FLORA AND FAUNA ASSESSMENT REPORT

2 MACPHERSON STREET
WARRIEWOOD

JULY 2017
REF: 7038

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Conacher Consulting Pty Ltd

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PREFACE

This Flora and Fauna Assessment Report has been prepared by *Conacher Consulting* to identify the flora and fauna characteristics of land for a proposed development within 2 Macpherson Street, Warriewood.

This report provides an assessment of existing habitats and the potential for the proposed activity to significantly impact on threatened species according to the provisions of Section 5(A) of *the Environmental Planning and Assessment (EP&A) Act* 1979 and the *Threatened Species Conservation Act* 1995.

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SECTION 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Conacher Consulting has been engaged to prepare a Flora and Fauna Assessment Report for a proposed development within 2 Macpherson Street, Warriewood.

This Report has been prepared to identify the flora and fauna characteristics of the site and to determine whether or not a Species Impact Statement should be prepared for development according to the provisions of Section 5(A) of the *Environmental Planning & Assessment Act* 1979 (EP&A Act) and the *Threatened Species Conservation Act* 1995 (TSC Act).

A previous Flora and Fauna Assessment was prepared for the subject site by Total Earth Care (TEC) (2016). This report utilises the results of the previous surveys and assessments undertaken for the site by TEC (2016) and provides details of additional surveys and assessments undertaken by Conacher Consulting.

1.2 SITE CHARACTERISTICS

The planning and cadastral details of the subject site are provided in Table 1.1.

TABLE 1.1
SITE DETAILS

Location (Subject site)	Lot 25 Section C DP 5464, 2 Macpherson Street, Warriewood.
Area	Approximately 2.2 hectares
Local Government Area	Northern Beaches
Existing Land Use	Vacant Land (previous nursery)

1.3 PROPOSED DEVELOPMENT

The subject site is located within the Warriewood Valley Urban Release Area. The proposed development is for civil works including vegetation clearing, earthworks and the installation of drainage infrastructure. As part of the proposal suitable riparian buffers will be established and management in accordance with the Vegetation Management Plan prepared by Conacher Consulting (2017).

Detailed plans of the proposed development have been provided as separate documentation to this report.

SECTION 2

FLORA CHARACTERISTICS

2.1 THREATENED FLORA SPECIES

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2017a) was undertaken to identify records of threatened flora species located within 10 km of the site. This allowed for a specific search for threatened flora to be undertaken to determine if any threatened flora species are present within the subject site. Details on threatened flora species as listed in Schedules 1 and 2 of the Threatened Species Conservation Act within 10km of the site are provided in Table 2.1.

TABLE 2.1
ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA

Name	TSC Act	EP&BC Act	Habitat Requirements	Comments
Acacia bynoeana	E	V	Heath and dry sclerophyll open forest on infertile well drained sand and sandy clay soils, often with ironstone gravels. Associated with disturbed areas such as roadsides (NSW NPWS 1999).	No suitable habitat present.
Acacia terminalis subsp. terminalis	E	E	Coastal scrub and dry sclerophyll woodland on sandy soils in near-coastal areas from the northern shores of Sydney Harbour S to Botany Bay.	No suitable habitat present.
Asterolasia elegans	E	E	Sheltered moist sclerophyll forests on Hawkesbury sandstone on mid- to lower slopes and valleys.	No suitable habitat present.
Boronia umbellata	V	V	Wet open gully forest.	No suitable habitat present.
Callistemon linearifolius	V	-	Sclerophyll Forest in moist gullies on coast and adjacent ranges (Fairley and Moore 1995).	No suitable habitat present.
Chamaesyce psammogeton	E	-	Coastal dunes (NSW OEH 2017b).	No suitable habitat present.
Cryptostylis hunteriana	V	V	Moist sandy soil in heath and sedgeland and coastal forest communities of Scribbly Gum, Bloodwood, Brown Stringy Bark and Smooth-barked Apple in moist to dry clay loam (Bell 2001).	No suitable habitat present.
Darwinia biflora	V	V	Open forest and shrubland habitats where shale-capped ridges intergrade with Hawkesbury Sandstone, predominantly within the Kuring-Gai, Hornsby, Baulkham Hills and Ryde LGAs (NSW DEC 2004).	No suitable habitat present.
Epacris purpurascens var. purpurascens	V	-	Moist habitats with strong shale influence (NSW OEH 2017b).	No suitable habitat present.
Eucalyptus camfieldii	V	V	Coastal shrub heath at exposed sandy locations over Hawkesbury Sandstone (NSW OEH 2017b).	No suitable habitat present.

TABLE 2.1 ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**TSC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Eucalyptus nicholii	V	V	Grassy or sclerophyll woodland on shallow relatively infertile soils on shales and slates on the New England Tableland.	No suitable habitat present.
Eucalyptus scoparia	E	V	Well drained granitic hilltops as scattered individuals in open forest and woodland from QLD to the New England Tableland (NSW OEH 2017b).	No suitable habitat present.
Genoplesium baueri	E	E	Sparse sclerophyll forest and moss gardens over sandstone. Flowers from December to March (NSW Scientific Committee 2012).	No suitable habitat present.
Grammitis stenophylla	E	-	Moist places, usually near streams, on rocks or in trees, in rainforest and moist eucalypt forest.	No suitable habitat present.
Grevillea caleyi	CE	E	Open forest to woodland habitats on clayey soil of lateritic sandstone ridgetops.	No suitable habitat present.
Haloragodendron lucasii	E	E	Sheltered gullies often at the base of rock faces with fern understorey (Fairley and Moore 1989).	No suitable habitat present.
Hibbertia puberula	E	-	Open woodland and low heath on sandy soil or rarely clay. Occurs near Sydney and Morton National Park (Toelken & Miller 2012).	No suitable habitat present.
Hibbertia superans	E	-	Sandstone ridgetops often near the shale / sandstone boundary in both open woodland and heathland, particularly open disturbed areas (NSW OEH 2017b).	No suitable habitat present.
Kunzea rupestris	V	V	Shallow depressions on large flat sandstone rock outcrops in short to tall shrubland or heathland habitats.	No suitable habitat present.
Lasiopetalum joyceae	V	V	Heath on lateritic to shale ridgetops on the Hornsby Plateau south of the Hawkesbury River.	No suitable habitat present.
Melaleuca deanei	V	V	Flat broad ridgetops and saddles in Coastal Sandstone Ridgetop Woodland vegetation (NSW DECCW 2010).	No suitable habitat present.
Microtis angusii	E	E	Known from a single population at Ingleside on modified lateritic ridgetop soils in highly disturbed habitat (NSW OEH 2017b).	No suitable habitat present.
Persoonia hirsuta	E	E	Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone (NSW OEH 2017b).	No suitable habitat present.
Persoonia laxa	PE	Ext	Heath or dry sclerophyll eucalypt woodland, or forest on sandstone, or in coastal sand from Newport and Manly.	No suitable habitat present.
Persoonia mollis subsp. maxima	E	E	Open forest and creek side scrub on sheltered hillsides, moist gullies and flood prone areas along creeks on sandy soils.	No suitable habitat present.

TABLE 2.1 ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**TSC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Pimelea curviflora var. curviflora	V	V	Shale/lateritic soils over sandstone and Shale/Sandstone transition soils on ridgetops and upper slopes amongst woodlands.	No suitable habitat present.
Prostanthera densa	V	V	Open forests and shrubland on coastal headlands and near coastal ranges chiefly on sandstone.	No suitable habitat present.
Prostanthera junonis	E	E	Sclerophyll forest and heath in shallow soil on sandstone on the Somersby Plateau (NSW OEH 2017b).	No suitable habitat present.
Prostanthera marifolia	CE	CE	Sclerophyll forest and woodland, usually near the coast, on deeply weathered clay-loam soils associated with ironstone and scattered shale lenses. Only known from the Sydney suburb of Seaforth.	No suitable habitat present.
Senecio spathulatus	E	-	Frontal coastal dune habitats (NSW OEH 2017b).	No suitable habitat present.
Syzygium paniculatum	E	V	Subtropical and littoral rainforest on sandy soil (Fairley and Moore 1995).	No suitable habitat present.
Tetratheca glandulosa	V	-	Strongly associated with areas of shale-sandstone transition habitat (NSW OEH 2017b).	No suitable habitat present.
Ext = Extinct P. Ext = Presumed Extinct CE = Critically Endangered E = Endangered V = Vulnerable Species				

No threatened flora species were observed within the subject site during surveys.

The habitats present are in highly disturbed condition and it is considered that they are not likely to be suitable for locally occurring threatened flora species.

2.2 THREATENED FLORA POPULATIONS & ECOLOGICAL COMMUNITIES

2.2.1 Threatened Flora Populations

There are no threatened flora populations currently listed as occurring in the local government area.

2.2.2 Threatened Ecological Communities

Details regarding the habitat attributes and indicative species for the threatened ecological communities known to be present in the local government area are provided in Table 2.2.

TABLE 2.2 THREATENED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**TSC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	VEC	**Geology / Soils:** Estuarine mud flats. **Topography:** Intertidal zone on the shores of estuaries and lagoons. **Characteristic Species:** *Sarcocornia quinqueflora, Sporobolus virginicus, Juncus krausii and Baumea juncea*.	No suitable habitat present.

TABLE 2.2 THREATENED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**TSC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Coastal Upland Swamp in the Sydney Basin Bioregion	EEC	EEC	**Geology / Soils:** Periodically waterlogged acidic soils on Hawkesbury Sandstone. **Topography:** Impermeable sandstone plateaus in the headwater valleys of streams and on sandstone benches with abundant moisture seepage. **Characteristic Species:** Highly diverse and variable, includes scrubs, heaths, sedgelands and fernlands.	No suitable habitat present.
Duffys Forest Ecological Community in the Sydney Basin Bioregion	EEC	-	**Geology / Soils:** Hawkesbury sandstone geology, in association with laterite soils and soils derived from shale and laminite lenses. **Topography**: Ridge tops, plateaus, upper slopes and occasionally mid slopes. **Characteristic Species**: *Eucalyptus sieberi, E. capitellata, E. haemastoma, Angophora costata* and *Corymbia gummifera.*	No suitable habitat present.
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Silts, muds or humic loams. **Topography:** Depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains. **Characteristic Species:** Composition is variable and dependent on water regime. May include amphibious grasses and sedges, emergent floating herbs and emergent tall sedges and floating and submerged aquatic herbs.	No suitable habitat present.
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	CEEC	**Geology / Soils:** Sand dunes and on soils derived from underlying rocks **Topography:** Located near the seaoin coastal dunes, headland or riparian habitats. **Characteristic Species:** Comprises the *Cupaniopsis anacardioides - Acmena* spp. alliance of Floyd (1990).	No suitable habitat present.
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Silts, clay-loams and sandy loams. **Topography:** Periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. **Characteristic Species:** Eucalypt canopy with species belonging to the genus Angophora or the sections Exsertaria or Transversaria of the genus Eucalyptus. Has low abundance of *E. robusta*, Casuarina and Melaleuca species and a groundcover of soft-leaved forbs and grasses.	No suitable habitat present.

TABLE 2.2 THREATENED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**TSC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Waterlogged or periodically inundated grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline. **Topography:** Flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. **Characteristic Species:** *Casuarina glauca.*	Suitable habitat present, observed during surveys.
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Waterlogged or periodically inundated humic clay loams and sandy loams. **Topography:** Alluvial flats and drainage lines associated with coastal floodplains. **Characteristic Species:** *Eucalyptus robusta, E. longifolia, E. botryoides, Melaleuca quinquenervia* and *M. ericifolia.*	No suitable habitat present.
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	EEC	-	**Geology / Soils:** Generally on the Warriewood and Tuggerah Soil Landscapes. **Topography:** Freshwater swamps in swales and depressions on sand dunes and low nutrient sandplain sites in coastal areas. **Characteristic Species:** *Eleocharis sphacelata, Baumea juncea, B. rubiginosa, B. articulata, Gahnia sieberiana, Ludwigia peploides* and *Persicaria* sp.	No suitable habitat present.
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	**Geology / Soils:** Found on a range of substrates including old sand dunes above cliffs and on basalt headlands, and less frequently on sandstone. **Topography:** Seacliffs and coastal headlands. **Characteristic Species:** *Themeda australis.*	No suitable habitat present.
Key to *TSC Act* and *EP&BC Act* Status CEEC = Critically Endangered Ecological Community EEC = Endangered Ecological Community VEC = Vulnerable Ecological Community				

A highly disturbed variant of the Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (SOFF) endangered ecological community (EEC) was observed within the subject site during surveys.

The SOFF EEC is mapped in Figure 2.1 and assessed under the 7 part test of significance as detailed in Section 4 and Appendix 1 of this report.

2.3 VEGETATION SURVEY METHODOLOGY

To determine the likely and actual occurrence of flora species and plant communities on the subject site, field survey work was undertaken to supplement literature reviews and previous flora surveys of the area. The methods utilised for the flora survey are outlined as follows.

Literature Review

- A review of available literature for the area was undertaken to obtain reference material and background information for this study. These documents are listed in the References section of this Report.

- A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2017) was undertaken to identify records of threatened flora species located within 10 km of the site. This enabled the preparation of a predictive list of threatened flora species that could possibly occur within the habitats found on the site.

Aerial Photograph Interpretation

- Aerial photographs were utilised to identify the extent of vegetation with respect to the site and surrounding areas.

Field Surveys

Previous Flora Surveys

- A previous flora inventory survey of the subject site was undertaken by TEC (2016) on 29 October 2014. The site was surveys by the completion of random meander searches.

Current Flora Surveys

- A field survey which consisted foot traverses within vegetated areas was conducted according to Cropper (1993) to identify the occurrence of flora species and the extent and location of vegetation communities present across the subject site.

- Flora surveys were undertaken generally in accordance with the requirements and methodologies of DEC (2004).

- Current flora surveys were undertaken on 8 June 2017 and consisted of a 1.5 hour meander search across the site with identification and recording of flora species encountered.

- Due to the highly disturbed condition of the site and linear nature of the vegetation present, formal plot and transect surveys were deemed not suitable as part of the site flora survey program.

- Specimens of plants not readily identified in the field were collected for identification.

- Specimens of plants tentatively identified as threatened species are sent to the Sydney Royal Botanic Gardens for confirmation of the identification.

- All vascular plants were identified using keys and nomenclature in Harden (1994), Harden and Murray (2000) and Harden (2002). Wherever they were known, changes to nomenclature and classification have been incorporated into the results.

Vegetation Community Nomenclature

- Native vegetation communities were classified and described according to the dominant floristics and the structural formation of the dominant vegetative growth form according to the definitions provided by Walker and Hopkins (1990).

- Corresponding units of available vegetation mapping have been identified where available.

- Corresponding Endangered Ecological Communities listed on both the *TSC Act* (1995) and *EP&BC Act* (1999) are also provided if relevant.

Searches for Cryptic Flora Species
The subject site is highly disturbed and it is considered that no suitable habitat is present for seasonally flowering cryptic threatened fauna species. It is considered that additional searches for cryptic threatened flora species are not necessary.

2.4 FLORA SPECIES AND VEGETATION COMMUNITIES DESCRIPTIONS

The following vegetation communities were observed within the subject site during surveys:

- Disturbed Regrowth Swamp Oak Forest (SOFF EEC);
- Cleared Land and Exotic Vegetation.

Vegetation community descriptions are provided below and a detailed list of flora species observed within the subject site is provided in Table 2.3. The locations of vegetation communities are shown in Figure 2.1.

No threatened flora species were observed within the subject site during surveys.

DISTURBED SWAMP OAK FOREST (SOFF EEC)

Structure:

Upper Stratum:	To 3-20 metres high, with 30-70% Projected Foliage Cover (PFC).
Mid Stratum:	To 6 metres high, with 30% PFC.
Lower Stratum:	To 1 metre high, with 50% PFC.

Floristics:
(Characteristic Species)

Upper Stratum:	*Casuarina glauca, Eucalyptus robusta* and *Melaleuca quinquenervia.*
Mid Stratum:	*Casuarina glauca* (regrowth), *Lantana camara, Monstera deliciosa, Erythrina crista-galli, Senna pendula var. glabrata,* and *Cestrum parqui.*
Lower Stratum:	*Arundo donax, Ageratina adenophora, Ageratum houstonianum, Conyza sumatrensis, Ipomoea indica.*
Exotics:	*Lantana camara, Monstera deliciosa, Arundo donax, Ageratum houstonianum, Ageratina adenophora, Senna pendula var. glabrata, Ipomoea indica, Erythrina crista-galli* and *Ludwigia peruviana.*

Variation:
The distribution of understorey species is highly variable throughout areas containing Disturbed Swamp Oak Forest.

Disturbance:
The site consists of an abandoned plant nursery and the majority of flora species observed are exotic. Disturbed Swamp Oak Forest vegetation present consists of remnant canopy trees over an understorey of exotic flora species and patches of regrowth Swamp Oaks within the abandoned previously cleared nursery areas of the site. Areas within the central sections of the site occur on land previously cleared and utilised as a plant nursery.

Weed Invasion:
Weed invasion is moderate to high in the understorey stratums.

Location and Distribution:
Disturbed Swamp Oak Forest occurs around the perimeter of the site and as regrowth patches within the central sections of the site. This vegetation type occupies approximately 0.4 hectares of the subject site.

Classification:
The Swamp Sclerophyll Forest on Coastal Floodplain EEC was previously mapped more broadly across the site by TEC (2016), however further investigations have identified that the native vegetation present occurs over a more restricted area and is dominated by *Casuarina glauca* (Swamp Oak) with only low levels of sclerophyll species such as *Eucalyptus robusta* (Swamp Mahogany).

It is considered that the vegetation present corresponds to a highly disturbed / regrowth variant of the Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC. This vegetation community is mapped by NSW OEH (2013) as Coastal Freshwater Swamp Forest.

Photo 1. Disturbed Swamp Oak Forest (regrowth)

CLEARED LAND AND EXOTIC VEGETATION

Structure:

Upper Stratum:	To 20 metres high, with 40% Projected Foliage Cover (PFC).
Mid Stratum:	To 2 metres high, with 0-40% PFC.
Lower Stratum:	To 1 metre high, with 0-90% PFC.

Floristics:
(Characteristic Species)

Upper Stratum:	*Ficus benjamina, Ficus elastica, Erythrina crista-galli, Salix babylonica, Jacaranda mimosifolia, Howea forsteriana, Musa acuminata* and *Erythrina x sykesii.*
Mid Stratum:	*Lantana camara, Monstera deliciosa, Erythrina crista-galli, Senna pendula var. glabrata,* and *Cestrum parqui.*
Lower Stratum:	*Arundo donax, Ageratina adenophora, Ageratum houstonianum, Conyza sumatrensis, Ipomoea indica.*

Exotics: *Ficus benjamina, Erythrina crista-galli, Erythrina x sykesii* **,** *Lantana camara, Monstera deliciosa, Arundo donax, Ageratum houstonianum, Ageratina adenophora, Senna pendula var. glabrata, Ipomoea indica, Erythrina crista-galli* and *Ludwigia peruviana.*

Variation:
The distribution of exotic canopy and shrub species is highly variable throughout the site.

Disturbance:
Areas mapped as Cleared Land and Exotic Vegetation occur in historically and currently cleared areas and consist of mostly exotic and non-endemic planted species.

Weed Invasion:
Exotic flora species are dominant throughout Cleared Land and Exotic Vegetation areas.

Location and Distribution:
Cleared Land and Exotic Vegetation occurs throughout the majority of the site and occupies approximately 1.8 hectares.

Classification:
Cleared Land and Exotic Vegetation areas are not characteristic of any naturally occurring vegetation types and do not correspond to any threatened ecological communities listed within the *TSC Act* (1995) or the *EPBC Act* (1999).

Photo 2. Exotic Vegetation.

Photo 3. Cleared Land in foreground with regrowth Disturbed Swamp Oak Forest in background.

TABLE 2.3
FLORA SPECIES OBSERVED

Family	Scientific Name	Common Name
Trees		
Arecaceae	*Archontophoenix cunninghamiana*	Bangalow Palm
	*Howea forsteriana**	Kentia Palm
	Livistona australis	Cabbage Palm
Bignoniaceae	*Jacaranda mimosifolia**	Jacaranda
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Fabaceae (Faboideae)	*Erythrina crista-galli**	Cockspur Coral Tree
	*Erythrina x sykesii**	Coral Tree
Moraceae	*Ficus benjamina**	Weeping Fig
	*Ficus elastica**	Rubber Fig
	Ficus rubiginosa	Port Jackson Fig
	*Morus alba**	White Mulberry
Musaceae	*Musa acuminata**	Edible banana
Myrtaceae	*Eucalyptus microcorys*	Tallowwood
	Eucalyptus robusta	Swamp Mahogany
	Syzygium sp. cultivar	Lilly Pilly
Platanaceae	*Platanus hispanica* cv. 'Acerifolia'*	London Plane Tree
Salicaceae	*Salix babylonica**	Weeping Willow
Ulmaceae	*Ulmus parvifolia**	Chinese Elm
Shrubs		
Apocynaceae	*Plumeria alba**	White Frangipani
Araliaceae	*Schefflera actinophylla**	Umbrella Tree
	*Schefflera arboricola**	
Arecaceae	*Phoenix canariensis**	Canary Island Date Palm
Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart

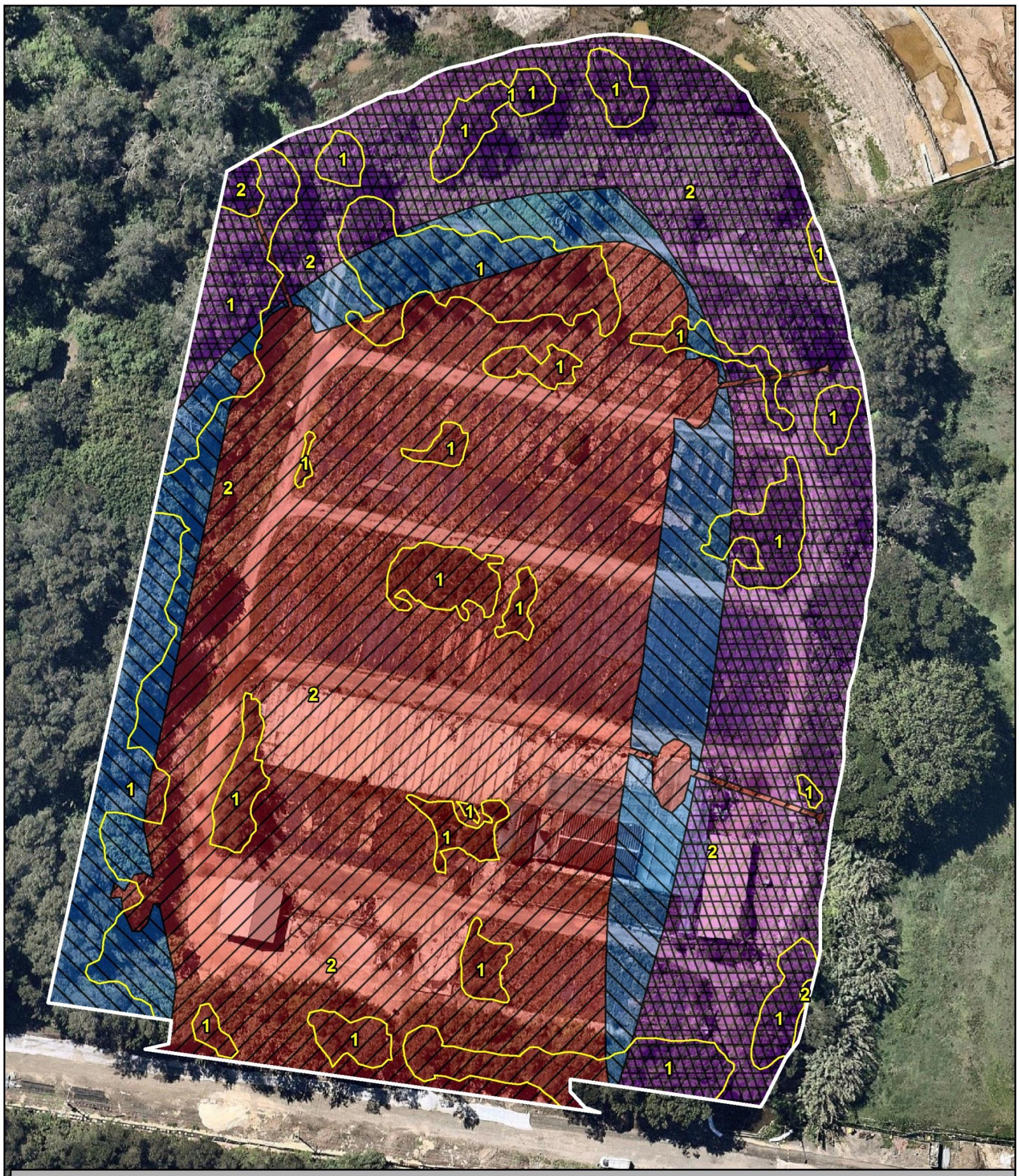
TABLE 2.3 FLORA SPECIES OBSERVED		
Family	**Scientific Name**	**Common Name**
	*Ricinus communis**	Castor Oil Plant
Fabaceae (Caesalpinioideae)	*Senna pendula var. glabrata**	
Myrtaceae	*Melaleuca decora*	
	Melaleuca quinquenervia	Broad-leaved Paperbark
Oleaceae	*Ligustrum lucidum**	Large-leaved Privet
	*Ligustrum sinense**	Small-leaved Privet
Onagraceae	*Ludwigia peruviana**	
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Poaceae	*Arundo donax**	Giant Reed
Proteaceae	*Banksia ericifolia*	Heath-leaved Banksia (planted)
Verbenaceae	*Lantana camara**	Lantana
Zingiberaceae	*Hedychium coronarium**	
Groundcovers		
Agavaceae	*Agave vivipara**	
	*Furcraea foetida**	Mauritius Hemp
Amaryllidaceae	*Clivia miniata**	
Apiaceae	*Hydrocotyle sibthorpioides*	A Pennywort
Araceae	*Alocasia brisbanensis*	
	*Monstera deliciosa**	Fruit Salad Plant
	Xanthosoma violaceum	Chinese Taro
	*Zantedeschia aethiopica**	Arum Lily
Asparagaceae	*Dracaena marginata**	
	*Sansevieria trifasciata**	Mother-in-law's Tongue
Asteraceae	*Ageratina adenophora**	Crofton Weed
	*Ageratum houstonianum**	
	*Bidens pilosa**	Cobbler's Pegs
	*Cirsium vulgare**	Spear Thistle
	*Conyza bonariensis**	Flaxleaf Fleabane
	*Conyza sumatrensis**	Tall fleabane
	*Sonchus oleraceus**	Common Sowthistle
Caryophyllaceae	*Cerastium glomeratum**	Mouse-ear Chickweed
	*Herniaria glabra**	
	*Stellaria media**	Common Chickweed
Commelinaceae	*Tradescantia fluminensis**	Trad
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
	Cyperus sanguinolentus	
	Fimbristylis dichotoma	Common Fringe-sedge
Fabaceae (Faboideae)	*Trifolium repens**	White Clover
	*Vicia sativa subsp. nigra**	Narrow-leaved Vetch
Haloragaceae	*Myriophyllum aquaticum**	Parrots Feather
Iridaceae	*Crocosmia x crocosmiiflora**	Montbretia
Liliaceae	*Lilium formosanum**	Formosan Lily
	*Liriope muscari**	big blue lilyturf
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Malvaceae	*Malva linnaei**	Cretan Hollyhock
	*Modiola caroliniana**	Red-flowered Mallow
Phyllanthaceae	*Phyllanthus tenellus**	Hen and Chicken
	*Phytolacca octandra**	Inkweed
Poaceae	*Andropogon virginicus**	Whisky Grass
	*Cortaderia selloana**	Pampas Grass

TABLE 2.3 FLORA SPECIES OBSERVED		
Family	**Scientific Name**	**Common Name**
	*Ehrharta erecta**	Panic Veldt-grass
	*Eleusine tristachya**	Goose Grass
	*Paspalum dilatatum**	Paspalum
	*Poa annua**	Winter Grass
Polygonaceae	*Persicaria strigosa*	
Solanaceae	*Cestrum parqui**	Green Cestrum
	*Solanum nigrum**	Black-berry Nightshade
Thelypteridaceae	*Christella dentata*	Binung
Verbenaceae	*Verbena bonariensis**	Purpletop
Violaceae	*Viola hederacea*	
Climbers		
Apocynaceae	*Trachelospermum jasminoides**	Star Jasmine Vine
Asparagaceae	*Asparagus aethiopicus**	Asparagus Fern
	*Asparagus asparagoides**	Bridal Creeper
Basellaceae	*Anredera cordifolia**	Madeira Vine
Convolvulaceae	*Ipomoea indica**	Morning Glory
Moraceae	*Ficus pumila**	Creeping Fig
Species name ^{TS} = Threatened Species * = Introduced Species		

2.5 LOCATION AND DISTRIBUTION OF ADJOINING AND CONTIGUOUS HABITATS

An inspection of the available aerial imagery for the local area, review of available vegetation mapping (NSW OEH 2013) and field surveys were undertaken to determine the extent and composition of vegetation within the subject site and immediately surrounding vicinity.

The subject site is surrounded by existing development to the north and cleared land to the east and south. The Disturbed Swamp Oak Forest vegetation within the subject site is interspersed with exotic trees and is contiguous with the vegetation present on the adjoining allotment to the west of the site, however no habitat connectivity is present through the subject site.


Legend
Subject Allotment Boundary
Vegetation Removal Area (Construction Works Footprint)
Vegetation Modification Area (Future APZ and Outer 25m Riparian Corridor)
Vegetation Retention and Replanting Area (Inner 25m Riparian Corridor)
1 Disturbed Swamp Oak Forest (SOFF EEC)
2 Cleared Land and Exotic Vegetation
N 0 10 20 30 40 50 m
Figure produced in A3 colour
conacher consulting
Drawn By: AM
Drawing Version: 1
Drawing No: 7038
Date: 22/06/17
* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial ©Nearmap (2017) Air Photo Date: 23/02/2017
Figure 2.1
Flora and Fauna Characteristics
Macpherson Street Warriewood

SECTION 3

FAUNA AND FAUNA HABITATS

3.1 THREATENED FAUNA SPECIES

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2017a) was conducted for threatened fauna species recorded within 10km of the subject site. This revealed a number of threatened species that have been recorded in the area. Details on threatened fauna species as listed in Schedule 1 and 2 of the TSC Act (1995) with a known or possible occurrence within the local area are provided in Table 3.1. Species which exclusively inhabit marine, estuarine and beach environments have been omitted due to a lack of suitable habitat within the study area.

TABLE 3.1
THREATENED FAUNA SPECIES OF THE AREA

Common Name Scientific Name	TSC Act	EP&BC Act	Preferred Habitat	Comments
Green and Golden Bell Frog *Litoria aurea*	E	V	Breeds in shallow (<1m) ponds or slowly moving waterways particularly areas which undergo disturbance regimes such as fluctuating water flow or inflow of saline water with both areas of open water and dense low vegetation (NSW NPWS 1999).	No suitable habitat present.
Giant Burrowing Frog *Heleioporus australiacus*	V	V	Small slowly flowing water courses, soaks and swamps which traverse plateaus and broad upland gullies (NSW NPWS 2001).	No suitable habitat present.
Red-crowned Toadlet *Pseudophryne australis*	V	-	Grass, debris and rock outcrops near ephemeral watercourses on sandstone (NSW OEH 2017).	No suitable habitat present.
Rosenberg's Goanna *Varanus rosenbergi*	V	-	Woodlands, dry open forests and heathland habitats on Hawkesbury sandstone. Shelters in burrows, hollow logs, rock crevices and outcrops (Cogger 2000).	No suitable habitat present.
Superb Fruit-Dove *Ptilinopus superbus*	V	-	Rainforests, adjacent mangroves, wet sclerophyll eucalypt forests, scrublands with native fruits (Higgins and Davies 1996).	No suitable habitat present.
Wompoo Fruit-Dove *Ptilinopus magnificus*	V	-	Large undisturbed patches of rainforest, adjacent moist eucalypt forests and isolated remnant trees feeding on fruit (Higgins and Davies 1996).	No suitable habitat present.
Australian Painted Snipe *Rostratula australis*	E	E	Murray-Darling basin and inland Australia within areas containing marshes and freshwater wetlands with swampy vegetation.	No suitable habitat present.
Bush Stone-curlew *Burhinus grallarius*	E	-	Open forests, savannah woodlands, dune scrub, savannah and mangrove fringes (Marchant and Higgins 1993).	No suitable habitat present.
Australasian Bittern *Botaurus poiciloptilus*	E	E	Shallow freshwater or brackish wetlands with tall dense vegetation.	No suitable habitat present.
Black Bittern *Ixobrychus flavicollis*	V	-	Permanent freshwater wetlands with tall, dense vegetation (Lindsey 1992).	No suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Comments**
Square-tailed Kite *Lophoictinia isura*	V	-	Coastal and sub-coastal open forest, woodland or lightly timbered habitats and inland habitats along watercourses and Mallee that are rich in passerine birds.	Suitable habitat present.
Little Eagle *Hieraaetus morphnoides*	V	-	Various habitats including woodland, open forest, partially cleared areas, along watercourses and around wetlands (Marchant and Higgins 1993).	Suitable habitat present.
Eastern Osprey *Pandion cristatus*	V	-	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding.	No suitable habitat present.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	V	-	Coastal areas and inland rivers and wetlands. Nests in large emergent eucalypts (Marchant and Higgins 1993).	Suitable habitat present.
Little Lorikeet *Glossopsitta pusilla*	V	-	Forests and woodlands feeding mostly on nectar and pollen particularly in profusely-flowering eucalypts (Courtney and Debus 2006).	Suitable habitat present.
Glossy Black-Cockatoo *Calyptorhynchus lathami*	V	-	Open forests with *Allocasuarina* species and hollows for nesting (Higgins 1999).	Suitable habitat present.
Gang-gang Cockatoo *Callocephalon fimbriatum*	V	-	Open forests, woodlands, and urban areas (Higgins 1999).	Suitable habitat present.
Powerful Owl *Ninox strenua*	V	-	Mature forests containing large hollows for breeding & densely vegetated gullies for roosting (Higgins 1999).	Suitable foraging habitat present.
Masked Owl Tyto novaehollandiae	V	-	Open forest & woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting (Higgins 1999).	Suitable foraging habitat present.
Sooty Owl *Tyto tenebricosa*	V	-	Tall, dense, wet forests containing trees with very large hollows for roosting and breeding (Higgins 1999).	No suitable habitat present.
Barking Owl *Ninox connivens*	V	-	Woodlands, open forests and partially cleared land where prey is available. Nests in tree hollows (Higgins 1999).	Suitable foraging habitat present.
Turquoise Parrot *Neophema pulchella*	V	-	Coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands (Higgins 1999).	No suitable habitat present.
Swift Parrot *Lathamus discolor*	E	CE	NSW eucalypt forests and woodlands with winter flowering eucalypts between March and October (Saunders and Tzaros 2011).	Suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Comments**
Scarlet Robin *Petroica boodang*	V	-	Dry eucalypt forest and woodlands during breeding season, dispersing during autumn–winter into open habitats including urban areas (Higgins and Peter 2002).	Suitable habitat present.
Regent Honeyeater *Anthochaera phrygia*	CE	CE	Box-Ironbark dry open forest and woodland and riparian River Sheoak forests. Also Coastal Swamp Forest and Spotted Gum Forest during winter. May occasionally forage within planted or remnant eucalypts (Higgins e*t al.*, 2001).	Suitable habitat present.
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	V	-	Inhabits a variety of habitats including forest, woodland, shrubland, heath and disturbed environments. Widespread species which inhabits inland and coastal areas (NSW OEH 2017).	Suitable habitat present.
Varied Sittella *Daphoenositta chrysoptera*	V	-	Open eucalypt woodlands forests and scrubs. May also forage within planted rough-barked trees (Higgins and Peter 2002).	Suitable habitat present.
Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis*	V	-	Found in woodlands containing box-ironbark associations and River Red Gums, also drier coastal woodlands of the Cumberland Plain and Hunter Richmond and Clarence (Higgins *et al*., 2001).	No suitable habitat present.
Eastern Pygmy-possum *Cercartetus nanus*	V	-	Occurs in sandstone heath and adjoining rainforest habitats. (Turner and Ward 1995).	No suitable habitat present.
Spotted-tailed Quoll *Dasyurus maculatus*	V	E	Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Shelters in hollow-bearing trees, fallen logs, small caves and rock crevices (NSW NPWS 1999).	No suitable habitat present.
New Holland Mouse Pseudomys novaehollandiae	-	V	Within NSW occurs in a variety of structural vegetation types including heathland and woodland, dry sclerophyll forest with a dense shrub layer and on vegetated sand dunes (Wilson and Laidlaw 2003).	No suitable habitat present.
Southern Brown Bandicoot (eastern) *Isoodon obesulus obesulus*	E	E	Open forest, woodland, heath, cleared land, urbanised areas and regenerating bushland with thick ground cover for shelter south of the Hawkesbury River (NSW OEH 2017b).	No suitable habitat present.
Squirrel Glider *Petaurus norfolcensis*	V	-	Box-Ironbark and River Red Gum forest west of the Great Dividing Range and coastal forest with heath understorey. Shelters in tree hollows (Suckling 1995).	No suitable habitat present.
Koala *Phascolarctos cinereus*	V	V	Wet & dry eucalypt forest on high nutrient soils containing preferred feed trees (Reed *at al*., 1991).	No suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Comments**
Greater Glider *Petauroides volans*	-	V	Inhabits eucalypt forests and shelters in large hollow sections of eucalypt trees.	No suitable habitat present.
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Roosts in trees in gullies, riparian habitats and urban areas (Tidemann 1995).	Suitable habitat present. Observed within subject site by TEC (2016).
Eastern Freetail-bat *Mormopterus norfolkensis*	V	-	Eucalypt forest and woodland on the coastal side of the Great Dividing Range. Roosts in tree hollows, under bark and in various man-made structures (Churchill 2008).	Suitable habitat present.
Large-eared Pied Bat *Chalinolobus dwyeri*	V	V	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies (Churchill 2008).	Suitable habitat present.
Little Bentwing-bat *Miniopterus australis*	V	-	Coastal forests, vine thickets and adjoining cleared areas. Roosts in caves, tree hollows and man-made structures (Churchill 2008).	Suitable habitat present. Observed within subject site by TEC (2016).
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	V	-	Coastal forests, vine thickets and adjoining cleared areas. Roosts in caves and man-made structures (Churchill 2008).	habitat present. Observed within subject site by TEC (2016).
Southern Myotis *Myotis macropus*	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water (Churchill 2008).	Suitable habitat present.
Greater Broad-nosed Bat *Scoteanax rueppellii*	V	-	Moist gullies in mature coastal forest, rainforest, open woodland, sclerophyll forest and cleared areas with remnant trees. Roosts in tree hollows, under bark and in man-made structures (Churchill 2008).	Suitable habitat present.
CE = Critically Endangered Species Ext. = Presumed Extinct Species V = Vulnerable Species E = Endangered Species				

The following threatened fauna species were observed within the subject site during surveys:

- Grey-headed Flying-fox (*Pteropus poliocephalus)*;
- Little Bentwing-bat (*Miniopterus australis)*; and
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis).*

These species were observed during previous surveys undertaken by TEC (2016).

The threatened fauna species which are considered to have suitable habitat within the subject have been assessed under the 7 part test of significance as detailed in Section 4 and Appendix 1 of this report.

3.2 ENDANGERED FAUNA POPULATIONS

The following endangered fauna populations occur within the local government area:

- Koala Population, Pittwater Local Government Area; and
- Squirrel Glider Population, Barrenjoey Peninsula.

These species were not observed on the subject site. It is therefore considered that no endangered flora population is present on the subject site.

3.3 FAUNA HABITATS

The site contains Disturbed Regrowth Swamp Oak Forest and Cleared Land and Exotic Vegetation. Disturbed fauna habitats are present throughout the site, these include:

- Flower, nectar and seed producing trees and shrubs (endemic and planted specimens);
- Exotic vegetation;
- Abandoned sheds and buildings;
- Cleared areas; and
- Disturbed watercourse habitats.

Amphibians
The watercourse habitats provide potential foraging and breeding habitats for amphibian species, however the upstream catchment areas are urbanised and highly disturbed.

Reptiles
The site contains disturbed arboreal and terrestrial foraging and shelter habitats for reptile species, no areas of rock outcropping are present.

Birds
The flower, nectar, fruit and seed producing native regrowth and exotic tree and shrub species present provide a seasonal foraging resource for bird species. The ground layer vegetation and areas of leaf litter also provide disturbed and modified areas of foraging habitat for locally occurring bird species.

Mammals
The flower, nectar, fruit and seed producing tree and shrub species provide a seasonal foraging resource for arboreal mammals and bat species. Disturbed understorey habitats are present and provide open foraging areas.

3.4 FAUNA SURVEY METHODOLOGY

In order to detect the possible occurrence of threatened fauna species specific methods targeting these species were employed.

Literature Review

- Review of local resource documents;

- A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2017a) was undertaken to identify records of threatened fauna species located within 10 km of the site. This enabled the preparation of a predictive list of threatened fauna species that could possibly occur within the habitats found on the site.

Previous Fauna Surveys
Previous fauna surveys of the site were completed by TEC (2016). Surveys over one day and two nights were completed on 29Th and 30th October 2014.

The previous diurnal survey undertaken involved observations and call detection of animal activity, habitat identification and searches for indirect evidence of fauna. Previous nocturnal surveys undertaken by TEC (2016) involved spotlighting, call playback for amphibians and mammals and ultrasonic bat call recording.

Current Fauna Surveys

The surveys undertaken were generally in accordance with the methodologies outlined by DEC (2004). The subject site is predominantly cleared with small areas of highly disturbed remnant and regrowth native vegetation and no hollow bearing trees. Due to the highly disturbed condition of the site, surveys were limited to 1.5 hrs of diurnal survey on 8 June 2017.

The following methods were utilised:

- Targeted diurnal reptile and amphibian searches;
- Diurnal bird surveys;
- Diurnal mammal surveys;
- Koala habitat assessment;
- Habitat searches and assessment
- Opportunistic observations during the completion of method specific fauna surveys; and
- Hollow bearing tree survey.

3.5 FAUNA OBSERVED

The fauna species observed within the subject site are listed in Table 3.2. The threatened fauna species, Grey-headed Flying-fox, Little Bentwing-bat and Eastern Bentwing-bat were observed within the subject site during surveys undertaken by TEC (2016). All fauna species observed are considered relatively common within the local area.

TABLE 3.2
FAUNA SPECIES OBSERVED

Common Name	Scientific Name	Observed During TEC (2016) Surveys	Observed During Current Surveys
Amphibians			
Common Eastern Froglet	*Crinia signifera*	W	W
Eastern Dwarf Tree Frog	*Litoria fallax*	W	
Peron's Tree Frog	*Litoria peronii*	W	
Reptiles			
Dark-flecked Garden Sunskink	*Lampropholis delicata*		O
Birds			
Crested Pigeon	*Ocyphaps lophotes*		O
Masked Lapwing	*Vanellus miles*	W	W
Rainbow Lorikeet	*Trichoglossus haematodus*	O	OW
Sulphur-crested Cockatoo	*Cacatua galerita*	W	OW
Laughing Kookaburra	*Dacelo novaeguineae*	O	W
Eastern Whipbird	*Psophodes olivaceus*	O	W
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*		OW
Superb Fairy-wren	*Malurus cyaneus*		OW

Lewin's Honeyeater	*Meliphaga lewinii*		OW
Yellow-faced Honeyeater	*Lichenostomus chrysops*		W
Noisy Miner	*Manorina melanocephala*	O	OW
Red Wattlebird	*Anthochaera carunculata*	W	
Red-browed Finch	*Neochmia temporalis*		OW
Grey Shrike-thrush	*Colluricincla harmonica*		OW
Pied Currawong	*Strepera graculina*	O	
Australian Magpie	*Cracticus tibicen*	W	OW
Little Wattlebird	*Anthochaera chrysoptera*		OW
Common Myna*	*Sturnus tristis*		O
House Sparrow*	*Passer domesticus*		OW
Red-whiskered Bulbul*	*Pycnonotus jocosus*		OW
Common Starling*	*Sturnus vulgaris*		OW
Mammals			
Common Brushtail Possum	*Trichosurus vulpecula*	O	
Black Rat *	*Rattus rattus*	O	
Rabbit *	*Oryctolagus cuniculus*		P
Dog *	*Canis lupus familiaris*		O
Large Forest Bat	*Vespadelus darlingtoni*	U	
Grey-headed Flying-fox TS	*Pteropus poliocephalus*	O	
White-striped Freetail-bat	*Tadarida australis*	U	
Little Bentwing-bat TS	*Miniopterus australis*	U	
Gould's Wattled Bat	*Chalinolobus gouldii*	U	
Eastern Bentwing-bat TS	*Miniopterus schreibersii oceanensis*	U	

Key to Observation Type

E - Nest / Roost	O - Observed
F - Tracks / Scratchings / Chew Marks	OW - Observed and Heard Call
FB - Burrow	P - Scat
G - Crushed Cones	Q - Camera
H - Hair / Feathers / Skin	T - Trapped
K - Dead	U - Ultrasonic Recording
M - Miscellaneous Record	W - Heard

Note: * indicates introduced species. TS indicates threatened species TSC Act NSW.

SECTION 4

ASSESSMENTS AND CONCLUSIONS

4.1 ENVIRONMENTAL PROTECTION & BIODIVERSITY CONSERVATION ACT (1999) ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act*, (1999) requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals systems for actions that have a significant impact on matters of National Environment Significance (NES). These may include:-

- Wetlands protected by international treaty (the Ramsar Convention);
- Nationally listed threatened species and ecological communities;
- Nationally listed migratory species.

Actions are projects, developments, undertakings, activities, series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a NES matter.

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to the Australian Government Department of the Environment and Energy (DoEE).

The following assessment in accordance with the EP&BC Act Policy Statement 1.1 *Significant Impact Guidelines* (DoE 2013) is provided:

i. Are there any Matters of National Environmental Significance located in the area of the proposed action?

A search of the Protected Matters Search Tool (DoEE 2017) was conducted for EPBC Listed threatened and migratory species recorded within 5 km of the subject site.

Suitable habitat is present for the following nationally listed threatened or migratory species recorded from the Protected Matters Search (DoEE 2017) which occur or which may occur within 5 km of the subject site:

Threatened Species

- Green and Golden Bell Frog (*Litoria aurea*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Swift Parrot (*Heleioporus australiacus*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Large-eared Pied-bat (*Chalinolobus dwyeri*).

The nationally listed threatened species, Grey-headed Flying-fox was observed during surveys.

Migratory Species

- Oriental Cuckoo (*Cucuclus optatus*)
- White-throated Needletail (*Hirundapus caudacutus*)
- Black-faced Monarch (*Monarcha melanopsis*)
- Spectacled Monarch (Monarcha trivirgatus)
- Satin Flycatcher (*Myiagra cyanoleuca*)
- Rufous Fantail (*Rhipidura rufifrons*)

No nationally listed migratory species were observed within the subject site during surveys.

Threatened Ecological Communities
No nationally listed threatened ecological communities have suitable habitat present within the subject site.

ii. Considering the proposed action at its broadest scope, is there potential for impacts on Matters of National Environmental Significance?

The proposal will require the removal or modification of approximately 0.26 hectares of vegetated habitats for the proposed development.

These areas provide suitable foraging habitat for nationally listed locally occurring threatened and migratory species.

iii. Are there any proposed measures to avoid or reduce impacts on Matters of National Environmental Significance?

The proposed development has have been situated to minimise impacts including removal of vegetation and habitats for nationally listed threatened and migratory biodiversity.

iv. Are any impacts of the proposed action on Matters of National Environmental Significance likely to be significant impacts?

No, the proposal is not likely to have a significant impact on a matter of National Environmental Significance.

A detailed assessment in accordance with AGDE (2013) Significant Impact Guidelines has been provided for the Grey-headed Flying-fox, in Appendix 2 of this report.

The assessment completed has determined that the proposal is not likely to have a significant impact on the Grey-headed Flying-fox.

The following additional assessments are provided as follows for nationally listed threatened species and ecological communities and nationally listed migratory species which were not observed during surveys with suitable habitat present within the subject site.

Nationally Listed Threatened Species
With regard to nationally listed threatened species it is considered that the proposal is not likely to:
- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a threatened species becoming established in the threatened species' habitat;
- introduce disease that may cause a species to decline; or
- interfere with the recovery of the species.

The following reasons are provided:
- These species were not observed within the subject site during surveys;
- There are larger areas of higher quality habitat for locally occurring nationally listed threatened and migratory species present within the locality, including lands reserved for conservation such as Warriewood Wetlands and Narrabeen lagoon State Park; and
- The area of proposed habitat loss is relatively small in area, and a riparian corridor will be retained and rehabilitated which will improve the habitats present.

Nationally Listed Migratory Species
With regard to nationally listed migratory species it is considered that the proposal is not likely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The following reasons are provided:
- The subject site does not contain important habitat for a nationally listed migratory species;
- The area of proposed habitat loss is relatively small in area; and
- No nationally listed migratory species have been recorded within the subject site during surveys.

Nationally Listed Threatened Ecological Communities
It is considered that the proposal is not likely to have a significant impact on nationally listed endangered or critically ecological communities as the proposal is not likely to:
- reduce the extent of an ecological community
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
  - assisting invasive species, that are harmful to the listed ecological community, to become established, or
  - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.

The following reasons are provided:
- The vegetation within the subject site does not correspond to a nationally listed endangered or critically endangered ecological community.

CONCLUSION
It is considered that the proposed action is not likely to have a significant impact on nationally listed threatened or migratory species or nationally listed threatened ecological communities.

4.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT (1979)

The *Environmental Planning and Assessment Act* (1979) is a state applicable act administered by the NSW State Government. Section 5(A) of the *EP&A Act* 1979 provides seven factors (referred to as the assessment of significance or 7 part test) which must be taken into account by a consent authority in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats, listed within the *Threatened Species Conservation Act* (1995).

The fauna threatened species, Grey-headed Flying-fox, Little Bentwing-bat and Eastern Bentwing-bat, as listed within the *TSC Act* (1995), were observed within the subject site during surveys.

No endangered populations listed within the *TSC Act* (1995), were observed during surveys.

The Swamp Oak Floodplain Forest EEC, as listed within the TSC Act (1995) was observed during surveys.

An Assessment of Significance prepared in accordance with Section 5A of the EP&A Act (1979) has been undertaken for threatened species, populations and ecological communities listed within the *TSC Act* (1995), observed or with suitable habitat contained within the subject site. The assessment is provided as Appendix 1 to this report and has determined that the proposed development is not likely to have a significant effect on threatened species, populations or ecological communities or their habitats.

4.3 STATE ENVIRONMENTAL PLANNING POLICIES

SEPP 14 - Coastal Wetlands
The subject site is not included within an area mapped as a wetland in SEPP 14.

SEPP 26 - Littoral Rainforest
The subject site is not included within any area mapped as a littoral rainforest in SEPP 26. The vegetation on-site does not correspond to Littoral Rainforest with respect to species composition and substrate.

SEPP 44 - Koala Habitat Assessment
The subject site was assessed for activity by Koalas using the following methods:

i. A search of the BioNet Atlas of NSW Wildlife (NSW OEH 2017a) was undertaken to identify records of Koalas in the area;

ii. The site was surveyed on foot with any species of Koala food trees being inspected for signs of Koala usage. Trees were inspected and identified for presence of Koalas, scratch and claw marks on the trunk and scats around the base of each tree. The proportion of any trees showing signs of Koala use was calculated for the whole of the site. Additionally the location and density of droppings if found were documented;

iii. Koalas were also targeted during spotlight surveys;

iv. Identification and assessment of the density of tree species listed as Koala food trees in State Environmental Planning Policy No. 44 - Koala Habitat Protection was undertaken across the site as outlined in Table 4.1.

TABLE 4.1
SEPP-44 KOALA FEED TREE SPECIES
(From SEPP-44 Schedule 2)

Scientific Name	Common Name	Observed On Site	Percentage within survey plots
Eucalyptus tereticornis	Forest Red Gum	No	0%
Eucalyptus microcorys	Tallowwood	No	0%
Eucalyptus punctata	Grey Gum	No	0%
Eucalyptus viminalis	Ribbon or Manna Gum	No	0%
Eucalyptus camaldulensis	River Red Gum	No	0%
Eucalyptus haemastoma	Broad-leaved Scribbly Gum	No	0%
Eucalyptus signata	Scribbly Gum	No	0%
Eucalyptus albens	White Box	No	0%
Eucalyptus populnea	Bimble Box or Poplar Box	No	0%
Eucalyptus robusta	Swamp Mahogany	Yes	<15%

The Koala food tree species, *Eucalyptus robusta* as listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) were observed within the subject site. The site does not contain areas of vegetation where these trees constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. Therefore the site does not contain potential koala habitat as defined by SEPP 44.

No Koalas were observed during the fauna survey and no evidence of Koala habitation, such as scats, claw and scratch marks, were located on the site. Therefore the subject site is considered to not form core koala habitat as defined by SEPP 44.

4.4 SPECIFIC LOCAL GOVERNMENT AREA REQUIREMENTS AND ASSESSMENTS

No additional specific local government area requirements or assessments relevant to this report have been identified.

4.5 CONCLUSIONS

Based on the detailed field survey and information provided in this report it is concluded that:

i. No threatened flora species were observed during surveys;

ii. The threatened fauna species Grey-headed Flying-fox, Little Bentwing-bat and Eastern Bentwing-bat, were observed during surveys;

iii. No threatened populations were observed within the subject site;

iv. The Swamp Oak Floodplain Forest endangered ecological community was observed during surveys;

v. A referral to the Australian Government Department of the Environment is considered unnecessary;

vi. The proposed development is not likely to have a significant effect on threatened species, populations or ecological communities or their habitats; and

vii. A Species Impact Statement is not required for the proposed development.

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APPENDIX 1

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT (1979)
SECTION 5(A) ASSESSMENT

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT (1979)
SECTION 5(A) ASSESSMENT

As identified in Section 5(A) of the *EP&A Act* 1979 the following matters need to be addressed to determine whether or not a significant effect on threatened species, populations or ecological communities or their habitats is likely to result from the proposed development.

A1.1 ASSESSMENT OF SIGNIFICANCE / 7 – PART TEST

For the purposes of the following assessments the definitions of specific terminology and interpretations of the key terms used are as per the DECC (2007) Threatened species assessment guidelines. Further clarification is also provided where deemed appropriate.

a) In the case of a threatened species, whether the action proposed 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,

Green and Golden Bell Frog (*Litoria aurea*)
The Green and Golden Bell Frog is largely aquatic and is found among vegetation within or at the edges of permanent water. The males call mainly after rain from spring to autumn while afloat among vegetation, usually in larger permanent dams, swamps and lagoons. Breeding often peaks after heavy rains in January to February (NSW NPWS 1999).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Square-tailed Kite (*Lophoictinia isura*)
The Square-tailed Kite inhabits the coastal forested and wooded lands of tropical and temperate Australia. The Square-tailed Kite is a specialist hunter of passerines, especially honeyeaters, and insects in the tree canopy, picking most prey items from the outer foliage (Marchant & Higgins 1993).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Little Eagle (*Hieraaetus morphnoides*)
This species forages in a variety of habitats including woodland open forest, partially cleared areas, along watercourses and around wetlands, avoiding large areas of dense forest. This species nests in mature living trees in open forest, woodland and remnant areas including farmland and areas close to urban development (Marchant and Higgins 1993).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

White-bellied Sea-Eagle (*Haliaeetus leucogaster)*
This species occupies home ranges of up to 100km2 and is widespread along most of the coastline areas of Australia and occasionally inland in association with rivers and wetlands. Nests are typically constructed in large emergent eucalypts (Marchant and Higgins 1993).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.\

Little Lorikeet (*Glossopsitta pusilla*)
Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Lorikeets are gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes (Courtney & Debus 2006).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
The Glossy Black-Cockatoo inhabits woodlands and open sclerophyll forests dominated by or with a middle stratum of Allocasuarina. They choose trees with larger cone crops, concentrating foraging in trees with a high ratio of total seed weight to cone weight. They breed in hollow trees or stumps usually in Eucalypts (Higgins 1999).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Gang-gang Cockatoo (*Callocephalon fimbriatum*)
The Gang-gang Cockatoo is associated with a variety of woodland and forest habitats, and occasionally more open areas in south–eastern New South Wales and Victoria. This species utilises eucalypt forests and exotic trees, and is known to feed on the seeds of native shrubs and trees, in addition to some exotic species such as the Hawthorn and Cupressus species (Higgins 1999).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Powerful Owl (*Ninox strenua*)
The Powerful Owl breeds in open or closed sclerophyll forests and woodlands, including wet sclerophyll forest and dry sclerophyll forest and woodlands. They nest in hollows in large old trees; usually living Eucalyptus, within or below canopy in stumps or broken-off trunks. Powerful Owls are sedentary within home ranges of about 1,000 hectares within open eucalypt, casuarina or Callitris pine forest and woodlands, though they often roost in denser vegetation, including rainforest or exotic pine plantations. Powerful Owls feed mainly on medium-sized arboreal marsupials (Higgins 1999).

It is considered that highly disturbed foraging habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Masked Owl (*Tyto novaehollandiae*)
The Masked Owl is widespread through forests and woodlands. The Masked Owl is known to utilise forest margins and isolated stands of trees within agricultural land. This species is often found in heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained. The Masked Owl is dependent upon hollow bearing trees all year round requiring old mature trees with large hollows for breeding and as diurnal roosting sites (Higgins 1999).

It is considered that highly disturbed foraging habitat for this species is present on the subject

site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Barking Owl (*Ninox connivens*)
The Barking Owl utilises dry sclerophyll forests and woodlands of tropical, temperate and semi-arid zones, particularly those associated with watercourses, wetlands and forest edges. Nests in large hollows in live eucalypts, often near open country (Higgins 1999).

It is considered that highly disturbed foraging habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Swift Parrot (*Lathamus discolor*)
This species feeds mainly on nectar and lerp from eucalypt flowers, particularly Blue Gum (Eucalyptus globulus). On the mainland, the Swift Parrot congregates where winter flowering species such as Yellow Gum, Red Ironbark, Mugga Ironbark, Box Gums and Swamp Gum. This species also occurs within Blackbutt, Forest Red Gum, Swamp Mahogany and Spotted Gum dominated communities along the coast. The Swift Parrot is a migratory species that breeds in Tasmania and its offshore islands in summer. In late March almost the entire population migrates to mainland Australia spreading from Victoria through to central and coastal NSW and south east Queensland (Saunders and Tzaros 2011).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Scarlet Robin (*Petroica boodang*)
This species inhabits mainly dry eucalypt forest and woodlands with open shrubby and grassy understorey on ridges and slopes during the spring-summer breeding season, dispersing during autumn–winter into open habitats including urban areas (Higgins and Peter 2002).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Regent Honeyeater (*Xanthomyza phrygia*)
The Regent Honeyeater inhabits mostly dry eucalypt woodlands and forests dominated by box ironbark eucalypts; on inland slopes of Great Divide, especially associations in moister more fertile sites, along creeks, broad river valleys and on lower slopes of foothills. Nectar is the principle food but sugary exudates from insects are also used. The Regent Honeyeater is known to breed along the western Slopes of the Great Dividing Range in New South Wales (Higgins *et al*., 2001).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
This species inhabits a variety of habitats including forest, woodland, shrubland, heath and disturbed environments. Widespread species which inhabits inland and coastal areas (OEH 2017).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Varied Sittella (*Daphoenositta chrysoptera*)
This species inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland (Higgins & Peter 2002).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Grey-headed Flying-fox (*Pteropus poliocephalus*)
Grey-headed Flying-foxes roost in camps during the day, which may contain tens of thousands of individuals, and then disperse to surrounding areas to forage at night. This species inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and urbanised and agricultural areas. Camps are commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy. Camps may also be formed in urban parkland areas (Tidemann 1995).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Eastern Freetail Bat (*Mormopterus norfolkensis*)
The Eastern Freetail-bat utilises dry eucalypt forest and woodland on the coastal side of the Great Dividing Range. They show a preference for open spaces in woodland or forest, and are more active in the upper slopes of forest areas rather than in riparian zones. They also forage over large waterways. This species roosts in hollow trees (usually in hollow spouts), under exfoliating bark and in various man-made structures (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Large-eared Pied Bat (*Chalinolobus dwyeri*)
In the Sydney Basin this species is most commonly recorded in areas of high fertility soils in wet sclerophyll forest along the edges of sandstone escarpments. This species is also recorded in dry sclerophyll forest and woodlands, sub-alpine woodland, at the edges of rainforest, Callitris forest and within sandstone outcrop country. Large-eared Pied Bats roost in clusters in fairy martin nests and on the ceilings of caves, crevices in cliffs and mines in twilight areas (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Little Bentwing-bat (*Miniopterus australis*)
The Little Bentwing-bat forages below the canopy within well-timbered areas including rainforest, vine thicket, wet and dry melaleuca swamps and coastal forests. This species is a cave dweller with individuals congregating during the summer months in maternity colonies and disperse during the winter. Other roost sites used by this species include abandoned mines, tunnels, stormwater drains and occasionally in buildings, banana trees and tree hollows (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
Preferred habitats for this species include rainforest, wet and dry sclerophyll forest, open woodland, Melaleuca forests and open grassland. The Eastern Bentwing-bat forages high in forested areas from just above canopy height to many times canopy height. In more open areas such as grasslands, flight may be within a few metres of the ground. Eastern Bentwing-bats are cave dwellers, but will also roost in man-made structures such as road culverts and mines (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Southern Myotis (*Myotis macropus*)
The Large-footed Myotis has a strong association with streams and permanent waterways, most commonly within vegetated areas at lower elevations and in flat undulating country. This species forages over water for small insects, fish and invertebrates and have a preference for large pools rather than flowing streams. Roost habitats for this species are near water and include caves, tree hollows, abandoned fairy martin nests, among vegetation, in clumps of Pandanus, and man-made structures including under bridges, in mines, tunnels, road culverts and stormwater drains (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not 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.

Greater Broad-nosed Bat (*Scoteanax rueppellii*)
A wide variety of habitats are utilised by this species including moist gullies in mature coastal forest, rainforest, open woodland, Melaleuca swamp woodland, wet and dry sclerophyll forest, cleared areas with remnant trees and tree-lined creeks in open areas. The Greater Broad-nosed Bat forages about 5m from the edge of isolated trees, forest remnants or along forest crowns with a slow direct flight pattern. This species is known to roost in tree hollows, cracks and fissures in trunks and dead branches, under exfoliating bark, as well as in man-made structures including roofs of old buildings (Churchill 2008).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed within the subject site during surveys. It is considered that the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

No flora or fauna specimens belonging to any endangered population were observed within the subject site. Therefore the proposed action will not have an adverse effect on the life cycle of any species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

c) In the case of a critically endangered or endangered ecological community, whether the action proposed:

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

A highly disturbed variant of the SOFF EEC was observed during surveys. The SOFF EEC occupies approximately 0.4 hectares within the site and includes several low condition patches which occur on previously cleared.

The proposed development is likely to result in the removal of approximately 0.15 hectares of SOFF EEC vegetation within the proposed development footprint and the modification of an additional 0.11 hectares of SOFF EEC within the Asset Protection Zone and Outer Riparian Corridor Area. Approximately 0.14 hectares of the SOFF EEC will be retained and rehabilitated within the Inner Riparian Corridor Area. There are also larger areas of the SOFF within adjoining areas offsite to the west.

It is considered that the proposed development is not likely to have an adverse effect on the extent of an ecological community such that its local occurrence is likely to be placed at risk of extinction

ii. Is likely to substantially and adversely modify the composition such that its local occurrence is likely to be placed at risk of extinction,

A highly disturbed variant of the SOFF EEC was observed during surveys. The SOFF EEC occupies approximately 0.4 hectares within the site and includes several low condition patches which occur on previously cleared.

The proposed development is likely to result in the removal of approximately 0.15 hectares of SOFF EEC vegetation within the proposed development footprint and the modification of an additional 0.11 hectares of SOFF EEC within the Asset Protection Zone and Outer Riparian Corridor Area. Approximately 0.14 hectares of the SOFF EEC will be retained and rehabilitated within the Inner Riparian Corridor Area. There are also larger areas of the SOFF within adjoining areas offsite to the west.

It is considered that the proposed action is not likely to substantially and adversely modify the composition of an ecological community such that its local occurrence is likely to be placed at risk of extinction.

d) In relation to the habitat of threatened species, populations or ecological community:

i. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and

The proposed development is likely to result in the removal of approximately 0.15 hectares of SOFF EEC vegetation within the proposed development footprint and the modification of an additional 0.11 hectares of SOFF EEC within the Asset Protection Zone and Outer Riparian Corridor Area. Approximately 0.14 hectares of the SOFF EEC will be retained and rehabilitated within the Inner Riparian Corridor Area.

The areas of exotic vegetation and cleared land within the site cover an area of approximately 1.8 hectares, including 1.02 hectares within the proposed development area, 0.23 hectares within the Outer Riparian Corridor / APZ area which will be managed and revegetated and landscaped and 0.55 hectares within the Inner Riparian Corridor Area which will be subject to replanting.

ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The subject site is surrounded by existing development to the north and cleared land to the east and south. The Disturbed Swamp Oak Forest vegetation within the subject site is interspersed with exotic trees and is contiguous with the vegetation present on the adjoining

allotment to the west of the site, however no habitat connectivity is present through the subject site.

The current patterns and extent of habitat connectivity for locally occurring threatened biodiversity are not likely to be affected by the proposed development.

It is therefore considered that the proposal is not likely to result in an area of habitat becoming fragmented or isolated from other areas of habitat.

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

The habitats within the subject site to be removed and modified are of low quality, are highly disturbed and are considered not likely to provide important connectivity for locally occurring threatened biodiversity.

It is therefore concluded that the habitats within the site are not likely to be of significant importance to the long-term survival of the threatened species, populations or ecological community within the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The subject site has not been classed as critical habitat within the provisions of the *Threatened Species Conservation Act* (1995). Therefore it is considered that the proposed development will not have an adverse effect on critical habitat either directly or indirectly.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

Recovery Plans
Recovery plans have been prepared for the following species within suitable habitat present within the subject site:

- Swift Parrot;
- Regent Honeyeater
- Barking Owl;
- Powerful Owl, and Masked Owl (Large Forest Owls Recovery Plan);
- Grey-headed Flying-fox; and
- Large-eared Pied Bat.

Implementation of actions required to meet the objectives listed in the identified recovery plans are primarily the responsibility of public authorities such as the NSW OEH and Local Government. It is considered that the proposed development is not likely to obstruct the implementation of the identified recovery objectives and is not inconsistent with the objectives or actions of the identified recovery plans.

Threat Abatement Plans
The following threat abatement plans have been prepared by the NSW OEH.
- Bitou Bush and Boneseed Threat Abatement Plan
- Predation by the Red Fox (*Vulpes vulpes*) Threat Abatement Plan
- Predation by *Gambusia holbrooki* (plague minnow) Threat Abatement Plan

The proposal is considered to be not inconsistent with the objectives or actions identified within these plans.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposal is likely to increase the impact of the key threatening processes 'Clearing of native vegetation'. It is considered that the proposal is unlikely to increase the operation of this key threatening process to the extent that a significant effect on threatened biodiversity will occur.

A1.2 ASSESSMENT OF SIGNIFICANCE (7-PART TEST) CONCLUSION

Based on the details provided in the accompanying report, ecological surveys completed and assessment undertaken above it is concluded that:

i. The proposed development is not likely to have a significant effect on threatened species, populations or ecological communities or their habitats; and

ii. A Species Impact Statement is not required for the proposed development.