Site Compatibility Certificate
Preliminary Ecological Assessment (PEA)

Lot 4 DP 844371 and Lot 1 DP 1018270 Bonny Hills NSW

NCA21R129410

18 October 2021

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Bonny Hills NSW

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Prepared for:

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David Martin	Gilbert Whyte	Gilbert Whyte

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Kleinfelder were engaged by the McCloy Group to prepare a Preliminary Ecological Assessment (PEA) to support a Site Compatibility Certificate (SCC) for a proposed Seniors Living development within land located within part of Lot 4 DP 844371 and Lot 1 DP 1018270, Bonny Hills NSW (hereafter referred to as the "Subject Site") (see **Figure 1**). The SCC will be assessed in accordance with the State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Seniors Housing SEPP) under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The following terms are used throughout this report to describe geographical areas (**Figure 1** and **Figure 2**):

- **Study Area –** Lot 4 DP 844371 and Lot 1 DP 1018270 Bonny Hills NSW.
- **Subject Site –** Part of the Study Area subject to the proposed Seniors Living SCC.
- **Locality –** land within a 5 km radius of the Study Area.

This report identifies key biodiversity values existing within the Study Area based on a site assessment, consideration of other state environmental planning policies (SEPPs), and threatened species records within the locality. An assessment of the potential impacts of future development within the Subject Site on identified threatened species, habitat features, wildlife corridors and vegetation communities was also undertaken.

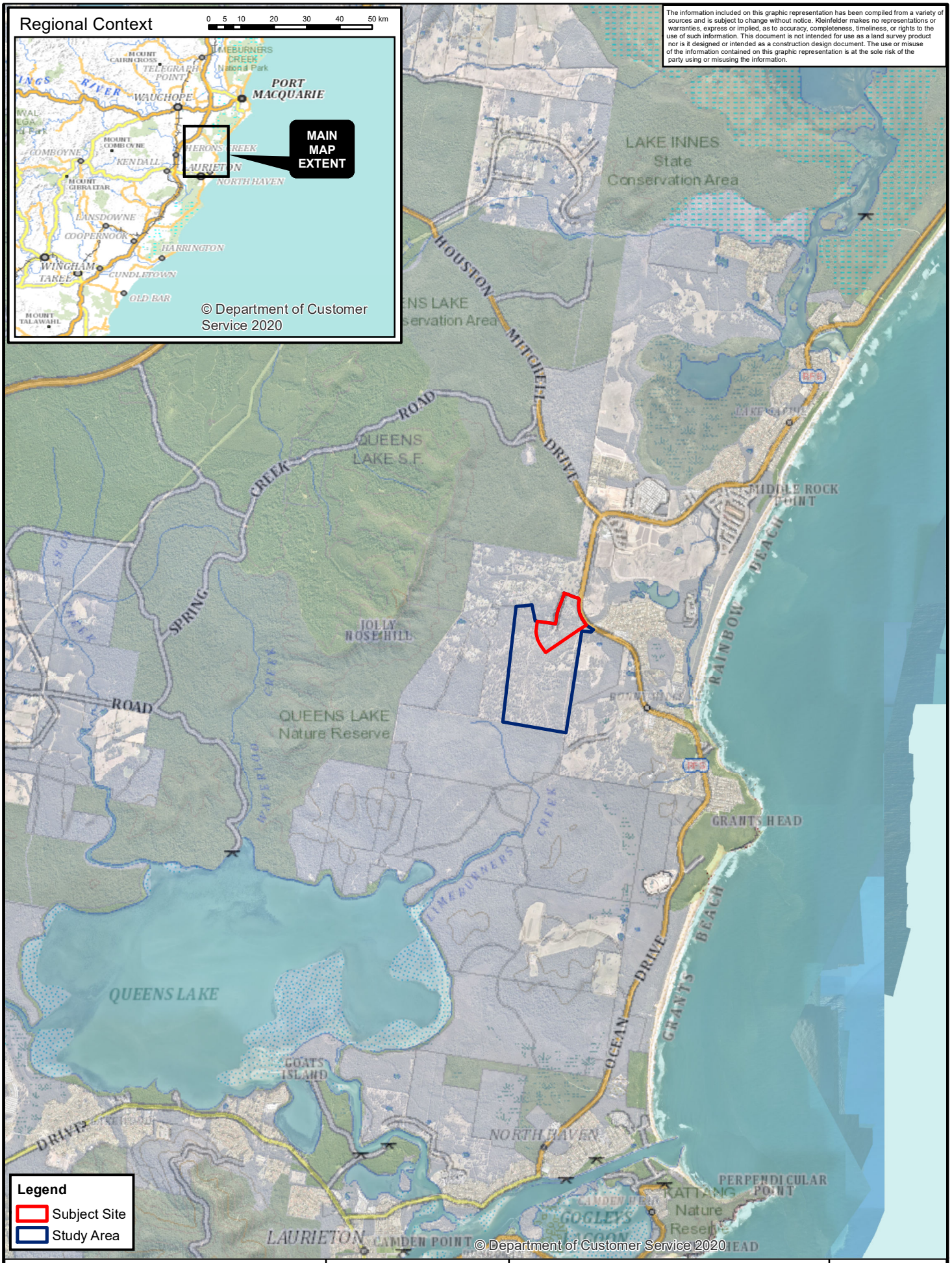
1.2 SITE DESCRIPTION

The Study Area is located approximately 17 km south of Port Macquarie within the Port Macquarie- Hastings Council Local Government Area (LGA) and is currently zoned as 'RU1 – Primary Production' under the Port Macquarie-Hastings Local Environmental Plan 2011 (Port Macquarie-Hastings LEP).

The Study Area is characterised by a mix of remnant forest, managed grassland, open forest and scattered eucalypts, intersected by cleared access tracks. The vegetation is subject to grazing, therefore shrub and midstorey vegetation is predominantly absent or heavily reduced. The topography is typified by undulating hills, alluvial flats towards the north-east and along Ocean Drive. Multiple first and second order drainage channels which are, tributaries to Dutchess Gully to the north-east, traverse the Study Area (**Figure 2**).

The vegetation within the Subject Site is similar to the vegetation in the broader Study Area, with the exception of having a greater area of alluvial flats, cleared grassland and forested wetlands remnants.

Site photographs are provided in **Appendix A.**



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DATA SOURCE:
McCloy Management Group - 2021
NSW DFSI - 2020
Nearmap - 2021

Locality

McCloy Project Management Pty Ltd
Preliminary Ecological Assessment -
Site Compatibility Certificate (SCC)
Part Lot 4 DP 844371 & Part Lot 1 DP 1018270

FIGURE:

1

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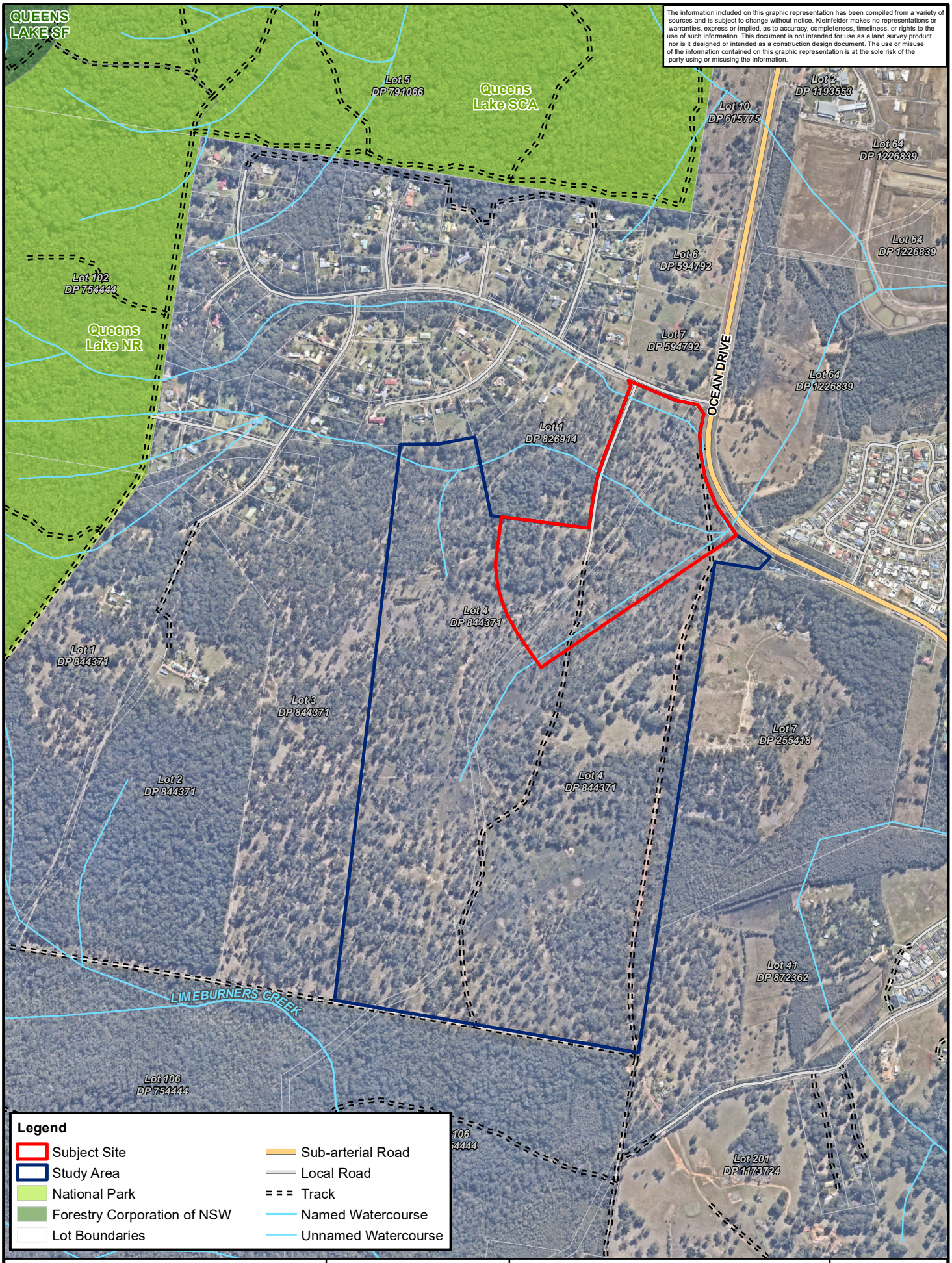

Legend

- Subject Site
- Study Area
- National Park
- Forestry Corporation of NSW
- Lot Boundaries
- Sub-arterial Road
- Local Road
- Track
- Named Watercourse
- Unnamed Watercourse

Metres
0 100 200 300 400 500

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Nearmap - 2021

Study Area and Subject Site

McCloy Project Management Pty Ltd
Preliminary Ecological Assessment -
Site Compatibility Certificate (SCC)
Part Lot 4 DP 844371 & Part Lot 1 DP 1018270

FIGURE:

2

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1.3 REPORT OBJECTIVES

The objectives of the combined assessment include:

- Complete a desktop assessment including of 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).
- Comment on the presence of environmentally sensitive land as defined by Schedule 1 of the Seniors Housing SEPP, including a review of land identified under other relevant environmental planning instruments including the Koala Habitat Protection SEPP 2020 (Koala SEPP 2020).
- 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).

2 LEGISLATIVE CONTEXT

2.1 STATE LEGISLATION

2.1.1 Environmental Planning and Assessment Act 1979

The EP&A Act forms the legal and policy platform for proposal assessment and approval in NSW and aims to 'encourage the proper management, development and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and the EP&A Regulation 2000. The ecological assessment provided within, aims to address requirements of a SCC as per the *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (*known hereafter as the "*Seniors Housing SEPP"),* (detailed in **Section 2.1.2**) under the EP&A Act.

2.1.2 State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

The *Seniors Housing SEPP* aims to facilitate development of housing for seniors and people with a disability in a way that balances the growing demand for suitable accommodation with the need to maintain the local character of neighbourhoods.

SCCs ensure seniors development is broadly compatible with surrounding land uses, before a development application can proceed to the Development Application (DA) lodgement, assessment and determination stage. Subject to certain criteria, a SCC allows a DA for seniors housing to be considered on land where it would otherwise be prohibited.

2.1.3 Biodiversity Conservation Act 2016

The NSW BC Act, the NSW *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 deliver "a strategic approach to conservation in NSW whilst supporting improved farm productivity and sustainable development". The NSW BC Act repeals several pre-existing Acts, most notably the NSW *Threatened Species Conservation Act 1995*, the NSW *Nature Conservation Trust Act 2001* and the NSW *Native Vegetation Act 2003*.

As part of the current assessment, threatened species and ecological communities as listed under the NSW BC Act that have previously been recorded within the locality (applying a 5 km buffer) were obtained from the on-line BioNet Atlas of NSW Wildlife (DPIE, 2020a). These records are discussed in Section 4 of this report. The NSW BC Act has been further addressed in this assessment through field surveys to assess the presence of threatened species, populations and ecological communities, as listed under Schedules 1 and 2 of the NSW BC Act.

2.1.4 State Environmental Planning Policy (Koala Habitat Protection) 2020, 2021

State Environmental Planning Policy (Koala Habitat Protection) 2021 (known hereafter as the "*Koala SEPP 2021*") aims to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to support a permanent free-living population over their present range and reverse the current trend of Koala population decline.

The *Koala SEPP 2021* applies to each Local Government Area listed in Schedule 1 of the SEPP. Where a Koala Plan of Management (KPoM) applies to the land, Clause 8 of the *Koala SEPP 2021* applies to the development. In that case the proposed development must be consistent with the approved KPoM that applies to the land.

Port Macquarie – Hastings Council LGA is listed in Schedule 1 of the *Koala SEPP 2021*. However, as the site is currently zoned as *RU1 – Primary Production* the Koala SEPP 2021 does not apply, instead *Koala SEPP 2020* (hereafter known as the "*Koala SEPP*") remains the relevant koala habitat protection planning instrument for the Subject Site and the SCC.

See **Section 3.9** for an assessment of koala habitat in accordance with the SEPP.

2.1.5 Coastal Management Act 2016

The *Coastal Management Act 2016* replaces the *Coastal Protection Act 1979* and 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.

The Coastal Management SEPP (commenced on 3 April 2018) updates and consolidates into one integrated policy: SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection), including clause 5.5. of the Standard Instrument – Principal Local Environmental Plan. These policies are now repealed.

The Coastal Management SEPP 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 four coastal management areas are:

- **Coastal wetlands and littoral rainforests area** – areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26.
- **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 Study Area contains mapped Coastal Wetlands, however, this area occurs outside of the Subject Site. No direct or indirect impacts to this mapped Coastal Wetlands are expected to occur through the development of the Subject Site.

2.1.6 Biosecurity Act 2015

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

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

Weed species recorded within the subject site during the current investigation are discussed in **Section 3**.

2.1.7 National Parks and Wildlife Act 1974

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

No areas of National Park estate occur within or immediately adjacent to the subject site. Queens Lake Nature Reserve is located approximately 500 m to the north and one kilometre to the west of the Subject Site.

2.2 Local Planning Instruments

2.2.1 Port Macquarie-Hastings Local Environmental Plan 2011

The Study Area is located within the Port Macquarie-Hastings Council LGA. The Port Macquarie-Hastings Local Environmental Plan 2011 (Port Macquarie-Hastings LEP) controls development within the Study Area through zoning and development controls. These controls are described in greater detail by the supporting Port Macquarie-Hastings Development Control Plan 2013 (Port Macquarie-Hastings DCP).

2.2.2 Port Macquarie-Hastings Development Control Plan 2013

The Port Macquarie-Hastings DCP supports the Port Macquarie-Hastings LEP by providing additional detail and guidance on addressing biodiversity issues associated with development. In regard to biodiversity, the DCP contains provisions that relate to environmental effects, soil and erosion control and vegetation. These provisions have been considered during the assessment.

2.3 Commonwealth Legislation

2.3.1 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:

1. World heritage properties.
2. National heritage places.
3. Wetlands of international importance (Ramsar Wetlands).
4. Threatened species and ecological communities.
5. Migratory species.

6. Commonwealth marine areas.
7. The Great Barrier Reef Marine Park.
8. Nuclear actions (including uranium mining).
9. A water resource, in relation to coal seam gas development and large coal mining development.

As part of the current assessment, MNES that are predicted to occur within the locality (applying a 10 km buffer) were obtained from the on-line Protected Matters Search Tool (DAWE 2021a). These records are discussed in **Section 3**. Materials and Methods

2.4 DESKTOP ASSESSMENT

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

- Regional vegetation mapping: CRAFTI Lower North East Vegetation Map - VIS_ID 1082 (DPIE 2010).
- The BioNet Atlas of NSW Wildlife (DPIE, 2021a) 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 (data retrieved 18/11/2020).
- The Department of the Environment and Energy (DAWE 2021a) Protected Matters Search Tool, which involved a search for matters of national environmental significance within a 10 km radius of the subject site (conducted on 18/11/2020).
- 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 B**).

2.5 FIELD SURVEY

2.5.1 Vegetation Assessment

A site inspection of the Subject Site was conducted on 28 July 2021. Plant community types were identified based on dominant flora species present within each structural layer (i.e. canopy, shrub and ground layers). Exotic or highly modified native vegetation was defined based on structure and species composition. Boundaries of vegetation types and communities were marked with a hand-held GPS and mapped using geographical information system (GIS) software.

Vegetation and habitats were compared with descriptions provided in the BioNet Vegetation Classification to identify Plant Community Types (PCTs). Vegetation types were also assessed against identification criteria for State and Commonwealth listed threatened ecological communities (DAWE 2021b; DPIE 2021d).

Three (3) 400 m² floristic plot/transects were sampled across the Subject Site in accordance with Section 5.3.4 of the NSW Biodiversity Assessment Method (BAM) (DPIE, 2020). Percentage cover and relative abundance was recorded for all plant species within each plot/transect. Plot/ transects were positioned to sample areas that were most representative of the floristic characteristics of each PCT.

Plant identification and nomenclature were based on species descriptions presented within The Flora of New South Wales Volumes 1 to 4 (Harden, 1993) and with reference to taxonomic updates in PlantNET - The Plant Information Network System of Botanic Gardens Trust, Sydney, Australia (Botanic Gardens Trust, 2021). The locations of all floristic plot/ transects are presented in **Figure 3**.

2.5.2 Fauna 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 Trimble device and photographed where appropriate.

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

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

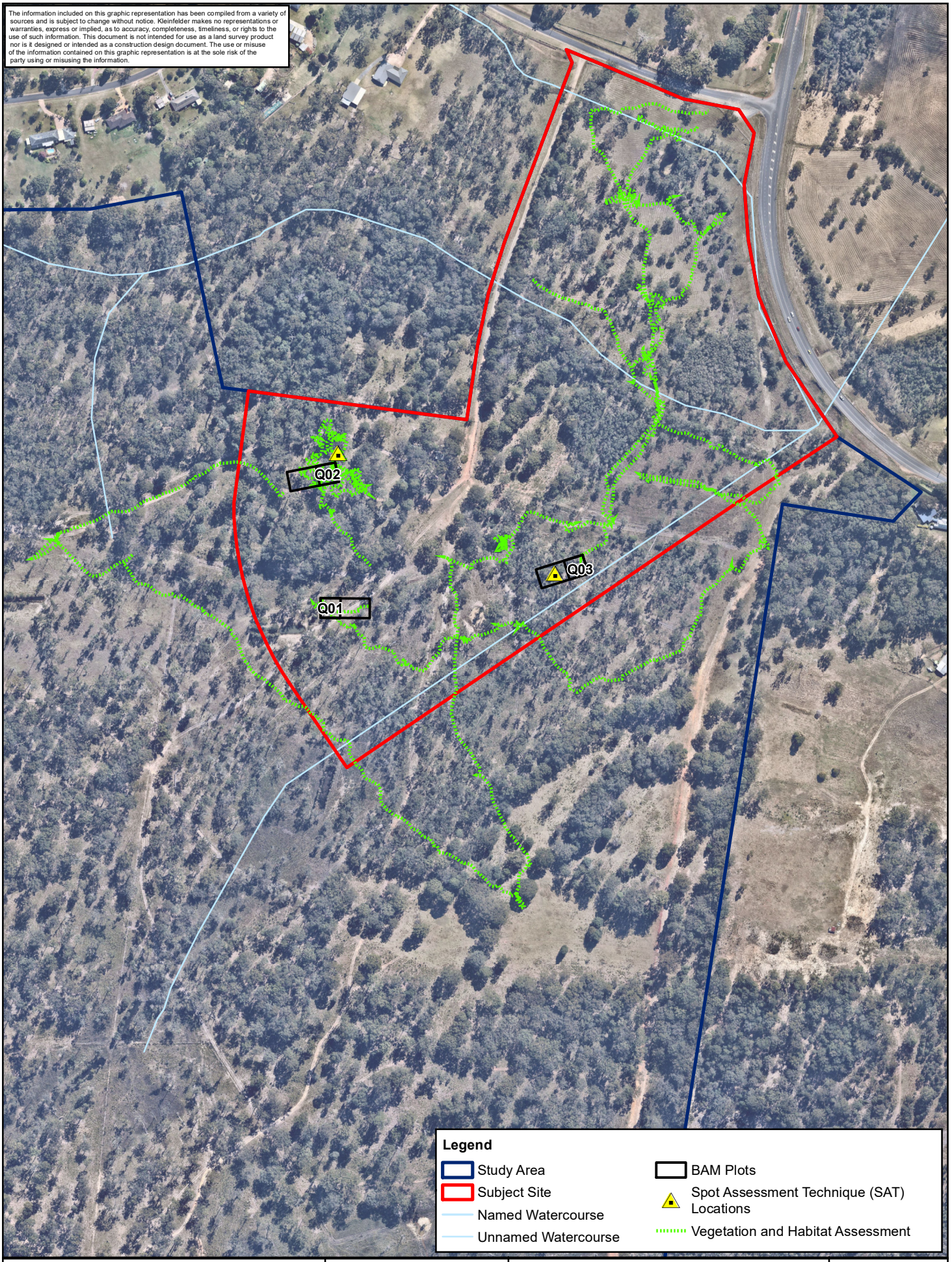
Diurnal opportunistic and incidental observations of fauna species were recorded during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces.

Two Scat Assessment Technique surveys (as per Phillips and Callaghan, 2011) were undertaken across the Subject Site on 28 July 2021, one in each of the mapped vegetation communities targeting suitable Koala habitat (see **Figure 3**).

2.6 SURVEY LIMITATIONS

The survey techniques and survey effort applied for this study were commensurate with the nature and condition of the Subject Site and requirements of a preliminary ecological assessment. 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.

The field survey was undertaken during a six-hour survey period by one ecologist (6 person hours total). While a moderate diversity of native and exotic flora species was recorded, a longer survey duration or multiple seasonal surveys would likely result in the detection of a greater diversity of species. The majority of the small Subject Site is considered to be degraded as a result of grazing, and unsuitable for most threatened plant species known to occur in the locality. Searches for threatened plants were focussed in areas where a greater diversity of flora was detected - such as near the bases of trees. No surveys were completed targeting nocturnal fauna species.



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DATA SOURCE:
McCloy Management Group - 2021
NSW DFSI - 2020
Nearmap - 2021

Survey Effort

McCloy Project Management Pty Ltd
Preliminary Ecological Assessment -
Site Compatibility Certificate (SCC)
Part Lot 4 DP 844371 & Part Lot 1 DP 1018270

FIGURE:

3

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3 RESULTS

3.1 PLANT DIVERSITY

A total of 91 plant species were identified during the assessment. These were comprised of 80 native species and 11 exotic species, which include the following growth forms:

- Nine (9) Trees (TG)
- 25 Shrubs (SG)
- 24 Grass and grasslike (GG) species
- 12 Forbs (FG)
- Two (2) Fern (EG)
- Eight (8) "Other" growth forms
- Eight (8) Exotics, inclusive of three (3) High Threat Exotic (HTE).

A complete list of flora species is presented in **Appendix C**.

3.2 WEEDS

One priority weed species for the North Coast Local Land Services Region (DPI, 2021) and Weed of National Significance (DAWE, 2021c) was identified within the Subject Site:

- *Senecio madagascariensis* (Fireweed).

Minor infestations of other exotic species were also identified within the site, including the following species:

- *Andropogon virginicus* (Whiskey Grass),
- *Axonopus fissifolius* (Narrow-leaved Carpet Grass)
- *Paspalum dilatatum* (Paspalum)

3.3 PLANT COMMUNITY TYPES

Regional vegetation mapping (DPIE 2010) indicates that the Subject Site is 'excluded', i.e. the land is not associated with a recognised vegetation community. The site assessment determined that two plant community types (PCTs) occur within the Subject Site:

- *PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion*
- *PCT 1230 Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion*

PCT 695 is generally restricted to the slopes and hills within the site. Historically, this community has been managed and subject to infrequent grazing. The understorey and midstorey are typically regenerating throughout this community. PCT 1230 is largely restricted to the low-lying flats and areas of periodic soil waterlogging. This community occurs in a managed state and is subject to regular grazing. The understorey contains a mix of native and exotic vegetation and the midstorey is regenerating throughout.

Full descriptions of each vegetation community are provided in the following sub-sections. Floristic plot data is provided in **Appendix C**.

Vegetation Community 1:

PCT 695: *Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion* (Managed).

Plate 1 PCT 695: Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion (Managed).

PCT 695: Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion (Managed).	
Vegetation Formation and Class	Wet Sclerophyll Forest (Shrubby sub-formation) North Coast Wet Sclerophyll Forests
Area within Subject Site	5.6 ha
Survey Effort	**Conducted:** 1 plot/transect.
Floristic description	This community is characterised by a canopy of *Syncarpia glomulifera* (Turpentine), *Eucalyptus microcorys* (Tallowwood) and *Corymbia gummifera* (Red Bloodwood). Co-dominant species include *Eucalyptus pilularis* (Blackbutt) and *Eucalyptus eugenioides* (Thin-leaved Stringybark) is scattered throughout. The midstorey exists in a regenerating state. Common native shrubs and trees are scattered throughout and include *Glochidion ferdinandi* (Cheese Tree), *Breynia oblongifolia* (Coffee Bush), *hibbertia empetrifolia* subsp. *empetrifolia* and *Platylobium formosum*. A range of other shrubs are scattered throughout and include *Lomatia silaifolia* (Crinkle Bush) and *Pimelea linifolia* (Slender Rice Flower).
Condition within Development Site	This community occurs in a managed state. Evidence of past clearing within the canopy is present and the midstorey and understorey have been subject to regular

PCT 695: Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion (Managed).	
	grazing. Large remnant trees still occur throughout, however, there are areas that have been cleared and canopy cover is limited. The understorey typically contains regenerating shrubs and small trees. A moderately dense understorey comprises of a mix of native and exotic species.
Justification for PCT selection	Vegetation within this community contains characteristic species of PCT 695, such as *Eucalyptus pilularis* (Blackbutt), *Syncarpia glomulifera* (Turpentine) and *Eucalyptus microcorys* (Tallowwood). The vegetation community within the site is also consistent with the landscape position and IBRA sub-region of this community. Additionally, the midstratum and ground stratum species listed for PCT 695, such as *dianella caerulea* (Blue Flax-lilly), *Breynia oblongifolia* (Coffee Bush) and *Lomandra longifolia* (Spiny-head Mat-rush) were also present throughout.
Status	**BC Act:** Not Listed.
	EPBC Act: Not Listed.
SAII	No
PCT % Cleared	5%

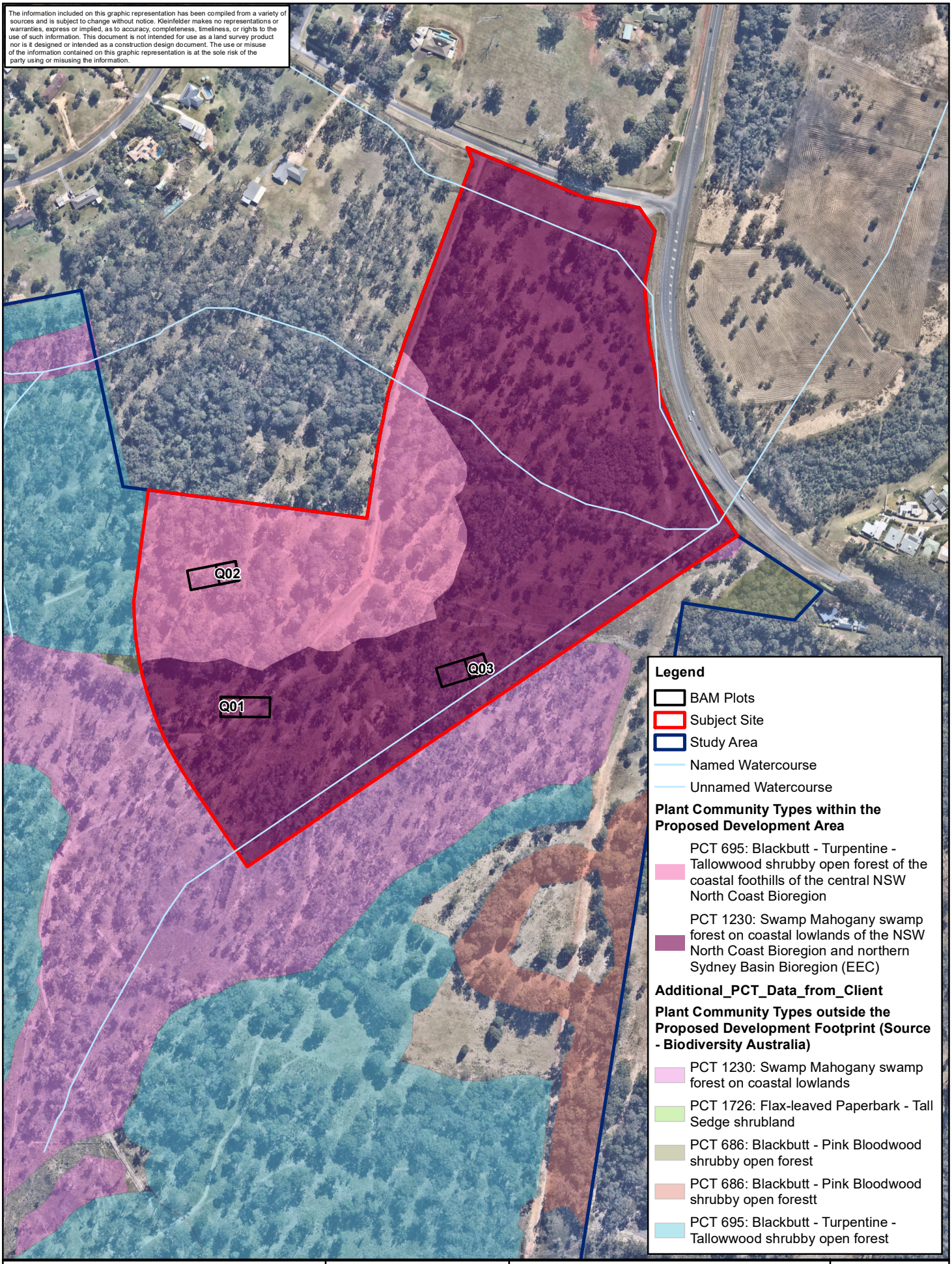
Vegetation Community 2:

PCT 1230: *Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion* (Managed)

Plate 2 ***PCT 1230: Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion* (Managed).**

PCT 1230: Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion (Managed).	
Vegetation Formation and Class	Forested Wetlands Coastal Swamp Forests
Area within Subject Site	15.7 ha
Survey Effort	Conducted: 1 Plot/Transect
Floristic description	Vegetation within this community is characterised by an open forest dominated by *Eucalyptus robusta* (Swamp Mahogany) and *Melaleuca quinquenervia* (Broad-leaved Paperbark). Small trees and shrubs, such as *Melaleuca linariifolia* (Flax-leaved Paperbark), *M. sieberi* and *Leptospermum juniperinum* (Prickly tea-tree) are abundant throughout, and usually regenerating. Native grasses and sedges dominate in some areas of this community. Species include *Lepidosperma quadrangulatum*, *Eragrostis leptostachya* (Paddock Lovegrass), *Themeda australis* (*Kangaroo Grass*) and *Lomandra longifolia* (Spiny-head Mat-rush). Exotic species, such as *Andropogon virginicus* (Whisky Grass), *Axonopus fissifolius* (Narrow-leaved Carpet Grass) and *Paspalum dilatatum* (Paspalum) are common across this community.

PCT 1230: Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion (Managed).	
Condition within Development Site	This community occurs in a modified state and is subject to regular grazing by livestock. Some areas have evidence of canopy tree removal; the midstorey is typically managed and shrubs and trees are regenerating across the community. The understorey is heavily modified and contains a mix of native and exotic species. Livestock (cattle) currently occur throughout this community and their presence, i.e. trampled vegetation and thoroughfares, is evident throughout.
Justification for PCT selection	This vegetation community occurring on site shares species characteristic of PCT 1230, including a canopy strongly dominated by *Eucalyptus robusta* and *Melaleuca quinquenervia,* with a co-dominance of *Eucalyptus resinifera*. *Leptospermum juniperinum* occurs as a regenerating shrub and is abundant throughout. *Callistemon pachyphyllus* is also evident within this community. The understorey is comprised a different mix of species typical of PCT 1230, which is likely due to the current management of the site. Small amount so *Gahnia spp.* are still present within parts of this community.
Status	**BC Act:** This community is commensurate with the Endangered Ecological Community *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. See **Appendix E** for a justification of this community.
	EPBC Act: Not Listed.
SAII	No
PCT % Cleared	75%



Legend

- BAM Plots
- Subject Site
- Study Area
- Named Watercourse
- Unnamed Watercourse

Plant Community Types within the Proposed Development Area

- PCT 695: Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion
- PCT 1230: Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion (EEC)

Additional_PCT_Data_from_Client

Plant Community Types outside the Proposed Development Footprint (Source - Biodiversity Australia)

- PCT 1230: Swamp Mahogany swamp forest on coastal lowlands
- PCT 1726: Flax-leaved Paperbark - Tall Sedge shrubland
- PCT 686: Blackbutt - Pink Bloodwood shrubby open forest
- PCT 686: Blackbutt - Pink Bloodwood shrubby open forestt
- PCT 695: Blackbutt - Turpentine - Tallowwood shrubby open forest

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Vegetation Mapping

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Part Lot 4 DP 844371 & Part Lot 1 DP 1018270

FIGURE:
4

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3.4 THREATENED ECOLOGICAL COMMUNITIES

One Endangered Ecological Community (EEC), *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (Swamp Sclerophyll Forest), was identified within the site. The community is restricted to low-lying areas across the Subject Site. A justification on how PCT 1230 meets the criteria for *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* is presented in **Appendix E**.

3.5 THREATENED FLORA SPECIES

No threatened flora species were identified within the Subject Site during the assessment. A search of the BioNet Atlas of NSW Wildlife (DPIE, 2021a) returned five records of threatened plant species within a 5 km radius of the Study Area. An EPBC Protected Matters Search returned a list of 18 threatened plant species predicted to occur within the locality of the Subject Site.

A "likelihood of occurrence' assessment determined that the Subject Site is unlikely to constitute suitable habitat for any threatened plant species predicted or recorded within the locality (**Appendix B**).

3.6 FAUNA HABITAT

The Subject Site is characterised by grassy groundcover (dominated by native grasses and sedges), with scattered and patches of eucalypts (dominated by *Eucalyptus robusta)* and *Melaleuca* spp. along the lower north-eastern and southern portions of the site. The slopes along the western boundary of the Subject Site are characterised by an open forest canopy containing a mix of *Syncarpia glomulifera* (Turpentine) and *Eucalyptus microcorys* (Tallowwood). Both vegetation communities consist of a heavily reduced midstorey and shrub layer owing to continuous management through grazing. Key fauna habitat features identified during the site assessment includes the following:

- Nine Hollow-bearing Trees (HBT), including seven (7) live trees with small hollows (0-19cm), one dead stag with a small hollow, and one live tree with a large hollow (>30cm).
- Mature trees within the Subject Site may provide marginal foraging and nesting habitat for several common native bird species.
- Two mapped drainage channels within the Subject Site, occurring as shallow vegetated depressions likely to fill and transport water towards culverts along Ocean Drive (north-east of the Subject Site) during high rainfall.

3.7 FAUNA SPECIES

A total of three (3) commonly occurring bird species were identified during the assessment, including the Noisy Friarbird (*Philemon corniculatus*), Scaly-breasted Lorikeet (*Trichoglossus chlorolepidotus*), and Rainbow Lorikeet (*Trichoglossus haematodus*).

These species are listed in **Appendix C**.

3.8 THREATENED FAUNA SPECIES

No threatened fauna species were detected within the Subject Site during the site assessment.

A search of the BioNet Atlas of NSW Wildlife (DPIE, 2021a) returned a list of 59 threatened fauna species that have previously been recorded within 5 km of the Subject Site. An EPBC Protected Matters Search returned an additional of 19 threatened fauna species predicted to occur within the locality of the Subject Site.

A "likelihood of occurrence" assessment (see **Appendix B**) determined a moderate likelihood of occurrence for 13 fauna species within the Subject Site, including five (5) birds and eight (8) mammals. A total of two species were identified as having a high likelihood of occurrence, including the Koala (*Phascolarctos cinereus*) and the Wallum Froglet (*Crinia tinnula*), based on the occurrence of suitable habitat throughout the Subject Site and recent records within the Subject Site or in close proximity.

3.9 KOALA HABITAT

Study Area is is located within Port Macquarie-Hastings Council LGA, which is listed within Schedule 1 of the Koala SEPP 2020. The Koala SEPP 2020 was therefore deemed applicable for the Subject Site. As such, an assessment of Koala habitat suitability was conducted in accordance with the SEPP including the determination of Potential Koala Habitat (Step 1) or Core Koala Habitat (Step 2) within the Subject Site. These terms are defined as the following:

- **Potential Koala Habitat:** *means areas of native vegetation where trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.*
- **Core Koala Habitat:** *means an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population.*

The presence of Potential Koala Habitat or Core Koala Habitat within the Subject Site, as defined by the SEPP, are considered below.

Step 1 - Potential Koala Habitat

Both Vegetation Communities within the Subject Site are dominated by Koala Feed tree species listed under Schedule 2 of the Koala SEPP. These include *Eucalyptus microcorys* (Tallowwood) and *Eucalyptus robusta* (Swamp Mahogany). These two species constitute over 15% of the total number of trees within the Vegetation Community 1 and Vegetation Community 2 respectively. As such, the vegetation within the Study Area constitutes "Potential Koala Habitat" as defined under the SEPP.

Step 2 - Core Koala Habitat

No signs of koalas were recorded within the Subject Site during opportunistic diurnal fauna survey and two (2) Spot Assessment Technique (SAT) tests (see **Figure 3**). Review of the NSW BioNet Atlas records shows that Koala records occur within the locality (within 5 km of the Subject Site). This includes a number of records along Ocean Drive and properties immediately adjacent to the Subject Site. Multiple records within 500 m of the Subject Site are associated with juvenile and/or female koalas with young. The occurrence of 'Core Koala Habitat' within the Subject Site, as defined by the Koala SEPP 2020, is determined based on the following considerations:

- An **'area of land'** is not defined under the Koala SEPP 2020. However, we have defined the 'land' as the Study Area (Lot 4 DP 844371 and Lot 1 DP 1018270) based on the reference to the 'land' being in relation to which a Development Application (DA) has been made. This definition is consistent with other Koala habitat protection planning instruments (i.e. SEPP 2019 and SEPP 2021).
- A **'resident koala population'** - One koala record (circa 2004) occurs within the Study Area (the 'land'), however this record is attributed to Lots to the south of the Study Area, its location within the Study Area is therefore likely the result of GPS error during the submission of licenced data. As such, of the 870 records of Koala within the locality (<5 km from the Study Area), none are directly associated with the land within the Study Area. Therefore, in accordance with the Koala SEPP 2020, and the definitions and information provided above, the vegetation within the Study Area does not constitute 'Core Koala Habitat'. However, targeted Koala surveys are required to provide an accurate assessment of Koala habitat value within the Study Area, in accordance with the SEPP.

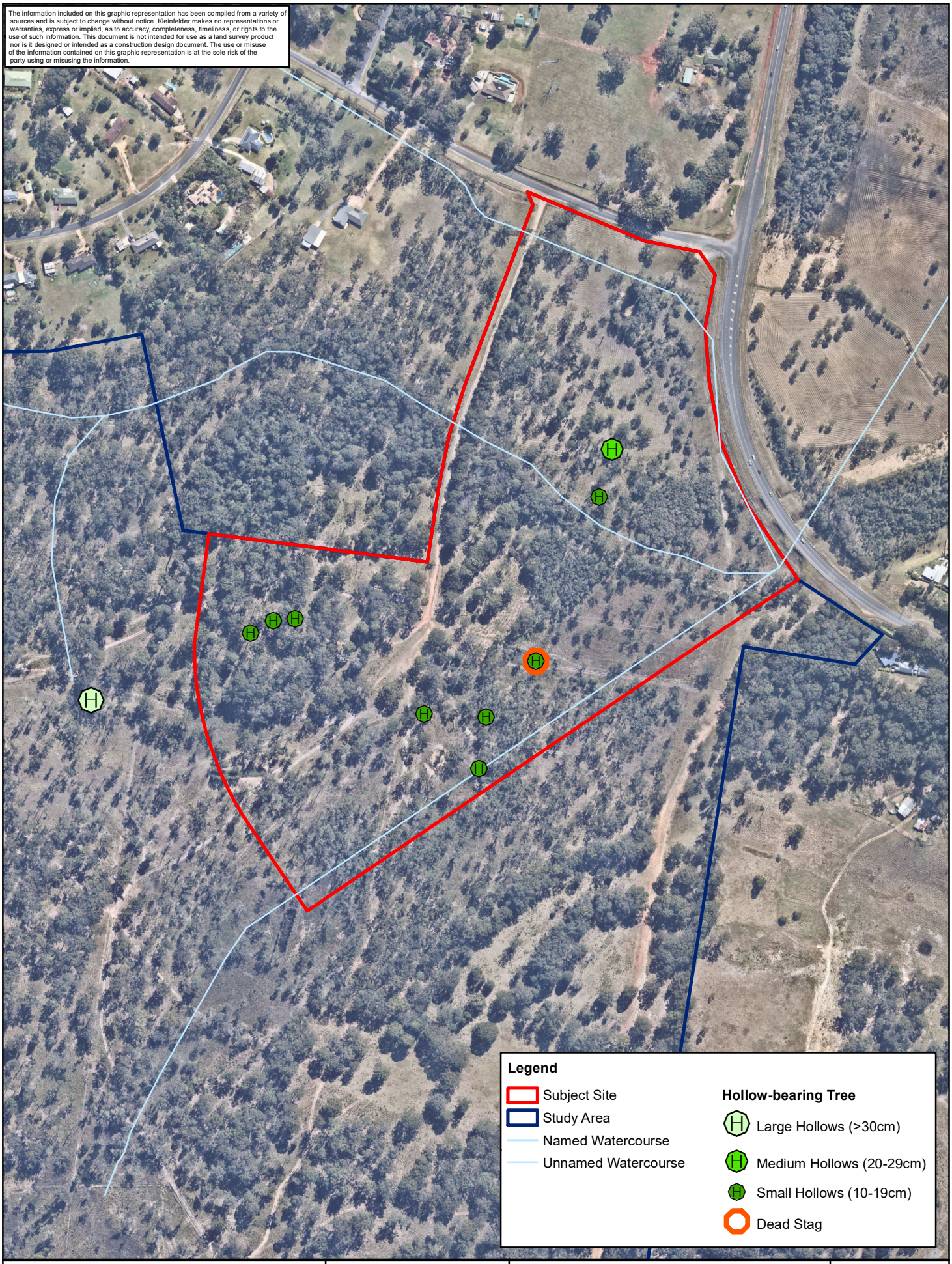
As such, despite a high number of Koala records within the locality, the vegetation within the Subject Site does not constitute "Core Koala Habitat" as defined by the Koala SEPP 2020. Further assessments are recommended.

3.10 EPBC Protected Matters

No EPBC Act listed threatened species or communities were detected within the Subject Site during the site assessment.

A 'likelihood of occurrence' assessment was conducted for all threatened species and migratory species returned by the EPBC Protected Matters Search (**Appendix B**). A total of three (3) threatened species listed under the EPBC Act were considered to have a moderate to high likelihood of occurrence within the Subject Site. These include the Swift Parrot (*Lathamus discolor*) [Critically Endangered], Koala (*Phascolarctos cinereus*) [Vulnerable], and Grey-headed Flying-fox (*Pteropus poliocephalus*) [Vulnerable].

Impacts to the above-mentioned matters of national environmental significance will need to be assessed in accordance with the EPBC Act Significant Impact Guidelines (DoE 2013).



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PROJECT REFERENCE: 20221149

DATE DRAWN: 26-Oct-21 15:56 Version 1

DRAWN BY: JCBrown

DATA SOURCE:
McCloy Management Group - 2021
NSW DFSI - 2020
Nearmap - 2021

Fauna Habitat

McCloy Project Management Pty Ltd
Preliminary Ecological Assessment -
Site Compatibility Certificate (SCC)
Part Lot 4 DP 844371 & Part Lot 1 DP 1018270

FIGURE:

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4 SUMMARY

4.1 KEY ECOLOGICAL CONSTRAINTS

4.1.1 Native Vegetation and Threatened Ecological Communities

The Subject Site is characterised by two vegetation communities, including:

- PCT 695 - *Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion*, and
- PCT 1230 - *Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion*.

Both vegetation communities were considered to be a moderate condition based on the occurrence of an intact, albeit reduced, native canopy, mixed native and exotic grassy groundcover, and a predominantly absent midstorey/shrub layer – the result of regular grazing.

PCT 1230 is representative of *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* EEC, albeit a low-moderate condition form of the EEC (see **Figure 6**). This community exists across low lying areas throughout the Subject Site and the broader Study Area.

Site selection within the north-eastern portion of the Study Area avoids impacts to mapped Coastal Wetlands located within the south eastern portion of the site (**Figure 6**).

4.1.2 Threatened Flora Species

No threatened flora species were identified within the Subject Site during the assessment. Subject Site is unlikely to constitute suitable habitat for any threatened plant species predicted or recorded within the locality.

4.1.3 Threatened Fauna Species and Habitat

The Subject Site is characterised by open forest to scattered trees and mixed native/exotic grassland, with a predominantly managed (grazed) groundcover and significantly reduced midstorey and shrub layer. As such, the vegetation within the Subject Site is likely to constitute only marginal habitat for highly mobile threatened bird (e.g. Swift Parrot) and mammal (e.g. Grey Headed Flying Fox) species, along with locally occurring threatened arboreal mammals such as the Koala.

Despite the high number of Koala records within the locality, the vegetation within the Subject Site does not meet the definition of 'Core Koala Habitat' in accordance with the Koala SEPP 2020. However, further targeted surveys (i.e. nocturnal surveys) in accordance with the SEPP are recommended in order to provide an accurate assessment of Koala habitat values within the Subject Site.

Low lying areas are subject to periodic waterlogging and flooding, as such these areas are likely to represent suitable habitat for threatened frog species including the Wallum Froglet (*Crinia tinnula*), previously recorded within the Subject Site. Further targeted surveys are recommended to ascertain the presence of the species and the extent of suitable habitat within the Subject Site.

Nine (9) Hollow-bearing Trees were recorded within the Subject Site, these were predominantly containing small (0-19cm) hollows, with one large hollow (>30cm) potentially suitable for threatened forest owls recorded within the locality, e.g. the Powerful Owl. As such, further surveys (i.e. stag-watching) are recommended.

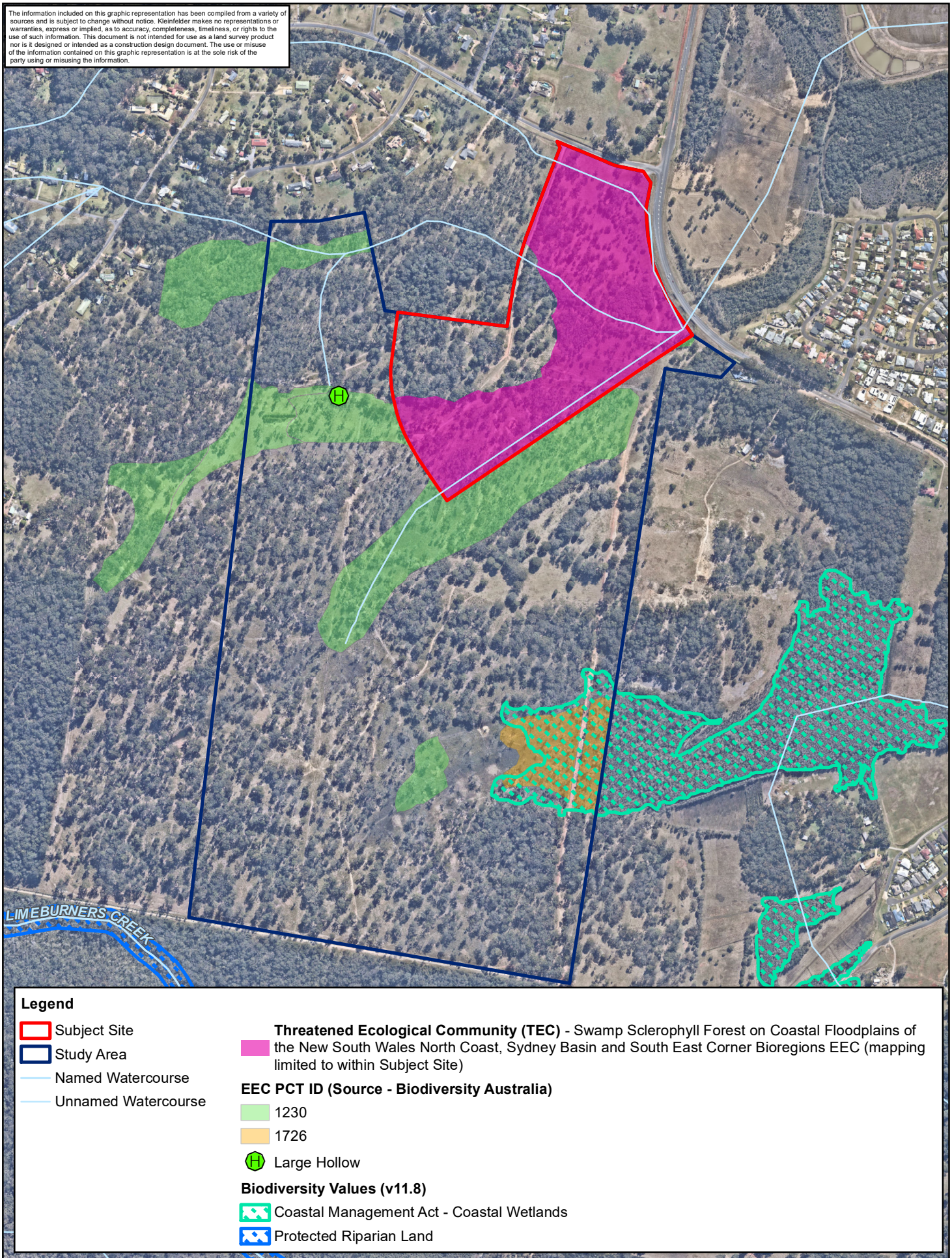
4.1.4 Aquatic Habitat

An area of Coastal Wetlands is mapped within the southern portion of the Study Area, however due the location of the Subject Site no direct or indirect impacts to this mapped Coastal Wetlands are expected to occur through the development of the Subject Site.

4.2 Conclusion and Recommendations

A number of ecological constraints exist within the Subject Site, including Swamp Sclerophyll Forest EEC, which will need to be managed during the development application process. However, the Subject Site is suitably located within close proximity to existing urban land uses and is positioned as to avoid 'environmentally sensitive' land as defined by the Seniors Housing SEPP (i.e. mapped coastal wetlands). As such, the site is compatible for development associated with the provision of seniors housing in accordance with the Seniors Housing SEPP.

Further threatened species surveys are recommended to support any future Development Application (DA), including for Koala and Wallum Froglet. The vegetation within the Subject Site does not constitute "Core Koala Habitat" as defined by the Koala SEPP 2020. Notwithstanding, based on the results of this preliminary ecological assessment, development within the site would likely trigger the Biodiversity Offset Scheme (BOS), requiring a Biodiversity Development Assessment Report (BDAR). With a minimum lot size of 40 ha, the vegetation clearing threshold that would trigger entry into the BOS is one (1) hectare.



Legend

- Subject Site
- Study Area
- Named Watercourse
- Unnamed Watercourse

Threatened Ecological Community (TEC) - Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions EEC (mapping limited to within Subject Site)

EEC PCT ID (Source - Biodiversity Australia)

- 1230
- 1726
- Large Hollow

Biodiversity Values (v11.8)

- Coastal Management Act - Coastal Wetlands
- Protected Riparian Land

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DRAWN BY: JCBrown
DATA SOURCE:
McCloy Management Group - 2021
NSW DFSI - 2020
Nearmap - 2021

Key Biodiversity Values

McCloy Project Management Pty Ltd
Preliminary Ecological Assessment -
Site Compatibility Certificate (SCC)
Part Lot 4 DP 844371 & Part Lot 1 DP 1018270

FIGURE:
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5 REFERENCES

Botanic Gardens Trust. (2020). New South Wales Flora online - PlantNET. Retrieved from http://plantnet.rbgsyd.nsw.gov.au/.

Churchill, S. (2009). Australian Bats (2 ed.). Australia: Allen and Unwin.

DAWE. (2021a). EPBC Protected Matters Search Tool. Commonwealth of Australia

DAWE. (2021b). Species Profile and Threats Database (SPRAT). Commonwealth of Australia

DAWE. (2021c). Weeds of National Significance. Retrieved from http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html

DPI. (2021). NSW WeedWise. Retrieved from https://weeds.dpi.nsw.gov.au/

DPIE. (2010). *Regional Vegetation Mapping: CRAFTI Lower North East Floristics*. VIS 1082. Retrieved from https://datasets.seed.nsw.gov.au/dataset/crafti-lower-north-east-floristics-vis-10822ceea.

DPIE (2020). Biodiversity Assessment Method. Published by the Environment, Energy and Science, Department of Planning, Industry and Environment, Parramatta, NSW.

DPIE. (2021a). Bionet Atlas of NSW Wildlife. Retrieved from https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

Department of Planning, Industry and Environment (DPIE) (2021b). *BioNet Vegetation Classification.* Available at: https://www.environment.nsw.gov.au/research/Visclassification.htm

Department of Planning, Industry and Environment (DPIE) (2021c). *Threatened Biodiversity Profile Search*. Available at: https://www.environment.nsw.gov.au/threatenedspeciesapp/

Duffy, A., Lumsden, L., Caddle, C., Chick, R., & Newell, G. (2000). The efficacy of Anabat ultrasonic detectors and harp traps for surveying microchiropterans in south-eastern Australia. Acta Chiropterologica, 2, 127-144.

Harden, G. (1993). Flora of New South Wales Volumes 1–4.

APPENDIX A SITE PHOTOGRAPHS

Plate 3: Vegetation Community 1 – native grassy groundcover.

Plate 4: Vegetation Community 2 – native groundcover and regenerating eucalypts.

APPENDIX B THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE'

THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE'

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 Study Area was obtained from the following databases:

- NSW DPIE BioNet Atlas: (http://www.bionet.nsw.gov.au/); and
- Commonwealth DAWE Protected Matters search tool: (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: (NSW BioNet Quick Guides and Manuals | NSW Environment, Energy and Science*l*).
- DAWE (2021b). *Species Profile and Threats Database (SPRAT)*. 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; and
  - **Nil** – habitat requirements not met for this species within the site

Note: Strictly aquatic / marine species listed in the Commonwealth Protected Matters Search Tool have been omitted from the below table based on obvious habitat constraints

Table B1 'Likelihood of Occurrence' table

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Flora								
1.	***Acacia courtii*** North Brother Wattle	V	V	P	PMST	The North Brother Wattle is found only in the Laurieton district on the north coast of NSW, occurring on North Brother, Middle Brother and South Brother Mountains. It usually grows on steep, dry, rocky slopes and in mixed dry forest on shallow soils, often under a canopy of White Mahogany and Grey Gum.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
2.	***Acronychia littoralis*** Scented Acronychia	E	E	P	PMST	Scented Acronychia is found between Fraser Island in Queensland and Port Macquarie on the north coast of NSW. It occurs in transition zones between littoral rainforest and swamp sclerophyll forest; between littoral and coastal cypress pine communities; and margins of littoral forest. It mainly grows within 2km of the coast on sandy soil.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
3.	***Allocasuarina defungens*** Dwarf Heath Casuarina	E	E	P	PMST	Dwarf Heath Casuarina is found only in NSW from the Nabiac area, north-west of Forster, to Byron Bay on the NSW north coast. Here it mainly grows in tall heath on sand, but can also occur on clay soils and sandstone. The species also extends onto exposed nearby-coastal hills or headlands adjacent to sandplains.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
4.	***Allocasuarina thalassoscopica***		E	P	PMST	This species is widespread along the North Coast of New South Wales occurring as far south as Diamond Head. It occurs as far north as the Noosa Heads of South-East Queensland. Here it occurs in graminoid heath vegetation on coastal flats.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
5.	***Arthraxon hispidus*** *Hairy-joint Grass*	V	V	P	PMST	The species has been recorded from scattered locations throughout Queensland and on the northern tablelands and north coast of NSW. Hairy-joint Grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps as well as woodland.	Nil	Broadly suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
6.	***Asperula asthenes*** Trailing Woodruff	V	V	P	PMST	This small herb occurs only in NSW. It is found in scattered locations from Raymond Terrace north to near Kempsey, with several records from the Port Stephens / Wallis Lakes area / Forster (including Myall Lakes NP, New England NP, Wallingat NP and Darawnk NR). Inhabits damp areas, often along riverbanks.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
7.	***Cryptostylis hunteriana*** Leafless Tongue Orchid	V	V	P	PMST	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.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
8.	***Cynanchum elegans*** White-flowered Wax Plant		E	5	BioNet, PMST	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.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
9.	***Diuris byronensis*** Byron Bay Diuris	E		1	BioNet	This orchid is known from a single location only, at Byron Bay in north-east NSW. Only about 20 plants have been recorded. It occurs in low-growing grassy heath vegetation based on clay soil.	Nil	No suitable habitat within the Subject Site. One record within the locality, however species is only known from Byron Bay. **Not recorded during site assessment.**
10.	***Eucalyptus nicholii*** Narrow-leaved Black Peppermint	V	V	2	BioNet	This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in central portions of its range. Found largely on private property and roadsides, and occasionally in conservation reserves. It typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock.	Nil	Outside of natural range of the species, no suitable habitat within the Subject Site. Two records within the locality, likely planted. **Not recorded during site assessment.**
11.	***Euphrasia arguta***	CE	CE	P	PMST	Euphrasia arguta was rediscovered in the Nundle area of the NSW north western slopes and tablelands in 2008. Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
12.	***Melaleuca biconvexa*** Biconvex Paperbark	V	V	P	PMST	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects	Nil	Broadly suitable habitat within the Subject Site, however the site is outside of natural range of species. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
13.	***Persicaria elatior*** Tall Knotweed	V	V	P	PMST	Tall Knotweed has been recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Nil	Broadly suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
14.	***Phaius australis*** Lesser Swamp-orchid	E	E	P	PMST	Occurs in Queensland and north-east NSW as far south as Coffs Harbour. Historically, it extended farther south, to Port Macquarie. Swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas.	Nil	Broadly suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
15.	***Rhizanthella slateri*** Eastern Australian Underground Orchid	V	E	P	PMST	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore, usually located only when the soil is disturbed. Flowers September to November.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
16.	***Rhodamnia rubescens*** Scrub Turpentine	CE		6	BioNet, PMST	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
17.	***Rhodomyrtus psidioides*** Native Guava	CE		20	BioNet, PMST	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
18.	***Syzygium paniculatum*** Magenta Lilly Pilly	CE	V	P	PMST	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
19.	***Thesium australe*** Austral Toadflax	V	V	P	PMST	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Nil	Broadly suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
20.	***Tylophora woollsii*** Cryptic Forest Climber	E	E	P	PMST	The Cryptic Forest Twiner is found from the NSW north coast and New England Tablelands to southern Queensland, but is very rare within that range. Known on the Tablelands from the Bald Rock and Boonoo Boonoo areas north of Tenterfield. This species grows in moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
Birds								
1.	***Anthochaera phrygia*** Regent Honeyeater	CE	CE	11	BioNet, 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.	Low	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	***Artamus cyanopterus cyanopterus*** Dusky Woodswallow	V		6	BioNet	The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. 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.	Low	Broadly suitable aerial foraging habitat within the Development Site. Records within the locality. **Not recorded during site assessment.**
3.	***Botaurus poiciloptilus*** Australasian Bittern	E	E	P	PMST	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha spp*.) and spikerushes (*Eleocharis spp*.).	Low	Marginally suitable freshwater wetland habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
4.	***Calyptorhynchus lathami*** Glossy Black-Cockatoo	V		37	BioNet	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.	Low	No suitable foraging habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
5.	***Daphoenositta chrysoptera*** Varied Sittella	V		3	BioNet	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low	Broadly suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
6.	***Esacus magnirostris*** Beach Stone-curlew	E		1	BioNet	In Australia, the Beach Stone-curlew occupies coastlines from about Point Cloates in Western Australia, across northern and north-eastern Australia south to north-eastern NSW, with occasional vagrants to south-eastern NSW and Victoria. Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Their nests are just a shallow scrape in sand or gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands or among open mangroves.	Nil	No suitable habitat within the Subject Site. Only one record within the locality. **Not recorded during site assessment.**
7.	***Ephippiorhynchus asiaticus*** Black-necked Stork	E		27	BioNet	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries.	Moderate	Suitable habitat within the Subject Site. Records exist within the locality including in in mapped coastal wetland in the south-east of the Study Area. **Not recorded during site assessment.**
8.	***Falco hypoleucos*** Grey Falcon	E	V	P	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.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
9.	***Glossopsitta pusilla*** Little Lorikeet	V		12	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.	Moderate	Suitable foraging habitat within the Subejct Site. Records within the locality. **Not recorded during site assessment.**
10.	***Grantiella picta*** Painted Honeyeater	V	V	P	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.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
11.	***Haematopus fuliginosus*** Sooty Oystercatcher	E		2	BioNet	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. It forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
12.	***Haematopus longirostris*** Pied Oystercatcher	E		10	BioNet	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
13.	***Haliaeetus leucogaster*** White-bellied Sea-Eagle	V	M	28	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).	Moderate	Marginal foraging habitat within the Subject Site and broader Study Area. No nests were detected during habitat assessments within the Subject Site. **Not recorded during site assessment.**
14.	***Hieraaetus morphnoides*** Little Eagle	V		1	BioNet	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring. It nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
15.	***Hirundapas caudacutus*** White-throated Needletail		M,V	1	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.	Low	Broadly suitable aerial foraging habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
16.	***Lathamus discolor*** Swift Parrot	E	CE, M	31	BioNet, 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.	Moderate	Suitable foraging habitat within the Subject Site Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
17.	***Lophoictinia isura*** Squared-tailed Kite	V		11	BioNet	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Low	Broadly suitable aerial foraging habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
18.	***Ninox strenua*** Powerful Owl	V		11	BioNet	The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine, Black She-oak, Blackwood, Rough-barked Apple, Cherry Ballart and a number of eucalypt species. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	Moderate	Broadly suitable foraging habitat within the Subject Site. No suitable nesting hollows within the Subject Site. Records within the locality. **Not recorded during site assessment.**
19.	***Pandion cristatus*** Eastern Osprey	V		18	BioNet	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
20.	***Rostratula australis*** Australian Painted snipe	E	E	P	PMST	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. It prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
21.	***Thinornis cucullatus cucullatus*** Eastern Hooded plover	CE	V	P	PMST	Found along the coast from south of Jervis Bay, NSW. In the late 1920s and early 1930s the species was recorded from Port Stephens but are now considered locally extinct. It has not been seen in the Sydney area since the 1940s. Presently the Hooded Plover occurs in NSW north to Sussex Inlet.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
22.	***Tyto novaehollandiae*** Masked Owl	V		4	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. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Low	Broadly suitable foraging habitat within the Subject Site. No suitable nesting hollows within the Subject Site. Records within the locality. **Not recorded during site assessment.**
23.	***Tyto tenebricosa*** Sooty Owl	V		3	BioNet	Occurs in the coastal, escarpment and tablelands regions of NSW. More common in the north and absent from the western tablelands and further west. Inhabits tall, moist eucalypt forests and rainforests, and are strongly associated with sheltered gullies, particularly those with tall rainforest understorey. Roosts in tree hollows, amongst dense foliage in gullies or in caves, recesses or ledges of cliffs or banks. Nest in large (>40cm wide, 100cm deep) tree hollows in unlogged/unburnt gullies within 100m of streams or in caves.	Low	Broadly suitable foraging habitat within the Subject Site. No suitable nesting hollows within the Subject Site. Records within the locality. **Not recorded during site assessment.**
Mammals								
1.	***Cercartetus nanus*** Eastern Pygmy-possum	V		1	BioNet	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Prefers dry forest close to sandstone ridgelines.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	***Chalinolobus dwyeri*** Large-eared Pied Bat	V	V	P	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.	Nil	No suitable roosting habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
3.	***Dasyurus maculatus*** Spotted-tailed Quoll	V	E	3	BioNet, 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.	Low	Broadly suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
4.	***Micronomus norfolkensis*** Eastern Coastal Free-tailed Bat	V		2	BioNet	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	Moderate	Suitable foraging habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
5.	***Miniopterus australis*** Little Bentwing-bat	V		26	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.	Moderate	Suitable foraging habitat within the Subject Site. No suitable roosting habitat. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
6.	***Miniopterus orianae oceanensis*** Large Bent-winged Bat	V		3	BioNet	Forages in forested habitats. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings, and other man-made structures.	Moderate	Suitable foraging habitat within the Subject Site. No suitable roosting habitat. Records within the locality. **Not recorded during site assessment.**
7.	***Myotis macropus*** Southern Myotis	V		3	BioNet	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	Moderate	Suitable foraging habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
8.	***Petauroides volans*** Greater Glider		V	2	BioNet, PMST	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows.	Nil	No suitable habitat within the Subject Site. Two records within the locality. **Not recorded during site assessment.**
9.	***Petaurus australis*** Yellow-bellied Glider	V		23	BioNet	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. Very mobile species known to occupy large home ranges between 20 to 85 ha.	Moderate	Suitable foraging habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
10.	***Petaurus norfolcensis*** Squirrel Glider	V		14	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.	Moderate	Suitable foraging habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
11.	***Petroica phoenicea*** Flame Robin	V		1	BioNet	Prefers clearings or areas with open understoreys. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.	Low	Broadly suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
12.	***Petrogale penicillata*** Brush-tailed Rock-wallaby	E	V	P	PMST	Occurring from Shoalhaven to the Queensland border the species is now mostly extinct west of the Great Dividing Range, except in the Warrumbungles and Mt Kaputar. The species inhabits rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. They browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
13.	***Phascogale tapoatafa*** Brush-tailed Phascogale	V		9	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. Mating occurs May – July.	Moderate	Broadly suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
14.	***Phascolarctos cinereus*** Koala	V	V	870	BioNet, PMST	Found in a variety of forest types with suitable feed tree species.	High	Suitable habitat within the Subject Site, including preferred feed trees. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
15.	***Planigale maculata*** Common Planigale	V		3	BioNet	Occupies coastal north-eastern NSW, coastal east Queensland and Arnhem Land. The species reaches its confirmed southern distribution limit on the NSW lower north coast. Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water.	Low	Broadly suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
16.	***Potorous tridactylus tridactylus*** Long-nosed Potoroo	V	V	P	PMST	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
17.	***Pseudomys novaehollandiae*** New Holland Mouse		V	P	PMST	Inhabits open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
18.	***Pteropus poliocephalus*** Grey-headed Flying-fox	V	V	39	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.	Moderate	Suitable foraging habitat within the Subejct Site. Records within the locality. **Not recorded during site assessment.**
19.	***Ptilinopus magnificus*** Wompoo Fruit-dove	V		1	BioNet	It occurs along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula. 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. It occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
20.	***Scoteanax rueppellii*** Greater Broad- nosed Bat	V		3	BioNet	This species occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland.	Low	Broadly suitable foraging habitat within the Development Site. Records within the locality. **Not recorded during site assessment.**
21.	***Vespadelus troughtoni*** Eastern cave Bat	V		4	BioNet	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals	Low	Broadly suitable foraging habitat within the Development Site. Records within the locality. **Not recorded during site assessment.**
Reptiles								
1.	***Coeranoscincus reticulatus*** Three-toed Snake-tooth Skink	V	V	P	PMST	The Three-toed Snake-tooth Skink occurs on the coast and ranges from the Macleay valley in NSW to south-eastern Queensland. It is very uncommon south of Grafton. This species occurs within rainforest and occasionally moist eucalypt forest, on loamy or sandy soils. The Three-toed Snake-tooth Skink lives in loose soil, leaf litter and rotting logs, and feeds on earthworms and beetle grubs.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
Amphibians								
1.	***Crinia tinnula*** Wallum Froglet	V		8	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.	High	Suitable habitat within the Subejct Site. Records within the Subject Site and broader Study Area. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	***Litoria aurea*** Green and Golden Bell Frog	E	V	5	BioNet, PMST	This species prefers open water bodies, fringed by reeds and other aquatic vegetation for breeding and foraging purposes. Needs fallen logs and debris for shelter and over-wintering purposes.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
3.	***Litoria brevipalmata*** Green-thighed Frog	V		1	BioNet	Occurs north from Gosford to Qld. Breeding occurs in flooded semi-permanent or ephemeral pools, usually in grassy areas and within 100 m of significant stands of native vegetation. Can tolerate some disturbance but not found in >50% cleared grazing land or entirely urban areas. Usually associated with moist forest (swamp forest, wet sclerophyll or rainforest) but often recorded from dry sclerophyll forests in the northern part of its range.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
4.	***Mixophyes balbus*** Stuttering Frog	E	V	P	PMST	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
5.	***Mixophyes iteratus*** Giant Barred Frog	E	E	P	PMST	Occurs on the coast and ranges from south-eastern QLD to the Hawkesbury River in NSW, particularly in Coffs Harbour - Dorrigo area. Forage and live amongst deep, damp leaf litter in rainforest, moist eucalypt forest and nearby dry eucalypt forest. Breed in shallow, flowing rocky streams. Within Sydney Basin, confined to small populations in tall, wet forest in the Watagan Mountains north of the Hawkesbury and the lower Blue Mountains.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Insects								
1.	***Argynnis hyperbius*** Laced Fritillary	E	CE	P	PMST	Recorded in scattered locations across south-eastern Queensland and north-eastern New South Wales. Restricted to areas where its larval food plant, *Viola betonicifolia*, occurs. Usually occurs around river estuaries or open, swampy coastal regions.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
Migratory Species								
1.	***Actitis hypoleucos*** Common Sandpiper		M	3	BioNet, PMST	Utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. Has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. Often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
2.	***Apus pacificus*** Fork-tailed Swift		M	1	BioNet	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.	Low	Broadly suitable aerial foraging habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
3.	***Ardenna carneipes*** Flesh-footed Shearwater	V	M	1	BioNet	Ranges throughout the Pacific and Indian Oceans. There are two main breeding areas in the world: one in the South West Pacific includes Lord Howe Island and New Zealand; the other along the coast of Western Australia.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
4.	***Ardenna grisea*** Sooty Shearwater		M	1	BioNet	The Sooty Shearwater is a pelagic species which breeds mainly on subtropical and sub-Antarctic islands, as well as on the mainland of New Zealand.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
5.	***Ardenna tenuirostris*** Short-tailed Shearwater		M	1	BioNet	Found in coastal waters. The Short-tailed Shearwater establishes massive breeding colonies off the southern and south-eastern coasts of Australia each year. Breeding colonies in NSW contain over 18 million adult individuals. The Short-tailed Shearwater feeds on krill, small fish and other small marine creatures. Food is caught mostly on the surface of the water but sometimes birds are seen diving for food.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
6.	***Arenaria interpres*** Ruddy Turnstone		M	11	BioNet	Prefers rocky coastlines, on coral and sand islands.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
7.	***Calidris acuminata*** Sharp-tailed Sandpiper		M	1	BioNet, PMST	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. Also occur in saltworks and sewage farms. Use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. Use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
8.	***Calidris canutus*** Red Knot		M	11	BioNet, PMST	Prefers intertidal mud and sandflats.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
9.	***Calidris ferruginea*** Curlew Sandpiper	E	CE, M	15	BioNet, PMST	Occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
10.	***Calidris ruficollis*** Red-necked Stint		M	8	BioNet	Mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in salt flats. Sometimes use flooded paddocks or damp grasslands.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
11.	***Calidris tenuirostris*** Great Knot	V	CE, M	3	BioNet	Migratory visitor to Australia. Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
12.	***Cuculus optatus*** Oriental Cuckoo		M	P	PMST	Inhabits rainforest margins, monsoon forest, vine scrub, riverine thickets, wet densely canopied Eucalypt forests, paperbark swamp and mangroves.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
13.	***Limosa lapponica*** Bar-tailed godwit		V, M	2	BioNet, PMST	The Bar-tailed Godwit is a migratory wader which is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It often occurs around beds of seagrass, and sometimes in nearby saltmarsh or the outer margins of mangrove areas.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
14.	***Limosa limosa*** Black-tailed Godwit		M	1	BioNet	Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
15.	***Monarcha melanopsis*** Black-faced Monarch		M	P	PMST	Found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
16.	***Monarcha trivirgatus*** Spectacled Monarch		M	P	PMST	Prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
17.	***Myiagra cyanoleuca*** Satin Flycatcher		M	P	PMST	Found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
18.	***Numenius madagascariensis*** Eastern Curlew		M	4	BioNet, PMST	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The Eastern Curlew breeds in Russia and north-eastern China but its distribution is poorly known. It is carnivorous, mainly eating crustaceans (including crabs, shrimps and prawns), small molluscs, as well as some insects.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
19.	***Numenius phaeopus*** Whimbrel		M	1	BioNet, PMST	Prefers intertidal mud and sandflats.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
20.	***Pluvialis fulva*** Pacific Golden Plover		M	1	BioNet	Inhabits intertidal sand and mudflats, coastal saltmarshes and rocky shores.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
21.	***Pluvialis squatarola*** Grey Plover		M	9	BioNet	Inhabits intertidal sand and mudflats, especially in estuaries and bays.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
22.	***Rhipidura rufifrons*** Rufous Fantail		M	P	PMST	Found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground.	Nil	No suitable habitat within the Subject Site. No records within the locality. **Not recorded during site assessment.**
23.	***Sterna hirundo*** Common Tern		M	1	BioNet	The Common Tern is a non-breeding visitor, occurring right along the east coast and at sparsely scattered sites elsewhere. Each year, most of the Common Terns that occur in Australia breed in Siberia, and then, in July and August, migrate south after nesting has finished. The Common Tern is mainly coastal when not breeding and found in offshore waters, ocean beaches, estuaries and large lakes.	Nil	No suitable habitat within the Subject Site. One record within the locality. **Not recorded during site assessment.**
24.	***Sternula albifrons*** Little Tern	E	M	7	BioNet	Inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. It nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. It is often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
25.	***Thalasseus bergii*** Crested Tern		M	4	BioNet	The Crested Tern is usually a strictly coastal species, however there are occasional records in the arid interior of Australia, where birds were possibly blown by passing tropical cyclones.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
26.	***Tringa nebularia*** Common Greenshank		M	2	BioNet, PMST	Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. Uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores.	Nil	No suitable habitat within the Subject Site. Records within the locality. **Not recorded during site assessment.**
Threatened Ecological Communities								
1.	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community.		E	P	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 dominated2 by Casuarina glauca (swamp oak, swamp she-oak).	Nil	Absent from Development Site
2.	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia		CE	P	PMST	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia typically occurs close to the coast from northern Queensland southwards to eastern Victoria and on offshore islands. It occurs as a series of naturally disjunct and localised stands, on a range of landforms which have been influenced by coastal processes including dunes and flats, headlands and sea-cliffs.	Nil	Absent from Development Site
3.	Lowland Rainforest of Subtropical Australia		CE	P	PMST	The Lowland Rainforest of Subtropical Australia generally occurs between the mountains and the sea at least two kilometres inland from the eastern Australian coast, mainly within the region from Maryborough in Queensland, south to the Clarence River (near Grafton) in New South Wales. It also occurs further south in isolated areas between the Clarence River and Hunter River such as the Bellinger and Hastings valleys	Nil	Absent from Development Site

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
4.	Subtropical and Temperate Coastal Saltmarsh		V	P	PMST	The ecological community occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coasts. It is typically found on sandy or muddy substrate and may include coastal clay pans or similar areas. It occurs in places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences. The ecological community may also include areas that have groundwater connectivity to tidal water bodies.	Nil	Absent from Development Site

APPENDIX C FLORA SPECIES LIST

Table C1: - Flora Species List

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3	
					Cover	Abund	Cover	Abund	Cover	Abund
1.	**Acanthaceae**	*Brunoniella australis*	Blue Trumpet	Forb (FG)	-	-	-	-	0.1	5
2.	**Apiaceae**	*Centella asiatica*	Indian Pennywort	Forb (FG)	0.1	20	-	-	0.1	20
3.	**Apocynaceae**	*Parsonsia straminea*	Common Silkpod	Other (OG)	-	-	0.1	1	-	-
4.	**Araliaceae**	*Polyscias sambucifolia*	Elderberry Panax	Shrub (SG)	-	-	-	-	0.1	3
5.	**Asteraceae**	*Hypochaeris radicata*	Catsear	Exotic	-	-	-	-	0.1	5
6.	**Asteraceae**	*Senecio madagascariensis*	Fireweed	Exotic	0.1	5	-	-	-	-
7.	**Campanulaceae**	*Lobelia purpurascens*	Whiteroot	Forb (FG)	0.1	10	-	-	0.1	5
8.	**Clusiaceae**	*Hypericum gramineum*	Small St John's Wort	Forb (FG)	0.1	10	-	-	-	-
9.	**Colchicaceae**	*Wurmbea biglandulosa*	-	Forb (FG)	0.1	1	-	-	-	-
10.	**Cyperaceae**	*Baumea articulata*	Jointed Twig-rush	Grass & grasslike (GG)	-	-	0.5	10	-	-
11.	**Cyperaceae**	*Chorizandra cymbaria*	-	Grass & grasslike (GG)	0.5	20	0.1	5	-	-
12.	**Cyperaceae**	*Cyperus spp.*	-	Grass & grasslike (GG)	0.1	2	-	-	-	-
13.	**Cyperaceae**	*Fimbristylis dichotoma*	Common Fringe-sedge	Grass & grasslike (GG)	0.1	1	-	-	-	-
14.	**Cyperaceae**	*Gahnia spp.*	-	Grass & grasslike (GG)	0.1	1	-	-	-	-
15.	**Cyperaceae**	*Lepidosperma laterale*	Variable Sword-sedge	Grass & grasslike (GG)	-	-	-	-	2	50

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3	
					Cover	Abund	Cover	Abund	Cover	Abund
16.	**Cyperaceae**	*Lepidosperma quadrangulatum*	-	Grass & grasslike (GG)	5	100	45	150	-	-
17.	**Cyperaceae**	*Ptilothrix deusta*	-	Grass & grasslike (GG)	-	-	-	-	0.5	10
18.	**Cyperaceae**	*Schoenus apogon*	Fluke Bogrush	Grass & grasslike (GG)	0.5	150	1	50	-	-
19.	**Dennstaedtiaceae**	*Pteridium esculentum*	Bracken	Fern (EG)	-	-	-	-	2	50
20.	**Dilleniaceae**	*Hibbertia empetrifolia subsp. empetrifolia*	-	Shrub (SG)	0.1	1	0.5	5	0.5	15
21.	**Ericaceae**	*Leucopogon juniperinus*	Prickly Beard-heath	Shrub (SG)	-	-	-	-	0.2	10
22.	**Fabaceae (Faboideae)**	*Chorizema Parviflorum*	Eastern Flame Pea	Shrub (SG)	-	-	-	-	0.1	2
23.	**Fabaceae (Faboideae)**	*Daviesia umbellulata*	-	Shrub (SG)	-	-	-	-	0.2	3
24.	**Fabaceae (Faboideae)**	*Desmodium varians*	Slender Tick-trefoil	Other (OG)	-	-	-	-	0.1	5
25.	**Fabaceae (Faboideae)**	*Glycine clandestina*	Twining glycine	Other (OG)	-	-	-	-	0.1	5
26.	**Fabaceae (Faboideae)**	*Gompholobium pinnatum*	Pinnate Wedge Pea	Shrub (SG)	-	-	-	-	0.1	3
27.	**Fabaceae (Faboideae)**	*Hardenbergia violacea*	False Sarsaparilla	Other (OG)	0.1	1	-	-	-	-
28.	**Fabaceae (Faboideae)**	*Platylobium formosum*	-	Shrub (SG)	-	-	-	-	0.5	5
29.	**Fabaceae (Faboideae)**	*Pultenaea retusa*	-	Shrub (SG)	0.1	2	0.1	2	0.1	1

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3	
					Cover	Abund	Cover	Abund	Cover	Abund
30.	**Fabaceae (Mimosoideae)**	*Acacia maidenii*	Maiden's Wattle	Tree (TG)	-	-	-	-	0.2	3
31.	**Fabaceae (Mimosoideae)**	*Acacia myrtifolia*	Red-stemmed Wattle	Shrub (SG)	-	-	-	-	0.1	1
32.	**Goodeniaceae**	*Dampiera stricta*	-	Forb (FG)	-	-	-	-	0.1	2
33.	**Haloragaceae**	*Gonocarpus micranthus*	-	Forb (FG)	0.2	50	-	-	-	-
34.	**Haloragaceae**	*Gonocarpus teucrioides*	Germander Raspwort	Forb (FG)	0.1	2	0.2	20	0.1	5
35.	**Juncaceae**	*Juncus spp.*	-	Grass & grasslike (GG)	0.5	10	-	-	-	-
36.	**Lauraceae**	*Cassytha glabella*	-	Other (OG)	-	-	0.1	2	-	-
37.	**Lindsaeaceae**	*Lindsaea linearis*	Screw Fern	Fern (EG)	-	-	-	-	0.5	150
38.	**Lomandraceae**	*Lomandra longifolia*	Spiny-headed Mat-rush	Grass & grasslike (GG)	5	50	0.2	2	1	20
39.	**Luzuriagaceae**	*Geitonoplesium cymosum*	Scrambling Lily	Other (OG)	-	-	-	-	0.2	20
40.	**Myrtaceae**	*Corymbia gummifera*	Red Bloodwood	Tree (TG)	-	-	-	-	5	2
41.	**Myrtaceae**	*Eucalyptus eugenioides*	Thin-leaved Stringybark	Tree (TG)	-	-	-	-	5	2
42.	**Myrtaceae**	*Eucalyptus resinifera*	Red Mahogany	Tree (TG)	5	1	5	2	-	-
43.	**Myrtaceae**	*Eucalyptus robusta*	Swamp Mahogany	Tree (TG)	5	2	20	8	-	-
44.	**Myrtaceae**	*Leptospermum juniperinum*	Prickly Tea-tree	Shrub (SG)	-	-	5	50	-	-
45.	**Myrtaceae**	*Melaleuca linariifolia*	Flax-leaved Paperbark	Shrub (SG)	-	-	1	5	-	-

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3	
					Cover	Abund	Cover	Abund	Cover	Abund
46.	**Myrtaceae**	*Melaleuca quinquenervia*	Broad-leaved Paperbark	Tree (TG)	1	1	1	0	-	-
47.	**Myrtaceae**	*Melaleuca sieberi*	-	Shrub (SG)	0.5	10	2	10	-	-
48.	**Myrtaceae**	*Melaleuca thymifolia*	Thyme Honey-myrtle	Shrub (SG)	0.5	15	0.5	15	-	-
49.	**Myrtaceae**	*Syncarpia glomulifera*	Turpentine	Tree (TG)	-	-	-	-	25	1
50.	**Oleaceae**	*Notelaea ovata*	-	Shrub (SG)	-	-	-	-	2	30
51.	**Phormiaceae**	*Dianella caerulea*	Blue Flax-lily	Forb (FG)	-	-	-	-	0.1	2
52.	**Phyllanthaceae**	*Breynia oblongifolia*	Coffee Bush	Shrub (SG)	-	-	-	-	1	30
53.	**Phyllanthaceae**	*Glochidion ferdinandi*	Cheese Tree	Tree (TG)	-	-	-	-	3	20
54.	**Pittosporaceae**	*Billardiera scandens*	Hairy Apple Berry	Other (OG)	-	-	-	-	0.1	2
55.	**Poaceae**	*Andropogon virginicus*	Whisky Grass	HTW	10	200	2	40	5	40
56.	**Poaceae**	*Aristida vagans*	Threeawn Speargrass	Grass & grasslike (GG)	-	-	-	-	0.5	100
57.	**Poaceae**	*Axonopus fissifolius*	Narrow-leafed Carpet Grass	HTW	10	200	-	-	-	-
58.	**Poaceae**	*Cymbopogon refractus*	Barbed Wire Grass	Grass & grasslike (GG)	-	-	-	-	0.1	1
59.	**Poaceae**	*Digitaria spp.*	-	Grass & grasslike (GG)	-	-	-	-	2	50
60.	**Poaceae**	*Entolasia stricta*	Wiry Panic	Grass & grasslike (GG)	0.2	5	-	-	5	100
61.	**Poaceae**	*Eragrostis brownii*	Brown's Lovegrass	Grass & grasslike (GG)	0.5	200	-	-	-	-

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3	
					Cover	Abund	Cover	Abund	Cover	Abund
62.	**Poaceae**	*Eragrostis leptostachya*	Paddock Lovegrass	Grass & grasslike (GG)	5	150	-	-	0.1	5
63.	**Poaceae**	*Imperata cylindrica*	Blady Grass	Grass & grasslike (GG)	0.1	1	-	-	25	500
64.	**Poaceae**	*Microlaena stipoides*	Weeping Grass	Grass & grasslike (GG)	-	-	-	-	35	1000
65.	**Poaceae**	*Oplismenus aemulus*	-	Grass & grasslike (GG)	-	-	-	-	0.1	1
66.	**Poaceae**	*Panicum simile*	Two-colour Panic	Grass & grasslike (GG)	-	-	-	-	0.1	1
67.	**Poaceae**	*Paspalum dilatatum*	Paspalum	HTW	35	1500	-	-	-	-
68.	**Poaceae**	*Paspalum spp.*	-	Grass & grasslike (GG)	20	1000	10	500	5	50
69.	**Poaceae**	*Sporobolus africanus*	Parramatta Grass	Exotic	1	20	-	-	-	-
70.	**Poaceae**	*Themeda triandra*	Kangaroo Grass	Grass & grasslike (GG)	1	20	-	-	2	70
71.	**Proteaceae**	*Banksia spinulosa*	Hairpin Banksia	Shrub (SG)	-	-	0.1	1	-	-
72.	**Proteaceae**	*Lomatia silaifolia*	Crinkle Bush	Shrub (SG)	-	-	-	-	0.5	10
73.	**Proteaceae**	*Persoonia conjuncta*	-	Shrub (SG)	-	-	-	-	0.2	1
74.	**Proteaceae**	*Persoonia linearis*	Narrow-leaved Geebung	Shrub (SG)	-	-	-	-	0.1	1
75.	**Rosaceae**	*Rubus moluccanus var. trilobus*	Molucca Bramble	Shrub (SG)	0.1	1	-	-	0.2	5
76.	**Rubiaceae**	*Opercularia diphylla*	Stinkweed	Forb (FG)	0.1	5	-	-	-	-
77.	**Rubiaceae**	*Richardia humistrata*	-	Exotic	0.1	2	-	-	-	-

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3	
					Cover	Abund	Cover	Abund	Cover	Abund
78.	**Rutaceae**	*Boronia pinnata*	-	Shrub (SG)	-	-	-	-	0.1	1
79.	**Smilacaceae**	*Smilax glyciphylla*	Sweet Sarsaparilla	Other (OG)	-	-	-	-	0.2	10
80.	**Thymelaeaceae**	*Pimelea linifolia*	Slender Rice Flower	Shrub (SG)	0.1	1	-	-	0.2	10

APPENDIX D FAUNA SPECIES LIST

Table D1 Fauna Species List

No.	Scientific Name	Common Name	Status		Observation Type*	General Abundance within Subject Site**
			BC	EPBC		
1.	*Philemon corniculatus*	Noisy Friarbird	P	0	O	UC
2.	*Trichoglossus chlorolepidotus*	Scaly-breasted Lorikeet	P	0	O	UC
3.	*Trichoglossus haematodus*	Rainbow Lorikeet	P	0	O	UC

*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 E THREATENED ECOLOGICAL COMMUNITY DETERMINATIONS

Appendix E-1: Threatened Ecological Community Determination – BC Act *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* – EEC.

Vegetation Community 2 – Patch 1/1 – PCT 1230: *Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion* (Managed).

Table E-1-1: Assessment of Conservation Status - *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions – EEC* (BC Act). – Vegetation Community 2: PCT 1230: *Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion* (Managed).

Decision Key Criteria	Answer	Justification
Occurs in the NSW North Coast, Sydney Basin and Southeast Corner IBRA7 Bioregions?	**Yes**	The Study Area is based within the **NSW North Coast** IBRA Bioregion.
Occurs within Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs Harbour, Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes and Port Stephens, Lake Macquarie, Wyong, Gosford, Hornsby, Pittwater, Warringah, Manly, Liverpool, Rockdale, Botany Bay, Randwick, Sutherland, Wollongong, Shellharbour, Kiama and Shoalhaven but may occur elsewhere in these bioregions.	**Yes**	The Study Area occurs within the **Hastings LGA**

Decision Key Criteria	Answer	Justification
IS the ecological community associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains – which are generally below 20m elevation, and no more than 50m elevation.	**Yes**	Soil profiles on the same landscape position and adjacent to the site (obtained from DPIE (eSPADE)) describe the soil as **Dermosol – light clay on alluvial lithology**. Elevation averages **10m** – determined through contours on DPIE Spatial Services mapping (SIX Maps) and GPS data (GDA 2020 datum) from the site.
Does the community have an open to dense tree layer of eucalypts and paperbarks, which may exceed 25 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality?	**Yes**	Canopy cover varies across the site but is generally consistent with an open forest. Canopy is dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark) and *Eucalyptus robusta* (Swamp Mahogany) with *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany) occurring as a co-dominant species.
Is the groundcover of the community composed of abundant sedges, ferns, forbs, and grasses?	**Yes**	The understorey varies across the site, with drier parts dominated by a mix of native and exotic grasses. Wetter areas are typically dominated by sedges, such as *Lepidosperma quadrangulatum*, *Schoenus apogon* and *Machaerina spp.*
Does this community have a relatively dense tree canopy dominated by *Eucalyptus robusta, Melaleuca quinquenervia* or *E. botryoides*? Does this community also contain the relatively infrequent occurrence of other eucalypts, *Casuarina glauca* or *Lophostemon suaveolens*; the occasional presence of rainforest elements as scattered trees or understorey plants; and the prominence of large sedges and ferns in the groundcover?	**Yes**	Canopy is dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark) and *Eucalyptus robusta* (Swamp Mahogany). *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany) occurs as a co-dominant species. Very little *Casuarina glauca* occurs within this community; no *Lophostemon confertus* was evident either. As stated above, ground cover varies, but is generally dominated by grasses and sedges.
Are the soils are usually waterlogged, stained black or dark grey with humus, and show little influence of saline ground water?	**Yes**	The soils are light-dark brown. Most of this community had very waterlogged soil. Saline influence is very minimal which can be seen from the absence of saline tolerant vegetation, i.e. *Phragmites australis* and *Casuarina glauca*.
Determination	The vegetation within the Study Area **meets** the definition of the Endangered Ecological Community *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* as listed under the Commonwealth's Environment Protection Biodiversity Conservation Act 1999.	

APPENDIX F STAFF CONTRIBUTIONS

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

Name	Qualification	Title/Experience	Contribution
David Martin	MSc	Ecologist (Botanist)	Report Author
Ben Stewart	MMarSc&mgmt	Ecologist	Flora and Fauna surveys
James Baldry	MConsBio	Ecologist	Reporting
Dr. Gilbert Whyte	BSc (Hons), PhD Accredited BAM Assessor	Senior Ecologist	Report Review
Gayle Joyce	BSc (Forestry) (Hons)	GIS Specialist	GIS and figure preparation

APPENDIX G LICENSE AND PERMITS

Kleinfelder employees involved in the current study are licensed or approved under the *Biodiversity Conservation Act 2016* (License Number: SL100730, Expiry: 31 March 2022) 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.