 ha (0.3428 ha within the Subject Site)
Survey Effort	BAM Plot and Meander
Floristic description	The vegetation within this zone is characterised by an absence of a canopy and a shrub layer. A large proportion of the lawned areas were covered in sand from the 2022 flooding. The Managed Lawns were characterised by Green Couch (*Cynondon dactylon*), Queensland Blue Couch (*Digitaria didactyla*), several native Cyperus species, and by Kikuyu (*Pennisetum clandestinum) and a wide range of other exotic species* (**Plate 8** and **Plate 9**).
Condition within Development Site	The vegetation within this zone is characterised by a mix of planted native/exotic grasses with exotic forbs throughout.
Justification for PCT selection	Vegetation within this zone is not representative of a PCT.
Status	**BC Act:** N/A **EPBC Act:** N/A
PCT % Cleared	N/A

Plate 8: Area of a Managed Lawns within the Subject Site (Biodiversity Assessment Method Site BWPS1)

Plate 9: Managed lawns with *Eucalyptus robusta* within the Subject Site

0 2.5 5 10 15 20 25
Scale 1:612 Metres
N

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DATE DRAWN: 8/7/2023 Version 1
DRAWN BY: KWormington
DATA SOURCE:
NSW DFSI - 2020
Nearmap - 2023

Vegetation Zones

Broadwater PS:
Northern NSW
Flood Recovery – Ecological Assessment
SINSW03370-22

FIGURE:
4

J:\00 CLIENT FILES\125103_ADCO\24001279_Northern Rivers Schools\Mapping\230731_Broadwater_Fig04_VegZone_A4P.mxd

4.4 Threatened Ecological Communities

A search of the BioNet Atlas of NSW Wildlife (Dept of Planning and Environment 2023) returned 12 records of threatened ecological communities (TECs) within a 5 km radius of the Subject Site. An EPBC Protected Matters Search (DCCEEW 2023a) returned one additional TEC within the locality of the Subject Site (**Appendix A**). None of the above TECs were within the Subject Site.

4.5 Threatened Flora Species

A total of 37 native flora species were detected within the Subject Site during field surveys (**Appendix B**). None were threatened flora species. A search of the BioNet Atlas of NSW Wildlife returned 15 records of threatened plant species within a 5 km radius of the Subject Site. None of the above were within the Subject Site. An EPBC Protected Matters Search returned a list of 17 additional threatened plant species predicted to occur within the locality of the Subject Site. A "likelihood of occurrence' assessment determined that no threatened flora species have a moderate or high likelihood of occurrence within the Development Site, based on habitat suitability and occurrence of records within the locality.

See **Appendix A** for likelihood of occurrence assessment for threatened flora species within the Subject Site.

4.6 Fauna Habitat

Fauna habitat within the Subject Site is characterised by linear strips of planted trees and shrubs, and open managed (mown) grassland areas. All the vegetation within the Development Site is highly managed, and therefore there is little leaf litter and no logs, trees or shrub cover that would otherwise provide important habitat for ground dwelling native fauna or hollow trees that would provide denning or roosting for hollow dependent species. As such most of the vegetation within the Development Site is unlikely to constitute habitat for threatened species and only minor habitat for locally occurring species associated with urban/suburban environments.

4.7 Threatened Fauna Species

A total of 7 native fauna species were detected within the Subject Site during field surveys (**Appendix C**). None were threatened fauna species. A search of the BioNet Atlas of NSW Wildlife returned a list of 5 threatened terrestrial fauna species that have previously been recorded within 5 km of the Subject Site. None of the above were recorded in the Subject Site. An EPBC Protected Matters Search returned an additional 19 threatened terrestrial fauna species and 7 migratory terrestrial species predicted to occur within the locality of the Subject Site. No threatened species have been recorded in the Subject Site.

A "likelihood of occurrence" assessment (see **Appendix A**) determined that one threatened fauna species (Koala) had a moderate likelihood of occurrence within the Development Site. Based on the occurrence of largely unsuitable habitat throughout the Subject Site no other fauna had a moderate or high likelihood of occurrence within the Development Site. The Koala was further assessed in Section 4.8, Appendix D and Appendix E.

4.8 Koala Habitat

The Richmond Valley Koala Habitat Atlas (Mitchell, D 2008) and State Vegetation Type Map NSW Extant PCT mapping showed that there was Secondary Koala Habitat 700 m to the east containing the Koala food trees; Swamp Mahogany, *Eucalyptus bancroftii* and *E. tindaliae*. Koala have not been recorded in this location, but have been recorded in Koala habitat 700 m to the south east of the Subject Site and on the western side of the Richmond River. However, the Subject Site is separated from the Koala habitat by sugar cane crops and the Richmond River. It is possible that Koalas could use the Subject site for foraging but it is unlikely. There were two Koala food tree species (Blue Gum *Eucalyptus tereticornis* and Swamp Mahogany *E. robustus*) on the Subject Site. Two of the Swamp Mahogany at the southern end of the subject site will be removed but it is highly unlikely these would cause any significant impacts on Koalas (**Appendix A**).

Due to the removal of 2 Koala feed trees in the Subject Site, the Koala was further assessed by the 5 Factor Test of Significance under Section 7.3 of the BC Act and under EPBC Act Significant Impact Guidelines . Both the 5

Factor Test and the Significant Impact Guidelines determined that there would not be significant impact on the Koala (**Appendix D** and **Appendix E**).

4.9 EPBC Protected Matters

No EPBC Act listed threatened species were recorded within the Subject Site. A 'likelihood of occurrence' assessment was conducted for all threatened species and migratory species returned by the EPBC Protected Matters Search (**Appendix A**). No threatened species, population or ecological community listed under the EPBC Act were identified as occurring within the Subject Site or having a moderate to high likelihood of occurrence within the Subject Site except for the Koala which has been recorded in the Locality.

The Koala was assessed under EPBC Act Significant Guidelines (**Appendix E**) which determined the Koala would not be Significantly Impacted.

5 DISCUSSION

5.1 IMPACT ASSESSMENT

5.1.1 Impacts to Native Vegetation

The proposed development will not directly impact any PCTs, including TECs, within the Development Site (**Figure 4 and Appendix A**). Impacts to planted vegetation will include:

- **Vegetation Zone 1**: Planted Vegetation (0.0335 ha).
- **Vegetation Zone 2**: Managed Lawns (0.2185 ha).

It should be noted that the Development Site contains most of the existing infrastructure which will become playing fields and other recreation areas containing managed Lawns and gardens. Mitigation measures to minimise the potential for disturbance of native species within the Subject Site are presented in **Section 5.2**.

5.1.2 Impacts to Fauna

Potential indirect impacts of the proposed development on resident fauna populations include the following:

- Noise during the construction phase may cause minor disturbance to resident fauna within the locality and disrupt their natural behaviour.
- Pollution such as chemical spills from construction machinery may have adverse effects on the water quality and biota within downstream aquatic habitat.
- Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of sediment. Sedimentation could adversely affect the water quality within any downstream aquatic habitat.

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

5.1.3 Impacts to Threatened Species

No threatened species were identified within the Subject Site during the assessment. Additionally, no threatened species were assessed as having a moderate or high likelihood of occurrence except the Koala (**Appendix A**). However, the 5 Part Test of significance under the BC Act and the assessment of Significance under the EPBC ACT determined the Koala would not be significantly impacted. Therefore, the proposed development is unlikely to impact on threatened species or their habitats.

5.1.4 Impacts to Aquatic Habitat

The Development Site is located within 35 m of the Richmond River and its mangrove vegetation, but there is no obvious drainage line from the Subject Site into the Richmond River. However, due to the proximity to the river, any drainage from BWPS will find its way into the river. There will not be any direct impacts from the development site but there may be potential indirect impacts to the Richmond River.

Potential indirect impacts include the following:

- The excavation of soil within the Subject Site during the construction phase has the potential to facilitate sediment movement into areas of mangrove vegetation along the Richmond River.
- The introduction of chemicals such as fuels for vehicles and machinery during the construction phase has the potential to cause pollution to downstream aquatic habitat.

Recommendations to reduce the potential for adverse environmental impacts to aquatic habitat are presented in **Section 5.2**.

5.1.5 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 impacts to native vegetation under the proposed development will occur. No other known projects within the locality are known to have relevance to this project

that could exacerbate cumulative impacts. Any related development proposed within the site, as well as those external to the site, should consider 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 proposed development considers existing biodiversity values within the Subject Site, including minor impacts to areas of Planted Vegetation located within the school grounds.

The ecological values existing within the Planted Vegetation, which are to be minimised as a result of the proposed development design, include the following:

- The vegetation within this Subject Site is planted native and exotic trees but could provide foraging for some fauna species.
- The vegetation is in a low to moderate condition, with a mostly native tree canopy with a midstorey and shrub layer.
- The vegetation does not contain important fauna habitat features.
- The vegetation was observed as being in use by a number of local bird species and possible suitable habitat for highly mobile threatened species common within the locality (i.e. Grey Headed Flying Fox (*Pteropus poliocephalus*) but not arboreal mammals.

The footprint of the proposed development is positioned only to impact the managed lawns and a small area of Planted Native vegetation. As a result the proposed development will not impact threatened species, threatened populations or their habitat.

Appropriate mitigation measures have been detailed below to further minimise any indirect impacts to biodiversity values within the site and the environment.

5.2.2 Mitigation Measures

5.2.2.1 Erosion Control

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

- Installation of erosion and sediment control structures surrounding the Planted Vegetation area and excavation works within the development site prior to any construction works and in accordance with Managing Urban Stormwater: Soils and Construction (The Blue Book).
- Regular inspection of erosion and sediment control measures, particularly following rainfall events to ensure their ongoing functionality.
- Avoid stockpiling of materials adjacent to native vegetation, but instead use areas that are already cleared/ disturbed.
- Undertake maintenance of silt fences and other mitigation measures to isolate runoff.
- Any trenching activities for services should aim to minimise open trenches and ensure appropriate sedimentation management of the excavated material and any open entry / exit points of the trench.

5.2.2.2 Dust Control

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

- Setting maximum speed limits for all traffic within the Subject Site to limit dust generation.
- Application of dust suppressants or covers on soil stockpiles.

5.2.2.3 Chemical Spills

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.

5.2.2.4 Vegetation Clearing (Tree Removal)

Nine trees will be cleared, so a qualified Ecologist may be required to oversee the felling of the trees or be required for species that could nest in the Managed Lawns and need relocation, e.g. Masked Lapwing.

5.2.2.5 Tree and Habitat Protection Measures

Specific measures to minimise the impacts to trees, fauna habitat and Threatened Ecological Communities within the Subject Site should include:

- Clearly delineate the boundaries of the project footprint to prevent any unnecessary clearing beyond its extent.
- All retained trees are to be protected in accordance with AS 4970 – 2009.
- It is recommended that all civil contractors that enter the site are made aware of the importance of preserving retained trees and understand the tree protection measures that are put in place to preserve retained trees. Appropriate signage such as 'no go zone' or 'environmental protection area' should be installed.
- Prior to demolition works Tree Protection Fencing (TPF) and/or zones as identified in AS 4970 – 2009 is recommended to be located under the guidance of an appointed site arborist. Unless specified otherwise the location of tree protection fencing is to be positioned to allow for adequate work access and/or be located at the extremity of the Tree Protection Zone (TPZ) (approximately 12.6m for the subject site). Where design and construction access may be restrictive timber beam trunk protection is recommended to be installed, with ground protection mats provided to protect underlying tree roots within tree protection zones or designated protection areas.
- Unless approved otherwise, activities prevented within the TPZ (12.6m) include machine excavation, including trenching, storage & work preparation, wash down areas, soil level change, utility services and physical damage to trees.
- In accordance with AS4970 - 2009 a Project or Site Arborist (at least AQF 5) is to be engaged to monitor, supervise excavation within TPZ setbacks, if required, advise and provide certification of protection works conducted.
- Where approved by the arborist the pruning of roots at or below 30mm in diameter is to be conducted in accordance with AS4970 – 2009. Root protection during works within the TPZ, will occur such that tree roots are not damaged or ripped beyond the point of excavation by site machinery. Where larger roots have been encountered, they are to be referred to the arborist for further advice.
- For deep excavations exposed roots at the excavated cut face are to be protected with jute mesh, geotextile fabric or similar being secured in place to avoid drying of roots and the exposed soil profile.
- Any additional works outside of the area assessed as part of this report, if required, will be referred to any arborist before works commence.
- Any pruning of tress to comply with AS4373 Pruning Standards, and specifically be conducted in accordance with Safe Work Australia – Guide to managing risks of tree trimming and removal works 2016.
- Should there be any uncertainty with tree protection requirements the development site superintendent shall contact the appointed qualified arborist for advice prior to works occurring.
- Ensure vehicle and equipment parking areas and stockpile areas are identified and positioned to avoid areas containing ecological value.
- Limit the use of pesticides in the project footprint where possible to avoid contamination of nearby watercourses/wetland areas.
- Increased human activity (from workers and traffic levels) directly adjacent to sensitive habitat areas may cause disturbance to flora and fauna species in adjoining habitat.
- Levels of lighting within the site will be reduced to a minimal level to reduce any adverse effects upon the essential behavioural patterns of light-sensitive fauna. Lighting should comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting.

5.2.2.6 Weed Management

Specific measures to minimise the impacts of weed invasion to retained native vegetation areas within the Subject Site should include:

- The fungal pathogens *Phytophthora cinnamomi* and Myrtle Rust (*Puccinia psidii*) are known to occur in the Ballina LGA however, it is unknown if they occur within the Development Site. These pathogens can have devastating impacts on native plant communities and inhabiting fauna if not properly managed.

- Ensure soil and seed material is not transferred in accordance with measures outlined in the CEMP.
- Weed infestations within the construction footprint are to be identified and mapped prior to construction.

5.2.2.7 Management of Displaced Fauna

There is unlikely to be displaced fauna species unless there are species that nest in the trees or on open ground, or species exposed to open trenches from service installations:

- Should a native species nest in the Managed Lawns, this area should be fenced until the use of the nesting by the species is complete, or it has been inspected by a suitably trained Ecologist.
- Trenches should ideally be filled the same day of excavation. If they are left open overnight they should be inspected the following morning by an appropriately qualified person, and any trapped fauna extracted and released.
- All handling of fauna species should be conducted by a suitably trained Ecologist.
- Displaced fauna species are to be relocated to adjacent bushland.
- If any injured fauna species are found during the construction period, construction must stop immediately so that the injured animal can be safely removed and taken to a vet or wildlife carer.

6 CONCLUSION

The proposed development will not require the removal of any native vegetation consistent with PCTs or TECs. A small area (0.0335 ha) of Vegetation Zone 1 (Native and exotic trees and shrubs) will be cleared under the proposed development but most of the vegetation clearing will be 0.2185 ha of managed lawns.

No threatened communities, flora or fauna species were recorded within the Subject Site or are considered to have a moderate to high likelihood of occurrence except the Koala which, determined by assessments, would not be significantly impacted. As such, the proposed development is unlikely to cause a significant impact to any threatened communities, species or populations listed under the NSW BC Act or the EPBC Act.

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

7 REFERENCES

DCCEEW (2023a) *EPBC Act Protected Matters Search Tool http://environment.gov.au/epbc/protected-matters-search-tool*. Department of Climate Change, Energy, the Environment and Water, Canberra, Australia.

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APPENDIX A – THREATENED COMMUNITIES AND SPECIES DATABASE SEARCH

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Subject Site was obtained from the following databases:

- NSW DPIE BioNet Atlas (BioNet) (Dept of Planning and Environment 2023): (http://www.bionet.nsw.gov.au/).
- Commonwealth - Protected Matters Search Tool (PMST) (DCCEEW 2023a): (https://www.environment.govSPRAT.au/epbc/protected-matters-search-tool).

Further resources used to inform the threatened species database search included:

- NSW DPIE BioNet Threatened Biodiversity Profiles (Office of Environment and Heritage 2023): (Threatened biodiversity profile search | NSW Environment, Energy and Science).
- Species Profile and Threats Database (SPRAT) (DCCEEW 2023b). Available at: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

An assessment was then made of the likelihood of the threatened species, populations, and ecological communities reported or modelled to occur in the locality occurring within the Development Site or using the habitat within the Development Site as an essential part of a foraging range.

The table below summarises the likelihood of threatened species and EPBC Act listed migratory species occurring within the Development Site based on the habitat requirements of each species.

A brief definition of the likelihood of occurrence criteria is provided below:

- Known – species identified within the site during surveys.
- High – species known from the area (DPIE BioNet Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site.
- Moderate – species may be known from the area, potential habitat is present within the site.
- Low – species not known from the area and/or marginal habitat is present within the site.
- Nil – habitat requirements not met for this species within the site.

Due to the Subject Site being a terrestrial area; marine and freshwater wetland mammals, birds, reptiles and fish have not been included in Table 5. References used for habitat information include:

- NSW DPIE BioNet Threatened Biodiversity Profiles (Office of Environment and Heritage 2023).
- Species Profile and Threats Database (SPRAT) (DCCEEW 2023b).
- PlantNet (National Herbarium of NSW 2023)
- Pizzey and Knight Digital Edition (Pizzey and Knight 2017).

Note: Species recorded in the BioNet Atlas Species Sightings Search over 5 km from the Subject Site are not considered in the locality due to the minimum area available from the search covering greater than a 5 km radius.

Table 5: 'Likelihood of Occurrence' (LoO) table (Assess Req = further assessment required)

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
		BC Act	EPBC Act						
Threatened Ecological Communities									
1.	Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion	E	-	K	Bionet	Coastal Cypress Pine Forest characteristically has a closed to open canopy of Coastal Cypress Pine (*Callitris columellaris*), which may sometimes be mixed with eucalypts such as Pink Bloodwood (*Corymbia intermedia*), Blackbutt (*Eucalyptus pilularis*) or Scribbly Gum (*E. signata*), wattles including Salwood (*Acacia disparrima subsp. disparrima*) and also Black She-oak (*Allocasuarina littoralis*), Coast Banksia (*Banksia integrifolia subsp. integrifolia*) or Old-man Banksia (*B. serrata*) and/or rainforest trees. The understorey of shrubs, sedges and herbs is typically open to sparse.	Absent from Development Site	Nil	No
2.	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	Bionet	Coastal Saltmarsh occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. It is frequently found as a zone on the landward side of mangrove stands. Characteristic plants include *Baumea juncea*, Sea Rush (*Juncus krausii subsp. australiensis*), Samphire (*Sarcocornia quinqueflora subsp. quinqueflora*), Marine Couch (*Sporobolus virginicus*), Streaked Arrowgrass (*Triglochin striata*), Knobby Club-rush (*Ficinia nodosa*), Creeping Brookweed (*Samolus repens*), Swamp Weed (*Selliera radicans*), Seablite (*Suaeda australis*) and Prickly Couch (*Zoysia macrantha*). Occasionally mangroves are scattered through the saltmarsh. Tall reeds may also occur, as well as salt pans.	Absent from Development Site	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
3.	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community. (Same EPBC Act)	-	E	K	BioNet PMST	The ecological community is found within the South Eastern Queensland (SEQ), NSW North Coast (NNC), Sydney Basin (SYB) and part of the South East Corner (SEC) IBRA7 bioregions. The canopy layer is dominated by *Casuarina glauca* (Swamp Oak, Swamp She-oak).	Absent from Development Site	Nil	No
4.	Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	-	E		PMST	The Coastal Sclerophyll Swamp Forest often has a layered canopy, dominated by melaleucas and/or *Eucalyptus robusta.*	Absent from Development Site	Nil	No
5.	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	BioNet	Typically occurs on silts, muds or humic loams in low-lying parts of floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes. Dense grassland or sedgeland vegetation, often less than 0.5 metre tall and dominated by amphibious plants including *Paspalum distichum* (water couch), *Leersia hexandra* (swamp rice-grass), *Pseudoraphis spinescens* (mud grass) and *Carex appressa* (tussock sedge).	Absent from Development Site	Nil	No
6.	Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	BioNet	Littoral Rainforest is generally a closed forest, the structure and composition of which is strongly influenced by its proximity to the ocean. The canopy is dominated by rainforest species, with scattered emergent individuals of sclerophyll species, such as Angophora costata, Banksia integrifolia, Eucalyptus botryoides and Eucalyptus tereticornis occur in many stands. There is considerable floristic variation between stands and in particular areas, localised variants may be recognised.	Absent from Development Site	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
7.	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E	-	K	BioNet	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions is an ecological community of subtropical rainforest and some related, structurally complex forms of dry rainforest. The trees are taxonomically diverse at the genus and family levels, and some may have buttressed roots. A range of plant growth forms are present in Lowland Rainforest, including palms, vines and vascular epiphytes.	Absent from Development Site	Nil	No
8.	Lowland Rainforest of Subtropical Australia (Same EPBC Act)	E	CE	K	BioNet PMST	The ecological community occurs on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on enriched rhyolitic soils and basaltically enriched metasediments. Lowland Rainforest mostly occurs in areas <300 m above sea level. In addition, Lowland Rainforest typically occurs in areas with high annual rainfall (>1300 mm).	Absent from Development Site	Nil	No
9.	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	E	-	K	BioNet	Lowland Rainforest on Floodplain supports a rich diversity of plants and animals. Typical tree species in the community include figs (F*icus macrophylla, F. obliqua* and *F. watkinsiana*), palms (*Archontophoenix cunninghamiana and Livistona australis*), Silky Oak (*Grevillea robusta*), Black Bean (*Castanospermum australe*) and Brush Cherry (*Syzygium australe*).	Absent from Development Site	Nil	N0

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
10.	Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion (Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland Bioregions)	E	E	K	BioNet PMST	The most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. siderophloia* (grey ironbark), *Corymbia intermedia* (pink bloodwood) and, north of the Macleay floodplain, *Lophostemon suaveolens* (swamp turpentine). Other trees may be scattered throughout at low abundance or locally common at few sites. These include *Eucalyptus moluccana* (grey box), *E. propinqua* (grey gum), *E. seeana* (narrow-leaved red gum), *Angophora subvelutina* (broad-leaved apple), *E. robusta* (swamp mahogany), *Eucalyptus resinifera* subsp. *Hemilampra* (red mahogany), *E. acmenoides* (white mahogany), *Angophora woodsiana, A. paludosa* and rainforest trees such as *Ficus* spp. (figs) and *Cupaniopsis* spp. (tuckeroos).	Absent from Development Site	Nil	No
11.	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	BioNet	This community is found on the coastal floodplains of NSW. It has a dense to sparse tree layer in which Casuarina glauca (swamp oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (lilly pilly), *Glochidion* spp. (cheese trees) and *Melaleuca* spp. (paperbarks) may be present as subordinate species.	Absent from Development Site	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
12.	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	BioNet	The trees may exceed 25 m in height, but stands dominated by Melaleuca ericifolia typically do not exceed 8 m in height. The community also includes some areas of fernland and tall reedland or sedgeland, where trees are very sparse or absent. The most widespread and abundant dominant trees include *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) Scattered trees, include *Callistemon salignus* (sweet willow bottlebrush), *Casuarina glauca* (swamp oak) and *Eucalyptus resinifera* subsp. *hemilampra* (red mahogany), *Livistona australis* (cabbage palm) and *Lophostemon suaveolens* (swamp turpentine).	Absent from Development Site	Nil	No
13.	Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E	-	K	BioNet	*Themeda australis* is the dominant species in the Themeda Grassland on seacliffs and coastal headlands in the ecological community. *Themeda australis* is an extremely widespread species, but in this community it may have a distinctive appearance, being prostrate and having glaucous leaves. *Banksia integrifolia subsp. integrifolia*, *Westringia fruticosa* and *Acacia sophorae* occurs as an emergent shrub.	Absent from Development Site	Nil	No
Flora									
1.	*Acronychia littoralis* Scented Acronychia	E	E	14	PMST	Scented Acronychia occurs in coastal areas (<2 km from the sea) in sub-littoral rainforest, usually in transitional zones between littoral rainforest and swamp sclerophyll forest, littoral and coastal cypress pine communities or on the margin of littoral forest and cleared land.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
2.	*Archidendron hendersonii* White Lace Flower	V	-	1	BioNet	White Lace Flower is a tree to 18 m tall, with light-brown bark. Its leaves are divided twice, into glossy hairless leaflets separated unequally by the midvein. White Lace Flower occurs in riverine and lowland subtropical rainforest, littoral rainforest, coastal cypress pine forest and their ecotones. It is found on a variety of soils including coastal sands and those derived from basalt and metasediments.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
3.	*Allocasuarina thalassoscopica*	E	E	-	PMST	Dioecious spreading to erect shrub 0.5-.1.5m high. The species is restricted to low closed heathland communities that occurs on clay.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
4.	*Arthraxon hispidus* Hairy Jointgrass	V	V	28	BioNet PMST	Hairy Jointgrass is a creeping grass with branching, erect to semi-erect purplish stems. Long white hairs project around the edge of the leaf. Moisture and shade-loving grass, found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
5.	*Belvisia mucronata* Needle-leaf Fern	E	-	1	BioNet	This fern has an underground stem that is densely covered with dark coloured scales. Fronds are up to 45 cm long, with a 1-5 cm stem. Forms small clumps on trees or rocks in dry rainforest or along creeks in moist open forest.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
6.	*Baloghia marmorata* Jointed Balogia	V	V	-	PMST	Jointed Baloghia is a shrub or small tree growing up to 8 m tall. The bark is greenish-cream, smooth or slightly vertically fissured. Leaves are 6.5 – 15 cm long, Three-leaved Bosistoa grows in lowland subtropical rainforest up to 300 m above sea level.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
7.	*Bosistoa transversa* Yellow Satinheart	V	V	-	PMST	A crooked tree up to 22 m tall with a dense dark-green crown. The broad, leathery leaves are heart-shaped at the base and paired on the stem. Three-leaved Bosistoa grows in wet sclerophyll forest, dry sclerophyll forest and rainforest including highly disturbed habitat up to 300 m in altitude.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
8.	*Cryptocarya foetida* Stinking Cryptocarya	V	V	3	BioNet PMST	The Stinking Cryptocarya is restricted to coastal sands, or if not, then close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
9.	*Cryptostylis hunteriana* Leafless Tongue Orchid	V	V	-	PMST	As its name implies, the Leafless Tongue Orchid has no leaf. It produces an upright flower-stem to 45 cm tall, bearing five to 10 flowers between October and March. Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum *(Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
10.	*Cynanchum elegans* White-flowered Wax Plant	E	E	-	PMST	A climber or twiner with a highly variable form. Mature stems have a fissured corky bark and can grow to 10 metres long and 3.5 cm thick. The leaves are paired and ovate to broadly ovate in shape. Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
11.	*Davidsonia jerseyana* Davidson's Plum	E	E	-	PMST	Slender tree to 10 m high, with few branches, each bearing a tuft of leaves, ± covered with irritant hairs. Confined to the Tweed and Brunswick River catchments, Davidson's plum is known from more than 100 sites. The majority of known sites are from south and east facing slopes in subtropical and riverine rainforest in high rainfall areas at less than 300 m above sea level.	No suitable habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Nil	No
12.	*Davidsonia johnsonii* Smooth Davidsonia	E	E	-	PMST	Smooth Davidson's Plum is a bushy, well-branched tree 5 – 12 m tall, with a dense crown. The smooth, glossy leaves are large and divided into 7 - 9 toothed leaflets. It has a restricted and highly fragmented distribution in Tallebudgera in Queensland to Tintenbar in coastal NSW. The majority of the populations are found in wet sclerophyll forests with a smaller number known from subtropical rainforest and in vegetation ecotones in between sclerophyll and rainforest ecological communities.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
13.	*Diploglottis campbellii* Small-leaved Tamarind	E	E	-	PMST	A large straight tree to 30 m tall. It has greyish-brown bark with vertical cracks. New leaves are at first softly-hairy, but soon become more or less hairless. It occurs in forest types varying from luxuriant lowland subtropical rainforest to drier subtropical rainforest with a *Lophostemon confertus* (Brush Box) open overstorey. The preferred habitat type is well-watered but well-drained sites on basalt-derived soils or alluvium at low altitude.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
14.	*Diuris byronensis* Byron Bay Diuris	E		1	BioNet	Byron Bay Diuris is one of the donkey orchids. This orchid is known from a single location only, at Byron Bay in north-east NSW. Only about 20 plants have been recorded. Occurs in low-growing grassy heath on clay soil.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
15.	*Endiandra floydii* Crystal Creek Walnut	E	E	-	PMST	Small tree, often with coppice shoots at base; young shoots finely hairy with fawn hairs, new leaves pinkish brown. Found in warm-temperate and subtropical rainforest, from sea level to 430 m altitude.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
16.	*Endiandra hayesii* Rusty Rose Walnut	V	V	5	BioNet PMST	Often a small crooked tree, but it can grow to 35 m tall. It has grey to grey-brown bark, which is smooth or slightly scaly. The dull, hairy leaves are egg-shaped and measure 6 – 12 cm long and 3 – 6 cm wide. Sheltered moist gullies in lowland subtropical and warm temperate rainforest on alluvium or basaltic soils.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
17.	*Floydia praealta* Ball Nut	V	V	-	PMST	The Ball Nut inhabits floristically-rich, tall, closed riverine to subtropical rainforest. The species is recorded on gently sloping alluvial levees to moderately sloped foot slopes and hillslopes, as well as steeply sloping scree slopes at altitudes from 50—350 m. This species generally occurs in red loam soil on basalt	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
18.	*Gossia fragrantissima* Sweet Myrtle	E	E	2	BioNet PMST	Small to medium-sized tree to 30 m high; bark brown, rough. Leaves oblanceolate to oblong, 10–25 cm long, 10–30 mm wide. Grows in subtropical and riverine rainforest north from the Clarence River north.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
19.	*Macadamia integrifolia* Macadamia Nut	-	V	-	PMST	Small tree; new growth pale green. It grows in remnant rainforest, preferring partially open areas such as rainforest edges. It spans a wide range of landforms including hill crests, hill slopes, scree slopes and foot slopes, gullies, benches and terrace plains. High nutrient alluvial and volcanic soils predominate.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
20.	*Macadamia tetraphylla* Rough-shelled Bush Nut	V	V	123	BioNet PMST	A small to medium-sized, usually densely bushy, tree growing up to 18m tall. The leaves are 7 – 25 cm long and oblong or slightly lance-shaped. The leaf-margins are toothed and prickly. It is a rare species that generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of these forests and in mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well-drained sites.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
21.	*Marsdenia longiloba (Leichhardtia longiloba)* Slender Marsdenia	E	V	1	BioNet PMST	It is a slender climber of the milk vine group, with pairs of very finely pointed leaves. Habitat is mainly subtropical and warm temperate rainforest, lowland moist or open eucalypt forest adjoining rainforest. Associated species include *Eucalyptus crebra, E. microcorys, E. acmenoides, E. saligna, E. propinqua, Corymbia intermedia* and *Lophostemon confertus*.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
22.	*Oberonia titania* Red-flowered King of the Fairies	V	-	2	BioNet	Epiphyte with 1-several shoots in a tight clump. Grows in a variety of habitats, in subtropical and littoral rainforest, Melaleuca swamps, mangroves and gorges in sclerophyll forest; north from Kendall district.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
23.	*Ochrosia moorei* Southern Ochrosia	E	E	1	BioNet PMST	Erect shrub or small tree to 9 m high, shoots glabrous; terminal leaf buds enclosed in a sticky exudate. Grows in subtropical rainforest in the Tweed and Richmond River districts.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
24.	*Olax angulata* Minnie Water Olax	V	V	-	PMST	It is an upright shrub, which may be parasitic on the roots of other plants. Its stiff branches are often yellowish in colour, with prominent U-shaped ridges. Habitat is dry coastal sand dune heaths and heathy woodlands on sandy soils , often in association with Wallum Banksia (*Banksia aemula*), and dry sandstone Sclerophyll Forests and woodlands.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
25.	Owenia cepiodora *Onionwood*	V	V	-	PMST	Tree up to 30 m high, buds resinous, glabrous; freshly cut bark smells of onions. Occurs in subtropical and dry rainforest from Bangalow to McPherson Range	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
26.	*Pedleya acanthoclada (Desmodium acanthocladum)* Thorny Pea	V	V	-	PMST	Shrub to c. 1 m high; branches rigid, glabrous, spinose. Leaves 3-foliolate; leaflets oblanceolate to oblong, 0.3–2.5 cm long, 1–6 mm wide. Grows mainly along rivers in Lismore-Grafton district	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
27.	*Persicaria elatior* Tall Knotweed	V	V	1	BioNet PMST	It is an erect herb to 90 cm tall, with stalked, glandular hairs on most plant parts. Its leaves are up to 11 cm long and 30 mm wide. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
28.	*Phaius australis* Southern Swamp Orchid	E	E	40	BioNet PMST	This orchid has flower stems up to 2 m tall and large broad leaves with a pleated appearance, both arising from a fleshy bulb near ground level. Swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
29.	*Rhodamnia maideniana* Smooth Scrub Turpentine	CE	CE	6	BioNet PMST	Bushy shrub, commonly 1.5–3 m high, with reddish brown fibrous-flaky bark; young shoots sparsely pubescent, glabrescent. Grows in subtropical rainforest, coastal districts north from Richmond River.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
30.	*Rhodamnia rubescens* Scrub Turpentine	CE	CE	6	BioNet PMST	Shrub or small tree to 25 m high with reddish/brown, fissured bark. Young stems densely covered in fine hairs. Leaves 5–10 cm long, 2–5 cm wide. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
31.	*Rhodomyrtus psidioides* Native Guava	CE	CE	23	BioNet PMST	A shrub or small tree to 12 m high with brown scaly bark. Young branchlets and inflorescences covered with pale hairs. Leaves 5–25 cm long, 2.5–6.5 cm wide with upper surface hairless and glossy. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
32.	*Syzygium hodgkinsoniae* Red Lilly Pilly	V	V	1	BioNet PMST	This is a small tree to about 11 m tall. Its paired leaves are oval shaped or slightly elongated, 8 - 15 cm long, with a short blunt point at the tips. Usually found in riverine and subtropical rainforest on rich alluvial or basaltic soils.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
33.	*Thesium australe* Austral Toadflax	V	V	-	PMST	Austral Toadflax is a small, straggling herb to 40 cm tall. Leaves are pale green to yellow-green, somewhat succulent, 1 - 4 cm long and 0.5 - 1.5 mm wide. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
34.	*Vincetoxicum woollsii (Tylophora woollsii)*	E	E	-	PMST	A slender woody climber that grows to 3 m long. The paired leaves are on stalks 7 - 20 mm long, and are an elongated heart-shape with a firm texture. This species grows in moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins. Plants appear to persist as a network of stems under leaf litter when aerial stems are absent.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
Birds									
1.	*Anseranas semipalmata* Magpie Goose	V	-	1	BioNet	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes.	Marginal suitable habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Low	No
2.	*Anthochaera phrygia* Regent Honeyeater	CE	CE	-	PMST	Mostly recorded in box-ironbark eucalypt associations. At times of food shortage, the species also uses other woodland types and wet lowland coastal forest dominated by Swamp Mahogany or Spotted Gum.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Low	No
3.	*Artamus cyanopterus cyanopterus* Dusky Woodswallow	v	-	1	BioNet	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. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
4.	*Calyptorhynchus lathami lathami* South-eastern Glossy Black-Cockatoo	V	V	4	BioNet PMST	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria. 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.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
5.	*Circus assimilis* Spotted Harrier	V	-	2	BioNet	Occurs in grassy open woodland including *Acacia* and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	No suitable habitat in the Subject Site. One record within the locality. Not recorded in the Subject Site.	Nil	No
6.	*Coracina lineata* Barred Cuckoo-shrike	V	-	3	BioNet	Rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses. They are usually seen in pairs or small flocks foraging among foliage of trees for insects and fruit. They are active birds, frequently moving from tree to tree.	Marginal habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Low	No
7.	*Climacteris picumnus victoriae* Brown Treecreeper	V	V	-	PMST	The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
8.	*Cyclopsitta diophthalma coxeni* Coxen's Fig-Parrot	CE	CE	-	PMST	Coxen's Fig-Parrot occupies habitats that occur from sea level to approximately 900 m above sea level in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest.	Marginally suitable habitat within the Subject Site. No records within the locality. Not recorded during site assessment.	Low	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
9.	*Daphoenositta chrysoptera* Varied Sittella	V	-	17	BioNet	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
10.	*Erythrotriorchis radiatus* Red Goshawk	CE	E	-	PMST	Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, *Melaleuca* swamp forest and riparian *Eucalyptus* forest of coastal rivers.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
11.	*Falco hypoleucos* Grey Falcon	E	E	-	PMST	Medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. The species is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
12.	*Glossopsitta pusilla*	v	-	4	BioNet	Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
13.	*Grantiella picta* Painted Honeyeater	V	V	-	PMST	Inhabits Acacia pendula, Acacia harpophylla, Box-Gum Woodlands and Box-Ironbark Forests. Feeds on the fruits of mistletoes growing on woodland eucalyptus and acacia.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
14.	*Grus rubicunda* Brolga	V	-	7	BioNet	Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged.	No suitable habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Nil	No
15.	*Haliaeetus leucogaster* White-bellied Sea-Eagle	V	M	17	BioNet	Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
16.	*Hirundapus caudacutus* White-throated Needletail	-	V, M	49	BioNet PMST	Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm (eg termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed.	Marginally suitable aerial foraging habitat above the Development Site. Records within the locality. Not recorded during site assessment.	Low	No
17.	*Ixobrychus flavicollis* Black Bittern	V	-	1	BioNet	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
18.	*Lathamus discolor* Swift Parrot	E	CE, M	-	PMST	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. This species does not breed within mainland Australia. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
19.	*Menura alberti* Albert's Lyrebird	V	-	4	BioNet	Mainly occur in the wettest rainforests or wet sclerophyll forests with a wet understorey, often of rainforest plants. Higher densities of Albert's Lyrebirds occur in association with a canopy of eucalypts compared with rainforest lacking eucalypts (for equivalent climate), and in wet sclerophyll forest with greater weights of litter and logs and slower rates of litter decomposition.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
20.	*Ninox strenua* Powerful Owl	V	-	1	BioNet	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider.	No suitable habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Nil	No
21.	*Pandion cristatus* Eastern Osprey	V	-	22	BioNet	Favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. 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 within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
22.	*Pezoporus wallicus wallicus* *Eastern Ground Parrot*	v	-	2	BioNet	The Ground Parrot occurs in high rainfall coastal and near coastal low heathlands and sedgelands, generally below one metre in height and very dense (up to 90% projected foliage cover). These habitats provide a high abundance and diversity of food, adequate cover and suitable roosting and nesting opportunities for the Ground Parrot, which spends most of its time on or near the ground.	No habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Nil	No
23.	*Pomatostomus temporalis temporalis* Grey-crowned Babbler (eastern subspecies)	v	-	21	BioNet	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Live in family groups that consist of a breeding pair and young from previous breeding seasons.	No habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
24.	*Ptilinopus magnificus* Wompoo Fruit-Dove	V		18	BioNet	Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests. Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit. Thought to be an effective medium to long-distance vector for seed dispersal.	No habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
25.	*Ptilinopus regina* Rose-crowned Fruit-Dove	V		24	BioNet	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful.	No habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
26.	*Rostratula australis* Australian Painted Snipe	E	E	-	PMST	In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
27.	*Stagonopleura guttata* Diamond Firetail	V	V	-	PMST	Diamond firetails occur in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. They prefer areas with relatively low tree density, few large logs, and litter cover but high grass cover.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
28.	*Turnix maculosus* Red-backed Button-quail	V	V	-	PMST	The Black-breasted Button-quail is restricted to rainforests and forests, mostly in areas with 770-1200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest. They may also be found in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes	No habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
29.	*Tyto longimembris* Eastern Grass Owl	V		11	BioNet	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains.	No habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
30.	*Tyto novaehollandiae* Masked Owl	v		1	BioNet	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 1000 hectares or more, depending on prey availability. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	No habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Nil	No
31.	*Tyto tenebricosa* Sooty Owl	V		1	BioNet	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation.	No habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
Mammals									
1.	*Chalinolobus dwyeri* Large-eared Pied Bat	V	V	-	PMST	Found in well-timbered areas containing gullies. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features.	Marginal foraging habitat but no suitable roosting or nesting habitat within the Development Site or Subject Site. No records within the locality.	Low	No
2.	*Dasyurus maculatus* Spotted-tailed Quoll	E	E	-	PMST	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. The Spot-tailed Quoll is predominantly nocturnal and rests during the day in dens. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
3.	*Miniopterus australis* Little Bentwing-bat	V	-	8	BioNet,	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca 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.	Marginally suitable foraging habitat but no suitable roosting or nesting habitat within the Development Site. Records within the locality.	Low	No
4.	*Nyctophilus bifax* Eastern Long-eared Bat	V	-	5	BioNet	Lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured.	Marginally suitable foraging habitat but no suitable roosting or nesting habitat within the Development Site. Records within the locality.	Low	No
5.	*Petauroides volans* Greater Glider	E	E	1	BioNet PMST	It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundant hollows. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range.	No suitable habitat within the Development Site. One record within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
6.	*Petaurus norfolcensis* Squirrel Glider	V	-	27	BioNet	Inhabits 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. Prefers mixed species stands with a shrub or Acacia midstorey. Require abundant tree hollows for refuge and nest sites.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
7.	*Petaurus australis australis* Yellow-bellied Glider	V	V	-	PMST	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Requires hollow-bearing trees for nesting and denning.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
8.	*Phascogale tapoatafa* Brush-tailed Phascogale	V	-	3	BioNet	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
9.	*Phascolarctos cinereus* Koala	E	E	711	BioNet PMST	Found in a variety of forest types with suitable feed tree species.	Marginal suitable foraging habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Moderate	Yes
10.	*Planigale maculata* Common Planigale	V	-	2	BioNet	Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water. They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
11.	*Potorous tridactylus* Long-nosed Potoroo	V	V	84	BioNet PMST	The Long-nosed Potoroo is sparsely distributed along the coast and Great Dividing Range of south-east Queensland through NSW. There is limited information about the species habitat in Queensland and NSW. It can be found in wet eucalypt forests to coastal heaths and scrubs. The main factors would appear to be access to some form of dense vegetation for shelter and the presence of an abundant supply of fungi for food	No habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
12.	*Pseudomys novaehollandiae* New Holland Mouse	-	V	1	BioNet PMST	Inhabits open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. Soil type may be an important indicator of suitability of habitat for the New Holland Mouse, with deeper top soils and softer substrates being preferred for digging burrows.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
13.	*Pteropus poliocephalus* Grey-headed Flying-fox	V	V	29	BioNet PMST	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.	Marginal foraging habitat present within the Development Site or camps detected in the Subject Site. Records within the locality. Not recorded during site assessment.	Low	No
14.	*Scoteanax rueppellii* Greater Broad- nosed Bat	V	-	2	BioNet	This species occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland. Although this species usually roosts in tree hollows, it has also been found in buildings.	Marginally suitable foraging habitat but no roosting or nesting habitat within the Development Site. Records within the locality.	Low	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
15.	*Syconycteris australis* Common Blossom-bat	V	-	6	BioNet	Common Blossom-bats often roost in littoral rainforest and feed on nectar and pollen from flowers in adjacent heathland and paperbark swamps. They have also been recorded in a range of other vegetation communities, such as subtropical rainforest, wet sclerophyll forest and other coastal forests. They generally roost individually in dense foliage and vine thickets of the sub-canopy, staying in the same general area for a season.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
16.	*Xeromys myoides* Water Mouse	V	V	-	PMST	Their habitat includes mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands. The main habitat difference at each location is the littoral, supralittoral and terrestrial vegetation which differs in structure and composition. These differences dictate the species' nesting behaviour.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
Reptiles									
1.	*Coeranoscincus reticulatus* Three-toed Snake-tooth Skink	V	V	-	PMST	The Three-toed Snake-tooth Skink has been found in loose, well mulched friable soil, in and under rotting logs, in forest litter, under fallen hoop pine bark and under decomposing cane mulch. n NSW, the Three-toed Snake-tooth Skink has been recorded in dry rainforest, northern warm temperate rainforest, subtropical rainforest, grassy wet sclerophyll forest and shrubby sclerophyll forest	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
Amphibians									

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
1.	*Crinia tinnula* Wallum Froglet	V	-	66	BioNet	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. The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
2.	*Litoria olongburensis* Wallum Sedge Frog	V	E	8	BioNet PMST	The Wallum Sedge Frog is found in ephemeral, seasonal and permanent wetlands with emergent reeds, ferns and/or sedges, in undisturbed coastal wallum swamps. While most common in swamps, the Wallum Sedge Frog may also be found around creeks and freshwater lakes in coastal wallum.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
3.	*Mixophyes fleayi* Fleay's Frog	E	E	-	PMST	Fleay's Frog is associated with montane rainforest and open forest communities adjoining rainforest (. The species occurs along stream habitats from first to third order streams and is not found in ponds or ephemeral pools. Adults may be found in leaf litter and along watercourses in rainforest and adjoining wet sclerophyll forests.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
Insect									
1.	*Argynnis hyperbius inconstans* Australian Fritillary	-	CE	-	PMST	The Australian fritillary usually occurs around river estuaries or open, swampy coastal regions. While the Australian fritillary has been successfully reared on Viola hederaceae in captivity, the subspecies is believed to be host-plant specific in the wild and therefore only occurs in areas where its larval food plant, the arrowhead violet, occurs.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
2.	*Phyllodes imperialis smithersi* Pink Underwing Moth	E	E	-	PMST	The Pink Underwing Moth is found below the altitude of 600 m in undisturbed, subtropical rainforest on rich volcanic soils and fertile alluvium. It occurs in association with the vine *Carronia multisepalea*, a collapsed shrub that provides the food and habitat the moth requires in order to breed. Where *C. multisepalea* attains an upright form, the association with the moth does not occur	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Nil	No
Migratory Species									
1.	*Apus pacificus* Pacific Swift	-	M		PMST	Almost entirely aerial and give spectacular displays of high-speed flying above any habitat, urban or rural. Swifts are most often seen in late summer, nearly always in flocks. They are typically associated with stormy weather when they feed on nuptial swarms of various insects.	Broadly suitable aerial foraging habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Low	No
2.	*Cuculus optatus* Oriental Cuckoo	-	M	1	BioNet PMST	Inhabits rainforest margins, monsoon forest, vine scrub, riverine thickets, wet densely canopied Eucalypt forests, paperbark swamp and mangroves.	No suitable habitat within the Development Site. Records within the locality. Not recorded during site assessment.	Nil	No
3.	*Monarcha melanopsis* Black-faced Monarch	-	M	-	PMST	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical and subtropical rainforest, broadleaf thicket/shrubland. It is also sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Low	No

	Species	Status		Records	Source	Habitat	Summary	LoO	Asess Req
4.	*Motacilla flava*	-	M	-	PMST	Uses short grass and bare ground, swamp margins, sewerage ponds, saltmarshes and playing fields. Rare non-breeding migrant to Australia but common in Europe.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Low	No
5.	*Myiagra cyanoleuca* Satin Flycatcher	-	M	-	PMST	Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moist, tall forests, often occurring in gullies. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Low	No
6.	*Rhipidura rufifrons* Rufous Fantail	-	M	-	PMST	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts, usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Low	No
7.	*Symposiachrus trivirgatus* Spectacled Monarch	-	M	-	PMST	Uses understorey of mountain/lowland rainforests, thickly wooded gullies, waterside vegetation including mangroves below the canopy.	No suitable habitat within the Development Site. No records within the locality. Not recorded during site assessment.	Low	No

APPENDIX B – FLORA SPECIES LIST

Table 6: Flora Species List – BWPS 1 and Planted Vegetation

	Plant Species	Common name	BWPS1	Planted Vegetation
	Native Species		**Ground Cover**	**Vegetation Layer**
	Trees			
1.	*Acacia binerva*	Coastal Mayall		m
2.	*Alphitonia excelsa*	Red Ash		c
3.	*Archidendron grandiflorum*	Pink Lace Fower		m
4.	*Araucaria cunninghamii*	Hoop Pine		c
5.	*Archontophoenix cunninghamiana*	Bangalow Palm		c,m,s,g
6.	*Callitris columellaris*	Bribie Pine		m
7.	*Eucalyptus robusta*	Swamp Mahogany	3	c,g
8.	*Eucalyptus tereticornis*	Blue Gum		c,g
9.	*Ficus benjamina*	Weeping Fig		c
10.	*Ficus macrophylla*	Moreton Bay Fig		m
11.	*Lophostemon confertus*	Queensland Brush Box		c
12.	*Melaleuca quinquenervia*	Broad-leaved Paperbark		c
13.	*Melaleuca viminalis*	Weeping Bottlebrush		m
14.	*Melicope elleryana*	Pink Euodia		c
15.	*Neolitsea australiensis*	Green Bolly Gum		m,s
16.	*Neolitsea dealbata*	Hairy Bolly Gum		m
17.	*#Schefflera actinophylla*	Umbrella Tree		m
18.	*Syzygium australe*	Bush Cherry		s
19.	*#Wodyetia bifurcata*	Foxtail Palm		c,g
	Grass/Grass like			
1.	*Cynondon dactylon*	Green Couch Grass	5	
2.	*Digitaria didactyla*	QLD Blue Couch Grass	10	
3.	*Cyperus difformis*	Dirty Dora	2	g
4.	*Cyperus eragostis*	Tall Flatsedge	1	g
5.	*Cyperus exaltatus*	Giant Sedge	0.5	g
6.	*Cyperus gracilis*	Slender Flatsedge	1	
7.	*Cyperus polystachyos*	Bunchy Flatsedge	0.2	
8.	*Juncus usitatus*	Common Rush	5	g

	Plant Species	Common name	BWPS1	Planted Vegetation
9.	*Lomandra longifolia*	Mat-rush	2	g
10.	*Typha orientalis/ domingensis*	Cumbungi	2	g
	Forb			
1.	*Eclipta prostrata*	False Daisy	0.2	g
2.	*Portulaca oleracea*	Pig Weed	3	
3.	*Persicaria attenuata*	Hairy Knotweed	0.5	g
4.	*Persicaria decipiens*	Slender Knotweed	0.5	g
5.	*Sesuvium portulacastrum*	Sea Purslane	3	
	Other			
1.	*Cordyline rubra*	Red-fruited Palm Lilly		s
2.	*Eustrephus latifolius*	Wombat Berry		g
3.	*Maclura cochinchinensis*	Cockspur Thorn		c
	Non-native spp richness (E)		**Exotic Cover%**	**Vegetation Layer**
	Trees			
1.	*Albizia saman*	Rain Tree		m
2.	*Caryota spp*	Fishtail Palm		s
3.	*Cinnamomum camphora*	Camphor Laurel		c,s,g
	Grass/Grass like			
1.	*Cyperus brevifolius*	Mullumbimby Couch	2	g
2.	*Cyperus rotundus*	Nut Grass	1	
3.	*Eleusine indica*	Crowsfoot		g
4.	*Pennisetum clandestinum*	Kikuyu Grass	1	
5.	*Poa annua*	Annual Bluegrass	0.5	g
6.	*Saccharum spp.*	Sugarcane		g
7.	*Kyllinga brevifolia*	Green Kyllinga	0.1	
	Forbs			
1.	*Ageratum conyzoides*	Billygoat Weed		g
2.	*Bidens pilosa*	Cobblers Peg	1	
3.	*Centella asiatica*	Pennywort	0.5	g
4.	*Commelina benghalensis*	Hairy Commelina		g
5.	*Cuphea carthagenensis*	Columbian Waxweed	0.5	g
6.	*Emilia sonchifolia*	Emilia		g
7.	*Erigeron sumatrensis*	Tall Fleabane		g

	Plant Species	Common name	BWPS1	Planted Vegetation
8.	*Physalis angulata*	Gooseberry		g
9.	*Ranunculus trilobus*	Large Annual Buttercup	0.5	g
10.	*Rorippa palustris*	Marsh Cress	0.5	g
11.	*Rumex Crispus*	Curly Dock	1	g
12.	*Rumex spp*	a Dock		g
13.	*Rumex sanguineus*	Red-veined Sorrel	5	g
14.	*Solanum nigrum*	Blackberry Nightshade		g
15.	*Soliva anthemifolia*	Button Burweed	1	g
16.	*Sphagneticola trilobata*	Singapore Daisy		g
17.	*Trifolium repens*	Clover		g
	Other			
1.	*Dypsis lutescens*	Golden Cane Palm		m,s
2.	*Monstera deliciosa*	Swiss Cheese Plant		s
3.	*Syngonium podophyllum*	Arrowhead Vine		g
	High Threat Exotic			
1.	*Asparagus asparagoides*	Bridal Creeper		g
2.	*Senecio madagascariensis*	Fireweed		g
3.	*Eichhornia crassipes*	Water Hyacinth	0.1	

APPENDIX C – FAUNA SPECIES LIST

Table 7: Fauna Species List

No.	Scientific Name	Common Name	Status		Observation Type*	General Abundance within Development Site**
			BC	EPBC		
	Birds					
1.	*Colluricincla harmonica*	Grey Shrikethrush			O, H	1
2.	*Meliphaga lewinii*	Lewin's Honeyeater			O, H	3
3.	*Grallina cyanoleuca*	Magpie-lark			O, H	2
4.	*Manorina melanocephala*	Noisy Miner			O, H	3
5.	*Cracticus nigrogularis*	Pied Butcherbird			O, H	1
6.	*Trichoglossus haematodus*	Rainbow Lorikeet			O, H	5
7.	*Pardalotus striatus*	Striated Pardalote			O, H	1

*Observation Type: O (Visual Observation), H (Heard whilst on site), E (Evidence recorded inc scats, tracks or markings), R (Recorded through the use of call detectors [level of confidence C: Confident, Pr: Probable, Po: Possible]).

** General Abundance: I (Individual record), UC (Uncommon, 2-5 records), C(Common occurrence on site >5 records)

APPENDIX D - ASSESSMENT OF SIGNIFICANCE (PURSUANT TO SECTION 7.3 OF THE BC ACT)

D.1 FACTORS OF ASSESSMENT - *BIODIVERSITY CONSERVATION ACT 2016*

The five factors considered in the test of significance under s.7.3 of the 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.

Table D1: Factors addressed in the assessment of significance

Factor	Species	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.	-	-	-
(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	-	-	-
(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).	-	-	-
(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.	-	-	-

D1. 2 Threatened mammals

The threatened species assessment on mammals considers the following species:

- Koala (*Phascolarctos cinereus*)

Table D1.2: Threatened mammal species

Factor	Assessment
(a) Effect on life cycle of **threatened species**.	The proposed activity will remove 2 Koala Feed Trees. However, due to the closet Koala habitat being 700 m to the east and separated by Sugar Cane fields, it is unlikely that Koalas would forage in the Subject Site. These loss of 2 koala feed trees in an area without connectivity to the closet koala would not impact on any foraging or potential breeding habitat for this species.
(b) (i) Effect on the extent of **EEC** or **CEEC**.	Not Applicable
(b) (ii) Effect on composition of **EEC** or **CEEC**.	Not Applicable
(c) (i) Extent of habitat removal or modification for **threatened species**, **population,** or **ecological community**	The activity will not modify any habitat utilised or required by this species.
(c) (ii) Extent of fragmentation or isolation of habitat for **threatened species**, **population,** or **ecological community.**	The activity will not impact any wooded vegetation used by Koalas, no fragmentation or isolation will occur. There will not be fenced off area, allowing free transit of fauna.
(c) (iii) The importance of habitat to **threatened species**, **populations,** or **ecological community**.	The habitat to be impacted is associated to the requirements of any of these species, but is not connected to other Koala habitat.
***(d)* Area of Outstanding Biodiversity Value**	Not Applicable
***(e)* Key Threatening Processes**	Key Threatening Processes relevant to the proposed development: ▪ Clearing of native vegetation ▪ Removal of dead wood and dead trees (potential) ▪ Predation by feral predators (potential as a result of increased human activity and discarded waste products attracting such animals) ▪ Invasion of native plant communities by exotic perennial grasses The proposed development may facilitate the above-listed KTP's to a minor extent. This is in consideration of the small scale of proposed impact and the existing disturbed nature of the site.
Conclusion	The proposed activity will not impact any wooded vegetation used by Koalas; 2 Koala feed trees are to be removed but they are not accessible by Koalas. No impact will occur to any foraging or potential breeding habitat for these species. Potential KTPs are likely to be minimal and can be appropriately controlled.

APPENDIX E – EPBC ACT ASSESSMENT OF SIGNIFICANCE

Species Assessed under the EPBC Act Significant Impact Guidelines

The following pertains to Assessments of Significance for direct or indirect impacts to EBPC Act listed threatened species, populations, and communities.

The following species have been assessed under the EPBC Act *Matters of National Environmental Significance Significant impact guidelines 1.1* (DoE 2013) (Significant Impact Guidelines):

- Critically Endangered Species
  - None
- Endangered Species
  - Koala (*Phascolarctos cinereus*)
- Vulnerable Species
  - None
- Migratory Species
  - None

E1 Critically Endangered and Endangered Species – EPBC Act Assessment of Significance

The EPBC Act Significant Impact Guidelines (DoE 2013) state:

> *An action is likely to have a significant impact on a Critically Endangered and Endangered species if there is a real chance or possibility that it will:*
>
> - *lead to a long-term decrease in the size of a population*
> - *reduce the area of occupancy of the species*
> - *fragment an existing population into two or more populations*
> - *adversely affect habitat critical to the survival of a species*
> - *disrupt the breeding cycle of a population*
> - *modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*
> - *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*
> - *introduce disease that may cause the species to decline, or*
> - *interfere with the recovery of the species.*
>
> *A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered, or vulnerable threatened species, occurrences include but are not limited to:*
>
> - *a geographically distinct regional population, or collection of local populations, or*
> - *a population, or collection of local populations, that occurs within a particular bioregion.*

Table E1 Critically Endangered and Endangered Species

Will the action -	Koala - *Phascolarctos cinereus*
- lead to a long-term decrease in the size of a population	The proposed activity will not impact any habitat, foraging or breeding that is accessible by these animals, nor will it result in any direct or indirect impacts to this species, that could result in a long-term decrease in population size.

Will the action -	Koala - *Phascolarctos cinereus*
- reduce the area of occupancy of the species - fragment an existing population into two or more populations	The activity will not impact any habitat required that could be used by this species; thus, there will be no reduction in the area of occupancy nor fragmentation of habitat.
- adversely affect habitat critical to the survival of a species - modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed will impact 2 Koala feed trees but these are not accessible for Koalas. No critical or important habitat will be adversely affected, modified, destroyed, or otherwise impacted that could cause species or species habitat decline.
- disrupt the breeding cycle of a population	The loss of 2 inaccessible feed trees would not impact on the breeding cycle of this species. It may result in increased predators if appropriate management practices are not implemented (such as waste management). Measures have been included in this document to adequately manage such risk; these matters would be further managed through the Construction Environment Management Plan (CEMP).
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat - introduce disease that may cause the species to decline	Mitigation measures are described in this document to suitably manage the potential spread of fungal pathogens that could impact Koala food trees. Ensuring all equipment used to clear and remove vegetation, or that is to be used onsite, is free from fungal contaminants prior to entering the site will result in an acceptable level of risk in maintaining healthy Koala habitat. The risk of an increase in pest animal activity (namely feral rats and cats), can be adequately managed through measures provided in this document and through a CEMP. All vehicles and equipment should also be void of organic matter such as soil or mud that may contain seeds of invasive species. Appropriate management of waste will ensure local and/or wild dogs are not attracted to the area.
- interfere with the recovery of the species.	Implementation of mitigation measures outlined within this document will ensure that the proposed activity does not interfere in the recovery of any of these species.
Conclusion	The proposed activity will only impact on habitat that is not accessible by this species which would not be important or critical to the survival of this species. Risks caused by feral animals and disease can be appropriately managed through measures detailed in this document and by a CEMP. The proposed activity is not likely to result in a significant impact to any critically endangered or endangered species.

APPENDIX F – STAFF CONTRIBUTIONS

The following staff were involved in the compilation of this report.

Table 8: Staff Contributions

Name	Qualification	Title/Experience	Contribution
Dr Kevin Wormington	PhD Ecology	Senior Ecologist	Report Writing and GIS
Dr Howard Rogers	PhD Forest Dynamics and Community Ecology	Principal Ecologist	Report Review
Rachel Hourigan	BSc MEnv	GIS Analyst	GIS Mapping

APPENDIX G – LICENSING

Kleinfelder employees involved in the current study are licensed or approved under the *Biodiversity Conservation Act 2016* (Accreditation Number: 81350, Expiry: 1 May 2024) 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.

APPENDIX H – DATABASE SEARCHES

BioNet Atlas Communities

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Communities in selected area [North: -28.95 West: 153.39 East: 153.49 South: -29.05] returned 0 records for 12 entities.

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Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Community				*Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion*		Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion	E3		K	
Community				*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*		Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community		E	K	
Community				*Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	

Community	*Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3		K
Community	*Lowland Rainforest of Subtropical Australia*	Lowland Rainforest of Subtropical Australia		CE	K
Community	*Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion*	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	E3		K
Community	*Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion*	Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	E3		K
Community	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Community	*Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Community	*Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions*	Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3		K

Bionet Atlas Threatened Species

Yellow highlight indicates marine and wetland species removed from analysis

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) ,Commonwealth listed ,CAMBA listed ,JAMBA listed or ROKAMBA listed Entities in selected area [North: -28.95 West: 153.39 East: 153.49 South: -29.05] returned a total of 1,475 records of 73 species.

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Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3137	*Crinia tinnula*		Wallum Froglet	V,P		66	
Animalia	Amphibia	Hylidae	3202	*Litoria olongburensis*		Olongburra Frog	V,P	V	8	
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*		Powerful Owl	V,P,3		1	
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*		Eastern Osprey	V,P,3		22	
Animalia	Aves	Psittacidae	8913	*^^Pezoporus wallicus wallicus*		Eastern Ground Parrot	V,P,3		2	
Animalia	Aves	Tytonidae	0252	*^^Tyto longimembris*		Eastern Grass Owl	V,P,3		11	
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*		Masked Owl	V,P,3		1	
Animalia	Aves	Tytonidae	9924	*^^Tyto tenebricosa*		Sooty Owl	V,P,3		1	
Animalia	Aves	Cacatuidae	8862	*^Calyptorhynchus lathami lathami*		South-eastern Glossy Black-Cockatoo	V,P,2	V	4	
Animalia	Aves	Anseranatidae	0199	*Anseranas semipalmata*		Magpie Goose	V,P		1	
Animalia	Aves	Procellariidae	0072	*Ardenna carneipes*		Flesh-footed Shearwater	V,P	J,K	2	
Animalia	Aves	Procellariidae	0071	*Ardenna tenuirostris*		Short-tailed Shearwater	P	C,J,K	2	
Animalia	Aves	Scolopacidae	0129	*Arenaria interpres*		Ruddy Turnstone	P	C,J,K	2	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		1	
Animalia	Aves	Accipitridae	0218	*Circus assimilis*		Spotted Harrier	V,P		2	
Animalia	Aves	Campephagidae	0428	*Coracina lineata*		Barred Cuckoo-shrike	V,P		3	
Animalia	Aves	Cuculidae	8922	*Cuculus optatus*		Oriental Cuckoo	P	C,J,K	1	

Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*	Varied Sittella	V,P		17
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		24
Animalia	Aves	Burhinidae	0175	*Esacus magnirostris*	Beach Stone-curlew	E4A,P		1
Animalia	Aves	Scolopacidae	0168	*Gallinago hardwickii*	Latham's Snipe	P	J,K	1
Animalia	Aves	Laridae	0111	*Gelochelidon nilotica*	Gull-billed Tern	P	C	4
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*	Little Lorikeet	V,P		4
Animalia	Aves	Gruidae	0177	*Grus rubicunda*	Brolga	V,P		7
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*	Pied Oystercatcher	E1,P		98
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		17
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	49
Animalia	Aves	Jacanidae	0171	*Irediparra gallinacea*	Comb-crested Jacana	V,P		6
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*	Black Bittern	V,P		1
Animalia	Aves	Scolopacidae	0153	*Limosa lapponica*	Bar-tailed Godwit	P	C,J,K	2
Animalia	Aves	Menuridae	0351	*Menura alberti*	Albert's Lyrebird	V,P		4
Animalia	Aves	Scolopacidae	0149	*Numenius madagascariensis*	Eastern Curlew	P	CE,C,J,K	1
Animalia	Aves	Scolopacidae	0150	*Numenius phaeopus*	Whimbrel	P	C,J,K	1
Animalia	Aves	Charadriidae	8006	*Pluvialis fulva*	Pacific Golden Plover	P	C,J,K	1
Animalia	Aves	Pomatostomidae	8388	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		21
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*	Wompoo Fruit-Dove	V,P		18
Animalia	Aves	Columbidae	0021	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P		24
Animalia	Aves	Laridae	0953	*Sterna hirundo*	Common Tern	P	C,J,K	6
Animalia	Aves	Laridae	0117	*Sternula albifrons*	Little Tern	E1,P	C,J,K	16
Animalia	Aves	Diomedeidae	0861	*Thalassarche cauta steadi*	White-capped Albatross	P	V	1

Animalia	Aves	Diomedeidae	0088	*Thalassarche melanophris*	Black-browed Albatross	V,P	V	1
Animalia	Aves	Laridae	0115	*Thalasseus bergii*	Crested Tern	P	J	11
Animalia	Aves	Scolopacidae	0158	*Tringa nebularia*	Common Greenshank	P	C,J,K	1
Plantae	Flora	Orchidaceae	14732	*^Diuris byronensis*	Byron Bay Diuris	E1,P,2		1
Plantae	Flora	Orchidaceae	7077	*^Oberonia titania*	Red-flowered King of the Fairies	V,P,2		2
Plantae	Flora	Orchidaceae	4480	*^Phaius australis*	Southern Swamp Orchid	E1,P,2	E	40
Plantae	Flora	Fabaceae (Mimosoideae)	7757	*Archidendron hendersonii*	White Lace Flower	V		1
Plantae	Flora	Poaceae	4776	*Arthraxon hispidus*	Hairy Jointgrass	V	V	28
Plantae	Flora	Polypodiaceae	8154	*Belvisia mucronata*	Needle-leaf Fern	E1		1
Plantae	Flora	Lauraceae	3477	*Cryptocarya foetida*	Stinking Cryptocarya	V	V	3
Plantae	Flora	Lauraceae	3491	*Endiandra hayesii*	Rusty Rose Walnut	V	V	5
Plantae	Flora	Myrtaceae	11894	*Gossia fragrantissima*	Sweet Myrtle	E1	E	2
Plantae	Flora	Apocynaceae	1233	*Marsdenia longiloba*	Slender Marsdenia	E1	V	1
Plantae	Flora	Apocynaceae	1176	*Ochrosia moorei*	Southern Ochrosia	E1	E	1
Plantae	Flora	Polygonaceae	5280	*Persicaria elatior*	Tall Knotweed	V	V	1
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE	6
Plantae	Flora	Myrtaceae	4284	*Rhodomyrtus psidioides*	Native Guava	E4A	CE	23
Plantae	Flora	Myrtaceae	4290	*Syzygium hodgkinsoniae*	Red Lilly Pilly	V	V	1
Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		8
Animalia	Mammalia	Vespertilionidae	1336	*Nyctophilus bifax*	Eastern Long-eared Bat	V,P		5

Animalia	Mammalia	Pseudocheiridae	1133	*Petauroides volans*	Southern Greater Glider	E1,P	E	1
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*	Squirrel Glider	V,P		27
Animalia	Mammalia	Dasyuridae	1017	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		3
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	E1,P	E	711
Animalia	Mammalia	Dasyuridae	1045	*Planigale maculata*	Common Planigale	V,P		2
Animalia	Mammalia	Potoroidae	1175	*Potorous tridactylus*	Long-nosed Potoroo	V,P	V	84
Animalia	Mammalia	Muridae	1455	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	1
Animalia	Mammalia	Muridae	1464	*Pseudomys oralis*	Hastings River Mouse	E1,P	E	1
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	29
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		2
Animalia	Mammalia	Pteropodidae	1294	*Syconycteris australis*	Common Blossom-bat	V,P		6
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*	Loggerhead Turtle	E1,P	E	10
Animalia	Reptilia	Cheloniidae	2008	*Eretmochelys imbricata*	Hawksbill Turtle	P	V	2