

# Flora and Fauna Assessment Report

15 Ocean Road, Palm Beach

Report prepared by Narla Environmental for

BJB Architects Pty. Ltd.

September 2023



NARLA environmental

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# Glossary

Acronym/ Term	Definition
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BC Act	New South Wales Biodiversity Conservation Act 2016
Biodiversity values	The composition, structure and function of ecosystems, including threatened species, populations and ecological communities, and their habitats
CEMP	Construction Environmental Management Plan
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environmental and Water
Development	The use of land, and the subdivision of land, and the carrying out of a work, and the demolition of a building or work, and the erection of a building, and any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument but does not include any development of a class or description prescribed by the regulations for the purposes of this definition (Environmental Planning and Assessment Act 1979).
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (Now known as DPE)
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning & Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FFA	Flora and Fauna Assessment
ha	Hectares
km	Kilometre
КТР	Key Threatening Process listed under Schedule 4 of the BC Act
LGA	Local Government Area
Locality	An area of 10 km <sup>2</sup> surrounding the Subject Land
m	metres
mm	millimetres
Native Vegetation	Any of the following types of plants native to New South Wales: (a) trees (including any sapling or shrub), (b) understorey plants, (c) groundcover (being any type of herbaceous vegetation) and (d) plants occurring in a wetland.
NPWS	NSW National Parks and Wildlife Services



Acronym/ Term	Definition
NSW	New South Wales
OEH	Office of Environment and Heritage (now known as the DPE)
Proposal	The development, activity or action proposed.
PLEP	Pittwater Local Environment Plan 2014
PDCP	Pittwater Development Control Plan 2021
SEPP	State Environmental Planning Policy
SRZ	Structural Root Zone
Subject Property	15 Ocean Road, Palm beach (Lot 2/DP 412086)
Subject Land	All areas associated with the proposed development including the APZ
Threatenedspecies,populationsandecologicalcommunities	Species, populations and ecological communities specified in Schedules 1 and 2 of the BC Act 2016.
ΤΡΖ	Tree Protection Zone: A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development



# 1. Introduction

#### 1.1 Project Background

Narla Environmental Pty Ltd (Narla) was engaged by BJB Architects Pty. Ltd. (the proponent) to undertake a Flora and Fauna Assessment (FFA) for the proposed development at 15 Ocean Road, Palm Beach NSW 2108 (Lot 2/ DP 412086, hereafter referred to as the 'Subject Property', **Figure 1**). The proposed development includes the construction of a new dwelling including the removal of existing vegetation. All areas associated with the proposed development are hereafter referred to the 'Subject Land' (**Figure 1**, **Appendix C**).

Narla have produced this report in order to assess any potential impacts associated with the proposed development on terrestrial ecology (biodiversity), particularly threatened species, populations and ecological communities listed under the Biodiversity Conservation Act 2016 (BC Act). The report will also recommend appropriate measures to mitigate any potential impacts in line with all relevant State Environmental Planning Policies (SEPPs), Guidelines for developments adjacent to National Parks (NPWS 2020) and local government plans, namely the Pittwater Local Environment Plan 2014 (PLEP) and Pittwater Development Control Plan 2011 (PDCP).

#### 1.2 Site Description and Location

The Subject Property is located on the western side of Ocean Road, in the Suburb of Palm Beach in The Northern Beaches Local Government Area (LGA) and covers an area of approximately 0.09ha. Currently, it is mostly clear of native vegetation except for a few individuals at the rear of the property. The property boundary has been defined by cadastral boundaries provided on the NSW Government Land & Property Information Spatial Information Exchange map viewer (SIX Maps, 2023). The Subject Land is the area of the proposed dwelling outside the existing dwelling boundaries within the Subject Property and covers an area of approximately 0.008ha.

#### 1.2.1 Topography, Geology and Soil

The Subject Property is located on a South-East facing slope with elevation ranging from 7m above sea level (asl) in the South-East to 24m asl in the North-West (Google Earth 2023). The Subject Property is situated on the Watagan soil landscape as indicated on the Soil Landscapes of the Sydney 1:100,000 Sheet (Chapman et al 2009). The Watagan landscape, is characterised by mostly interbedded laminite and shale with quartz to lithic quartz sandstone. Minor red claystones occur north of the Hawkesbury River. Clay pellet sandstone occurs south of the Hawkesbury River (Chapman et al 2009).

#### 1.2.2 Hydrology

There are no mapped or unmapped watercourses within the Subject Property, with the nearest mapped watercourse (1<sup>st</sup> order) occurring approximately 1km South of the site.

#### 1.3 Scope of Assessment

The objectives of this flora and fauna assessment were to:

- Establish the likelihood of occurrence of migratory species, threatened species, endangered populations and threatened ecological communities as listed under the New South Wales BC Act and/or the Commonwealth EPBC Act;
- Assess any potential impacts to species and/or communities listed under the BC Act and EPBC Act;



- Identify and map the distribution of vegetation communities in the Subject Land;
- Record presence and the extent of any known or potential fauna habitat features such as nests, drays, caves, crevices, culverts, pools, soaks, flowering trees, fruiting trees, hollow-bearing trees and provide recommendations for on-going management of these habitat features and any fauna present;
- Record presence and the extent of any priority weeds or weed infestations and provide recommendations for on-going management; and
- Recommend any controls or additional actions to be taken to protect or improve environmental outcomes of the proposed development.

#### 1.4 Study Limitations

This study was not intended to provide a complete inventory of all flora and fauna species with potential to occur on the Subject Land. The species list provided for the site in this report was restricted to what was observed during the site visits by the Narla Ecologist. The timing of the surveys may not have coincided with emergence times of some species of flora and fauna, such as seasonally flowering herbs, seasonal migratory fauna or nocturnal fauna.

To account for those species that could not be identified during the field surveys, detailed habitat assessments were combined with desktop research and local ecological knowledge to establish an accurate prediction of the potential for such species to occur on or adjacent the Subject Land.





Figure 1 Components of the Subject Property.

#### 1.5 Relevant Legislation and Policy

The legislation and policy that are addressed in this report are listed in Table 1.

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Environmental Planning and Assessment Act 1979 (EP&A Act)	All features.	Yes	This FFA and all subsequent recommendations relevant to the planning process under 'Part 4 Development assessment and consent'.
Biodiversity Conservation Act 2016 (BC Act) (NSW)No BC Act listed threatened community was observed within the Subject Property during the site assessment.No BC Act listed threatened species were identified within the site during the site assessment.		Yes	This FFA, particularly the likelihood tables for threatened fauna and flora species occurring or potentially occurring within the Subject Land, as well as severity of potential direct and indirect impacts that may occur as a result of the proposed development.
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)	NoEPBCActlistedthreatenedecologicalcommunitywereobservedwithinthe SubjectPropertyduringthe site assessment.NoEPBCActthreatenedspecieswereidentifiedwithintheduringthe site assessment.	Yes	This FFA, particularly the likelihood tables for EPBC Act listed fauna and flora species occurring or potentially occurring within the Subject Land, as well as severity of potential direct and indirect impacts that may occur as a result of the proposed development.
Biosecurity Act 2015 (Bio Act)	One (1) Priority Weeds for the Greater Sydney region were identified within and surrounding the Subject Land: • Asparagus aethiopicus (Ground Asparagus).	Yes	All priority weeds must be managed in accordance with the Bio Act.

Table 1. Relevant legislation and policy addressed.



Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala Habitat Protection 2021	The Subject Property is located in an LGA listed in Schedule 2 of the SEPP; therefore, this chapter of the SEPP applies to the proposed development.	Yes	The Subject Property was not considered to contain Core Koala Habitat and therefore no further assessment should be required (See Section 1.7).
StateEnvironmental Planning Policy (Resilience and Hazards)The Subject Property is located within the Coastal use area; therefore, division 4 of this chapter in the SEPP applies to the proposed development.		Yes	The proposed development has taken factors of surrounding coastal and built environment, and the bulk, scale and size into account. Therefore, no further action should be required if factors outlined in <b>Section 1.8</b> have been accounted for.
Fisheries Management Act 1994 (FM Act)No areas within the Subject Property are listed as Key Fish Habitat under the FM Act.		No	None.
Water Management Act 2000	No mapped hydrolines (SixMaps 2022) occur within or in close proximity to the Subject Property.	No	None



#### 1.6 Biodiversity Assessment Pathway

The requirements of the BC Act and Biodiversity Conservation Regulation 2017 are mandatory for all development applications assessed pursuant to Part 4 of the EP&A Act submitted in the Northern Beaches LGA.

The Biodiversity Values (BV) Map (DPE 2023a) identifies land with high biodiversity values that are particularly sensitive to impacts from development and clearing. The map forms part of the Biodiversity Offsets Scheme Entry Threshold which is one of the triggers for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal. The map has been prepared by the Department of Planning and Environment (DPE) under Part 7 of the Biodiversity Conservation Act 2016 (BC Act).

The Subject Land does not intersect areas identified on the Biodiversity Values Map (**Figure 2**). No native vegetation in this area is proposed to be impacted to accommodate these works, with impacts to vegetation being restricted to the removal of exotic species.

The BC Act and its regulations stipulate clearing 'area threshold' values (**Table 2**) that determine whether a development is required to be assessed in accordance with the 'Biodiversity Offset Scheme' (BOS). Minimum entry thresholds for vegetation clearing depend on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

The minimum lot size prescribed by the PLEP (Northern Beaches Council 2014) to the Subject Property is 0.07ha. To avoid triggering the BOS the proponent must avoid the clearing/management of native vegetation in excess of 0.25ha (**Table 2**). The proposed development will require the removal/management of approximately 0.02ha of native vegetation. All other impacts to vegetation as a result of the proposed development is to exotic dominated vegetation.

Therefore, the Biodiversity Offset Scheme is not triggered and a Biodiversity Development Assessment Report (BDAR) is not required. As such, a standard Flora and Fauna Assessment Report (this report) has been produced to assess the impact of the proposed DA.

Table 2. Biodiversity Offset Scheme Entry Thre	sholds. Bold text indicates the clearing threshold applicable to the
proposed development.	

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more





Figure 2. Areas containing Biodiversity Values in relation to the Subject Property.

# 1.7 State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala Habitat Protection 2021

This chapter of the SEPP aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. This applies to LGAs that are listed in Schedule 2 'Local government areas' of the SEPP. As the Northern Beaches LGA is included in Schedule 2, this chapter applies to the Subject Property. As such, the development control provisions of Part 4.2 of the SEPP apply to development applications relating to the land that:

- Has an area of at least 1 hectare (including adjoining land within the same ownership); and
- Does not have an approved koala plan of management applying to the land.

As the Subject Property area is under the 1ha threshold, no koala plan of management is required.

#### 1.8 State Environmental Planning Policy (Resilience and Hazards) 2021 – Chapter 2 Coastal Management

This chapter of the SEPP aims promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016. The Subject Property falls within the 'coastal use area', therefore Division 4 of Chapter 2 is applied to the development.

Division 4 states development consent must not be granted to development on land that is within the coastal use area unless the consent authority—

- (a) has considered whether the proposed development is likely to cause an adverse impact on the following—
  - (i) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,
  - (ii) overshadowing, wind funnelling and the loss of views from public places to foreshores,
  - (iii) the visual amenity and scenic qualities of the coast, including coastal headlands,
  - 。 (iv) Aboriginal cultural heritage, practices and places,
  - (v) cultural and built environment heritage, and
- (b) is satisfied that—
  - (i) the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or
  - (ii) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or
  - (iii) if that impact cannot be minimised—the development will be managed to mitigate that impact, and
- (c) has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.

The proposed development has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development, therefore no further action should be required.

#### 1.9 Pittwater Local Environmental Plan 2014 (PLEP)

1.9.1 Zoning



The Subject Property is contained within land zoned as 'C4 Environmental Living'. The Pittwater LEP requires that the development satisfies this zone objectives which are as follows:

- To provide for low-impact residential development in areas with special ecological, scientific or aesthetic values.
- To ensure that residential development does not have an adverse effect on those values.
- To provide for residential development of a low density and scale integrated with the landform and landscape.
- To encourage development that retains and enhances riparian and foreshore vegetation and wildlife corridors.

#### 1.10 Pittwater Development Control Plan 2021 (PDCP)

#### 1.10.1 D12.10 Landscaped Area – Environmentally Sensitive Land

This control applies to all land in the Palm Beach Locality within Areas 1 and 2 of the Landscaped Area Map. The Subject Property resides within Area 1; therefore, the applicable controls are:

- The total landscaped area on land zoned R2 Low Density Residential or E4 Environmental Living shall be 60% of the site area.
- The use of porous materials and finishes is encouraged where appropriate.
- Any alterations or additions to an existing dwelling shall provide a minimum 60% of the site area as landscaped area.

The proposed development has been deliberately designed to increase the landscaped area from approximately 50% to approximately 60% of the Subject Property as per Landscape Calculations (BJB Architects 2023).



# 2. Methodology

#### 2.1 Desktop Assessment and Literature Review

A thorough literature review of local information relevant to the Northern Beaches Council area was undertaken. Searches using NSW Wildlife Atlas (BioNet; DPE 2023b) and the Commonwealth Protected Matters Search Tool (DCCEEW 2023) were conducted to identify all current threatened flora and fauna, as well as migratory fauna records within a 10km x 10km cell search area centered on the Subject Property. These data were used to assist in establishing the presence or likelihood of any ecological values as occurring on or adjacent to the Subject Property and helped inform our Ecologist on what to look for during the site assessment.

Soil landscape and geological mapping was examined to gain an understanding of the environment on the Subject Land and assist in determining whether any threatened flora or ecological communities may occur there (Chapman et al. 2009).

#### 2.2 Ecological Site Assessment

#### 2.2.1 General Survey

Site assessments was undertaken on the 17<sup>th</sup> of July 2023 by experienced Narla Ecologist Philip Maxwell. During the site assessments, the following activities were undertaken:

- Identifying and recording the vegetation communities present on the Subject Land, with focus on identifying any threatened ecological communities (TEC);
- Recording a list of flora species encountered on the Subject Land, with a focus on threatened species, species diagnostic of threatened ecological communities and priority weeds;
- Identifying the impacts to vegetation within BV Mapped areas;
- Identifying the potential for Core Koala Habitat;
- Recording opportunistic sightings of any fauna species seen or heard on or within the immediate surrounds of the Subject Land;
- Targeted surveys for threatened flora;
- Identifying and recording the locations of notable fauna habitat such as important nesting, roosting or foraging microhabitats;
- Targeting the habitat of any threatened and regionally significant fauna including:
  - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos and arboreal mammals);
  - 。 Caves and crevices (habitat for threatened reptiles, small mammals and microbats);
  - Termite mounds (habitat for threatened reptiles);
  - Soaks (habitat for threatened frogs);
  - Wetlands (habitat for threatened fish, frogs and water birds);
  - Drainage lines (habitat for threatened fish and frogs);
  - Fruiting trees (food for threatened frugivorous birds and mammals);
  - Flowering trees (food for threatened nectarivorous mammals and birds);
  - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals); and
  - Any other habitat features that may support fauna (particularly threatened) species.
- Assessing the connectivity and quality of the vegetation within the Subject Land and surrounding area.



#### 2.2.2 Weather conditions prior and during the general flora and fauna survey

Weather conditions recorded at the nearest weather station, Terrey Hills AWS (station 066059) prior to and during the general flora and fauna survey period are provided in **Table 3** (BOM 2023). The data revealed rain and mild temperatures in the lead up to the site assessments. These weather conditions may have been conducive to the emergence of annual flora.

	1	1	1	1
Survey date	Day	Minimum Temp. (°C)	Maximum Temp. (°C)	Rainfall (mm)
11/07/2023	Monday	4.3	18.3	0.0
12/07/2023	Tuesday	7.5	18.8	0.0
13/07/2023	Wednesday	6.7	20.5	0.0
14/07/2023	Thursday	9.5	21.8	0.0
15/07/2023	Saturday	11.1	22.2	0.0
16/07/2023	Sunday	13.7	16.4	0.0
17/07/2023	Monday	11.1	17.8	0.6

Table 3. Weather conditions in Terrey Hills (station 066059) preceding and during the survey period (survey dates in bold).

#### 2.3 Mapping and Analysis of Vegetation Communities

Narla examined local satellite imagery, geological mapping, soil landscape mapping and topographic mapping, in addition to existing vegetation mapping to stratify the Subject Land and guide the site assessment survey efforts. The following documents were consulted during assessment to assist with the identification of vegetation communities present within the Subject Land:

- eSPADE v2.2 (DPE 2023d);
- Chapman G.A., Murphy C.L., Tille P.J., Atkinson G. and Morse R.J., 2009, Soil Landscapes of the Sydney 1:100,000 Sheet map, Ed. 4, Department of Environment, Climate Change and Water, Sydney; and
- Department of Planning and Environment (DPE) (2023e) NSW State Vegetation Type Map Sharing and Enabling Environmental Data in NSW.

#### 2.4 Impact Assessment

A 5-part Test (BC Act) and an Assessment of Significant Impact Criteria (EPBC Act) was also undertaken for the BC Act and EPBC listed Grey-headed Flying Fox which has the potential to be indirectly impacted by the proposed works (**Appendix D** and **Appendix E**).

An assessment of likely occurrence was carried out for all other locally occurring threatened species (**Table 5**; **Table 7**) and it was determined no further assessment was required for these species.



# 3. Native Vegetation

#### 3.1 Vegetation Communities

#### 3.1.1 Historically Mapped Vegetation Communities

Vegetation mapping conducted by DPE (2023e) indicated the presence of two (2) vegetation communities within and surrounding the Subject Land (**Figure 3**):

- PCT 3592 Sydney Coastal Enriched Sandstone Forest; and
- PCT 3594 Sydney Coastal Sandstone Foreshores Forest.

#### 3.1.2 Field Validated Vegetation Communities

The field survey conducted by the Narla Ecologist identified one (1) vegetation community within the Subject Land:

• Exotic Dominated Vegetation.

The vegetation community found within the Subject Land is detailed in Table 4.

The Sydney Coastal Sandstone Foreshore Forest vegetation community was also identified within the Subject Property, but was outside the Subject Land. The vegetation communities within the Subject Property are displayed in **Figure 4**.



Historically Mapped Vegetation Subject Land Subject Property Historical Vegetation Mapping (DPE 2023e) 3592- Sydney Coastal Enriched Sandstone Forest 3594- Sydney Coastal Sandstone Forest	0       25       50       75 m         0       25       20       75 m         0       25       50       75 m         0       25       20       75 m         0       25       20       75 m         0       25       20       20         0       20       20       20         0       20       20       20         0       20       20       20

Figure 3. Historically mapped vegetation within and adjoining the Subject Land.

Field-validated Vegetation Mapping Subject Land Subject Property Field-validated Vegetation Communities Exotic Dominated Vegetation PCT 3594- Sydney Coastal Sandstone Foreshore Forest	0 5 10 15 m

Figure 4. Narla mapped vegetation communities within the Subject Property.

#### Table 4. Description of Exotic Dominated Vegetation

**Exotic Dominated Vegetation** 





# 4. Threatened Species

#### 4.1 Threatened Flora

Desktop analysis revealed a range of threatened flora as occurring or having the potential to occur on or within a 10km x 10km cell centered on the Subject Land. Thorough targeted surveys were undertaken throughout the Subject Land for potentially occurring threatened flora whose survey period coincided within the time of the site assessments (**Figure 5**). No threatened flora were identified at the time of the site assessment.

A comprehensive list of flora species identified during the site assessment is presented in **Appendix A**. The following locally occurring species were assessed for their potential to occur within the Subject Land (**Table 5**). Based on unsuitable habitat, geographic distribution and/or the small scale of the development, it was determined that the proposed works are unlikely to significantly impact upon these species. Therefore, no further assessment of impacts pursuant the BC Act (e.g. Biodiversity Development Assessment Report [BDAR]) and/or EPBC Act Referral to Commonwealth will be required.

Species	BC Act	EPBC Act	Habitat Requirements (DPE 2023f)	Likelihood of Occurrence within the Subject Land	Further Impact Assessment Required?
Acacia terminalis subsp. Eastern Sydney (Sunshine wattle)	E	E	Occurs in coastal scrub and dry sclerophyll woodland on sandy soils.	Absent. The Subject Land does not contain coastal scrub and dry sclerophyll woodland on sandy soils; however, a targeted survey was conducted during the approved survey period for this species (DPE 2023c) and no individuals were identified.	No
Asterolasia elegans	E	E	Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes <i>Syncarpia glomulifera</i> <i>subsp. glomulifera</i> , <i>Angophora costata</i> , <i>Eucalyptus</i> <i>piperita</i> , <i>Allocasuarina torulosa</i> and <i>Ceratopetalum</i> <i>gummiferum</i> .	Low. Sheltered forests on Hawkesbury sandstone does occur within the Subject Land; however, a targeted survey was conducted during the approved survey period for this species (DPE 2023c) and no individuals were identified.	No

#### Table 5. Likelihood of occurrence of threatened flora species within the Subject Land.



Species	BC Act	EPBC Act	Habitat Requirements (DPE 2023f)	Likelihood of Occurrence within the Subject Land	Further Impact Assessment Required?
<i>Boronia umbellate</i> (Orara Boronia)	V	V	Grows as an understorey shrub in and around gullies in wet open forest.	Absent. The Subject Lands does not contain wet open forest.	No
<i>Caladenia tessellate</i> (Thick Lip Spider Orchid)	E	V	Grows in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	Low. The Subject Lands does not contain in grassy sclerophyll woodland on clay loam or sandy soils.	No
Callistemon linearifolius (Netted Bottle Brush)	V	-	Grows in dry sclerophyll forest on the coast and adjacent ranges.	Low. Dry sclerophyll forest does not occur within the Subject Land; however, a targeted survey was conducted during the approved survey period for this species (DPE 2023c) as it does occur within the Subject Property. No individuals were identified.	No
Chamaesyce psammogeton (Sand Spurge)	E	-	Grows on fore-dunes, pebbly strandlines and exposed headlands, often with <i>Spinifex sericeus</i> and <i>Zoysia macrantha</i> .	Absent. The Subject Land does not contain fore-dunes, pebbly strandlines or exposed headlands.	No
Cryptostylis hunteriana (Leafless Tongue Orchid)	V	V	Typically occur in woodland dominated by <i>Eucalyptus</i> sclerophylla, E. sieberi, Corymbia gummifera and Allocasuarina littoralis; appears to prefer open areas in the understorey of this community and is often found in association with C. subulata and C. erecta.	Low. The Subject Land does not contain woodland dominated by <i>Eucalyptus</i> sclerophylla, E. sieberi, Corymbia gummifera and Allocasuarina littoralis	No
<i>Eucalyptus</i> nicholii (Narrow- leaved Black Peppermint)	V	V	Grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock.	Absent. The Subject Land does not contain dry grassy woodland, on shallow soils of slopes and ridges.	No



Species	BC Act	EPBC Act	Habitat Requirements (DPE 2023f)	Likelihood of Occurrence within the Subject Land	Further Impact Assessment Required?
<i>Genoplesium baueri</i> (Bauer's Midge Orchid)	E	E	Grows in dry sclerophyll forest and moss gardens over sandstone. Flowers February to March.Low. Potential habitat was not present for this species within the Subject Land; however, a targeted survey was conducted during the approved survey period for this species (DPE 2023c) as it does occur within the Subject Property. No individuals were identified.		No
Kunzea rupestris	V	V	Grows in shallow depressions on large flat sandstone rock outcrops. Characteristically found in short to tall shrubland or heathland. Absent. The Subject Land does not contain short to tall shrubland or heathland.		No
Lasiopetalum joyceae	V	V	Grows in heath on sandstone. Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River.		No
<i>Melaleuca deanei</i> (Deane's Paperbark)	V	V	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Flowers appear in summer but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate.		No
<i>Persoonia hirsuta</i> (Hairy Geebung)	E	E	The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone. It is usually present as isolated individuals or very small populations.	Absent. Sandy soils with dry sclerophyll open forest does not occur within the Subject Land; however, a targeted survey was conducted during the approved survey period for this species (DPE 2023c) as it does occur within the Subject Property. No individuals were identified.	No



Species	BC Act	EPBC Act	Habitat Requirements (DPE 2023f)	Likelihood of Occurrence within the Subject Land	Further Impact Assessment Required?
Pimelea curviflora var. curviflora	V	V	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawarra coastal plain.	Low. Potential habitat was not present for this species within the Subject Land; however, a targeted survey was conducted during the approved survey period for this species (DPE 2023c) as it does occur within the Subject Property. No individuals were identified.	No
Prostanthera densa (Villous Mint-bush)	V	V	Grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea.	Absent. Potential habitat was not present for this species within the Subject Land; however, a targeted survey was conducted during the approved survey period for this species (DPE 2023c) as it does occur within the Subject Property. No individuals were identified.	No
<i>Rhodamnia rubescens</i> (Scrub Turpentine)	E	CE	Occurs in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Absent. The Subject Land does not contain littoral, warm temperate and subtropical rainforest or wet sclerophyll forest.	No
<i>Rhodomyrtus psidioides</i> (Native Guava)	CE	CE	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines	Absent. The Subject Land does not contain littoral, warm temperate and subtropical rainforest or wet sclerophyll forest.	No
Syzygium paniculatum (Magenta Lilly Pilly)	E	V	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Low. The Subject Land does not contain littoral rainforest.	No



Species	BC Act	EPBC Act	Habitat Requirements (DPE 2023f)	Likelihood of Occurrence within the Subject Land	Further Impact Assessment Required?
<i>Thesium austral</i> (Austral Toadflax)	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Low. The Subject Land does not contain grassland or grassy woodland.	No

\*X= Extinct, CE = Critically Endangered, E = Endangered, V = Vulnerable



#### 4.2 Threatened Fauna Species

Details of the fauna habitat recorded within the Subject Land are included in **Table 6**. The likelihood of occurrence of threatened fauna species within the Subject Land is presented in in **Table 7**.

A BC Act test of significance (5-Part Test; **Appendix D**) and EPBC Act Assessment of Significant Impact (**Appendix E**) was conducted for *Pteropus poliocephalus* (Grey-headed Flying Fox (GHFF)) as the Subject Land is in proximity to both Avalon and Warriewood GHFF camps. Following the completion of these assessments it was considered unlikely that the proposed works will significantly impact upon the local population of this species.

Furthermore, based on unsuitable habitat, geographic distribution and the disturbed nature of the Subject Land, it was determined that the proposed works are unlikely to significantly impact upon a local viable population or occurrence of any other threatened species. Therefore, no BDAR or EPBC Act Referral to the Commonwealth is required for the proposed development.

A small suite of avian fauna species were identified within and surrounding the Subject Land during the site assessments. All native fauna species encountered were listed as 'protected' under the BC Act. The list of fauna recorded during the site visit was produced opportunistically (**Appendix B**).

Habitat component	Site values
Coarse woody debris	Absent.
Rock outcrops, bush rock, caves, crevices and overhangs	Present on the western boundary of the Subject Property, however no anticipated impacts are expected on this feature.
Culverts, bridges, mine shafts, or abandoned structures	Absent.
Nectar/lerp-bearing trees	Nectar-bearing Banksia species were not recorded within the Subject Land, but were recorded within the Subject Property.
Nectar-bearing shrubs	Nectar-bearing shrubs occurred within and surrounding the Subject Land.
Large stick nests	Absent.
Sap and gum sources	Native sap and gum source trees were not recorded within the Subject Land, but were recorded within the Subject Property.
She-oak fruit (Glossy Black Cockatoo feed)	Absent.
Soft-fruit-bearing trees	Present. Trees such as Pittosporum undulatum occur in the Subject Land.
Dense shrubbery and leaf litter	Present. Leaf litter and dense shrubbery were present within the Subject Land.
Tree hollows	Absent.
Decorticating bark	Absent.
Wetlands, soaks and streams	Absent.
Open water bodies	Absent.
Estuarine, beach, mudflats, and rocky foreshores	Absent.

Table 6. Fauna habitat values identified within and surrounding the Subject Land.



#### 4.2.1 Migratory Fauna Species

Desktop analysis revealed the following EPBC Act listed migratory terrestrial fauna species were considered to have the potential to utilise habitat within the Subject Land (e.g. foraging or passage) during part of their lifecycles:

- Cuculus optatus (Oriental Cuckoo);
- *Hirundapus caudacutus* (White-throated Needletail);
- Monarcha melanopsis (Black-faced Monarch);
- Motacilla flava (Yellow Wagtail);
- Myiagra cyanoleuca (Satin Flycatcher);
- Rhipidura rufifrons (Rufous Fantail); and
- Symposiachrus trivirgatus (Spectacled Monarch).

It was determined that the proposed works are unlikely to have a significant impact on these species. Therefore, a Referral to Commonwealth pursuant to the EPBC Act is not required.



#### Table 7. Threatened Fauna Likelihood of Occurrence Tables.

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
<i>Anthochaera Phrygia</i> (Regent Honeyeater)	Critically Endangered	Critically Endangered	Low	The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Potential foraging habitat present within the Subject Land.	This species typically occupies woodlands that have a significantly large number of mature trees, high canopy cover and abundance of mistletoes. There are only two known breeding areas in NSW. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat. The Subject Land is not mapped on the Regent Honey Eater Important Areas Map (DPE 2023c).	No
Artamus cyanopterus (Dusky Woodswallow)	Vulnerable	-	Low	inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very	Nest is an open, cup- shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed. Potential foraging habitat present within the Subject Land.	in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage. No breeding habitat present within the Subject Land.		
Botaurus poiciloptilus (Australasian Bittern)	Endangered	Endangered	Low	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes ( <i>Typha</i> spp.) and spikerushes ( <i>Eleocharis</i> spp.). No potential foraging habitat present within the Subject Land.	Nests are built in secluded places in densely- vegetated wetlands on a platform of reeds. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Burhinus</i> <i>grallarius</i> (Bush Stone-curlew)	Endangered	-	Low	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. No potential foraging habitat present within the Subject Land.	Nest on the ground in a scrape or small bare patch. No breeding habitat present within the Subject Land	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
<i>Calidris canutus</i> (Red Knot)	-	Endangered	Low	Occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps. No potential foraging habitat present within the Subject Land.	Roost on sandy beaches, spits, islets and mudflats close to feeding grounds, usually in open areas. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Callocephalon fimbriatum</i> (Gang- gang Cockatoo)	Vulnerable	-	Low	Generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Feeds mainly on seeds of native and introduced trees and	Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10cm in diameter or larger and at least 9m above the ground in eucalypts. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				shrubs, with a preference for Eucalypts, Wattles and introduced Hawthorns. No potential foraging habitat present within the Subject Land.			
Calyptorhynchus lathami (Glossy Black- Cockatoo)	Vulnerable	_	Low	This species feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species). Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur. No potential foraging habitat present within the Subject Land.	Dependent on large hollow-bearing eucalypts for nest sites. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
Cercartetus nanus (Eastern Pygmy- possum)	Vulnerable	-	Low	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. They may occupy small patches of vegetation in fragmented landscapes and although	Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird- nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. No	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				the species prefers habitat with a rich shrub understory, they are known to occur in grassy woodlands and the presence of Eucalypts alone is sufficient to support populations in low densities. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests. Potential foraging habitat present within the	breeding habitat present within the Subject Land.		
<i>Chalinolobus dwyeri</i> (Large- eared Pied Bat)	Vulnerable	Vulnerable	Low	Subject Land. Found mainly in areas with extensive cliffs, caves and well-timbered areas containing gullies. Likely to hibernate through the coolest months. This species probably forages for small, flying insects	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle- shaped mud nests of the Fairy Martin ( <i>Petrochelidon</i> <i>ariel</i> ), frequenting low to mid-elevation dry open	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				below the forest canopy. No foraging habitat present within Subject Land.	forest and woodland close to these features. No breeding habitat present within the Subject Land.		
<i>Charadrius leschenaultia</i> (Greater Sand- plover)	Vulnerable	Vulnerable	Low	Occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Diet includes insects, crustaceans, polychaete worms and molluscs. No foraging habitat present within Subject Land.	Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
Climacteris picumnus victoriae (Brown Treecreeper (eastern subspecies))	Vulnerable	_	Low	Found in eucalypt woodlands (including Box- Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum ( <i>Eucalyptus</i> <i>camaldulensis</i> ) Forest bordering wetlands with an open understorey of	Hollows in standing dead or live trees and tree stumps are essential for nesting. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. No foraging habitat present within Subject Land.			
<i>Dasyornis brachypterus</i> (Eastern Bristlebird)	Endangered	Endangered	Low	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these vegetation types are fire prone. Feeds on a variety of insects, particularly ants. No foraging habitat present within Subject Land.	Nests are elliptical domes constructed on or near the ground amongst dense vegetation. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
Dasyurus maculatus	Vulnerable	Endangered	Low	Recorded across a range of habitat types, including rainforest, open forest,	This species uses hollow- bearing trees, fallen logs, small caves, rock outcrops	Negligible, minor impact to potential foraging habitat given	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
(Spotted-tailed Quoll)				woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Potential prey items may occur within the Subject Land.	and rocky-cliff faces as den sites. No breeding habitat present within the Subject Land.	the small area of removal. No anticipated loss of breeding habitat.	
<i>Grantiella picta</i> (Painted Honeyeater)	Vulnerable	Vulnerable	Low	Inhabits Boree/ Weeping Myall ( <i>Acacia pendula</i> ), Brigalow ( <i>A. harpophylla</i> ) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Insects and nectar from mistletoe or eucalypts are occasionally eaten. No foraging habitat present within Subject Land.	Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Glossopsitta pusilla</i> (Little Lorikeet)	Vulnerable	-	Low	Forages primarily in the canopy of open Eucalyptus Forest and woodland, yet also finds food in Angophora, Melaleuca and	Nests in proximity to feeding areas, if possible, most typically selecting hollows in the limb or trunk of smooth-barked	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. No foraging habitat present within Subject Land.	Eucalypts. Entrance is small (3cm) and usually high above the ground (2–15m). No breeding habitat present within the Subject Land.		
Haematopus fuliginosus (Sooty Oystercatcher)	Vulnerable	-	Low	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. No foraging habitat present within Subject Land.	Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Haematopus longirostris</i> (Pied Oystercatcher)	Endangered	-	Low	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. No foraging habitat present within Subject Land.	Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones. No	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
					breeding habitat present within the Subject Land.		
<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)	Vulnerable	-	Low	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. No such habitat was identified within the Subject Land.	Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nests are large structures built from sticks and lined with leaves or grass. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
Heleioporus australiacus (Giant Burrowing Frog)	Vulnerable	Vulnerable	Low	Whilst in non-breeding habitat (within 300m of creeks), this species burrows below the soil surface or in the leaf litter near creeks. Individual frogs occupy a series of burrow sites, some of which are used repeatedly. It has a generalist diet of invertebrates including ants, beetles, cockroaches, spiders, centipedes and scorpions. No foraging	Breeding habitat of this species is generally soaks or pools within first or second-order streams. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				habitat present within Subject Land.			
Hieraaetus morphnoides (Little Eagle)	Vulnerable	-	Low	Occupies open eucalypt forest, woodland or open woodland. She-oak or Acacia woodlands and riparian woodlands of interior NSW are also used. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion. Potential prey items are unlikely to occur within the Subject Land.	Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No
<i>Isoodon obesulus obesulus</i> (Southern Brown Bandicoot (eastern))	Endangered	Endangered	Low	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit- bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. No foraging habitat present within Subject Land.	Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material. Nests may be located under Grass trees Xanthorrhoea spp., blackberry bushes and other shrubs, or in rabbit burrows. The upper surface of the nest may be mixed with earth to waterproof the inside of the nest. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
<i>Lathamus discolor</i> (Swift Parrot)	Endangered	Critically Endangered	Low	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. No foraging habitat present within Subject Land.	Breeds in Tasmania. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat. The Subject Land is not mapped on the Swift Parrot Important Areas Map (DPE 2023c).	No
<i>Lophoictinia isura</i> (Square-tailed Kite)	Vulnerable	-	Low	Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy. Prey items may occur within the Subject Land.	Nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No
<i>Meridolum maryae</i> (Maroubra Woodland Snail)	Endangered	_	Low	Found in the leaf litter of coastal vegetation communities, most commonly in heathland on foredunes also from areas of podsolised dunes/sand plains that support taller heath communities including Eastern Suburbs Banksia Scrub. No foraging habitat present within the Subject Land.	Same as foraging habitat. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Micronomus</i> <i>norfolkensis</i> (Eastern Coastal Free-tailed Bat)	Vulnerable	-	Low	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range, feeding on insects. No foraging habitat	Roost mainly in tree hollows but will also roost under bark or in man- made structures. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				present within the Subject Land.			
<i>Miniopterus australis</i> (Little Bent- winged Bat)	Vulnerable	-	Low	Found in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. at night forage for small insects beneath the canopy of densely vegetated habitats. No foraging habitat present within the Subject Land.	This species primarily breeds in caves but has been known to utilise tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings. The existing dwelling is potential breeding habitat present in proximity to the Subject Land.	Negligible, no anticipated loss of foraging habitat. Potential minor impact to breeding habitat due to existing dwelling in proximity to the Subject Land.	No
Miniopterus orianae oceanensis (Large Bent- winged Bat)	Vulnerable	-	Low	Hunt in forested areas, catching moths and other flying insects above the tree tops. Potential foraging habitat present within the Subject Land.	This species only breeds in caves. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No
<i>Myotis Macropus</i> (Southern Myotis)	Vulnerable	_	Low	This species forages over streams and pools catching insects and small fish by raking their feet across the water surface. No foraging habitat present within the Subject Land.	Generally, roost in groups of 10 - 15 close to water in caves, mine shafts, hollow- bearing trees, storm water channels, buildings, under bridges and in dense foliage. The existing dwelling is potential breeding habitat present in	Negligible, no anticipated loss of foraging habitat. Potential minor impact to breeding habitat due to existing dwelling in proximity to the Subject Land.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
					proximity to the Subject Land.		
Neophema chrysostoma (Blue-winged Parrot)	_	Vulnerable	Low	Inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi- arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs. No foraging habitat present within the Subject Land.	Forests and woodlands within the breeding range in Tasmania, coastal south- eastern South Australia and southern Victoria. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Neophema pulchella</i> (Turquoise Parrot)	Vulnerable	-	Low	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and	Nests in tree hollows, logs or posts, from August to December. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				herbaceous plants, or browsing on vegetable matter. No foraging habitat present within the Subject Land.			
<i>Ninox connivens</i> (Barking Owl)	Vulnerable	_	Low	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. No foraging habitat present within the Subject Land.	Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Ninox strenua</i> (Powerful Owl)	Vulnerable	-	Low	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider.	Powerful Owls nest in large tree hollows (at least 0.5m deep), in large eucalypts (diameter at breast height of 80-240cm) that are at least 150 years old. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				As most prey species require hollows and a shrub layer, these are important habitat components for the owl. No foraging habitat present within the Subject Land.			
<i>Notamacropus parma</i> (Parma Wallaby)	Vulnerable	_	Low	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. No foraging habitat present within the Subject Land.	During the day they shelter in dense cover. Potential dense cover is present within the Subject Property; however there is no breeding habitat present within the Subject Land Furthermore, this species range is confined from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino, as such its presence within the Subject Land is highly unlikely.	Negligible, no anticipated loss of foraging or breeding habitat.	No
Pandion cristatus (Eastern Osprey)	Vulnerable	-	Low	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. No foraging habitat present within the Subject Land.	Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Petauroides</i> <i>volans</i> (Southern Greater Glider)	Endangered	Endangered	Low	Occurs in eastern Australia, in eucalypt forests and woodlands. Feeds	Shelter during the day in tree hollows and will use up to 18 hollows in their	Negligible, no anticipated loss of	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				exclusively on eucalypt leaves, buds, flowers and mistletoe. No foraging habitat present within the Subject Land.	home range. No breeding habitat present within the Subject Land.	foraging or breeding habitat.	
<i>Petaurus australis</i> (Yellow-bellied Glider)	Vulnerable	Vulnerable	Low	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Potential foraging habitat is present within the Subject Land.	Den, often in family groups, in hollows of large trees. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No
<i>Petaurus norfolcensis</i> (Squirrel Glider)	Vulnerable	_	Low	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein. Potential foraging habitat is present within the Subject Land.	Require abundant tree hollows for refuge and nest sites. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
<i>Petroica boodang</i> (Scarlet Robin)	Vulnerable	-	Low	Lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. Forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. No foraging habitat present within the Subject Land.	Nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
Phascolarctos cinereus (Koala)	Vulnerable	-	Low	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. No foraging habitat present within the Subject Land.	Spend most of their time in trees, but will descend and traverse open ground to move between trees. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
Potorous tridactylus (Long- nosed Potoroo)	Vulnerable	Vulnerable	Low	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The fruit- bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Potential foraging habitat is present within the Subject Land.	Often digs small holes in the ground in a similar way to bandicoots. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No
Pseudomys novaehollandiae (New Holland Mouse)	-	Vulnerable	Low	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. No foraging habitat present within the Subject Land.	Lives predominantly in burrows shared with other individuals. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
Pseudophryne australis (Red-crowned Toadlet)	Vulnerable	-	Low	Disperses outside the breeding period where they are found under rocks and logs on sandstone ridges	Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and	Negligible, minor impact to potential foraging habitat given the small area of	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				and forage amongst leaf- litter. Potential foraging habitat is present within the Subject Land.	gutters. No breeding habitat present within the Subject Land.	removal. No anticipated loss of breeding habitat.	
Pteropus poliocephalus (Grey-headed Flying-fox)	Vulnerable	Vulnerable	Medium	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Potential marginal habitat, only to be used on an opportunistic bases, present within the Subject Land.	No breeding camps were identified within the Subject Land or broader Subject Property.	Low, impact to potential foraging habitat given the small area of removal and large areas continuing to exist surrounding the Subject Land and greater locality. No anticipated net loss of breeding habitat.	Yes. Owing to the proximity of both the Warriewood and Avalon Camps a 5-part Test of Significance (BC Act) and Assessment of Significant Impact (EPBC Act) was conducted to assess the potential indirect impacts associated with the proposed development.
<i>Ptilinopus regina</i> (Rose-crowned Fruit-Dove)	Vulnerable	-	Low	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Potential	Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				foraging habitat is present within the Subject Land.			
<i>Ptilinopus superbus</i> (Superb Fruit- dove)	Vulnerable	_	Low	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Potential foraging habitat is present within the Subject Land.	Breeding takes place from September to January. The nest is a structure of fine interlocked forked twigs, giving a stronger structure than its flimsy appearance would suggest, and is usually 5-30m up in rainforest and rainforest edge tree and shrub species. No breeding habitat present within the Subject Land.	Negligible, minor impact to potential foraging habitat given the small area of removal. No anticipated loss of breeding habitat.	No
<i>Rostratula australis</i> (Australian Painted Snipe)	Endangered	Endangered	Low	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. No foraging habitat present within the Subject Land.	Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Scoteanax</i> <i>rueppellii</i> (Greater Broad- nosed Bat)	Vulnerable	-	Low	Forages after sunset, flying slowly and directly along creek and river corridors. No foraging habitat present within the Subject Land.	This species usually roosts in tree hollows. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Stagonopleura guttata</i> (Diamond Firetail)	Vulnerable	-	Low	Found in grassy eucalypt woodlands, including Box- Gum Woodlands, Snow Gum Woodlands, riparian areas (rivers and creeks), and sometimes in lightly	Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. No breeding habitat	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
				wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). No foraging habitat present within the Subject Land.	present within the Subject Land.		
Tyto novaehollandiae (Masked Owl)	Vulnerable	_	Low	Lives in dry eucalypt forests and woodlands from sea level to 1100m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree- dwelling and ground mammals, especially rats. No foraging habitat present within the Subject Land.	Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No
<i>Varanus rosenbergi</i> (Rosenberg's Goanna)	Vulnerable	_	Low	Found in heath, open forest and woodland. Individuals require large areas of habitat. Feeds on carrion, birds, eggs, reptiles and small mammals. No foraging habitat present within the Subject Land.	Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens. Lays up to 14 eggs in a termite mound; the hatchlings dig themselves out of the mounds. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No



Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Subject Land	Breeding Habitat Present Within the Subject Land	Anticipated Impact	Further Impact Assessment Required?
<i>Vespadelus troughtoni</i> (Eastern Cave Bat)	Vulnerable	-	Low	Occasionally found along cliff-lines in wet eucalypt forest and rainforest. No foraging habitat present within the Subject Land.	Cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. No breeding habitat present within the Subject Land.	Negligible, no anticipated loss of foraging or breeding habitat.	No





Figure 5. Threatened Species Targeted Survey Effort.

#### 5.1 Vegetation

#### 5.1.1 Vegetation Loss

In total approximately 0.008ha of vegetation will be removed/managed in order to facilitate the proposed development; which includes approximately:

• 0.008ha of Exotic Dominated Vegetation.

#### 5.2 Threatened Species

Based on the potential for indirect impacts resulting from the removal of vegetation, and the presence of two (2) breeding colonies located within the broader locality (Warriewood and Avalon) it was determined that further impact assessments (BC Act - 5-Part Test and EPBC Act Assessment of Significant Impact Assessment) were required for the Grey-headed Flying Fox (**Appendix D** and **Appendix E**).

It was deemed that the proposed works will not result in a significant impact such that a local viable population or occurrence of any of the threatened species aforementioned will be placed at risk of extinction. Therefore, no BDAR or EPBC Act Referral to Commonwealth should be required for the proposed development.



# 6. Recommendations

#### 6.1 Impact Mitigation and Minimisation Recommendations

This section of the report details recommended efforts to avoid and minimise impact on biodiversity values associated with the proposed development. Measures to be implemented before, during and post construction to avoid and minimise the impacts of the project are detailed in **Table 8**.

Table 8. Table of measures to be im	plemented before, during	and after construction t	to avoid and minimise the im	pacts of the project.
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Action	Outcome	Timing	Responsibility
Project Location, Design and Planning	The proposed development has been strategically designed to avoid and minimise impacts to the areas within the Subject Property that contain the highest biodiversity values. Impacts to vegetation have been largely restricted to areas of exotic vegetation or landscaped native species.	Pre- construction phase	Proponent
Assigning a Project Ecologist	<ul> <li>Prior to the implementation of the development, the proponent should commission the services of a qualified and experienced Ecologist with a minimum tertiary degree in Science, Conservation, Biology, Ecology, Natural Resource Management, Environmental Science or Environmental Management.</li> <li>The Ecologist must be licensed with a current Department of Primary Industries Animal Research Authority permit and New South Wales Scientific License issued under the BC Act.</li> <li>The Ecologist will be commissioned to: <ul> <li>Undertake a pre-clearing survey; delineating habitat-bearing trees and shrubs to be retained/removed;</li> <li>Supervise the clearance of habitat containing trees and shrubs (native and exotic) in order to capture, treat and/or relocate any displaced fauna particularly</li> </ul> </li> </ul>	Pre- construction phase	Proponent

Action	Outcome	Timing	Responsibility
Tree Protections	Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970) outlines that a Tree Protection Zone (TPZ) is the principal means of protecting trees on construction sites. It is an area isolated from construction disturbance so that the tree remains viable. Ideally, works should be avoided within the TPZ.	Pre- construction phase	Proponent Arborist
	A Minor Encroachment is less than 10% of the TPZ and is outside the Structural Root Zone (SRZ). A Minor Encroachment is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. A Major Encroachment is greater than 10% of the TPZ or inside the SRZ. Major Encroachments generally require root investigations undertaken by non-destructive methods or the use of tree sensitive construction methods. Trees proposed for retention should be delineated by temporary fencing by the Project Arborist. Temporary fencing should be erected at a minimum distance of the structural root zone of each tree proposed for retention.		
Landscaping	Where possible landscaping efforts within the Subject Property should incorporate locally ingenious species representative of PCT 3594 - Sydney Coastal Sandstone Foreshores Forest.	Post- construction phase	Proponent
Erosion and Sedimentation	An erosion and sediment control plan should be prepared for the proposed development. The applicant must ensure that adequate erosion and sediment measures are in place at all times during construction activity. Always follow best practice guidelines (Landcom 2004).	Construction phase	Proponent Construction Contractor
Storage and Stockpiling (Soil and Materials)	Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained. Avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site in order to avoid the potential of incurring indirect impacts on biodiversity values.	Construction phase	Construction Contractors



# 7. Conclusion

This assessment indicates that the relevant provisions of the BC Act 2016 and the EPBC Act 1979 have been satisfied and that the proposed development has been appropriately located within the area identified as having the least ecological impact.

In total approximately 0.019ha of exotic dominated vegetation will be removed/managed in order to facilitate the proposed development.

The proposed development is considered unlikely to result in any significant impacts to adjoining land or to any threatened species within the Subject Property. It is anticipated that any direct or indirect impacts to threatened fauna will be minimal.

If the appropriate recommendations in this report are followed the proposed development should have minimal ecological impact.



# 8. References

Australian Standard 4970 (2009) Protection of Trees on Development Sites

BJB Architects (2023) Proposed Stie Plan: 15 Ocean Road, Palm Beach, NSW 2108

Bureau of Meteorology (BOM) (2023) Terrey Hills, New South Wales, July 2023, Daily Weather Observations.

Chapman GA, Murphy CL, Tille PJ, Atkinson G and Morse RJ (2009) Ed. 4, Soil Landscapes of the Sydney 1:100,000 Sheet map, Department of Environment, Climate Change and Water, Sydney.

Commonwealth of Australia Department of Climate Change, Energy, the Environment and Water (2023) Protected Matters Search Tool, http://www.environment.gov.au/epbc/pmst/

Department of Planning, Industry and Environment (DPIE) (2020) Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method.

Department of Planning and Environment (DPE) (2023a) Biodiversity Values Map and Threshold Tool. https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsetsscheme/entry-requirements/biodiversity-values-map

Department of Planning and Environment (DPE) (2023b) Koala SEPP 2021- Factsheet- Development Applications

Department of Planning and Environment (DPE) (2023c) NSW BioNet. The website of the Atlas of NSW Wildlife http://www.bionet.nsw.gov.au/

Department of Planning and Environment (DPE) (2023d) eSPADE v2.2 https://www.environment.nsw.gov.au/eSpade2Webapp#

Department of Planning and Environment (DPE) (2023e) NSW State Vegetation Type Map – Sharing and Enabling Environmental Data in NSW

https://geo.seed.nsw.gov.au/Html5Viewer412/index.html?viewer=SEED.SEED&local=enau&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED\_Catalog.317.Plant%20Community%20Type%20wit h%20object%20labels,SEED\_Catalog.318.Flora%20Sites,SEED\_Catalog.317.NSW\_VegetationFormation\_5m,SEE D\_Catalog.317.NSW\_VegetationClass\_5m,SEED\_Catalog.317.NSW\_PlantCommunityType\_5m,SEED\_Catalog.317 .Plant%20Community%20Type%20with%20labels

Department of Planning and Environment (DPE) (2023f) Threatened biodiversity profile search <a href="https://www.environment.nsw.gov.au/threatenedspeciesapp/">https://www.environment.nsw.gov.au/threatenedspeciesapp/</a>

Department of Primary Industries (DPI) (2023) Priority Weeds for the Greater Sydney Region NSW Weeds Wise http://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=3

Landcom (2004) Managing Urban Stormwater: Soils and Construction 'The Blue Book', Volume 1, Fourth Edition, New South Wales Government, ISBN 0-9752030-3-7

National Parks and Wildlife Service (NPWS) (2020), Developments adjacent to NPWS lands: Guidelines for consent and planning authorities, National Parks and Wildlife Service, Department of Planning Industry and Environment, Sydney, NSW.

Northern Beaches Council (2021) Pittwater Development Control Plan.

Northern Beaches Council (2014) Pittwater Local Environmental Plan.



NSW Government Spatial Services (SIX Maps) (2023) NSW Government Land & Property Information Spatial Information Exchange map viewer, https://six.nsw.gov.au/

PlantNET (2023) The NSW Plant Information Network System, Royal Botanic Gardens and Domain Trust, Sydney. http://plantnet.rbgsyd.nsw.gov.au

Robinson, L. (2003) 'Field Guide to the Native Plants of Sydney', Third Edition, Kangaroo Press

State Environmental Planning Policy – Koala Habitat protection (2021) https://legislation.nsw.gov.au/#/view/EPI/2019/658



# 9. Appendices

Appendix A. Flora species identified within the Subject Property.

Appendix B. Fauna species identified within and surrounding the Subject Property.

Appendix C Proposed Site Plan (BJB Architects 2023).

Appendix D. Biodiversity Conservation Act Test of Significance (5-part Test) – Grey-headed Flying Fox. Appendix E. EPBC Act Assessment of Significant Impact Criteria - Grey-headed Flying Fox.



Scientific Name	Canopy	Mid-storey	Groundcover
Agapanthus sp.		Х	
Agave attenuata*		х	
Asparagus aethiopicus**			X
Asplenium australasicum		х	
Banksia integrifolia	x		
Canna indica*		х	
Cardamine flexuosa*			X
Coprosma repens*		х	
Crassula multicava*			X
Crinum pedunculatum			X
Cyrtomium falcatum*			X
Dicksonia antarctica		х	
Ficus rubiginosa	x		
Heptapleurum actinophyllum*	X		
Hibiscus rosa-sinensis*		х	
Homalanthus populifolius	x		
Howea belmoreana*	x		
Hypochaeris radicata*			X
Impatiens walleriana*			X
Kniphofia uvaria*		х	
Nephrolepis cordifolia*		х	
Oxalis pes-caprae*			X
Pandorea pandorana			X
Parietaria judaica*			X
Pittosporum undulatum		х	
Plumeria alba*	х		
Poa annua*			X
Pteridium esculentum		х	
Ravenala madagascariensis*		Х	
Senecio tamoides*			X
Senna pendula*			X
Stenotaphrum secundatum*			X
Tradescantia fluminensis*			X
Tropaeolum majus*			X
Viburnum odoratissimum*		X	
Viola hederacea*			X
Yucca gigantea*	Х		

Appendix A. Flora species identified within the Subject Property.

\* Denotes exotic species, \*\* Denotes Priority Weed.

#### Appendix B. Fauna species identified within and surrounding the Subject Property.

Class	Scientific Name	Common Name	Status
Aves	Dacelo novaeguineae	Laughing Kookaburra	Ductostad
	Manorina melanocephala	Noisy Miner	Protected



#### Appendix C Proposed Site Plan (BJB Architects 2023).





Biodiversity Conservation Act 2016– Assessment of Significance (5-part Test)		
for		
	Grey-headed Flying-Fox	
(Pteropus poliocephalus)		
Species Ecology	Grey-headed Flying-fox forage opportunistically, often at distances up to 30 km from camps, and occasionally up to 60-70 km per night, in response to patchy food resources. This species is a canopy-feeding frugivore, blossom-eater and nectarivore of rainforests, open forests, woodlands, <i>Melaleuca</i> swamps and <i>Banksia</i> woodlands. As such, the species contributes important ecosystem function by providing a means of seed dispersal and pollination for many indigenous tree species. Grey- headed Flying-fox feed on introduced trees including commercial fruit crops. Grey-headed Flying-foxes congregate in large numbers at roosting sites (camps) that may be found in rainforest patches, <i>Melaleuca</i> stands, mangroves, riparian woodland or modified vegetation in urban areas. Individuals generally exhibit a high fidelity to traditional camps and return annually to give birth and rear offspring. The Grey-headed Flying-fox show a regular pattern of seasonal movement. Much of the population concentrates in May and June in northern NSW and Queensland where animals exploit winter-flowering trees such as Swamp Mahogany ( <i>Eucalyptus robusta</i> ), Forest Red Gum ( <i>E. tereticornis</i> ) and Paperbark ( <i>Melaleuca quinquenervia</i> ).	
(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 proposed development is unlikely to adversely effect upon the life cycle of the species. At the time of preparing this report there were no known roosts or camps of Grey-headed Flying-fox within the Subject Land or Subject Property. However, the Subject Land is located approximately 3km away for the Avalon Flying Fox Camp and 11km From the Warriewood Flying Fox Camp. The Subject Land is likely to provide potential marginal habitat, only to be used on an opportunistic bases by this species when feed trees are flowering and fruiting. 0.008ha of landscaped and exotic vegetation that may provide potential foraging habitat is predicted to be removed for the proposed development. The vegetation to be removed exists within a disturbed and historically altered landscape with high levels of human activity. It is likely that this foraging habitat is not of high importance to this species. Potential foraging habitat for the species will remain within the broader Subject Property. The proposed action will not cause a significant loss in habitat resources, or result in any disruptions such that will be likely to reduce the viability of a local population, such that the species is likely to be placed at risk of extinction.	

#### Appendix D. Biodiversity Conservation Act Test of Significance (5-part Test) – Grey-headed Flying Fox.



Biodiversity Conservation Act 2016–Assessment of Significance (5-part Test)			
for Grey-headed Flying-Fox			
(Pteropus poliocephalus)			
	BC Act Status: Vulnerable		
(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 – Grey-headed Flying Fox is not an ecological community.	
	(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 – Grey-headed Flying Fox is not an 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 Subject Land is likely to provide potential marginal habitat, only to be used on an opportunistic bases by this species when feed trees are flowering and fruiting. 0.008ha of landscaped and exotic vegetation that may provide potential foraging habitat is predicted to be removed for the proposed development.	
(c) in relation to the habitat of a threatened species or ecological community:	(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 habitat available on the Subject Land for this species will not become fragmented from other areas as a result of the proposed development. As the species is highly mobile, minor loss of select trees and shrubs from within the Subject Land or minor obstructions is not considered likely to significantly affect the species. Habitat connectivity will continue to occur across the greater landscape.	



Biodiversity Conservation Act 2016– Assessment of Significance (5-part Test)		
for		
Grey-headed Flying-Fox		
	BC Act Status: Vulnerable	
	(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 area to be impacted within the Subject Land is considered to be of low importance to the long-term survival of this species. The proposed development will be situated predominantly in a disturbed and historically altered landscape that would only provide potential marginal habitat, only to be used on an opportunistic bases, for the species in comparison to the extensive potential foraging habitat provided in the broader 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),	The activity is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.	
(e) whether the proposed development or activity is or is part of a key threatening process (KTP) or is likely to increase the impact of a KTP.	<ul> <li>The KTPs relevant to these species within the Subject Land are:</li> <li>Clearing of native vegetation;</li> <li>Predation by the European Red Fox (<i>Vulpes Vulpes</i>) (Linnaeus, 1758);</li> <li>Loss and degradation of native plant and animal habitat by invasion of escaped garden plants;</li> <li>Invasion of native plant communities by African Olive (<i>Olea europaea subsp. cuspidate</i>) (Wall. ex G. Don) Cif;</li> <li>Invasion and establishment of exotic vines and scramblers; and</li> <li>Predation by the Feral Cat (<i>Felis catus</i>).</li> </ul>	
References         NSW Government (2017) NSW Legislation: Biodiversity Conservation act 2016 No 63, Schedule 4: Key Threatening Processes https://www.legislation.nsw.gov.au/acts/2016-63.pdf         NSW Office of Environment and Heritage (2017) Grey-headed Flying-fox – Species Profile https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697		



odendix E. EPBC A	Act Assessment of	t Significant In	nbact Criteria -	- Grev-headed Fiving Fox.

Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Assessment of Significant Impact Criteria for the Grey-headed Flying Fox (Pteropus poliocenhalus)		
EPBC Act Status: Vulnerable Significant impact criteria An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
	necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: key source populations either for breeding or dispersal; populations that are necessary for maintaining genetic diversity, and/or; populations that are near the limit of the species range.	
<ul> <li>lead to a long-term decrease in the size of an important population</li> </ul>	No important population was located within the Subject Land, however the Flying-fox camp located at Avalon is considered as nationally important and is located approximately 3km away from the Subject Land.	
	The proposed activity will involve the removal approximately 0.019ha of landscaped and exotic vegetation within the Subject Land that may provide potential marginal habitat, only to be used on an opportunistic bases by the important population.	
	It is not believed that this removal of potential marginal habitat over 3km away from the population will result in the long-term decrease in its size, when considering the extensive suitable foraging habitat that will remain within the locality.	
• reduce the area of occupancy of an important population	The proposed action will not reduce the area of occupancy of an important population. No existing roosts exist within the Subject Land; however, the Avalon Flying Fox Camp is located approximately 3km from the Subject Land. The vegetation is only deemed likely to provide potential marginal habitat, only to be used on an opportunistic bases, for these species. Extensive suitable habitat will remain within the locality. Therefore, it is deemed unlikely that the	



Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Assessment of Significant Impact Criteria for the Grey-headed Flying Fox (Pteropus poliocephalus)		
EPBC Act Status: Vulnerable		
	proposed activity would result in a reduced area of occupancy for the important population.	
• fragment an existing important population into two or more populations	The Subject Land is located over 3km away from the important population whose camp is located in Avalon. Whilst the proposed activity might result in the removal of potential marginal habitat, it will not result in the fragmentation of the population.	
• adversely affect habitat critical to the survival of a species	The development will not adversely affect habitat critical to the survival of this species. No existing roost camps exist within the Subject Land. As the Subject Land only provides limited and intermittent foraging resources, it is not considered critical habitat for the survival of the species.	
• disrupt the breeding cycle of an important population	The proposed activity will have no impact on the breeding cycle of the important Flying Fox Camp located in Avalon.	
• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that Grey-headed flying foxes are likely to decline. The proposed development will involve the removal approximately 0.008ha of landscaped and exotic vegetation within the Subject Land that may provide marginal habitat, only to be used on an opportunistic bases by the important population. This is not expected to significantly impact the species when considering the maneuverability of the species and the extensive suitable foraging habitat that will remain within the locality.	
• result in invasive species that are harmful to the vulnerable species becoming established in the vulnerable species' habitat	Invasive predators including foxes or cats have some potential to access site currently. Proposed works are considered unlikely to exacerbate predation by exotic predators.	
• introduce disease that may cause the species to decline, or	The proposed development is deemed unlikely to introduce disease that will cause any of these species to decline.	
• interfere with the recovery of the species.	The proposed development will not interfere substantially with the recovery of the Grey-headed Flying Fox. The proposed development will involve the	



# Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Assessment of Significant Impact Criteria for the Grey-headed Flying Fox (Pteropus poliocephalus) EPBC Act Status: Vulnerable removal approximately 0.019ha of landscaped and exotic vegetation within the Subject Land that may provide marginal habitat, only to be used on an opportunistic bases by the important population.

This is not expected to significantly impact the species when considering the extensive suitable foraging habitat that will remain within the locality.

#### References

Commonwealth of Australia (2013) Matters of National Environmental Significance - Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999

Department of Agriculture, Water and the Environment (2001). Grey-headed Flying Fox - Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\_id=855

Department of Environment and Energy (DEE) (2017) Draft Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus https://www.environment.gov.au/system/files/resources/78d5e396-7475-4fc0-8a64-48c86a1cb2b6/files/draft-recovery-plan-grey-headed-flying-fox.pdf

Threatened Species Scientific Committee (2001) Commonwealth Listing Advice on Pteropus poliocephalus (Greyheaded Flying-fox). Available from: http://www.environment.gov.au/biodiversity/threatened/species/p-poliocephalus.html. In effect under the EPBC Act from 06-Dec-2001.







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