



## Biodiversity Assessment Report

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# Byron Bay Bus Interchange

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Reference No. 30011906  
Prepared for Sydney Trains  
15 May 2019

## Document Control

Document:	Biodiversity Assessment Report
File Location:	T:\Projects\30031829\006_Rptg\Draft
Project Name:	Byron Bay Bus Interchange
Project Number:	30011906
Revision Number:	Rev01

## Revision History

REVISION NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED FOR ISSUE BY
Draft	24/05/18	David Sharpe	Liam Hogg	Melissa Laginha
Final	19/10/18	David Sharpe	Melissa Laginha	Bernie Lariviere
Rev01	14/05/19	Kristen Bigland Joel Callaghan	Rachel Musgrave	Bernie Lariviere

## Issue Register

DISTRIBUTION LIST	DATE ISSUED	NUMBER OF COPIES
Sydney Trains	15 May 2019	1
Sydney Trains	15 May 2019	1
Sydney Trains	17 May 2019	1

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## GLOSSARY OF TERMS

DEFINITIONS	
Direct impact	Where a primary action is a substantial cause of a secondary event or circumstance which has an impact on a protected matter
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic component (OEH 2014).
Indirect impact	Where an event or circumstance is a direct consequence of the action (ref <a href="http://www.environment.gov.au/system/files/resources/0b0cfb1e-6e28-4b23-9a97-fdadda0f111c/files/environment-assessment-manual.pdf">http://www.environment.gov.au/system/files/resources/0b0cfb1e-6e28-4b23-9a97-fdadda0f111c/files/environment-assessment-manual.pdf</a> ).
MNES	A matter of national environmental significance (MNES) protected by a provision of Part 3 of the EPBC Act.
Minimisation	Action to reduce the severity of an impact (OEH 2014).
Mitigation measure	Any measure that facilitates the safe movement of wildlife and/or prevents wildlife mortality.
Population	All the individuals that interbreed within a given area.
Proposal	The collective actions proposed on the Site
Site	The area of land that is directly impacted by the proposal
Study area	The area directly affected by the proposal and any additional areas likely to be affected by the proposal, either directly or indirectly (OEH 2014).
<b>Abbreviations</b>	
BBAM	BioBanking Assessment Methodology
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
CEMP	Construction Environmental Management Plan
EEC	Endangered ecological community
EP&A Act	<i>Environment Planning and Assessment Act 1979</i> (NSW)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal)
MNES	Matters of National Environmental Significance
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PMST	Protected Matters Search Tool
SEPP	State Environmental Planning Policy
VIS	Vegetation information system

## Executive Summary

Sydney Trains have commissioned SMEC Australia to undertake a biodiversity assessment for a proposed new bus interchange at Butler Street, Bryon Bay (the 'Site').

The Site is approximately 0.68 hectares in area and is predominately covered by contiguous vegetation. The Site is TfNSW and is adjacent to the former Byron Bay railway station. The Site is located within the rail corridor and was previously used for associated activities (e.g. water tower, engine turntable, etc). Thus, the Site has been subjected to a high level of on-going disturbance.

More recently, following the closure of the railway, some native vegetation at the Site has been allowed to re-establish. Based on the site inspection, the vegetation at the Site is in a disturbed condition, demonstrated by an open canopy and substantial presence of weeds.

Background database searches and field investigations were undertaken to assess the impact of the proposal on the ecological values of the Site. Two PCTs were recorded on the Site: PCT 1536 Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest and PCT 1064 Paperbark swamp forest. The Paperbark swamp forest is consistent with the EEC Swamp sclerophyll forest (SSF) on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, which is listed under the NSW *Biodiversity Conservation Act 2016* (BC Act). This PCT occurs in two areas within the Site, totalling 0.22 ha. This vegetation is continuous with similar vegetation within the Study Area and totals 0.83 ha. Thus, 27% of the SSF would be removed.

The construction and operation of the bus interchange and associated infrastructure, would require the Site to be totally cleared as part of the proposal. The loss of this community would require offsetting in accordance with the TfNSW Biodiversity Offsets Calculator.

No threatened flora was recorded however a small number of the threatened fauna may utilise the Site. Fauna species capable of flight are able to access the Site intermittently (i.e. seasonally for nectar or for only a small part of the daily activity period). The loss of threatened fauna habitat of threatened would need to be offset in accordance with the TfNSW Biodiversity Offsets Calculator. No threatened fauna would be dependent on the Site and none are likely to breed there (e.g. lack of hollow-bearing trees).

A number of impacts associated with the proposal were identified, the most important being habitat loss and noise and light impacts during the construction and operation stages. Management measures are recommended to minimise impacts prior to, during and after construction, which would reduce the impacts to an acceptable level.

Assessments of significance were undertaken as part of the biodiversity assessment based on the assumption that the management recommendations, including offsets, would be implemented. A five-part Test of Significance under the NSW *Biodiversity Conservation Act* (BC Act) was undertaken for Swamp Sclerophyll Forest and threatened fauna species likely to use the Site. In addition, a test of significance was also conducted for the Grey-headed Flying-fox using the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Significant Impact Guidelines. These assessments concluded that the proposal is not likely to have a significant impact on EECs or threatened species listed under the BC Act or the EPBC Act. Therefore, a Species Impact Statement (BC Act) or an EPBC Act referral are not required.

# 1 Introduction

Sydney Trains have commissioned SMEC Australia to undertake a biodiversity assessment of a proposed new bus interchange on land owned by Sydney Trains on Butler Street, Bryon Bay, hereafter referred to as the 'Site'. The Site and adjacent areas surveyed as part of the assessment are collectively referred to as the 'Study Area' (Figure 1-1).

The proposal is shown in Figure 1-2 and would include:

- provision of three dedicated stops for regional coaches within the interchange;
- associated customer facilities such as covered canopies, shelters, waiting areas;
- provision of a disability car parking spot, two taxi ranks and two kiss and rides;
- public amenities;
- accessible paths to key interchange elements; and
- landscaped areas within the interchange.

It is understood that the proposal would involve bus movements during the day and night.

The Site is 0.68 hectares in area and is predominately located on land zoned as SP2 Infrastructure (Rail Corridor) under the *Byron Bay Local Environmental Plan 2014* (LEP). Land zoned R2 Low Density Residential and RE1 Public Recreation borders the western boundary.

The Site is located between Butler Street to the west and the now inactive North Coast Railway to the east. To the north, the Site abuts Swamp Sclerophyll Forest dominated by Broad-leaved Paperbark (*Melaleuca quinquenervia*). To the south is a walkway (previous an old pig run) used to access the town centre commercial precinct from the west. On the south side of this walkway is additional Swamp Sclerophyll Forest. Both areas of Swamp Sclerophyll Forest occur as linear strips between Butler Street and the railway and extend for no more than 100 metres.

The Site is within a rail corridor and was previously used for associated activities (e.g. water tower, engine turntable, etc). Thus, the Site has previously been subject to a high level of on-going disturbance. More recently, following the cessation of transport activities, vegetation has regrown on the Site, however large canopy gaps remain and a number of weed species have established.

The purpose of the biodiversity assessment is to identify the ecological constraints of the Site and to assess the ecological impact of the proposed concept design. It will be used to inform the detailed design for the proposal and to ensure compliance with the:

- NSW *Biodiversity Conservation Act 2016* (BC Act);
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *State Environmental Planning Policy 44 – Koala Habitat Protection* (SEPP 44); and
- *State Environmental Planning Policy (Coastal Management) 2018*.

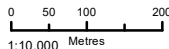


**LEGEND**  
 Study Area



**FIG NO. 1**      **FIGURE TITLE** Study Area

**DATE**  
 14/05/2019




1:10,000 Metres

**PAGE SIZE**  
 A4

**COORDINATE SYSTEM**  
 GDA 1994 MGA Zone 56

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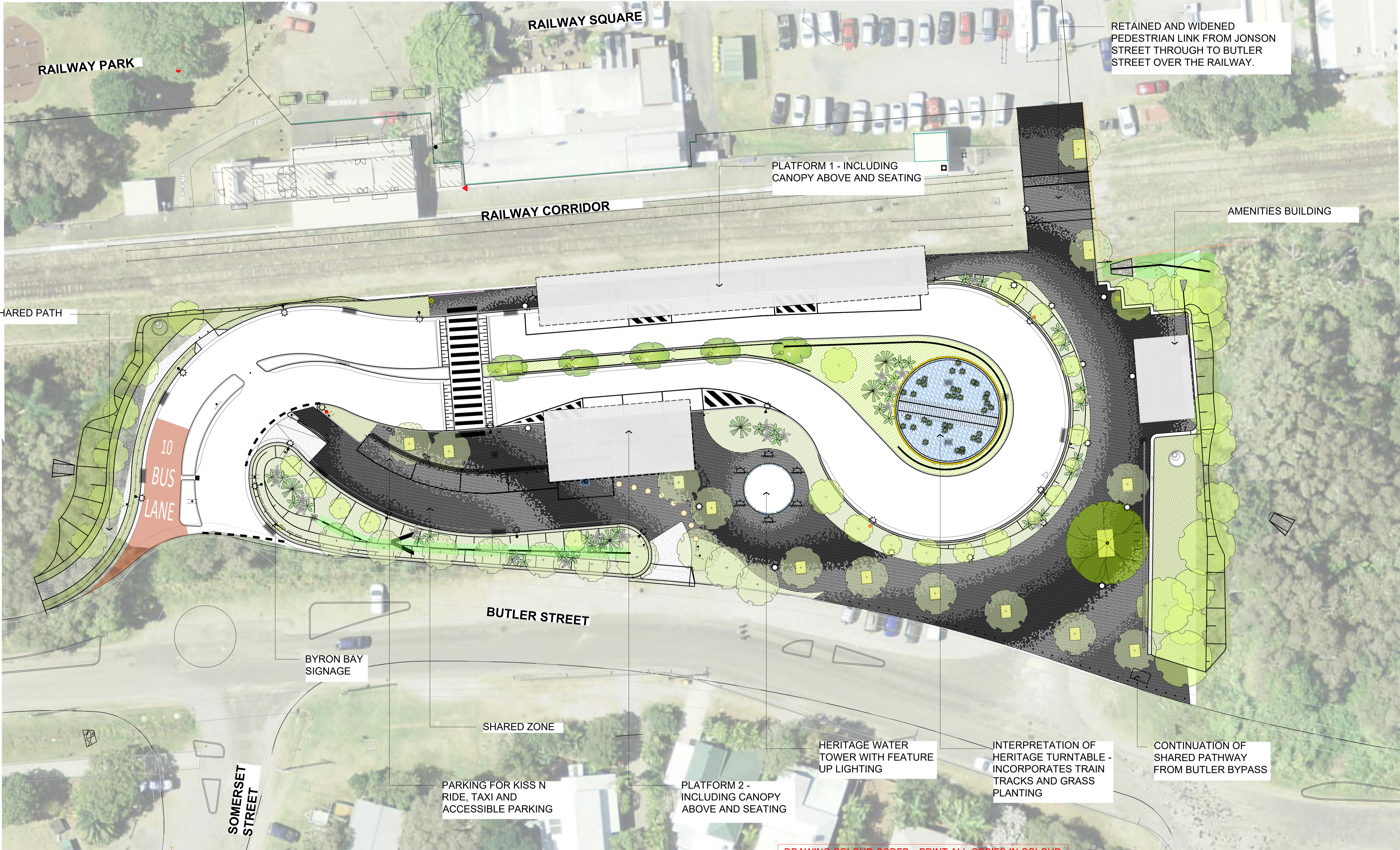
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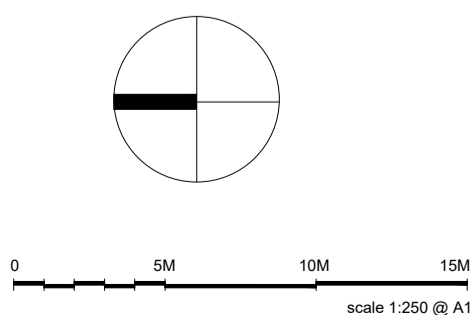
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**BYRON BAY INTERCHANGE LANDSCAPE DESIGN OVERALL SITE PLAN**

FILE No.	BB-WT-LA-1001	SHEET:	1 OF 1	A1
STATUS:	FOR COMMUNITY CONSULTATION			
DRG No.	BB-WT-LA-1001	A	EDMS No.	CV_0716085

Plotted by MENOCH

File Path: C:\projects\2016\16057 Rural & Regional Interchange Projects Package 1\3. Working Docs\3.01 CAD\Plot\Byron Bay\_Water Tower.dwg  
Plot Date & Time: 15/05/2018 3:04 PM

## 2 Methods

### 2.1 Database Searches

Prior to conducting the site inspection, a review of available background information was undertaken to gain an understanding of the surrounding environment and potential target species within 5 kilometres of the Site (the Locality). This involved review of the following databases:

- OEH BioNet Atlas, which provides records of threatened flora and fauna and Endangered Ecological Communities (EECs) listed under the BC Act;
- OEH Vegetation Information System, which provided mapping of the Byron Bay Local Government Area;
- *State Environmental Planning Policy (Coastal Management) 2018* maps; and
- Matters of National Environmental Significance (MNES) using the Protected Matters search tool (PMST), which predicts which threatened flora, threatened and migratory fauna and Threatened Ecological Communities listed under the EPBC Act.

An assessment of the habitat requirements for threatened and migratory species identified through the desktop analysis was undertaken to determine the likelihood of occurrence on the site. Habitat requirements include the broad habitat types occupied (e.g. rainforest, wetlands) and the presence of features such as hollow-bearing trees, fallen logs and seasonal foraging resources. The likelihood of each species (flora and fauna) being present was categorised as either nil, low, moderate, high or occasional, defined as follows:

- **Nil** - Species for which habitat is clearly not present (e.g. rainforest is not present within the Study Area);
- **Low** – Species with only a limited amount of suitable habitat available, restricted by the presence or absence of key habitat features. This includes species that may be present in the wider area and, therefore, cannot be definitively ruled out;
- **Moderate** - Species for which the broad habitat type is available, but are likely to be limited by the presence of a particular habitat feature (e.g. hollow-bearing trees); and
- **High** - Species that have been recorded on the site or on adjacent lands in similar habitat or for which both the broad habitat type and key habitat features are present.

Threatened species do not need to be continuously present on the site but may be present on a seasonal or intermittent basis, depending on resource availability (e.g. Grey-headed Flying-fox). For other species, the site may only form part of their home-range area. No targeted surveys were carried out as part of the assessment, however, habitat assessments for threatened flora and fauna species were undertaken. Assessments of significance (five-part test under the BC Act and significant impact guidelines under the EPBC Act) were also undertaken for all species with a moderate to higher likelihood of occurrence, irrespective of whether they were actually recorded.

### 2.2 Flora Survey

A flora survey was conducted in accordance with BioBanking Assessment Methodology 2014 (BBAM) and Draft Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (DEC, 2004). Two 20 x 50m quadrats were undertaken to describe the vegetation on the Site and an additional quadrat was used to the south of the Site, across the walkway (Figure 3-1). Flora plot sampling was conducted in accordance with the BC Act and utilised the BBAM that includes the establishment of a 20 metre x 50 metre plot within which the following data was collected:

- Native species richness recorded within each stratum of a 20 metre x 20 metre plot
- Native over-storey projected foliage cover recorded at 10 points along a 50 metre transect
- Native mid-storey projected foliage cover recorded at 10 points along a 50 metre transect
- Native groundcover projected foliage cover recorded at 10 points along a 50 metre transect for three life forms (shrubs, grasses and other)
- Weed species projected foliage cover expressed as a percentage of over-storey, mid-storey and ground cover along a 50 metre transect
- Number of trees with hollows where entrance width is more than five centimetres and hollow is at least one metre above ground within the 20 metre x 50 metre plot
- The percentage of regenerating canopy species within the vegetation zone

- The total length in meters of fallen logs more than 10 centimetres in diameter within the 20 metre x 50 metre plot.

In addition to collection of native plant species richness within a 20 metre x 20 metre plot, full floristic data was also collected to enable classification of each vegetation zone to the best fit Plant Community Type (PCT).

Field traverses were undertaken by SMEC ecologists to habitat boundaries and any changes in potential to support threatened flora.

### 2.3 Fauna Survey and Fauna Habitat Assessment

A fauna habitat assessment was undertaken to assess which threatened and migratory fauna have the potential to use the Site. The following data were recorded:

- BBAM details described above;
- Presence of and distance to water;
- Evidence of disturbance;
- Indirect evidence of fauna such as scats, diggings and scratchings;
- Opportunistic observations; and
- Presence of seasonal foraging resources (e.g. nectar, fruit).

## 3 Results and Discussion

### 3.1 Database Searches

The database searches (BioNet/PMST) returned 184 species listed under the BC Act and/or EPBC Act. This included 47 flora species, five invertebrates, five amphibians, eight reptiles, 88 birds and 23 mammals (Appendix A).

The habitat requirements of each species was assessed against the habitat available on the Site (see Likelihood of Occurrence table in Appendix A), which considerably reduced the number of species that are likely to occur within the Study Area. For example, fauna species wholly or largely dependent on oceanic environments would not occur in the Study Area due to the lack of suitable habitat. Similarly, flora species occurring in rainforest on basalt would not be present on the sandy/organic soils of the Study Area. Each species returned by the database searches is assessed for their likelihood of occurrence in Appendix A .

The likelihood of occurrence assessment concluded that only nine threatened fauna species were likely to use the Study Area (Table 3-1). The small area, isolation, soil type, restricted number of plant communities, lack of tree hollows and fallen logs, lack of Eucalyptus trees and degree of disturbance of the Site all contributed to this conclusion. All these factors are known to influence habitat occupancy by threatened flora and fauna. For example, the Koala would not be present on the Site as there are no Eucalypts, which are the sole foraging resource for this species, present. Rainforest flora preferring basalt soils would not be present. Similarly, species dependent on tree hollows would not breed in the Study Area due to the lack of suitable nesting sites.

The review of the *State Environmental Planning Policy (Coastal Management) 2018* maps revealed that while Coastal Wetlands and Littoral Rainforest occur in the Locality, the Site is not within the mapped areas or their associated buffers.

Table 3-1: Threatened species with a moderate to high likelihood of occurring on the Site. A full likelihood analysis of database search result is given in Appendix A.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Bush-hen <i>Amaurornis moluccana</i>	V		Habitats with a tall dense understorey or ground-layer vegetation on the margins of freshwater streams and wetlands, usually within or bordering rainforest, rainforest remnants or forests. Also occurs in secondary forest growth, rank grass or reeds, thickets of weeds, such as Lantana ( <i>Lantana camara</i> ), mangroves, tall pastures, crops or other farmland (e.g. sugar cane, and grassy or weedy fields), or urban gardens where they border forest and streams or wetlands, such as farm dams. Feeds on seeds, plant matter, earthworms, insects and some frogs.	Moderate. Lack of sufficiently extensive dense understorey. As the site is on the edge of town, likely to be exposed to predation by domestic and feral dogs. However, there is a 2001 record within Paperbark Forest with a dense Molasses Grass understorey about 100m north of the Site. This record is likely to be associated with a dispersing individual.
<i>Saccolaimus flaviventris</i> Yellow-bellied Sheath-tail Bat	V		Inhabits eucalypt rainforest, sclerophyll forest and open woodland vegetation. Forages for insects, flying fast over the forest canopy or lower in open country. Availability of tree hollows is important for access to roosting and breeding sites.	Moderate. May forage over the site infrequently. No hollow-bearing trees for roosting.
Eastern Freetail-bat <i>Mormopterus norfolkensis</i>	V		Preferred habitat includes dry eucalypt forest and coastal woodlands but also include riparian zones in rainforest and wet sclerophyll forest. Forages above forest canopy or forest edge and mainly roosts in tree hollows.	Moderate. May forage over the site infrequently. No hollow-bearing trees for roosting.
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	V		Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. They form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. This species tends to hunt in forested areas, catching flying insects above the canopy.	Moderate. Possibly forages over the site on rare occasions. No suitable roosting or breeding structures.
Little Bentwing-bat <i>Miniopterus australis</i>	V		This species occurs in moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bent-wing Bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Moderate. Possibly forages on the site on rare occasions, but site likely to be too open for regular use. No suitable roosting or breeding structures.
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	V		Occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland. Often feeds along habitat edges. Large hollow bearing trees required for roosting.	Moderate. May occasionally foraging along the edge of existing habitat. No hollow-bearing trees for roosting.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Eastern Long-eared Bat <i>Nyctophilus bifax</i>	V		Lowland subtropical and littoral rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Roosts in tree hollows, the hanging foliage of palms, in dense clumps of foliage of rainforest trees, under bark and in shallow depressions on trunks and branches, among epiphytes, in the roots of strangler figs, among dead fronds of tree ferns and rarely in buildings.	Moderate. Possibly forages on the site on rare occasions, but site likely to be too open for regular use. No suitable roosting or breeding structures.
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy. They travel up to 50 km to forage, on the nectar and pollen of native trees, in particular <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Banksia</i> , and fruits of rainforest trees and vines.	High. Likely to use seasonally available nectar and fruit resources on and adjacent to the site. The site is about 300m from an intermittent roosting camp at the end of Sommerset Street. The site is separated from the camp by existing residential development.
Eastern Blossom-bat <i>Syconycteris australis</i>	V		Roosts in littoral rainforest, feeds on nectar in adjacent heathland and paperbark swamps, occasionally eucalypt forest	Moderate. Likely to use seasonally available nectar resources on and adjacent to the site.

### 3.2 Vegetation communities

The Site is approximately 0.68 hectares in area and is predominately covered by contiguous vegetation.

Two Plant Community Types (PCT) are present at the Site (Table 3-2, Figure 3-1):

- PCT 1536 Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest; and
- PCT 1064 Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion.

Table 3-2: Vegetation communities at the Site

VEGETATION COMMUNITIES	AREA (HA)
PCT 1536 Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest	0.24
PCT 1064 Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion.	0.22
Cleared (path across existing rail, exotic grassland)	0.22
<b>Total</b>	<b>0.68</b>

The majority of the Site is covered by highly disturbed PCT 1536 Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest (Figure 3-1). While this is described as a littoral rainforest by the PCT, it does not meet the legal definition Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions - Endangered Ecological Community listing. According to the NSW Scientific Committee's final determination, rainforest species with evergreen mesic or coriaceous leaves dominate the Littoral Rainforest EEC, while Coast Banksia (*Banksia integrifolia*) is only present as scattered individuals. In contrast, due to previous Site disturbance, the fragmented canopy at the Site is dominated by Coast Banksia. Apart from Broad-leaved Tuckeroo (*Cupaniopsis anacardioides*) and Cheesetree (*Glochidion ferdinandi*), any additional rainforest species are only present as small saplings.

Two small areas in the very north and south of the Site were consistent with PCT 1064 Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion (Figure 3-1). These areas have also been previously impacted by disturbance and human use. In the northern section of the Site, the canopy is fairly intact and dominated by Broad-leaved Paperbark (*Melaleuca quinquenervia*). However, the midstorey has been removed and the dense groundcover is dominated by Molassas Grass (*Melinis minutiflora*).

This community is consistent with the definition of the EEC (Endangered Ecological Community) Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions as:

- the canopy is dominated by the indicator species Broad-leaved Paperbark;
- the Site occurs on a coastal sandplain; and
- it occurs on a humic soil.

As part of the proposal, the majority of Swamp Sclerophyll Forest on the Site (Figure 3-1) would be retained and continue to be used as the receiving environment for surface and sub-surface water generated by rainfall on the Site and adjacent land.

The structural characteristics of each PCT are summarised in Table 3-3 and Table 3-4. Cover and abundance estimates for the PCTs are given in Appendix B .



Table 3-3: PCT indicator species actually present are shown.

PCT	NAME	INDICATOR SPECIES	PRESENT
1536	Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest	Trees	
		<i>Cupaniopsis anacardioides</i>	X
		<i>Acmena smithii</i>	X
		<i>Banksia integrifolia</i>	X
		Shrubs	
		<i>Myrsine variabilis</i>	
		<i>Breynia oblongifolia</i>	
		<i>Pittosporum revolutum</i>	
		<i>Polyscias elegans</i>	
		<i>Notelaea longifolia</i>	
		<i>Glochidion ferdinandi</i>	X
		Climbers	
		<i>Smilax australis</i>	
		<i>Marsdenia rostrata</i>	
		<i>Pandorea pandorana</i>	
		<i>Cissus hypoglauca</i>	
		<i>Cissus antarctica</i>	
Groundcovers			
<i>Pteridium esculentum</i>	X		
<i>Lomandra longifolia</i>	X		
<i>Oplismenus imbecillis</i>	X		
1064	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Trees	
		<i>Melaleuca quinquenervia</i>	X
		<i>Melaleuca linariifolia</i>	
		<i>Melaleuca sieberi</i>	
		<i>Melaleuca alternifolia</i>	
		Shrubs	
		<i>Leptospermum</i> spp.	
		<i>Melastoma affine</i>	
		Climbers	
		<i>Parsonsia straminea</i>	
Groundcovers			
<i>Blechnum indicum</i>			
<i>Gahnia</i> spp.	X		
<i>Hypolepis muelleri</i>			

Table 3-4: Summary of the structural characteristics of the two PCTs found on the Site.

PCT			COVER %	LENGTH (M)	
<b>PCT 1536</b>					
Soil Type	Sand	Bare Earth	22	HBT	0
Slope	0	Leaf Litter	30	Logs	0
Aspect	na	Rock	0		
		Moss	0		
	Canopy	Sub-canopy	Shrubs	Climbers	Groundcover
Height (m)	14	10	2	2	0.6
Cover (%)	5	43	8	3	48
<b>PCT 1064</b>					
Soil Type	Humic	Bare Earth	5	HBT	0
Slope	0	Leaf Litter	30	Logs	0
Aspect	na	Rock	0		
		Moss	0		
	Canopy	Sub-canopy	Shrubs	Climbers	Groundcover
Height (m)	14	10	2		0.7
Cover (%)	35	38	15	0	65



**LEGEND**

- Quadrat locations
- ▭ Proposal Area

**Plant Community Types (PCT)**

- PCT 1064 Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
- PCT 1536 Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest

**FIG NO.** 3-1      **FIGURE TITLE** Plant Community Types (PCT) and survey locations


**DATE** 09/04/2019

0 10 20 40  
1:2,000 Metres

**PAGE SIZE** A4      **COORDINATE SYSTEM** GDA 1994 MGA Zone 56

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Member of the Sarsina Jung Group

**PROJECT NO.** 30011906      **PROJECT TITLE** Byron Bay Station REF

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### 3.3 Threatened flora

A total of 68 flora species were recorded on the Site. Of these, 36 (52%) were introduced species (Appendix B ). No threatened flora species were detected.

The majority of the Site supports highly disturbed native vegetation. Coast Banksia (*Banksia integrifolia*), an important winter nectar-producing tree, was common on the Site as it establishes well following disturbance. A small number of Broad-leaved Paperbark, which provides nectar during autumn, are present. One Small-leaved Fig (*Ficus obliqua*) was present in the north of the Site.

### 3.4 Threatened fauna

During the Site inspection, only three bird species were observed on the Site: Noisy Miner (*Manorina melanocephala*), Blue-faced Honeyeater (*Entomyzon cyanotis*) and Scaly-breasted Lorikeet (*Trichoglossus chlorolepidotus*). All these species are highly tolerant of modified habitat and a high human presence. While not expected to be a full account of species likely to use the Site, they are indicative of the type of species that would occur (i.e. generalist species). Bird species have the additional advantage of high mobility, which enables them to use the Site on a seasonal or intermittent basis. Therefore, they do not need to be permanent residents to use the Site.

The fauna habitat assessment suggested that nine threatened fauna species listed under the BC Act were likely to use the Site (Table 1; Appendix A ). All species are flying mammals that have a high degree of mobility. Three microbat species, the Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) and the Eastern Freetail-bat (*Mormopterus norfolkensis*) are high flying species that may forage over the Site occasionally. Three other microbat species (Greater Broad-nosed Bat *Scoteanax rueppellii*, Little Bentwing-bat *Miniopterus australis*, Eastern Long-eared Bat *Nyctophilus bifax*) may use the Site occasionally, despite the open and fragmented canopy and small area of the Site. The Grey-headed Flying-fox (*Pteropus poliocephalus*) and Eastern Blossom-bat (*Syconycteris australis*) are nectarivorous and may use the Site during the flowering periods of Broad-leaved Paperbark (late summer/early winter) and Coast Banksia (autumn/spring). It is unclear whether the Site would be subject to levels of human activity too high for the Eastern Blossom-bat. However, an intermittent Grey-headed Flying-fox roost is known from about 300m north-west of the Site and the species is known to forage in urban areas. The Grey-headed Flying-fox is the only threatened species under the BC Act that is also listed under the EPBC Act.

No other threatened or migratory fauna are likely to use the Site due to factors such as: essential food resources are not present (e.g. fleshy fruit, Eucalypt nectar, Koala food trees), the small area and relative isolation of the Site, the proximity to high levels of human activity, the presence of domestic and feral predators (e.g. cats, dogs, foxes) and the lack of shelter sites (e.g. hollow-bearing trees, fallen logs).

## 4 Proposal Impacts

The proposal would entail direct and indirect impacts on the ecological features of the Site. Proposal impacts on threatened species listed under the BC Act are assessed via five-part tests of significance are given in Appendix C . Proposal impacts on threatened species listed under the EPBC Act are given in Appendix D . These impacts are evaluated on the assumption that the recommended impact minimisation measures given in Section 5 are adopted.

### 4.1 Direct Impacts

A direct impact associated with the proposal is the removal of all native vegetation from the Site. This would involve clearing 0.24 ha of the disturbed PCT 1536 Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest. This would cause the removal of mostly Coast Banksia and a small number of Broad-leaved Paperbark, both of which provide seasonal nectar to fauna. All of this PCT would be removed from the Site (Figure 3-1).

There would be small areas of PCT 1064 removed in the north and south of the Site. (Figure 3-1). As stated above, PCT 1064 conforms to the definition of the Swamp Sclerophyll Forest (SSF) EEC. This community continues to the north and south of the Site (Figure 3-1). The maximum extent of clearance of this vegetation types would be 0.22 ha out of a total of 0.83 ha within the immediate locality. The extent of PCT 1064 represents 27% of this community that would be affected within the Study Area. Most of this community occurring in the north of the Study Area, however, would be retained and continue to be used for Site drainage.

The removal of vegetation on the Site is not expected to increase the impact of edge effects as the existing vegetation is very limited in area and linear in configuration. Edge effects and habitat fragmentation are, therefore, already in operation on the Site and impacting upon its biodiversity values. Because the threatened species that would use the Site are capable of flight, the proposal is not expected to increase the operation of fragmentation.

The removal of vegetation and its replacement with hardstand and landscaping would alter the drainage and hydrological characteristics within the Site. Rain falling on the Site would be temporarily retained and filtered through the underlying sand bed before discharging off the Site. Thus, no change to the quantity or quality of rainwater discharged from the Site is expected.

### 4.2 Indirect Impacts

Noise, light and activity would occur during the construction and operational stages of the proposal. Vibration during construction would also be a potential impact. Construction activities would occur during the day, whereas all threatened species likely to use the Site are active at night. Other, common, species would use the Site during the day (e.g. Noisy Miner, Blue-faced Honeyeater, Scaly-breasted/Rainbow Lorikeets).

The Site is already in an area that is subject to a high human presence and activity during both the day and night, suggesting the proposal is unlikely to have additional noise, light and activity impacts on threatened species during operation.

Erosion and sedimentation may occur during the construction phase of the proposal following vegetation removal. While the sands that underlie the Site are not particularly erodible, erosion and sediment control measures will be required.

Fuel spills and oil leaks may result in pollution of surface and groundwater. However, the risks are relatively minor provided construction machinery and buses are well maintained and would be of a similar magnitude to those already occurring due to existing roads and human activity in the Locality. As a precaution, strategies to deal with any fuel and chemical issues will need to be developed. Litter may be produced during the operational stage and may be transported to areas of native vegetation and waterways nearby during windy conditions.

### 4.3 Calculation of Biodiversity Offsets

The loss of EEC vegetation and threatened species habitat resulting from the proposal requires offsetting in accordance with the TfNSW Biodiversity Offsets Calculator. This calculator was followed as the proposal would not have a significant impact on these biodiversity values, however, their habitat would still be affected.

As per the dichotomous key in Chapter 6 of the Biodiversity Offsets Calculator, the presence of threatened vegetation (SSF) requires Item Two: Threatened Vegetation of the Biodiversity Offset Table to be followed (Refer to Table 4-1).

Considering two or more impact questions were answered affirmatively, a moderate impact is assumed. Where suitable revegetation cannot be undertaken, a contribution is made into the Biodiversity Offset Fund (BOF). Given the constraints of the Site and availability of a suitable area, it is unlikely revegetation would be undertaken as part of this proposal however this option is still presented in Table 4-1.

The calculations for the offsets were based on the area of SSF to be removed as part of the proposal, that is 0.22 ha (or 2,200 square metres). As per the calculator, \$30 per square metres is to be contributed to the BOF for every square metre of EEC removed, totalling \$66,000.

Table 4-1: Offset options for the proposal

ECOLOGICAL LOSS RESULTING FROM ACTIVITY	IMPACT QUESTIONS	OFFSET OPTIONS (MODERATE IF YES TO 1 OR MORE QUESTIONS)
<p><b>4. Will the activity impact on a vegetation community that forms part of a vulnerable, endangered, or critically endangered ecological community (ie. threatened vegetation)?</b></p> <p><b>a. If yes, go to Item 2: Threatened Vegetation in the biodiversity offset table</b></p>		
<p><b>Item 2. Threatened Vegetation</b> Vegetation communities that are listed as critically endangered, endangered, or vulnerable</p>	<p>Of the main body of vegetation to be cleared does the threatened vegetation being removed account for 10% or more of the canopy cover?</p> <p>Will any remaining threatened vegetation become isolated from a main vegetation body?</p> <p>Is there potential that the threatened vegetation would be used by one or more threatened fauna species for:</p> <p>Shelter Breeding</p>	<p><u>1. Where possible:</u> Where possible: Undertake bush revegetation using locally native species and targeted weed removal of the disturbed area for a minimum of 2 years AND Revegetation to increase the area of threatened vegetation by at least 50%, using relevant species from the threatened vegetation affected, with revegetation located (where possible) to provide a buffer effect AND Contribute \$20/m<sup>2</sup> of threatened vegetation that will be disturbed to the BOF to rehabilitate land supporting the same threatened vegetation OR <u>2. If the above is not possible,</u> contribute \$30/m<sup>2</sup> of threatened vegetation community that will be disturbed to the BOF to rehabilitate land supporting the same threatened vegetation community</p>

## 5 Recommendations

To minimise impacts on threatened vegetation and species arising from the proposal, the following recommendations should be adopted at each proposal stage according to guidelines provided by TfNSW (2016).

### 5.1 Prior to Construction

Prior to the commencement of construction, the following vegetation management measures should be implemented:

- Review the Biodiversity Assessment Report (BAR) to identify the type and location of vegetation on the Site
- Incorporate specific vegetation management measures identified in the EIA into the site induction, toolbox talk and pre-start meetings. Exclusion fencing will be required to protect the tree to be retained in the south of the Site
- Develop a construction management plan (CEMP). The CEMP will include a map showing its location the location of the retained tree and its exclusion zone and other required mitigation measures (e.g. erosion and sediment control)
- Conduct a site inspection and mark vegetation to be removed and fence and mark vegetation to be protected as identified in the BAR
- Install highly visible barriers around the perimeter of the construction site. This will be specified required to protect EEC vegetation to be retained in the Study Area.
- Fence trees and vegetation to be retained, ensuring fencing is outside the tree protection zone (Figure 1-2)
- Install signs clearly identifying areas of protected native vegetation.
- Install erosion and sediment controls measures specified in the CEMP.
- Locate construction parking, compounds, stockpiles and chemical storage away from vegetated areas (including tree protection zones) and in areas which do not necessitate anymore clearing of vegetation than necessary.

### 5.2 Construction

During construction, the following vegetation management measures should be implemented:

- Use only defined access tracks and entry/exit points for all vehicle movements
- Use only designated areas for parking, stockpiles, materials and waste storage
- Do not store materials or park equipment/vehicles within tree protection zones
- Revegetate or mulch disturbed areas
- Mulch and reuse cleared vegetation on site for site stabilisation and/or landscaping where appropriate
- Undertake regular inspections of vegetation management measures to ensure they are in place and effective
- Dispose of weeds that have been identified on the Site in a manner consistent with TPO Weed Management and Disposal Guide
- Monitor the health of retained vegetation and seek advice from an arborist if vegetation shows signs of stress (discolouration, die back)
- Prepare emergency responses in case of an oil or fuel spill/leak.

### 5.3 After construction

After construction, the following vegetation management measures should be implemented:

- Stabilise all disturbed areas, implement landscaping and remove vegetation protection measures
- Plant Coast Banksias and other winter nectar resources on the Site as part of the Site landscaping to mitigate the loss of seasonal foraging resources on the Site. Species to be used in landscaping would interact via pollination and seed dispersal with other areas of native vegetation in the Locality. Therefore, all plants used in landscaping should be sourced from the local area to ensure genetic compatibility and integrity
- Ensure that external lighting is not directed towards the Swamp Forest north of the Site to ensure that additional artificial lighting does not affect the foraging behaviour of threatened and common species likely to use the Site
- Use porous surfaces, buried leaky tanks or equivalent strategies to minimise hydrological changes
- Ensure a maintenance program is in place for any landscaping or revegetation undertaken as part of the proposal

- Prepare emergency responses in case of an oil or fuel spill/leak.
- Provide a sufficient number of well-spaced bins for rubbish.



## 6 Assessment of Significance

Detailed BC Act five-part tests of significance and EPBC Act impact assessments are given in Appendix C and Appendix D respectively. The assessments of significance are summarised in Table 6-1. The proposal is not likely to have a significant impact on any threatened species or Threatened Ecological Communities associated with the Site. Therefore, a Species Impact Statement is not required under the BC Act nor a referral to the Commonwealth Minister for the Environment required under the EPBC Act.

Table 6-1: Summary of tests of significance outcomes under the BC Act and the EPBC Act.

BC ACT SIGNIFICANCE ASSESSMENTS						
Threatened species, or communities	Significance assessment question <sup>1</sup>					Likely significant impact?
	a	b	c	d	e	
Swamp sclerophyll forest on the floodplains of the NSW North Coast Bioregion and Sydney Basin Bioregion	NA	No	No	No	No	No
Pale-vented Bush-hen ( <i>Amaurornis moluccana</i> )	No	NA	No	NA	No	No
Eastern Bentwing-bat ( <i>Miniopterus schreibersii oceanensis</i> )	No	NA	No	NA	No	No
Little Bentwing-bat ( <i>Miniopterus australis</i> )	No	NA	No	NA	No	No
Eastern Freetail-bat ( <i>Mormopterus norfolkensis</i> )	No	NA	No	NA	No	No
Greater Broad-nosed Bat ( <i>Scoteanax rueppellii</i> )	No	NA	No	NA	No	No
Yellow-bellied Sheath-tail-bat ( <i>Saccolaimus flaviventris</i> )	No	NA	No	NA	No	No
Eastern Long-eared Bat ( <i>Nyctophilus bifax</i> )	No	NA	No	NA	No	No
Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> )	No	NA	No	NA	No	No
Eastern Blossom-bat ( <i>Syconycteris australis</i> )	No	NA	No	NA	No	No
EPBC Act Assessments						
Threatened species, or communities	Important population					Likely significant impact?
Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> )	Yes					No

## 7 Conclusions

The 0.68-hectare Site on Butler Street, Byron Bay is adjacent to the railway station and has a long history of human use and impact. More recently, following the closure of the railway, some native vegetation has re-established on the Site, but it remains in a disturbed condition as evidenced by the open canopy and substantial presence of weeds. The proposal would entail the construction and operation of a bus interchange and associated infrastructure. This would require the Site to be totally cleared.

Background database searches and field investigations were undertaken to assess the impact of the proposal on the ecological values of the Site. Two PCTs were recorded on the Site: PCT 1536 Tuckeroo - Lilly Pilly - Coast Banksia littoral rainforest and PCT 1064 Paperbark swamp forest. The Paperbark swamp forest is consistent with the EEC Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, which is listed under the BC Act. It occurs in two areas and totals 0.22 ha in area. The loss of this community would be offset in accordance with the TfNSW Biodiversity Offsets Calculator. No threatened flora were recorded on the Site, during surveys in accordance with the Guide for Surveying Threatened Plants (OEH 2016). A small number of the threatened fauna may use the Site as detailed in the likelihood of occurrence table (Table 3-4 and Appendix A ). All fauna species are capable of flight, enabling them to access the Site intermittently (i.e. seasonally for nectar or for only a small part of the daily activity period). The loss of threatened fauna habitat of threatened would be offset in accordance with the TfNSW Biodiversity Offsets Calculator.

No threatened fauna would be dependent on the Site and none are likely to breed there (e.g. lack of hollow-bearing trees). A number of impacts associated with the proposal were identified, the most important being habitat loss and noise and light during the construction and operation stages. Management measures are recommended to minimise impacts prior to, during and after construction, which would reduce the impacts to an acceptable level. Habitat loss would be offset in accordance with the TfNSW Biodiversity Offsets Calculator.

A five-part Test of Significance under the EP&A Act was undertaken for SSF and threatened fauna species likely to use the Site. A test of significance was also conducted for the Grey-headed Flying-fox using EPBC Significant Impact Guidelines. These assessments concluded that the proposal is not likely to have a significant impact on EECs or threatened species listed under the BC Act or the EPBC Act. Therefore, a Species Impact Statement (BC Act) or an EPBC referral are not required.

## 8 References

DEC 2004. Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities, NSW Department of Environment and Conservation, Hurstville.

DECC 2007. Threatened species assessment guidelines: The assessment of significance. Department of Environment and Conservation (NSW).

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

DoE 2013. Matters of National Environmental Significance, Significant Impact Criteria Guidelines 1.1 Environmental Protection and Biodiversity Conservation Act 1999. Department of the Environment.

OEH 2014. Framework for Biodiversity Assessment: NSW Biodiversity Offsets Policy for Major Proposals, Office of Environment and Heritage for the NSW Government, Sydney.

OEH 2016. NSW Guide to Surveying Threatened Plants, Office of Environment and Heritage for the NSW Government, Sydney.

Transport for NSW (2016) Vegetation Management (Protection and Removal) Guideline. NSW Government, Sydney.

## Appendix A Database Search Results and Likelihood of Occurrence

V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Wallum Froglet <i>Crinia tinnula</i>	V		Usually associated with acidic swamp on coastal sand plains and occur in a range of habitats, including sedgeland, wet heathland, paperbark swamps and drainage lines. This species can persist in disturbed areas and breed in both permanent and ephemeral water bodies. Shelter under leaf litter, debris or in burrows.	Low. A small, isolated area Paperbark swamp forest adjacent to site, but lacks groundcovers typical of acid wallum vegetation.
Green and Golden Bell Frog <i>Litoria aurea</i>	E	V	Large populations in NSW are located around coastal and near coastal areas of the metropolitan areas of Sydney, Shoalhaven and mid north coast. It inhabits marshes, dams and stream-sides, particularly those containing bullrushes ( <i>Typha</i> spp.) or spikerushes ( <i>Eleocharis</i> spp.)	None. No suitable habitat with emergent vegetation.
Olongburra Frog <i>Litoria olongburensis</i>	V	V	Ephemeral, semi-permanent and permanent wetlands and creeks within sedgeland, wet heath, and paperbark swamps with a well-developed understory of sedges and/or <i>Blechnum indicum</i> where the groundwater is acidic, usually on coastal sand; perches on emergent sedges and ferns (particularly <i>Baumea</i> , <i>Schoenus</i> and <i>Chorizandra</i> species), occasionally other vegetation; prefers to breed in ephemeral and semi-permanent perched swamps with thick emergent vegetation in spring, summer and autumn, though calling may also occur in winter; generally large breeding aggregations	None. No suitable sedge habitat.
Fleay's Frog <i>Mixophyes fleayi</i>	E	E	Restricted to an area of SE QLD and NE NSW east of the GDR. Occupies wet eucalypt forest and rainforest along the escarpments and coastal foothills.	Low: unlikely to occur. Not escarpment or foothill habitat.
Giant Barred Frog <i>Mixophyes iteratus</i>	E	E	Occurs in damp rainforest, and both moist and dry eucalypt forest below 1000m. Inhabit deep leaf litter and breed in shallow, flowing rocky streams. Are capable of dispersing hundreds of metres from streams.	None. No suitable habitat
Common Sandpiper <i>Actitis hypoleucos</i>	-	M	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. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves.	None. No suitable habitat.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Pale-vented Bush-hen <i>Amaurornis moluccana</i>	V		Habitats with a tall dense understorey or ground-layer vegetation on the margins of freshwater streams and wetlands, usually within or bordering rainforest, rainforest remnants or forests. Also occurs in secondary forest growth, rank grass or reeds, thickets of weeds, such as Lantana ( <i>Lantana camara</i> ), mangroves, tall pastures, crops or other farmland (e.g. sugar cane, and grassy or weedy fields), or urban gardens where they border forest and streams or wetlands, such as farm dams. Feeds on seeds, plant matter, earthworms, insects and some frogs.	Moderate. Lack of sufficiently extensive dense understorey. As the site is on the edge of town, likely to be exposed to predation by domestic and feral dogs. However, there is a 2001 record within Paperbark Forest about 100m north of the Site. This record is likely to be associated with a dispersing individual.
Common Noddy <i>Anous stolidus</i>		M	Tropical and subtropical oceans, reefs, cays	None. No suitable habitat.
Magpie Goose <i>Anseranas semipalmata</i>	V		Typically found in shallow open wetlands with fringing rushes or sedges.	None. No suitable habitat.
Regent Honeyeater <i>Anthochaera phrygia</i>	CE	CE	Inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. NSW the distribution is very patchy and mainly confined to the two main breeding areas at Capertee Valley and the Bundarra-Barraba region and surrounding fragmented woodlands. Birds are also found in drier coastal woodlands and forests. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. These habitats have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Nectar and fruit from the mistletoes are also eaten during the breeding season. Generally inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Regarded as an occasional visitor to Queensland, but there is some evidence that a small breeding population exists near Warwick. Infrequent in coastal areas where winter flowering Swamp Mahogany and spotted gum/ironbark associations are important.	Low. No Eucalypts on the site. Not recorded using Banksia or Melaleuca species.
Fork-tailed Swift <i>Apus pacificus</i>		M	Aerial space over a variety of habitat types; feeds on insects; breeds in Asia.	Low. Likely to forage over the site occasionally, but does not require the site for foraging.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Great Egret <i>Ardea alba</i>		M	Occurs in a wide range of wetlands, particularly with shallow water, including swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reef	Low. Lack of suitable habitat.
Cattle Egret <i>Ardea ibis</i>		M	Widespread and common, the Cattle Egret occurs in shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation. It particularly prefers moist, low-lying poorly drained pastures with a good cover of grass in association with stock. It roosts in trees, or amongst ground vegetation in or near lakes and swamps.	None. No suitable habitat.
Wedge-tailed Shearwater <i>Ardenna pacifica</i>		M	Oceans, feeds on schooling fish; breeds on islands	None. No suitable habitat.
Short-tailed Shearwater <i>Ardenna tenuirostris</i>		M	Oceans; breeds on coastal islands	None. No suitable habitat.
Ruddy Turnstone <i>Arenaria interpres</i>		M	Tidal reefs and pools, shorelines, mudflats	None. No suitable habitat.
Australasian Bittern <i>Botaurus poiciloptilus</i>	E	E	Inhabits temperate freshwater wetlands and occasionally estuarine reedbeds, with a preference for permanent waterbodies with tall dense vegetation. The species prefers wetlands with dense vegetation, including sedges, rushes and reeds. Freshwater is generally preferred, although dense saltmarsh vegetation in estuaries and flooded grasslands are also used by the species.	None. No suitable habitat with emergent vegetation.
Bush Stone-curlew <i>Burhinus grallarius</i>	E	E	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.	None. No suitable habitat.
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	-	M	Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	None. No suitable habitat.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Red Knot <i>Calidris canutus</i>		E, M	Tidal mudflats, sandflats, beaches, saltmarsh, ploughed fields, flooded pasture	None. No suitable habitat.
Curlew Sandpiper <i>Calidris ferruginea</i>	E	CE, M	Coastal migratory species with a NSW distribution from Hastings Point to Shoalhaven Heads. Found in open, sandy beaches with exposed sand bars and rocky outcrops. Rare use of near-coastal wetlands.	None. No suitable habitat.
Pectoral Sandpiper <i>Calidris melanotos</i>		M	Shallow freshwaters with low vegetation, flooded pasture, swamp margins, sewage ponds; occasionally mudflats and saltmarsh	None. No suitable habitat.
Red-necked Stint <i>Calidris ruficollis</i>		M	Tidal sandflats and mudflats, saltmarsh, sandy beaches, wetlands with shallow edges	None. No suitable habitat.
Great Knot <i>Calidris tenuirostris</i>	V	CE, M	Migratory shorebird distributed along entire coast of NSW. Occur on intertidal mudflats in sheltered coastal area	None. No suitable habitat.
Glossy Black-Cockatoo <i>Calyptorhynchus lathami</i>	V		Occupy coastal woodlands and drier forest areas, open inland woodlands or timbered watercourses where Casuarina and Allocasuarina species are present. This species is dependent on large hollow-bearing eucalypts for nesting.	None. No <i>Allocasuarina</i> species or large tree hollows present.
White-eared Monarch <i>Carterornis leucotis</i>	V		Rainforest, especially drier types, including littoral rainforest, wet and dry sclerophyll forests, swamp forest and regrowth forest. Appears to prefer the ecotone between rainforest and other open vegetation types or the edges of rainforest (e.g. along roads). Forages by sallying, hovering and fluttering around the outer foliage of rainforest trees, usually high in the canopy or subcanopy. Feeds primarily on insects. Breeds September to March, usually nesting high in the canopy, and often at the edge of rainforest patches	Low. No rainforest habitat present.
Spotted Harrier <i>Circus assimilis</i>	V	-	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	None. No suitable open grassy habitat.
Oriental Cuckoo <i>Cuculus optatus</i>		M	Occurs in a variety of forest types; feeds on insects; breeds across Eurasia	Low. May occur in the Swamp Forest adjacent to the site occasionally.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Coxen's Fig-Parrot <i>Cyclopsitta diophthalma coxeni</i>	CE	E	Rainforest, particularly stands with figs; sometimes isolated trees.	Low. One Small-leaved Fig present on the northern edge of the site, but otherwise unsuitable habitat.
Varied Sittella <i>Daphoenositta chrysoptera</i>	V		Inhabits most of mainland Australia except the treeless deserts and open grasslands. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low. No suitable habitat.
Eastern Reef Egret <i>Egretta sacra</i>		M	Inhabits islands, rocky shores, reefs, beaches, tidal rivers, mangroves; consumes ocean-based fish, crustaceans and molluscs.	None. No suitable habitat.
Black-necked Stork <i>Ephippiorhynchus asiaticus</i>	E		Restricted to coastal and near-coastal habitat. Inhabits wetlands, floodplains and deeper permanent water bodies. Occurs in shallow, permanent freshwater terrestrial wetlands and surrounding marginal vegetation. Nest in tall, live isolated paddock trees near freshwater swamps and construct large nesting platform.	None. No suitable habitat.
Red Goshawk <i>Erythroriorchis radiatus</i>	CE	V	Occurs in coastal and sub-coastal areas in woodland and forests, including riverine forests. Favours intermediate density forests to aid hunting of birds. Nest in tall trees, often beside permanent water sources.	Low. Habitat broadly suitable, but subject to existing disturbance during the day. Predicted in the MNES search, but no records in the locality.
Beach Stone-curlew <i>Esacus magnirostris</i>	CE		Open, undisturbed beaches, islands, reefs, estuarine intertidal sandflats and mudflats; diet consists of crabs and other marine invertebrates.	None. No suitable habitat.
Lesser Frigatebird <i>Fregata ariel</i>		M	Oceans; breeds on islands	None. No suitable habitat.
Latham's Snipe <i>Gallinago hardwickii</i>		M	Soft wet ground, shallow water with tussocks, inundated parts of paddocks, seepage below dams, saltmarsh and mangrove fringes	None. No suitable habitat.
Gull-billed Tern <i>Gelochelidon nilotica</i>		M	Typically forages over saltpans, coastal lagoons, mudflats, marshes and wet fields and inland sites such as large rivers, lakes, rice-fields, sewage ponds, reservoirs, saltpans and irrigation canals. It is an opportunistic feeder:	None. No suitable habitat.



COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
			largely insectivorous, but also spiders, worms, small reptiles, frogs, small fish, aquatic invertebrates.	
Little Lorikeet <i>Glossopsitta pusilla</i>	V		Mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. Nest in small hollows (entrance approx. 3 cm) of <i>Eucalyptus</i> spp. between 2 - 15 m above the ground.	Low. No Eucalypt forest present. No tree hollows for breeding.
Brolga <i>Grus rubicunda</i>	V		Freshwater swamps, floodplains, flooded grassland, margins of lagoons	None. No suitable habitat.
White Tern <i>Gygis alba</i>	V		Pelagic, migratory marine species. Require tall coastal forest for nesting sites.	None. No suitable habitat.
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	V		Occurs on rocky shorelines and headlands, stony beaches, offshore islands and exposed reefs and only occasionally on sandy beaches.	None. No suitable habitat.
Pied Oystercatcher <i>Haematopus longirostris</i>	E		Inhabits marine littoral habitats, including islands. It occupies muddy, sandy, stony or rocky estuaries, inlets and beaches, particularly intertidal mudflats and sandbanks in large marine bays.	None. No suitable habitat.
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>		M	Coastlines, estuaries, large rivers and lakes; occasionally over adjacent habitats; builds a large stick nest in a tall tree, rarely on artificial structures	Low. Likely to fly over the site occasionally, but unlikely to forage there. No large stick nests known near the Site.
Little Eagle <i>Hieraaetus morphnoides</i>	V		Occupies habitats rich in prey (birds, reptiles and mammals) within open eucalypt forest, woodland or open woodland. Requires tall living trees for building a large stick nest and preys on birds, reptiles and mammals and occasionally carrion.	None. No suitable habitat.
White-throated Needletail <i>Hirundapus caudacutus</i>		M	Aerial space over a variety of habitat types, but prefers to forage over treed habitats as these would provide a greater abundance of insect prey; often forage on the edge of low pressure systems and may follow these systems ; breeds in Asia.	Low. Likely to forage over the site occasionally, but does not require the site for foraging.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Caspian Tern <i>Hydroprogne caspia</i>		M	Coastal waters, beaches, mudflats, large rivers, dams and lakes	None. No suitable habitat.
Comb-crested Jacana <i>Irediparra gallinacea</i>	V		Permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies, or fringing and aquatic vegetation. Forages on floating vegetation, feeding on insects and other invertebrates, also some seeds and other vegetation.	None. No suitable habitat.
Black Bittern <i>Ixobrychus flavicollis</i>	V		Occurs below 200 m above sea level and inhabit both terrestrial and estuarine wetlands, with a preference for permanent water bodies and dense vegetation. Roosts in trees or amongst dense reeds.	None. No suitable habitat.
Swift Parrot <i>Lathamus discolor</i>	E	CE	In NSW mostly occurs on the coast and south west slopes, occurring in areas where eucalypts are flowering profusely or where there is abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany ( <i>Eucalyptus robusta</i> ), Spotted Gum ( <i>Corymbia maculata</i> ), Red Bloodwood ( <i>C. gummifera</i> ), Mugga Ironbark ( <i>E. sideroxylon</i> ), and White Box ( <i>E. albens</i> ).	Low. No Eucalypts present on the site, not recorded using <i>Banksia</i> or <i>Melaleuca</i> species.
Bar-tailed Godwit <i>Limosa lapponica</i>		M	Tidal mudflats, estuaries, shallow river margins, flooded pastures	None. No suitable habitat.
Western Alaskan Bar-tailed Godwit <i>Limosa lapponica baueri</i>		V, M	Estuaries and lagoons with large intertidal sandflats or mudflats	None. No suitable habitat.
Northern Siberian Bar-tailed Godwit <i>Limosa lapponica menzbieri</i>		CE, M	Mainly large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Also coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	None. No suitable habitat.
Square-tailed Kite <i>Lophoictinia isura</i>	V		Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	None. No suitable habitat.
Southern Giant Petrel <i>Macronectes giganteus</i>	E	E, M	Migratory marine bird distributed from Antarctic to subtropical waters and nests on offshore and Antarctic islands.	None. No suitable habitat.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Northern Giant-Petrel <i>Macronectes halli</i>	V	V, M	Circumpolar pelagic distribution with breeding on Australian offshore islands. Nest in secluded, sheltered coastal habitat with dense vegetation.	None. No suitable habitat.
Black-faced Monarch <i>Monarcha melanopsis</i>		M	Mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest.	Low. Lack of suitable rainforest habitat.
Spectacled Monarch <i>Monarcha trivirgatus</i>		M	Understorey of rainforest, well-timbered gullies, waterside vegetation; forages below canopy	Low. Lack of suitable rainforest habitat.
Yellow Wagtail <i>Motacilla flava</i>		M	Open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves; usually found near water.	None. No suitable habitat.
Satin Flycatcher <i>Myiagra cyanoleuca</i>	V	M	Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Low. No suitable habitat.
Powerful Owl <i>Ninox strenua</i>	V		Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. While territory size is influenced by prey availability, territories are generally large (400 - 4000 ha). Core populations require large tracts of forest or woodland habitat, but pairs may occur in fragmented landscapes. Powerful Owls nest in large tree hollows (at least 0.5m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. Sometimes takes roosting birds.	None. Lack of tree hollows and Common Ringtail Possum dreys indicates prey availability would be low. No large trees suitable for nesting.
Eastern Curlew <i>Numenius madagascariensis</i>		CE, M	Estuaries, tidal mudflats, sandspits, saltmarsh, mangroves	None. No suitable habitat.
Whimbrel <i>Numenius phaeopus</i>		M	Intertidal habitats; feeds by probing soft mud for small invertebrates and by picking small crustaceans off the surface	None. No suitable habitat.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Sooty Tern <i>Onychoprion fuscata</i>	V	M	Tropical and subtropical oceans; nests on sand or coral scrapes on islands and cays	None. No suitable habitat.
Eastern Osprey <i>Pandion cristatus</i>	V	M	Requires clear estuarine and inshore marine waters and coastal rivers for foraging, and nests in tall (usually dead or dead-topped) trees in coastal habitats from open woodland to open forest, within 1-2 km of water.	Low. Likely to fly over the site occasionally, but would not forage there. No large stick nests known near the site.
Red-tailed Tropicbird <i>Phaethon rubricauda</i>			Oceans; nests on coast and islands	None. No suitable habitat.
Glossy Ibis <i>Plegadis falcinellus</i>	-	M	Preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation.	None. No suitable habitat.
Pacific Golden Plover <i>Pluvialis fulva</i>	-	M	Estuaries, mudflats, mangroves, saltmarsh	None. No suitable habitat.
Marbled Frogmouth <i>Podargus ocellatus</i>			Wet sclerophyll forest and rainforest near streams	None. No suitable streamside habitat.
Black-throated Finch (southern subspecies) <i>Poephila cincta cincta</i>			Grassy, open woodlands and forests, typically dominated by <i>Eucalyptus</i> , <i>Corymbia</i> and <i>Melaleuca</i> , and occasionally in tussock grasslands or other habitats (e.g. freshwater wetlands); often near water.	None. No suitable habitat.
Grey-crowned Babbler (eastern subspecies) <i>Pomatostomus temporalis temporalis</i>	V		Open grassy dry forests and woodlands with a sparse shrub layer and groundcover with leaf litter and fallen timber; flight laborious and has difficulty crossing open areas; group territory generally 10-12 ha	Low. No suitable habitat; lack of suitable groundcover.
Grey Ternlet <i>Procelsterna cerulea</i>	V	M	Subtropical islands, associated islets or rock stacks with cliffs, and in surrounding nearshore waters. Vagrants are occasionally recorded in the pelagic zone off the coast of eastern Australia	None. No suitable habitat.
Gould's Petrel			Tropical, subtropical and temperate oceans; breeds on cliffs on islands	None. No suitable habitat.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
<i>Pterodroma leucoptera leucoptera</i>				
Kermadec Petrel (west Pacific subspecies) <i>Pterodroma neglecta neglecta</i>	V	V, M	Tropical, subtropical and temperate oceans; breeds on cliffs on islands	None. No suitable habitat.
Black-winged Petrel <i>Pterodroma nigripennis</i>	V	M	Tropical, subtropical and temperate oceans; breeds on islands	None. No suitable habitat.
Wompoo Fruit-Dove <i>Ptilinopus magnificus</i>	V		Typically occurs in patches of subtropical rainforest and adjoining wet sclerophyll habitats, with a preference for warmer, mature rainforests dominated by Ficus spp.	Low. One Small-leaved Fig present on the northern edge of the site, but otherwise unsuitable habitat.
Rose-crowned Fruit-Dove <i>Ptilinopus regina</i>	V		Rainforests, wet eucalypt forest and swamp forest; feeds on fleshy fruits	Low. One Small-leaved Fig present on the northern edge of the site, but otherwise unsuitable habitat.
Superb Fruit-Dove <i>Ptilinopus superbus</i>	V		Inhabits rainforests and similar closed forest at all altitudes.	Low. One Small-leaved Fig present on the northern edge of the site, but otherwise unsuitable habitat.
Rufous Fantail <i>Rhipidura rufifrons</i>		M	Subtropical and temperate rainforests, wet sclerophyll forest usually with a dense understorey, occasionally tall, dense coastal heath; drier forest and woodlands during migration	Low. No suitable habitat.
Australian Painted Snipe <i>Rostratula australis</i>	E	E, M	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum or canegrass or sometimes tea-tree ( <i>Melaleuca</i> ). Sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber. shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Most nest records are from or near small islands in freshwater wetlands. Forages near the	None. No suitable muddy habitat

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			water's edge, usually on muddy substrates, consuming vegetation, seeds, insects, worms and molluscs, crustaceans and other invertebrates.	
Diamond Firetail <i>Stagonopleura guttata</i>	V		Found in grassy eucalypt woodlands, open forest, mallee, grassland and riparian areas.	None. No suitable habitat.
Common Tern <i>Sterna hirundo</i>		M	Offshore waters, bays, estuaries, large freshwater wetlands	None. No suitable habitat.
Little Tern <i>Sternula albifrons</i>	E	M	Primarily sheltered coastal waters such as bays, estuaries, coastal lagoons and large rivers; sometimes off ocean beaches. Nests on sandy beaches or in low dunes	None. No suitable habitat.
Buller's Albatross <i>Thalassarche bulleri</i>		V, M	Marine, pelagic and occasionally inshore subtropical and subantarctic waters of the southern Pacific Ocean. Nests on islands.	None. No suitable habitat.
Crested Tern <i>Thalasseus bergii</i>			Coastal and offshore waters, beaches, bays, tidal rivers, salt swamps, lakes, large rivers	None. No suitable habitat.
Grey-tailed Tattler <i>Tringa brevipes</i>		M	Tidal mudflats, estuaries, shallow river margins, mangroves	None. No suitable habitat.
Wandering Tattler <i>Tringa incana</i>		M	Coral islands, rocky reefs and islands, rock platforms, rarely other tidal areas	None. No suitable habitat.
Common Greenshank <i>Tringa nebularia</i>		M	Mudflats, estuaries, saltmarsh, margins of wetlands	None. No suitable habitat.
Marsh Sandpiper <i>Tringa stagnatilis</i>		M	Salt, brackish or freshwater wetlands, mangroves, intertidal mudflats, estuaries	None. No suitable habitat.
Black-breasted Button-quail <i>Turnix melanogaster</i>	CE	V	Drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, <i>Araucarian</i> microphyll vine forest and <i>Araucarian</i> notophyll vine forest; also in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes. Will use Lantana, particularly when it forms a mosaic with preferred habitat types.	None. No suitable habitat.

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Eastern Grass Owl <i>Tyto longimembris</i>	V		Wet heaths and tall grasses in swampy areas	None. No suitable habitat.
Masked Owl <i>Tyto novaehollandiae</i>	V		Occurs throughout NSW, roosting and nesting in forests and woodlands within 300km of the coast. Hunts over open woodland and farmland, often along edges. Territory size is 500 - 1000 ha. The main requirements are tall trees with suitable large hollows for nesting and roosting and adjacent areas for foraging. Preferred foraging habitat has an open grassy understorey with denser patches of shrubs. Feeds mainly on small ground mammals, though arboreal mammals and roosting birds are sometimes taken.	None. No suitable habitat.
Sooty Owl <i>Tyto tenebricosa</i>	V		Inhabits subtropical and warm temperate rainforest, and moist or dry eucalypt forest with a well-developed mid-storey of trees or shrubs. Roost and nest sites for the species occur in gullies. Utilise large hollows for nesting and prey on other hollow dependent species. Roost in hollows or dense vegetation.	None. No suitable habitat.
Laced Fritillary or Australian Fritillary <i>Argynnis hyperbius inconstans</i>	E	CE	Open, swampy, coastal areas where the larval food plant, <i>Viola betonicifolia</i> , occurs; usually in association with <i>Lomandra longifolia</i> and grasses, especially Bladey Grass)	None. No suitable habitat, lack of larval food plant.
Giant Dragonfly <i>Petalura gigantea</i>	E		Permanent swamps and bogs with some free water and open vegetation	None. No suitable habitat.
Coastal Petaltail <i>Petalura litorea</i>	E		Occupies a variety of permanent to semi-permanent coastal freshwater wetlands	None. No suitable habitat.
Pink Underwing Moth (southern) <i>Phyllodes imperialis smithersi</i>	E	E	Undisturbed, subtropical rainforest below 600m. It occurs in association with a rare collapsed form of the vine <i>Carronia multisepealea</i> , which provides the food and habitat necessary for breeding. It does not associate with the more common upright form of <i>C. multisepealea</i> .	None. No suitable habitat. Larval food plant not present.
Mitchell's Rainforest Snail <i>Thersites mitchellae</i>	E	CE	Remnant areas of lowland subtropical rainforest and swamp forest on alluvial soils. Slightly higher ground around the edges of wetlands with palms and fig trees are particularly favoured habitat. Typically found	Low. Suitable habitat only 200 m <sup>2</sup> in area and isolated by roads and housing from any additional habitat.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
			amongst leaf litter on the forest floor, and occasionally under bark in trees. Active at night and feeds on leaf litter, fungi and lichen.	
Australian Fur-seal <i>Arctocephalus pusillus doriferus</i>	V	M	Oceans and rocky shores	None. No suitable habitat.
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	V	V	Roosts in disused mine shafts, caves, overhangs and disused Fairy Martin nests for shelter and to raise young. Also, potentially roost in tree hollows. Occurs in low to mid-elevation dry open forest and woodlands, preferably with extensive cliffs, caves or gullies. Pied Bat is largely restricted to the interface of sandstone escarpment (for roost habitat) and relatively fertile valleys (for foraging habitat).	Low. Lack of preferred roosting habitat and cliffines for foraging in the locality.
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	V	E	Utilises a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.	Low. Dispersing Quolls may roam widely, but the site and adjacent habitat are not likely to be core habitat.
Dugong <i>Dugong dugon</i>	E	-	Estuaries, bays, near-shore waters; feeds on seagrass.	None. No suitable habitat.
Southern Right Whale <i>Eubalaena australis</i>	E	E, M	Oceans.	None. No suitable habitat.
Humpback Whale <i>Megaptera novaeangliae</i>	V	V, M	Oceans.	None. No suitable habitat.
Little Bentwing-bat <i>Miniopterus australis</i>	V		This species occurs in moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bent-wing Bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Moderate. Possibly forages on the site on rare occasions, but site likely to be too open for regular use. No suitable roosting or breeding structures.
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	V		Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. They form discrete populations centred on a maternity cave that is used annually in	Moderate. Possibly forages over the site on rare occasions. No suitable roosting or breeding structures.



COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
			spring and summer for the birth and rearing of young. This species tends to hunt in forested areas, catching flying insects above the canopy.	
<i>Saccolaimus flaviventris</i> Yellow-bellied Sheath-tail Bat	V		Inhabits eucalypt rainforest, sclerophyll forest and open woodland vegetation. Forages for insects, flying fast over the forest canopy or lower in open country. Availability of tree hollows is important for access to roosting and breeding sites.	Moderate. May forage over the site infrequently. No hollow-bearing trees for roosting.
Eastern Freetail-bat <i>Mormopterus norfolkensis</i>	V		Habitats preference includes dry eucalypt forest and coastal woodlands but also include riparian zones in rainforest and wet sclerophyll forest. Forages above forest canopy or forest edge and requires roosts including tree hollows.	Moderate. May forage over the site infrequently. No hollow-bearing trees for roosting.
Southern Myotis <i>Myotis macropus</i>	V		This species generally roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. They forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Low. Lack of surface water for foraging. Lack of suitable roost structures.
Eastern Long-eared Bat <i>Nyctophilus bifax</i>	V		Lowland subtropical and littoral rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Roosts in tree hollows, the hanging foliage of palms, in dense clumps of foliage of rainforest trees, under bark and in shallow depressions on trunks and branches, among epiphytes, in the roots of strangler figs, among dead fronds of tree ferns and rarely in buildings.	Moderate. Possibly forages on the site on rare occasions, but site likely to be too open for regular use. No suitable roosting or breeding structures.
Greater Glider <i>Petauroides volans</i>		V	Eucalypt forests and woodlands, preferring mature forest with numerous large tree hollows. Folivorous, usually selecting habitats with a diversity of Eucalypt species. Sensitive to habitat fragmentation, restricted to gliding locomotion and reluctant to disperse through non-native habitat.	None. Lack of suitable habitat with large tree hollows.
Koala <i>Phascolarctos cinereus</i>	V	V	Inhabits a range of eucalypt forest and woodland communities. Adequate floristic diversity, availability of primary feed trees and presence of mature trees very important. Preferred food tree species vary with locality and there are quite distinct regional preferences ( <i>Eucalyptus tereticornis</i> , <i>E. microcorys</i> , <i>E. robusta</i> and <i>E. racemosa</i> are particularly important in northern NSW). They are able to persist in fragmented habitats, and even survive in isolated trees across a predominantly agricultural landscape.	None. No foraging habitat on the site; no Eucalypts, particularly primary food tree species, present.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Common Planigale <i>Planigale maculata</i>	V		Forests, heathlands, swamps, grassland, rocky areas where there is surface cover– usually close to water	Low. Broadly suitable habitat. However, the spatially limited habitat available is next to residential and commercial areas with a high human impact and exposure to domestic predators.
Long-nosed Potoroo <i>Potorous tridactylus</i>	V	V	Inhabits coastal heaths and dry and wet sclerophyll forests, with sandy loam soils. 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. Require dense vegetation for shelter and access to fungi. It is mainly nocturnal, hiding by day in dense vegetation - however, during the winter months animals may forage during daylight hours.	None. No suitable habitat.
Eastern Chestnut Mouse <i>Pseudomys gracilicaudatus</i>	V		Heathland, particularly dense wet heath, swamps and grassy woodlands. Reaches peak density after fire before swamp rat populations re-establish	None. No suitable habitat.
New Holland Mouse <i>Pseudomys novaehollandiae</i>		V	Inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. Nest in burrows and have a preference for deeper top soils and softer substrates to aid digging. Spends considerable time foraging above-ground for food in areas of high floristic diversity.	Low. Lack of suitable habitat
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are commonly found in gullies, close to water, in vegetation with a dense canopy. They travel up to 50 km to forage, on the nectar and pollen of native trees, in particular <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Banksia</i> , and fruits of rainforest trees and vines.	High. Likely to use seasonally available nectar and fruit resources on and adjacent to the site. The site is about 300m from an intermittent roosting camp at the end of Sommerset Street. The site is separated from the camp by existing residential development.
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i>	V		Inhabits eucalypt rainforest, sclerophyll forest and open woodland vegetation. Availability of tree hollows is important for access to roosting sites.	Moderate. May forage over the site infrequently. No hollow-bearing trees for roosting.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	V		Occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland. Often feeds along habitat edges. Large hollow bearing trees required for roosting.	Moderate. May occasionally foraging along the edge of existing habitat. No hollow-bearing trees for roosting.
Eastern Blossom-bat <i>Syconycteris australis</i>	V		Roosts in littoral rainforest, feeds on nectar in adjacent heathland and paperbark swamps, occasionally eucalypt forest	Moderate. Likely to use seasonally available nectar resources ( <i>Banksia</i> , <i>Melaleuca</i> ) on and adjacent to the site.
False Water-rat <i>Xeromys myoides</i>		V	Mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands. Most feeds within the intertidal zone at low tide. Builds nests as high tide refuges.	None. No suitable habitat.
Loggerhead Turtle <i>Caretta caretta</i>	E		Oceans, nests on beaches	None. No suitable habitat.
Green Turtle <i>Chelonia mydas</i>	V	V, M	Oceans, nests on beaches	None. No suitable habitat.
Adorned Delma <i>Delma torquata</i>		V	Not recorded in NSW. In Queensland, it inhabits drier eucalypt woodlands and open forests on alluvium, fine-grained sedimentary rocks and sandstone. Important microhabitat features include rocks, logs, bark and other coarse woody debris, and mats of leaf litter.	None. Predicted to occur, but not recorded in NSW. No suitable habitat.
Leathery Turtle <i>Dermochelys coriacea</i>	E	E, M	Oceans, nests on beaches	None. No suitable habitat.
Hawksbill Turtle <i>Eretmochelys imbricata</i>		V, M	Oceans and reefs, nests on beaches	None. No suitable habitat.
Stephens' Banded Snake <i>Hoplocephalus stephensii</i>	V		Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. A nocturnal snake that shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day. At night it hunts frogs, lizards, birds and small mammals.	Low. While some rainforest elements are present, the land adjacent to the site is Swamp Forest. General lack of shelter resources.
Pacific Ridley <i>Lepidochelys olivacea</i>		E, M	Oceans, particularly over the continental shelf, nests on sandy beaches	None. No suitable habitat.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Flatback Turtle <i>Natator depressus</i>		V, M	Turbid, shallow inshore waters and over the continental shelf, nests on sandy beaches	None. No suitable habitat.
Acalypha <i>Acalypha eremorum</i>	E		Subtropical rainforest, dry rainforest and vine thickets	None. No suitable habitat.
Scented Acronychia <i>Acronychia littoralis</i>	E	E	Grows <2 km from the sea in sub-littoral rainforest, usually in transitional zones between littoral rainforest and swamp sclerophyll forest, littoral and coastal cypress pine communities or on the margin of littoral forest and cleared land. Common associated tree species include Brush Box ( <i>Lophostemon confertus</i> ), Coast Banksia ( <i>Banksia integrifolia</i> ), Coast Cypress Pine ( <i>Callitris columellaris</i> ), Hoop Pine ( <i>Araucaria cunninghamii</i> ), Pink Bloodwood ( <i>Corymbia intermedia</i> ) and Broad-leaved Paperbark ( <i>Melaleuca quinquenervia</i> ). Only grows on sands of marine origin, including wind-blown sands on low coastal hills. Soils range from humus podzols to deeply-leached podzols, depending on the depth of the water-table.	Low. Potential, but marginal, habitat present. Not detected despite targeted searching on the small site. Species available for detection year-round.
Dwarf Heath Casuarina <i>Allocasuarina defungens</i>	E	E	Coastal areas of wet to dry, dense, low, closed heath land growing on Pleistocene marine aeolian derived soils; less commonly in coastal clay heath on bedrock soils, and on hinterland sandstone on humus podzol soils. The drier heath is on podzols with a sub-soil hard pan. Both soil types are subject to a high watertables during the rainy season.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Mt. Coolum she-oak <i>Allocasuarina thalassoscopica</i>		E	Restricted to the low closed heathland community on trachyte on the upper slopes of Mt. Coolum at an altitude of 150-200 m.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
White Lace Flower <i>Archidendron hendersonii</i>	V		Grows in riverine and lowland subtropical rainforest, north from Alstonville	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Hairy Jointgrass <i>Arthraxon hispidus</i>	V	V	In soaks, seepages and edges of wetlands in forests and pasture. Dies down in winter. Threats include Lantana invasion.	None. No suitable habitat. Available for detection at time of survey.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Jointed Baloghia <i>Baloghia marmorata</i>	V	V	Subtropical rainforest, wet sclerophyll forest dominated by Brush Box with a rainforest understorey on basalt at 150-550m elevation	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Hoop Pine Orchid <i>Bulbophyllum globuliforme</i>	V	V	An epiphytic orchid that only grows on Hoop Pine ( <i>Araucaria cunninghamii</i> )	None. Host species (Hoop Pine) not present.
Sand Spurge <i>Chamaesyce psammogeton</i>	E		Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex ( <i>Spinifex sericeus</i> ) and Prickly Couch ( <i>Zoysia macrantha</i> )	None. No suitable habitat.
Corokia <i>Corokia whiteana</i>	V	V	Occurs at altitudes of 10–800 m above sea level in ecotones between wet sclerophyll forest and Coachwood ( <i>Ceratopetalum apetalum</i> ) warm-temperate rainforests, or in Brush Box ( <i>Lophostemon confertus</i> ) open forest with littoral rainforest understorey. Suitable substrates are derived from rhyolite, basalt and quartzite sands.	Low. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Stinking Cryptocarya <i>Cryptocarya foetida</i>	V	V	Occurs in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m	Low. Potential, but marginal, habitat present. Not detected despite targeted searching on the small site. Species available for detection year-round.
Leafless Tongue Orchid <i>Cryptostylis hunteriana</i>	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including heathlands, heathy woodlands, sedgelands, <i>Xanthorrhoea</i> spp. plains, dry sclerophyll forests (shrub/grass sub-formation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests (grassy sub-formation). Soils are generally moist and sandy, however, also grows on dry or peaty soils. The larger populations typically occur in woodland dominated by Scribbly Gum ( <i>Eucalyptus sclerophylla</i> ), Silvertop Ash ( <i>E. sieberi</i> ), Red Bloodwood ( <i>Corymbia gummifera</i> ) and Black Sheoak ( <i>Allocasuarina littoralis</i> ); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid ( <i>C. subulata</i> ) and the Tartan Tongue Orchid ( <i>C. erecta</i> ). Flowers August to February. Fire is a threat, but is also required to stimulate flowering events.	Low. Broadly suitable habitat, but limited in area and subject to high levels of previous disturbance.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Davidson's Plum <i>Davidsonia jerseyana</i>	E	E	Restricted to the Brunswick and Tweed River catchments of the north coast of NSW where it is found in coastal and lowland subtropical rainforest and wet sclerophyll forest.	None. No suitable habitat. Site south of known species' distribution. Not detected despite targeted searching. Species available for detection year-round.
Smooth Davidson's Plum <i>Davidsonia johnsonii</i>	E	E	The species has a restricted and highly fragmented distribution from the Tallebudgera and Numinbah Valleys in Queensland south to Tintenbar in coastal NSW. The species occurs on landforms that include moderate to gentle slopes, creek flats and gullies. Aspect is most commonly south-western to south-eastern. Soils are generally shallow, clay-loam podzol, with surface rocks, weathered from metasediments of the Neranleigh-Fernvale complex. Occurrences of the species are also often on soils formed at the boundaries of Lismore basalt and Nimbin rhyolite. Habitat is mostly wet sclerophyll forests, occasionally subtropical rainforest and in ecotones between them. Dominant species in wet sclerophyll forest ecological communities in which the species occurs include <i>Eucalyptus grandis</i> (flooded gum) and <i>Lophostemon confertus</i> (brush box).	None. Geology and landform not suitable. Not detected despite targeted searching. Species available for detection year-round.
Thorny Pea <i>Desmodium acanthocladum</i>	V	V	Confined to the Lismore LGA and the western parts of the Byron LGA. Occurs in dry rainforest and fringes of riverine subtropical rainforest on basalt-derived soils at low elevations.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Small-leaved Tamarind <i>Diploglottis campbellii</i>	E	E	Occurs in forest types ranging from lowland subtropical rainforest to drier rainforest with a Brush Box ( <i>Lophostemon confertus</i> ) open overstorey. The preferred habitat type is well-watered but well-drained sites on basalt-derived soils or alluvium at low altitude. Also known from yellow podzol soils on quartz monozonites.	None. Geology not suitable. Not detected despite targeted searching. Species available for detection year-round.
Byron Bay Diuris <i>Diuris</i> sp. aff. <i>chrysantha</i>	E		Known only from a single location where it occurs in low-growing grassy heath on clay soil	None. No suitable habitat.
Basket Fern <i>Drynaria rigidula</i>	E		Grows on plants, rocks or on the ground. Usually found in rainforest but also in moist eucalypt and Swamp Oak forest.	Low. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Hairy Quandong <i>Elaeocarpus williamsianus</i>	E	E	Restricted to a very few sites between Goonengerry and Burringbar in north-east NSW. Subtropical to warm temperate rainforest, including regrowth areas where it has apparently regrown from root suckers after clearing. Soils are derived from metasediments.	None. Geology and landform not suitable. Not detected despite targeted searching. Species available for detection year-round.
Crystal Creek Walnut <i>Endiandra floydii</i>	E	E	Warm temperate, subtropical and littoral rainforest or wet sclerophyll forest with Brush Box overstorey, and in and Camphor Laurel forest. May occur in disturbed and regrowth sites. Generally prefers sheltered locations, however, it has been recorded on ridgelines, slopes, gullies and creek flats. Mostly occurs on metamorphics, but occasionally alluvium or sand.	Low. Geology and landform not suitable. Not detected despite targeted searching. Species available for detection year-round.
Rusty Rose Walnut <i>Endiandra hayesii</i>	V	V	Occurs in cool, moist sheltered valleys and gullies; mostly lowland riverine notophyll to complex notophyll vineforest on sedimentary soils and alluvium; also recorded at higher altitudes up to 720 m on basalt and in Brush Box forests. Also occurs in regrowth and highly modified forms of these habitats.	Low. Geology and landform not suitable. Not detected despite targeted searching. Species available for detection year-round.
Ball Nut <i>Floydia praealta</i>	V	V	Floristically-rich, tall, closed riverine to subtropical rainforest and coastal scrub	Low. No suitable habitat.
Southern Fontainea <i>Fontainea australis</i>	V	V	Occurs in lowland subtropical rainforest and complex notophyll vine forest on basaltic alluvial flats and well drained, bright reddish-brown alluvial clay loam	None. Geology and landform not suitable. Not detected despite targeted searching. Species available for detection year-round.
Pink Nodding Orchid <i>Geodorum densiflorum</i>	E		Dry eucalypt forest and coastal swamp forest at lower altitudes, often on sand.	Low. Broadly suitable habitat, but limited in area and subject to high levels of previous disturbance.
Sweet Myrtle <i>Gossia fragrantissima</i>	E	E	Subtropical rainforest	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
White Yiel <i>Grevillea hilliana</i>	E		Grows in subtropical rainforest, usually on basalt-derived soils.	None. Geology not suitable. Not detected despite targeted searching.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
				Species available for detection year-round.
Red Boppel Nut <i>Hicksbeachia pinnatifolia</i>			An understorey tree in subtropical rainforest, regrowth rainforest, moist eucalypt forest and Brush Box forest, particularly on basalt	None. Geology not suitable. Not detected despite targeted searching. Species available for detection year-round.
Isoglossa <i>Isoglossa eranthemoides</i>	E	E	An understorey plant within highly diverse White Booyong ( <i>Argyrodendron trifoliolatum</i> ) subtropical rainforest sub-alliance. This vegetation community occurs in moist, protected situations in coastal lowlands, valleys, riparian zones, floodplains, and at the foothills of coastal ranges. These vegetation communities occur on fertile basic igneous geology (basalt or gabbro), metasediments, or alluvium.	None. Geology not suitable, specific rainforest alliance not present. Not detected despite targeted searching. Species available for detection year-round.
Macadamia Nut <i>Macadamia integrifolia</i>		V	Rainforest and rainforest edges on ridges, hill slopes, scree slopes and foot slopes, gullies, benches and terrace plains on well-drained, high nutrient soils	None. Geology not suitable, suitable rainforest not present. Not detected despite targeted searching. Species available for detection year-round.
Rough-shelled Bush Nut <i>Macadamia tetraphylla</i>	V		Occurs in subtropical rainforest and complex notophyll vineforest, at the margins of these forests and in mixed sclerophyll forest. Grows on moderate to steep hillslopes on alluvial soils at well-drained sites	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Slender Marsdenia <i>Marsdenia longiloba</i>	E	V	Subtropical and warm temperate rainforest, lowland moist or open eucalypt forest adjoining rainforest and, sometimes, in areas with rock outcrops	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Coast Euodia <i>Melicope vitiflora</i>	E	E	Only known from five locations in NSW, from Brunswick Heads and Broken Head. It grows in subtropical and littoral rainforest.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Rusty Plum, Plum Boxwood <i>Niemeyera whitei</i>	V		Found in gully, warm temperate or littoral rainforests and the adjacent understorey of moist eucalypt forest. Grows on poorer soils below 600m asl. Occurs in Tuckeroo-Riberry-Yellow Tulipwood littoral rainforest.	None. No suitable habitat. Not detected despite targeted searching.



COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
				Species available for detection year-round.
Yellow-flowered King of the Fairies <i>Oberonia complanata</i>	E		An epiphytic orchid that grows in rainforest, also in mangroves, coastal scrub and in gorges in sclerophyll forest.	None. No suitable habitat.
Southern Ochrosia <i>Ochrosia moorei</i>	E	E	Typically found on hillsides near drainage lines, in warm subtropical rainforest or complex notophyll vineforest, at elevations of 100—1000 m above sea level. Soils are deep, alluvial or basalt derived, well-drained and reddish-brown to dark-brown.	No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Onion Cedar <i>Owenia cepiodora</i>	V	V	Subtropical and dry rainforest on or near soils derived from basalt.	None. Geology not suitable. Not detected despite targeted searching. Species available for detection year-round.
Brown Fairy-chain Orchid <i>Peristeranthus hillii</i>	V		An epiphytic orchid that grows in coastal and near-coastal habitats, particularly littoral and floodplain rainforest.	None. No suitable habitat.
Southern Swamp Orchid <i>Phaius australis</i>	E	E	Mostly occurs in mixed swamp forest (e.g. <i>Melaleuca quinquenervia</i> , <i>Lophostemon suaveolens</i> , <i>Eucalyptus robusta</i> ) in association with rainforest elements and palms. May occur along ecotones with other habitat types (e.g. heath, open forest). Flowers September-November.	None. Potential habitat present, but very limited in extent. Not detected despite targeted searching. Species available for detection year-round.
Dark Greenhood <i>Pterostylis nigricans</i>	V		Coastal heathland with Heath Banksia ( <i>Banksia ericifolia</i> ), and lower-growing heath with lichen-encrusted and relatively undisturbed soil surfaces, on sandy soils.	None. No suitable habitat.
Spiny Gardenia <i>Randia moorei</i>	E	E	Occurs in subtropical, riverine, littoral and dry rainforest and sometimes along moist scrubby watercourses. Often found in Hoop Pine ( <i>Araucaria cunninghamii</i> ) - Brush Box ( <i>Lophostemon confertus</i> ) forest with other rainforest elements present in the understorey. Grows on basalt, metasediments and alluvium.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Rainforest Cassia <i>Senna acclinis</i>	E		Grows on the margins of subtropical, littoral and dry rainforests. Often found as a gap phase shrub.	None. No suitable habitat. Not detected despite targeted searching.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
				Species available for detection year-round.
Brush Sophora <i>Sophora fraseri</i>	V	V	North from Casino. Grows in moist habitats, often in hilly terrain at altitudes from 60–660 m on shallow soils along rainforest margins in eucalypt forests or in large canopy gaps in closed forest communities.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Red Lilly Pilly <i>Syzygium hodgkinsoniae</i>	V	V	Grows in riverine subtropical or gallery rainforest on deep rich alluvial and basalt soils at altitudes of up to 300 m above sea level. The species is considered a rheophyte (adapted to growing along or sometimes within fast-flowing streams).	None. Geology not suitable. Not detected despite targeted searching. Species available for detection year-round.
Durobby <i>Syzygium moorei</i>	V	V	Found in subtropical and riverine rainforest at low altitude. It often occurs as isolated remnant paddock trees.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Austral Toadflax <i>Thesium australe</i>	V	V	Semi-parasitic on roots of a range of grass species, particularly Kangaroo Grass ( <i>Themeda triandra</i> ). Occurs on a variety of substrates in shrubland, grassland or woodland, often on damp sites.	None. No suitable habitat. Low diversity of grasses, <i>Themeda</i> not present.
Arrow-head Vine <i>Tinospora tinosporoides</i>	V		Wetter subtropical rainforest, including littoral rainforest, on fertile, basalt-derived soils.	None. Geology not suitable. Not detected despite targeted searching. Species available for detection year-round.
Queensland Xylosma <i>Xylosma terrae-reginae</i>	E		Littoral and subtropical rainforest on coastal sands or soils derived from metasediments.	None. No suitable habitat. Not detected despite targeted searching. Species available for detection year-round.
Byron Bay Dwarf Graminoid Clay Heath Community	E		Occurring on at Byron Bay along gently sloping clay ridges.	Low: unlikely to occur. The soils within the study area are sand based – not the required clay. Species assemblage does not conform.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion	E		Restricted to the NSW North Coast bioregion. Dominant species includes <i>Callitris columellaris</i> with <i>Corymbia intermedia</i> , <i>Eucalyptus pilulairs</i> and <i>E. signata</i> occurring less frequently.	Low: unlikely to occur. Species assemblage does not conform.
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	V	Occurs in the intertidal zone along the shores and lagoons that are permanently or semi-permanently open to the ocean. Commonly found on the landward side of mangrove stands.	Low: unlikely to occur. No suitable habitat. Observed species assemblage does not conform.
Coastal Swamp Oak ( <i>Casuarina glauca</i> ) Forest of New South Wales and South East Queensland ecological community.			Occurs in coastal catchments at elevation of less than 20m above sea-level. Occurs on unconsolidated sediments, including alluvial deposits that have been saturated by water for extended periods of time.	Low: unlikely to occur. Observed species assemblage does not conform.
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E		Occurs in areas subject to periodic flooding with standing freshwater persisting for the majority of the year. Associated with silts, muds or humic loams.	Low: unlikely to occur. No suitable habitat. Observed species assemblage does not conform.
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	CE	A closed forest influenced by a close proximity to the ocean. A predominantly rainforest assemblage occurs however other species such as <i>Banksia integrifolia</i> , <i>Angophora costata</i> and <i>Eucalyptus botryoides</i> can occur.	Low: unlikely to occur. Observed species assemblage does not conform.
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E	CE	A community with a diverse assemblage of species that usually form a closed forest. In disturbed sites a thick cover vines may be present.	Low: unlikely to occur. Observed species assemblage does not conform.
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	E		Occurs on the coastal floodplains or sandy flats along the NSW North Coast. Associated with clay and sand-based loams that occur below 50 above sea-level.	Low: unlikely to occur. No suitable habitat. Observed species assemblage does not conform.
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney	E		Associated with sand and clay-based loams. Soils are waterlogged or periodically inundated occurring on alluvial flats and floodplains.	Recorded.

COMMON NAME SCIENTIFIC NAME	BC	EPBC	HABITAT	LIKELIHOOD OF OCCURRENCE
Basin and South East Corner Bioregions.				

## Appendix B Floristic and Structural Details of each PCT

PCT 1536	Species	CANOPY TREES		SUB-CANOPY TREES		SHRUBS		GRASS		MONOCOT		DICOT		FERN		CLIMBER	
		Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund
	Exotic	5	2	43	10	8	6	35	0	3	24	8	45	2	4	3	6
	<i>Acacia longifolia subsp. Sophorae</i>					5	2										
	<i>Acmena smithii</i>	0	0														
	<i>Ageratina adenophora</i>	*										2	20				
	<i>Ageratina riparia</i>	*										0	0				
	<i>Ambrosia artemisiifolia</i>	*										5	20				
	<i>Archontophoenix cunninghamiana</i>			0	0												
	<i>Asparagus aethiopicus</i>	*														0	0
	<i>Asparagus africanus</i>	*								0	0						
	<i>Baloghia inophylla</i>			0	0												
	<i>Banksia integrifolia</i>			40	7												
	<i>Bidens pilosa</i>	*										1	5				
	<i>Blechnum indicum</i>													0	0		
	<i>Cayratia clematidea</i>															0	0
	<i>Celtis sinensis</i>	*		0	0												
	<i>Chloris gayana</i>	*						0	0								
	<i>Chrysanthemoides monilifera</i>	*				1	1										
	<i>Cinnamomum camphora</i>	*	0	0													

Appendix B Floristic and Structural Details of each PCT

PCT 1536		CANOPY TREES		SUB-CANOPY TREES		SHRUBS		GRASS		MONOCOT		DICOT		FERN		CLIMBER	
										1	4						
	<i>Commelina cyanea</i>																
	<i>Conyza sumatrensis</i>	*										0	0				
	<i>Crassocephalum crepidioides</i>	*										0	0				
	<i>Crotalaria lanceolata</i>	*										0	0				
	<i>Cupaniopsis anacardioides</i>			0	0												
	<i>Dianella caerulea</i>									0	0						
	<i>Ficus obliqua</i>		0	0													
	<i>Geitonoplesium cymosum</i>															0	0
	<i>Glochidion ferdinandi</i>			0	0												
	<i>Glochidion sumatranum</i>			3	2												
	<i>Hibbertia scandens</i>															0	0
	<i>Hibiscus diversifolius</i>					0	0										
	<i>Hypochoeris radicata</i>	*										0	0				
	<i>Imperata cylindrica</i>							20	>100								
	<i>Ipomoea indica</i>	*														1	2
	<i>Jagera pseudorhus</i>		0	0													
	<i>Lantana camara</i>	*				0	0										
	<i>Lomandra longifolia</i>									0	0						
	<i>Lygodium microphyllum</i>															0	0
	<i>Macaranga tanarius</i>			0	0												
	<i>Maclura cochinchinensis</i>															0	0

Appendix B Floristic and Structural Details of each PCT

PCT 1536	*	CANOPY TREES		SUB-CANOPY TREES		SHRUBS		GRASS		MONOCOT		DICOT		FERN		CLIMBER	
<i>Macroptilium atropurpureum</i>	*															0	0
<i>Mallotus discolor</i>				2	1												
<i>Melaleuca quinquenervia</i>		0	0														
<i>Melicope elleryana</i>				0	0												
<i>Melinis minutiflora</i>	*																
<i>Melinis repens</i>	*							0	0								
<i>Monotoca scoparia</i>						2	3										
<i>Murraya paniculata</i>	*															0	0
<i>Nephrolepis cordifolia</i>													0	0			
<i>Ochna serrulata</i>	*					0	0										
<i>Oplismenus imbecillis</i>								0	0								
<i>Paspalum notatum</i>	*							0	0								
<i>Passiflora edulis</i>	*															0	0
<i>Passiflora suberosa</i>	*															1	2
<i>Phragmites australis</i>								0	0								
<i>Pinus elliotii</i>	*	5	2														
<i>Pteridium esculentum</i>													2	4			
<i>Schefflera actinophylla</i>	*			0	0												
<i>Schinus terebinthifolius</i>	*			0	0												
<i>Senna pendula</i>	*			0	0												
<i>Sida rhombifolia</i>	*											0	0				

PCT 1536		CANOPY TREES		SUB-CANOPY TREES		SHRUBS		GRASS		MONOCOT		DICOT		FERN		CLIMBER	
<i>Solanum seaforthianum</i>	*															0	0
<i>Stephania japonica</i>																1	2
<i>Strelitzia nicolai</i>	*									0	0						
<i>Syagrus romanzoffianum</i>	*			0	0												
<i>Synoum glandulosum</i>		0	0														
<i>Tradescantia fluminensis</i>	*									2	20						
<i>Verbena bonariensis</i>	*											0	0				
<i>Verbena rigida</i>	*											0	0				
Unidentified Grass	*							15	>100								
PCT 1064		Canopy Trees		Sub-canopy Trees		Shrubs		Grass		Monocot		Dicot		Fern		Climber	
Species		Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund
	Exotic	35	7	38	24	15	5	34	150	0	0	6	15	25	0	0	7
<i>Acacia longifolia subsp. sophorae</i>						0	0										
<i>Acmena smithii</i>		0	0														
<i>Ageratina adenophora</i>	*											4	10				
<i>Ageratina riparia</i>	*											2	5				
<i>Ambrosia artemisiifolia</i>	*											0	0				
<i>Archontophoenix cunninghamiana</i>				10	7												
<i>Asparagus aethiopicus</i>	*															0	0



Appendix B Floristic and Structural Details of each PCT

PCT 1536		CANOPY TREES		SUB-CANOPY TREES		SHRUBS		GRASS		MONOCOT		DICOT		FERN	CLIMBER	
<i>Asparagus africanus</i>	*									0	0					
<i>Baloghia inophylla</i>				0	0											
<i>Banksia integrifolia</i>				0	0											
<i>Bidens pilosa</i>	*											0	0			
<i>Blechnum indicum</i>														25		
<i>Cayratia clematidea</i>															0	0
<i>Celtis sinensis</i>	*			0	0											
<i>Chloris gayana</i>	*							0	0							
<i>Chrysanthemoides monilifera</i>	*					0	0									
<i>Cinnamomum camphora</i>	*	0	0													
<i>Commelina cyanea</i>										0	0					
<i>Conyza sumatrensis</i>	*											0	0			
<i>Crassocephalum crepidioides</i>	*											0	0			
<i>Crotalaria lanceolata</i>	*											0	0			
<i>Cupaniopsis anacardioides</i>				0	0											
<i>Dianella caerulea</i>										0	0					
<i>Ficus obliqua</i>		20	1													
<i>Geitonoplesium cymosum</i>															0	0
<i>Glochidion ferdinandi</i>				25	10											
<i>Glochidion sumatranum</i>				1	1											
<i>Hibbertia scandens</i>															0	0

PCT 1536		CANOPY TREES		SUB-CANOPY TREES		SHRUBS		GRASS		MONOCOT		DICOT		FERN		CLIMBER	
<i>Hibiscus diversifolius</i>						0	0										
<i>Hypochaeris radicata</i>	*											0	0				
<i>Imperata cylindrica</i>								0	0								
<i>Ipomoea indica</i>	*															0	0
<i>Jagera pseudorhus</i>		0	0														
<i>Lantana camara</i>	*					15	5										
<i>Lomandra longifolia</i>										0	0						
<i>Lygodium microphyllum</i>																0	6
<i>Macaranga tanarius</i>				0	0												
<i>Maclura cochinchinensis</i>																0	0
<i>Macroptilium atropurpureum</i>	*															0	0
<i>Mallotus discolor</i>				3	1												
<i>Melaleuca quinquenervia</i>		15	6														
<i>Melicope elleryana</i>				0	0												
<i>Melinis minutiflora</i>	*							30	100								
<i>Melinis repens</i>	*							0	0								
<i>Monotoca scoparia</i>						0	0										
<i>Murraya paniculata</i>	*															0	0
<i>Nephrolepis cordifolia</i>														0			
<i>Ochna serrulata</i>	*					0	0										
<i>Opismenus imbecillis</i>								0	0								

Appendix B Floristic and Structural Details of each PCT

PCT 1536	*	CANOPY TREES		SUB-CANOPY TREES		SHRUBS		GRASS		MONOCOT		DICOT		FERN		CLIMBER	
<i>Paspalum notatum</i>	*							0	0								
<i>Passiflora edulis</i>	*															0	0
<i>Passiflora suberosa</i>	*															0	0
<i>Phragmites australis</i>								4	50								
<i>Pinus elliotii</i>	*	0	0														
<i>Pteridium esculentum</i>													0				
<i>Schefflera actinophylla</i>	*			1	1												
<i>Schinus terebinthifolius</i>	*			1	1												
<i>Senna pendula</i>	*			1	3												
<i>Sida rhombifolia</i>	*											0	0				
<i>Solanum seaforthianum</i>	*															0	0
<i>Stephania japonica</i>																0	1
<i>Strelitzia nicolai</i>	*									0	0						
<i>Syagrus romanzoffianum</i>	*			0	0												
<i>Synoum glandulosum</i>		0	0														
<i>Tradescantia fluminensis</i>	*									0	0						
<i>Verbena bonariensis</i>	*											0	0				
<i>Verbena rigida</i>	*											0	0				
Unidentified Grass	*							0	0								

## Appendix C Tests of Significance under the Biodiversity Conservation Act 2016

### Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions - Endangered Ecological Community

- (a) *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

NA

- (b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

A total of 0.83 ha of the community occurs in the Study Area (0.49 ha in the north and 0.34 ha in the south). The proposal would impact on a total of 0.22 ha (27%) of the community in the Study Area, occurring in two separate areas (Figure 3-1). This impact equates to approximately 26% of the mapped local occurrence of SSF. The management of stormwater runoff would enable existing hydrological regimes to be retained, as such there is unlikely to be a reduction of extent of the retained local occurrence as a result of changes to hydrological flows. However, the additional fragmentation and increase of edge effects are likely to increase the risk of weed invasion, and as a result an overall decrease in condition of the local occurrence of the EEC.

- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

The proposal does not entail any modification of SSF that would remain in the Study Area. Therefore, the proposal would not place the local occurrence of SSF at risk of extinction.

- (c) *in relation to the habitat of a threatened species or ecological community:*
- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

The proposal would require 0.22 ha of SSF and its habitat to be removed.

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

Small areas of SSF would remain in the north and south of the Study Area. As discussed above, this will further fragment of local occurrence of the EEC.

- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.*

The local occurrence of SSF has been previously distributed by urbanisation. Much of the local occurrence has lost a substantial proportion of its mid-storey and understorey strata with only the canopy intact. The local occurrence is in poor condition with high levels of weed invasion. The condition of the SSF is consistent across the patch. The area of SSF to be removed is unlikely to be of important to the long-term survival of the local occurrence.

- (d) *whether the action proposed is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly),*

Not Applicable

- (e) *whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The SSF vegetation in the Study Area occurs in two small patches, which are moderately isolated and disturbed. This would alter some of the ecological function of the EEC, but many ecological services, such as pollination and seed dispersal would remain functional because the vectors (e.g. birds, insects, flying-foxes, wind) would still act upon the community. While a small area of SSF would be removed by the proposal it would not increase the operation of the

clearing of native vegetation or increase the impact of fragmentation because existing community processes would be retained. The proposal is not likely to introduce threatening agents, such as pest species or disease.

The proposal is not likely to have a significant impact on SSF.

### **Pale-vented Bush-hen (*Amaurornis moluccana*) - Vulnerable**

- (a) *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

The Pale-vented Bush-hen occupies habitats characterised by a tall, dense understorey or groundcover, including the margins of freshwater streams and wetlands, rainforest remnants or forests. It also occurs in secondary forest growth, rank grass or reeds, thickets of weeds, such as Lantana (*Lantana camara*), mangroves, tall pastures, crops or other farmland (e.g. sugar cane, and grassy or weedy fields), or urban gardens where they border forest and streams or wetlands, such as farm dams. Feeds on seeds, plant matter, earthworms, insects and some frogs. There is a 2001 record of the Pale-vented Bush-hen in the north of the Study Area in Paperbark habitat with a dense groundcover of Molasses Grass. The next nearest record is 1.5 km away. It is likely that the record in the Study Area was of a dispersing or migrating individual. It is unlikely that the Bush-hen permanently inhabits the Study Area due to its small size and relative isolation.

The proposal would not require removal the specific habitat (dense grassy understorey) that the 2001 was obtained from. Moreover, the proposal would not result in habitat fragmentation for this species due to its ability to fly. Thus, the proposal would not cause a viable local population of the Pale-vented Bush-hen to be placed at risk of extinction.

- (b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at the risk of extinction, or*

NA

- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

NA

- (c) *in relation to the habitat of a threatened species or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

The proposal would require the removal of 0.46 ha of habitat (0.22 ha SSF, 0.24 ha of Coast Banksia-dominated habitat).

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

The Site is small in area and largely surrounded by existing commercial, transport and residential land. The Pale-vented Bush-hen is capable of flight, therefore, if it was able to use the Site, it is not currently experiencing habitat fragmentation in the local area. Due to these factors, the proposal would not result in habitat fragmentation or isolation.

- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.*

The amount of habitat affected by the proposal (0.46 ha), the disturbed nature of the Site (e.g. reduce tree cover), the current isolation of the Site and its proximity to existing human activity suggest that the habitat is not of any particular importance to the long-term survival of the Pale-vented Bush-hen in the Locality.

- (d) *whether the proposed development or activity is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly)*

NA

- (e) *whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process..*

The proposed development entails the clearing of 0.22 ha of native vegetation, however, the affected area is small, isolated and disturbed. Therefore, the proposal would not increase the operation of the clearing of native vegetation. The proposal is not likely to introduce threatening agents, such as pest species or disease.

The proposal is not likely to have a significant impact on the Pale-vented Bush-hen.

### **Eastern Blossom-bat (*Syconycteris australis*) - Vulnerable**

- (a) *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

The Eastern Blossom-bat is a highly mobile nectarivore that may access the Site when seasonal nectar resources are available. This would be in autumn, when Broad-leaved Paperbark flowers, and winter, when Coast Banksia flowers. However, it is not clear whether the current levels of human activity would be sufficient to deter its use of the Site.

The proposal would require the removal of a small number of mature Coast Banksias. However, Coast Banksia is widely distributed in the Locality and due to the mobility of the Eastern Blossom-bat all individuals in this area would be part of the same local population. Therefore, the loss of Coast Banksia on the Site would not have a significant impact on this local population. Moreover, the Site is already subject to a high level of human activity, including at night, due to its proximity to commercial and tourist areas. This suggests that daytime use of the Site as a bus terminal would not cause additional disturbance. Provided nocturnal lights are directed away from the SSF to be retained north of the Site, it is unlikely that night time disturbance would affect use of this area.

The proposal would not cause a viable local population of the Eastern Blossom-bat to be placed at risk of extinction.

- (b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

NA

- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

NA

- (c) *in relation to the habitat of a threatened species or ecological community:*
- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

The proposal would require the removal of 0.46 ha of habitat (0.22 ha SSF, 0.24 ha of Coast Banksia-dominated habitat).

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

The Site is small in area and largely surrounded by existing commercial, transport and residential land. The Eastern Blossom-bat is capable of flight, therefore, if it was able to use the Site, it is not currently experiencing habitat fragmentation in the local area. Due to these factors, the proposal would not result in habitat fragmentation or isolation.

- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.*

The amount of habitat affected by the proposal (0.46 ha), the disturbed nature of the Site (e.g. reduce tree cover), the current isolation of the Site and its proximity to existing human activity suggest that the habitat is not of any particular importance to the long-term survival of the Eastern Blossom-bat in the Locality.

- (d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).,*

NA

- (e) *whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The proposed development entails the clearing of 0.46 ha of native vegetation, however, the affected area is small, isolated and disturbed. Therefore, the proposal would not increase the operation of the clearing of native vegetation. The proposal is not likely to introduce threatening agents, such as pest species or disease.

The proposal is not likely to have a significant impact on the Eastern Blossom-bat.

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

- (a) *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

The Grey-headed Flying-fox is a highly mobile species that occupies areas of habitat depending on the seasonal availability of nectar and fruit. It roosts in large congregations called camps and may travel up to 50 km in a night to reach foraging resources.

The site is about 300 m from an intermittent roosting camp at the end of Sommerset Street. Usually there are less than 500 flying-foxes present at the camp when it is active. Therefore, the Site only provides seasonal foraging resources, mainly nectar from Coast Banksia during winter and also from Broad-leaved Paperbark to the north of the Site. The roosting camp is separated from the Site by residential development, suggesting that the construction and operation of the proposal would not affect this area.

The proposal would require the removal of a small number of mature Coast Banksias. However, Coast Banksia is widely distributed in the Locality and due to the mobility of the Grey-headed Flying-fox all individuals in this area would be part of the same local population. Therefore, the loss of Coast Banksia on the Site would not have a significant impact on this local population. Moreover, the Site is already subject to a high level of human activity, including at night, due to its proximity to commercial and tourist areas. This suggests that daytime use of the Site as a bus terminal would not cause additional disturbance. Provided nocturnal lights are directed away from the SSF to be retained north of the Site, it is unlikely that night time disturbance would affect use of this area by the Grey-headed Flying-fox.

The proposal would not cause a viable local population of the Grey-headed Flying-fox to be placed at risk of extinction.

- (b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

Not Applicable

- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not Applicable

- (c) *in relation to the habitat of a threatened species or ecological community:*
- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

The proposal would require the removal of 0.46 ha of habitat (0.22 ha SSF, 0.24 ha of Coast Banksia-dominated habitat).

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

The Site is small in area and largely surrounded by existing commercial, transport and residential land. The Grey-headed Flying-fox is capable of flight, therefore, it is not currently experiencing habitat fragmentation in the local area. Due to these factors, the proposal would not result in habitat fragmentation or isolation.

- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.*

The amount of habitat affected by the proposal (0.46 ha), the disturbed nature of the Site (e.g. reduce tree cover), the current isolation of the Site and its proximity to existing human activity suggest that the habitat is not of any particular importance to the long-term survival of the Grey-headed Flying-fox in the Locality.

- (d) *whether the action proposed is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

Not Applicable

- (e) *whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The proposed development entails the clearing of 0.46 ha of native vegetation, however, the affected area is small, isolated and disturbed. Therefore, the proposal would not increase the operation of the clearing of native vegetation. The proposal is not likely to introduce threatening agents, such as pest species or disease.

The proposal is not likely to have a significant impact on the Grey-headed Flying-fox.

## Microbats

Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*) - Vulnerable

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

Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) – Vulnerable

Little Bentwing-bat (*Miniopterus australis*) – Vulnerable

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

Eastern Long-eared Bat (*Nyctophilus bifax*) – Vulnerable

- (a) *in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

No hollow-bearing trees, caves or other roosting and breeding structures are available on the Site. Therefore, microbats would only use the Site for foraging. The small area and relative isolation and open, disturbed canopy of the Site suggests that the habitat would be marginal microbat species foraging below the canopy (Little Bentwing Bat, Eastern Long-eared Bat, Greater Broad-nosed Bat). However, occasional use of the Site cannot be entirely excluded. Species that forage above the canopy and over open areas are likely to be present (Yellow-bellied Sheath-tail-bat, Eastern Freetail-bat and Eastern Bentwing-bat).

The proposal would require 0.46 ha of the vegetation on the Site to be removed. The bus terminal would also be used at night, introducing activity, lighting and noise at this time. It is unlikely that these bat species would continue to forage on or over the Site during the construction and operational stages of the proposal. However, the Site is small in area and it is likely to form only part of the home-ranges of the individual bats that use the area. And only a small part of each local population would forage over the Site. Due to the small area of the Site, it is unlikely that the proposal would interfere with the life cycle of microbat species to the extent that viable local populations of microbats would be placed at risk of extinction.

- (b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

NA

- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

NA



(c) *in relation to the habitat of a threatened species or ecological community:*

(i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

The proposal would require the removal of 0.46 ha of habitat (0.22 ha SSF, 0.24 ha of Coast Banksia-dominated habitat).

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

The Site is small in area and largely surrounded by existing commercial, transport and residential land. All microbat species are capable of flight, therefore, if they were able to use the Site, they are not currently experiencing habitat fragmentation in the local area. Due to these factors, the proposal would not result in habitat fragmentation or isolation.

(iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.*

The amount of habitat affected by the proposal (0.46 ha) and the lack of roosting structures suggests that the Site is not likely to be of any particular importance to the long-term persistence of microbat species in the locality.

(d) *whether the action proposed is likely to have an adverse effect on any declared areas of outstanding biodiversity value (either directly or indirectly),*

NA

(e) *whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The proposed development entails the clearing of 0.46 ha of native vegetation, however, the affected area is small, isolated and disturbed. Therefore, the proposal would not increase the operation of the clearing of native vegetation. The proposal is not likely to introduce threatening agents, such as pest species or disease.

The proposal is not likely to have a significant impact on microbat species

## Appendix D Tests of Significance under the Environment Protection and Biodiversity Conservation Act 1999

### Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable

- *lead to a long-term decrease in the size of an important population of a species*

The Grey-headed Flying-fox is a highly mobile species that occupies areas of habitat depending on the seasonal availability of nectar and fruit. It roosts in large congregations called camps and may travel up to 50 km in a night to reach foraging resources.

The site is about 300m from an intermittent roosting camp at the end of Sommerset Street. Usually there are less than 500 flying-foxes present at the camp when it is active. Therefore, the Site only provides seasonal foraging resources, mainly nectar from Coast Banksia during winter and also from Broad-leaved Paperbark to the north of the Site. The roosting camp is separated from the Site by residential development, suggesting that the construction and operation of the proposal would not affect this area.

The proposal would require the removal of a small number of mature Coast Banksias. However, Coast Banksia is widely distributed in the Locality and due to the mobility of the Grey-headed Flying-fox all individuals in this area would be part of the same population. Therefore, the loss of Coast Banksia on the Site would not lead to a long-term decrease in the size of this population. Moreover, the Site is already subject to a high level of human activity, including at night, due to its proximity to commercial and tourist areas. This suggests that daytime use of the Site as a bus terminal would not cause additional disturbance. Provided nocturnal lights are directed away from the SSF to be retained north of the Site, it is unlikely that night time disturbance would affect use of this area by the Grey-headed Flying-fox.

- *reduce the area of occupancy of an important population*

The proposal would not reduce the area of occupancy of an important Grey-headed Flying-fox population.

- *fragment an existing important population into two or more populations*

The proposal would not fragment an important Grey-headed Flying-fox population.

- *adversely affect habitat critical to the survival of a species*

The proposal would not adversely affect habitat critical to the survival of the Grey-headed Flying-fox.

- *disrupt the breeding cycle of an important population*

The proposal would not disrupt the breeding cycle of an important Grey-headed Flying-fox population.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The proposal would entail minor habitat removal (0.46 ha) but this would not lead to a decrease in habitat availability such that Grey-headed Flying-fox is likely to decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The proposal would not lead to the establishment of invasive species harmful to the Grey-headed Flying-fox.

- *introduce disease that may cause the species to decline, or*

The proposal would not lead to the establishment of disease that may cause the Grey-headed Flying-fox to decline.

- *interfere substantially with the recovery of the species.*

The proposal would not interfere with the recovery of the Grey-headed Flying-fox.

## local people global experience

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SMEC is recognised for providing technical excellence and consultancy expertise in urban, infrastructure and management advisory. From concept to completion, our core service offering covers the life-cycle of a project and maximises value to our clients and communities. We align global expertise with local knowledge and state-of-the-art processes and systems to deliver innovative solutions to a range of industry sectors.