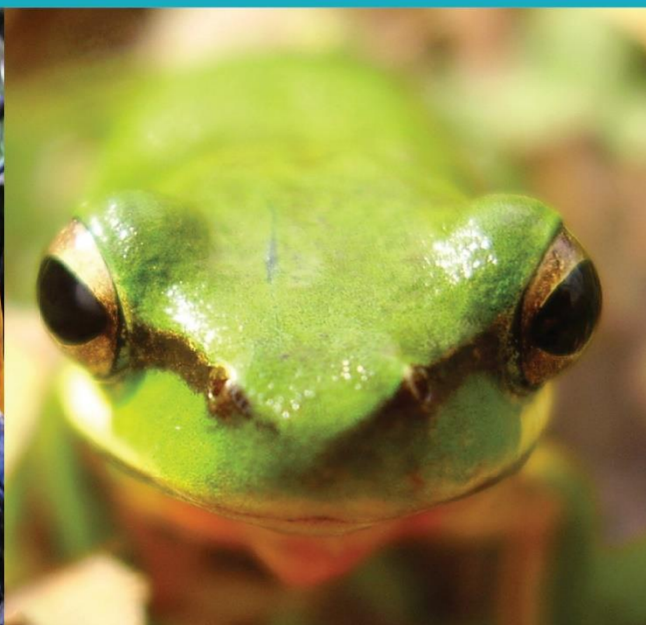




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BIODIVERSITY ASSESSMENT REPORT

Planning Proposal

Lot 3 DP 732565

7 City View Road

Pennant Hills

15 March 2022

(REF: 18EG22)

BIODIVERSITY ASSESSMENT REPORT

Planning Proposal

Lot 3 DP 732565, 7 City View Road, Pennant Hills

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

LIST OF ABBREVIATIONS

APZ	asset protection zone
BAM	Biodiversity Assessment Method
BAR	Biodiversity Assessment Report
<i>BC Act</i>	<i>Biodiversity Conservation Act (2016)</i>
<i>BC Reg</i>	<i>Biodiversity Conservation Regulation (2017)</i>
BCAR	Biodiversity Certification Assessment Report
BDAR	Biodiversity Development Assessment Report
BGHF	Blue Gum High Forest
BOS	Biodiversity Offset Scheme
BPA	bushfire protection assessment
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically endangered ecological community
<i>CM Act</i>	<i>Coastal Management Act 2016</i>
DAWE	Department of Agriculture, Water and the Environment.
DCP	development control plan
DEC	NSW Department of Environment and Conservation (superseded by DECC from April 2007)
DECC	NSW Department of Environment and Climate Change (superseded by DECCW from October 2009)
DECCW	NSW Department of Environment, Climate Change and Water (superseded by OEHL from April 2011)
DEWHA	Commonwealth Department of Environment, Water, Heritage & the Arts (superseded by SEWPAC)
DOEE	Commonwealth Department of Environment & Energy (superseded by DAWE)
DPIE	NSW Department of Planning, Industry and Environment
EEC	endangered ecological community
EPA	Environment Protection Authority
<i>EP&A Act</i>	<i>Environmental Planning and Assessment Act (1979)</i>
<i>EPBC Act</i>	<i>Environment Protection and Biodiversity Conservation Act (1999)</i>
<i>FM Act</i>	<i>Fisheries Management Act</i>
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	local environmental plan
LGA	local government area
<i>LLS Act</i>	<i>Local Land Services Act (2013)</i>
NES	national environmental significance
<i>NPW Act</i>	<i>National Parks and Wildlife Act (1974)</i>
NRAR	Natural Resources Access Regulator (NSW)
NSW DPI	NSW Department of Industry and Investment
OEHL	Office of Environment and Heritage (superseded by DPIE from August 2019)
PCT	plant community type
PFC	projected foliage cover
RFS	NSW Rural Fire Service
ROTAP	rare or threatened Australian plants
SAII	Serious And Irreversible Impacts
SEPP	State Environmental Planning Policy
SEWPAC	Commonwealth Dept. of Sustainability, Environment, Water, Population & Communities (superseded by DOEE)
SIS	species impact statement
SULE	safe useful life expectancy
TEC	threatened ecological community
TPZ	tree preservation zone
<i>TSC Act</i>	<i>Threatened Species Conservation Act (1995) – Superseded by the Biodiversity Conservation Act (2016)</i>
VMP	vegetation management plan

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Travers bushfire & ecology has been engaged to undertake a biodiversity constraints assessment within Lot 3 DP 732565, at 7 City View Road, Pennant Hills within Hornsby local government area (LGA). The extent of this entire lot is shown on Figure 1 below. This lot will hereafter be referred to as the 'study area'.

The proposal shall be assessed under the *Biodiversity Conservation Act (BC Act)*, 2016.



The proposal seeks to facilitate the future renewal of the site and achieve a genuine mixed-use residential-commercial outcome of 7 storeys stepped, as well as delivering community space, a 'pocket park' and seniors living component. It will also seek to achieve high standards of architectural, landscape and sustainable design, and achieve a sensitive transition in land-use between the surrounding residential properties and City View Road office towers. This will be achieved through the preparation of a site-specific Development Control Plan.

A building footprint is shown on Figure 2 below.

The planning proposal also seeks to make the following amendments to the Hornsby Local Environmental Plan (LEP) 2013:

- Amend the floor space ratio (FSR) map for the subject site from 1.5:1 to approximately 2.7:1; and,
- Amend Schedule 1 to include additional permissible uses for the subject site, including residential flat buildings and seniors housing, noting shop-top housing is a current permissible use.

No change is considered necessary to the current B5 zone, nor to the current building height standard.

The study area is not located in bushfire prone lands (in accordance with Council's mapping); therefore, additional impacts from bushfire management practices are not required.

BUILDING FOOTPRINT PROPOSED

The proposed footprint closely follows that of the existing building, effectively minimising its impact on the existing landscape. The existing tree groups on site form areas of Blue-Gum High Forest. The proposal retains a high number of these existing trees with the intent to grow and plant more.

The sloped site lends itself to a partly cantilevered ground floor, allowing for understorey planting. A 20 x 20 metre flora quadrat has been proposed to rectify the removal of existing trees.



Figure 2 – Building footprint (existing footprint in red)

(Source: Fender Katsalidis Architecture 09/07/2021)

As part of the proposal, a preliminary arboricultural impact assessment has been undertaken to provide guidance to the likelihood of trees being retained or removed across the site. Approximately seventeen (17) trees would require removal as they are within the development footprint (or well within 3m thereof, or had a SULE rating of 4 which indicates the tree is dead, dying or dangerous. Twenty-three trees of moderate-good health could likely be retained in close proximity to the development footprint, with an additional 30-40 trees located near the corner of Boundary Rd and City View Road (not assessed) and on the rail corridor boundary that could also be retained. Thirty (30) trees that were close to the development footprint that may have a small impact to the tree protection zone or structural root zone were considered to require further investigation at the DA stage.

A landscaping plan by *Arcadia* has been developed to assist in replacing lost trees by the development and to improve site amenity.

1.2 Site description

Table 1 provides a summary of the planning, cadastral, topographical, and disturbance details of the development footprint.

Table 1 – Site features

Location	7 City View Road Pennant Hills, Lot 3 DP 732565
Area of lot	6476 m ²
Local government area	Hornsby
Zoning	B5 – Business Development.
Grid reference	321100E 6264950N MGA-56
Topography	Moderate slopes with a south east aspect. City View Road elevation is approximately 175–180 m AMSL and the eastern boundary along the railway has an elevation of approximately 155 m AMSL.
Geology and soils	Geology – Ashfield Shale; Black to dark grey shale and laminate. Soils – The northern half of the site is mapped as being on the Glenorie Soils Landscape, and the southern half is mapped as the West Pennant Hills Soil Landscape.
Catchment, drainage and stream order	Overland flow drains to the south east to tributaries off Devlins Creek, which drains to Lane Cove River.
Existing land use	Vacant commercial office building
Connectivity features	There is sparse arboreal connectivity to the south. There is existing residential development and roads to the west and north, and a major railway to the east.

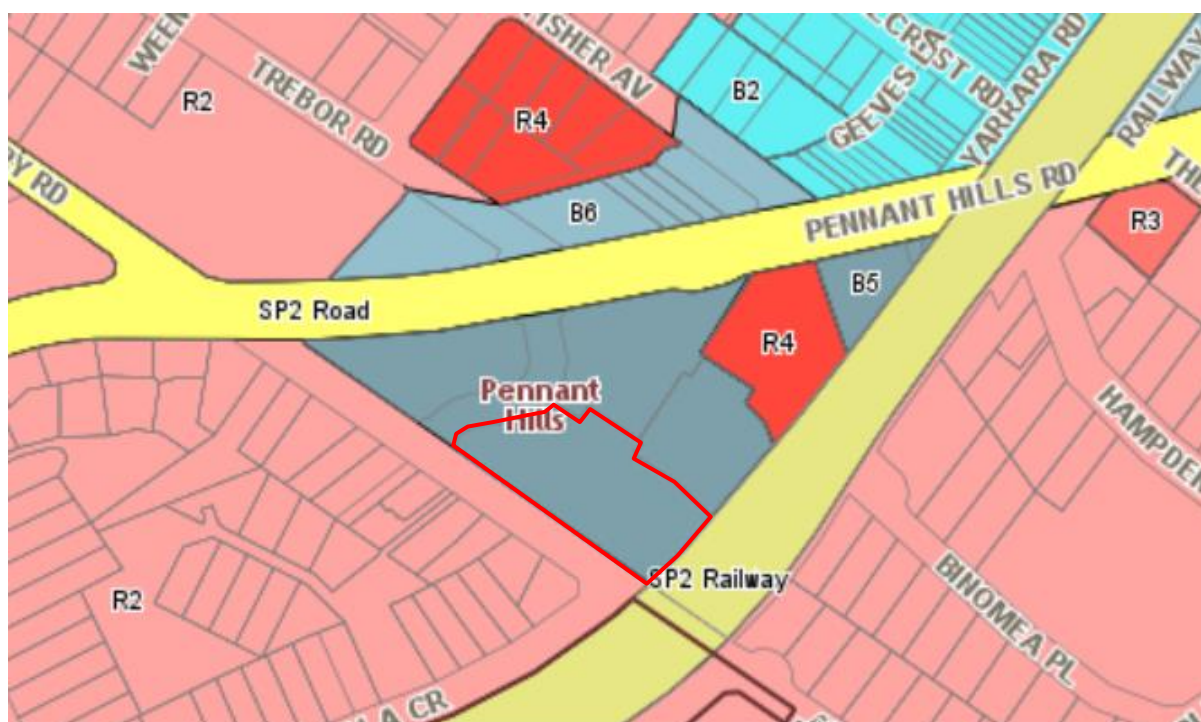


Figure 3 – Current zoning

2. FLORA

2.1 Survey

Botanical survey has been undertaken over several years.

2017

A botanical inspection was undertaken on 10 November 2017 over 2–2.5 hrs. During the inspection, an inventory was undertaken of all observed plants. Threatened species searches were undertaken for all relevant species throughout the site. One (1) 20 m x 20 m quadrat was undertaken at the rear of the property to assist in determining the vegetation type present.

2019

Botanical survey was undertaken on 20 March 2019 over a time frame of approximately 2 hrs.

Botanical survey included a random meander in accordance with *Cropper* (1993) to gain a full species list of the plants within the site, and then one (1) flora plot was undertaken within the site in accordance with the Biodiversity Assessment method (BAM). A review of the *Atlas of NSW Wildlife* (OEH 2019) was undertaken prior to the site visit to determine threatened species previously recorded within 10 km of the subject site, and relevant target searches were undertaken as suited, generally as near-linear transects underneath or adjacent to remnant canopy vegetation.

2021

Additional survey was undertaken on 23 August 2021. This involved a parallel field traverse to survey for threatened flora and determine any changes in vegetation since 2019. A review of the *Atlas of NSW Wildlife* (DPIE 2021) was undertaken prior to the site visit to determine threatened species previously recorded within 10 km of the subject site.

All naturally occurring species were identified to species level where possible, and tabulated in Appendix 1.

2.2 Vegetation communities

The Native Vegetation of the Sydney Metropolitan Area (OEH 2016) have mapped the majority of the site as Blue Gum High Forest (PCT 1237), with a small patch of Urban / Exotic vegetation in the far eastern corner (Figure 4).

Field verification of the study area found the following vegetation communities:

- PCT 1237 Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion - TEC
- Cleared or exotic vegetation



Figure 4 – Native Vegetation of the Sydney Metropolitan Area (OEH 2016)

Blue Gum High Forest

Canopy – Mostly 15-32m tall with a projected foliage cover averaging close to 25-40% where it is intact. Common species include *Eucalyptus saligna* and *Eucalyptus pilularis*. Less frequent species include *Angophora floribunda* and *Eucalyptus paniculata*.

Mid-storey – The mid-storey has been almost fully removed. Species such as *Cyathea australis* and *Pittosporum undulatum* occupy less than 5%. Naturally occurring shrub species are all but absent.

Ground Layer – The ground layer is highly disturbed and contains very few native species, instead being replaced with a diverse range of weeds and / or planted specimens. The more common native groundcovers include *Oplismenus aemulus*, *Dichondra repens*, *Geranium homeanum*, *Dianella caerulea*, *Einadia hastata*, *Sigesbeckia orientalis* and *Imperata cylindrica*.

Classification – This vegetation corresponds to a highly modified remnant of Blue Gum High Forest (BGHF) which is listed within the NSW *BC Act* (2016) and within the Commonwealth *EPBC Act* (1999) as a Critically Endangered Ecological Community (CEEC).

Cleared and exotic vegetation

The remainder of the study area is cleared or contains exotic vegetation.

2.2.1 Historic land-use

The imagery from SixMaps (1943) shown on Figure 5 indicated that approximately half of the site was used as an orchard or similar pursuits as it appears to contain rows of small trees or shrubs. Based on literature of the area, parts of Pennant Hills were well renowned for growing fruit trees. The adjacent railway line has been in place for over 130 years and the nearby station was opened in 1887.

Native vegetation occurs adjacent to the south-west boundary that is currently the road reserve for Boundary Road, with one, two or three scattered trees within the allotment.

By 1986 (Figure 6), the native vegetation had started to spread into the south-eastern corner of the site and the former State Forest building had been constructed. Vegetation in the north-western corner of the site had established by 1991 (Figure 7). The vegetation in this corner would have been planted post-construction of the building, however there is now some regrowth and natural understorey present. Vegetation appears to be wider and thicker along the edge of Boundary Road also, indicating young growth.

Based on the historic aerial photos, the age of the Blue Gum High Forest is quite young and explains why the trees are dense and there are limited number of large trees with big trunks (again evidenced by the tree assessment report).

Despite the relatively young age of the much of the vegetation, age is not a consideration with determining whether or not the vegetation is classified as Blue Gum High Forest.



Figure 5 – 1943 historic photo of the site



Figure 6 - 1986 historic photo of the site



Figure 7 - 1991 historic photo of the site



Photo 1 – Native vegetation in the east of the site, including Blue Gum High Forest and cleared / exotic vegetation



Photo 2 – Blue Gum High Forest vegetation along Boundary Rd



Photo 3 – Blue Gum High Forest vegetation at the corner of City View Rd and Boundary Rd intersection

2.3 Threatened flora species

BC Act – A search of the Atlas of NSW Wildlife (DPIE, 2021) indicated a list of species that have been recorded within a 10 km radius of the development footprint. These species are listed in Table 8 (Appendix 2) and are considered for potential habitat within the development footprint.

EPBC Act – A review of the schedules of the *EPBC Act* indicated the potential for a list of threatened flora species to occur within a 10 km radius of the development footprint. These species have also been listed in Table 8 for consideration of potential to occur.

Based on the habitat assessment within Table 8 (Appendix 2) it is considered that the development footprint provides potential habitat for the following threatened flora species. These species will be considered in the test of significance within Appendix 3:

Table 2 – Threatened flora species with suitable habitat present

Scientific name	BC Act	EPBC Act	Potential to occur
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	V	-	Low
<i>Syzygium paniculatum</i>	E1	V	Low
<i>Acacia bynoeana</i>	E1	V	Unlikely
<i>Callistemon linearifolius</i>	V	-	Unlikely
<i>Darwinia biflora</i>	V	V	Unlikely
<i>Hibbertia superans</i>	E1	-	Unlikely

No threatened flora species were recorded during targeted surveys.

All other threatened species in both the BioNet (NSW) and *EPBC Act* coordinate search (National) were considered to have no potential to occur within the study area because of unsuitable habitat and high disturbance.

The state test of significance assessment (Appendix 3) and a review of *EPBC* impact criteria (Appendix 4) has concluded that the proposal will not have a significant impact on threatened flora species or TECs. Therefore, (a) a Species Impact Statement is not required in respect to flora for the proposal and (b) the BOS will not be triggered by this threshold.

2.4 Endangered flora populations

Three (3) endangered populations are known to occur within 10 km of the study area. These populations are:

- *Wahlenbergia multicaulis* in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield
- *Pomaderris prunifolia* in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas
- *Dillwynia tenuifolia* Sieber ex D.C. in the Baulkham Hills local government area

No individuals of these populations were observed within the study area during the flora survey, and the highly disturbed nature of the site is not likely to support these species. Therefore, it is considered that these endangered populations do not occur within the study area.

2.5 Threatened ecological communities

PCT 1237 is commensurate with *Blue Gum High Forest in the Sydney Basin Bioregion*, which is listed as critically endangered under the State *BC Act*.

PCT 1237 is also potentially commensurate with a TEC of the same name listed under the Commonwealth *EPBC Act*. Occurrences of the *EPBC Act*-listed ecological community are considered to be part of the nationally listed ecological community if they are greater than one hectare in size and:

- have a canopy cover greater than 10%; or
- have a canopy cover less than 10% and occur in areas of native vegetation in excess of five hectares (Threatened Species Scientific Committee, 2005).

As the vegetation on site is contiguous with a patch of BGHF greater than 1 ha, and the canopy cover exceeds 10%, it is commensurate with the *EPBC*-listed TEC. Further consideration and assessment will be required for a DA. A referral to DAWE may also be required.

2.6 SEPP (Vegetation in Non-Rural Areas) 2017

The State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP) was one of a suite of Land Management and Biodiversity Conservation (LMBC) reforms that commenced in New South Wales on 25 August 2017. The Vegetation SEPP (the SEPP) works together with the *BC Act* and the *Local Land Services Amendment Act 2016* to create a framework for the regulation of clearing of native vegetation in NSW.

As 'development consent' is required for the proposed works the Vegetation SEPP does not apply.

3. FAUNA

3.1 Survey / Habitat assessment

Fauna survey including afternoon diurnal survey and nocturnal survey was undertaken within the subject site and nearby surrounds on 23 August 2021.

Diurnal fauna survey included:

- opportunistic bird call and between census points,
- mammal activity searches (scats, scratches, diggings, burrows, etc.), and
- habitat tree survey.

Weather conditions at the time of diurnal survey were 6-8/8 cloud, 11-28 km/h NW wind, no rain, 20-21°C between 16:15 – 17:30.

Nocturnal fauna survey included:

- spotlighting,
- stag-watching of dead-tree,
- ultrasonic microbat recording (x1 passive recording station), and
- owl call-playback (Powerful Owl, Masked Owl & Barking Owl).

Weather conditions at the time of nocturnal survey were 7-8/8 cloud, 0-20 km/h NNW wind, no rain, waning gibbous moon, 19-20°C between 17:30 – 19:00.

Specific survey effort locations and results are shown on Figure 8. All fauna species recorded during survey within the development footprint and nearby surrounds are listed in Table 9 (Appendix 2).

A review of the Atlas of NSW Wildlife (DPIE 2021) was undertaken prior to the site visit to determine threatened species previously recorded within 10km of the development footprint.

3.2 Habitat features

The following notable habitat features were observed present:

- one (1) dead tree (stag) with at least two (2) small (0-5 cm) entrances at the peak of the trunk,
- one (1) hollow-bearing tree just outside the site perimeter being utilised by a pair of Rainbow Lorikeets,
- year-round nectar producing tree species, principally *Eucalyptus* sp.,
- seed-producing *Casuarina glauca* trees, and
- abandoned buildings/undercover car park.

Stag and hollow-bearing tree data for the development footprint is provided in Table 4.

A stag approximately 6 metres high was located within the development footprint. This stag appears to have formed from the original tree having part of its upper trunk broken off, leaving the lower portion in situ. The peak of the remaining tree appears to have degraded such that at least two hollow entrances into the inner-tree now exist, which may provide habitat for fauna such as birds, arboreal marsupials and microbats. No sign of current fauna use was evident

during survey. A stag-watch was conducted from sunset at 17:30 to 18:45; no fauna was detected during this time.

It is recommended that, at the time of clearing, a fauna ecologist is present to effectively recover any residing fauna species from this stag.



Photo 4 – Stag with hollow peak (photo facing north-east).

A hollow-bearing tree was located just outside the development footprint. Only one hollow was located in this tree, being 5-10 cm in diameter and located approximately 2 metres off the ground. At the time of survey, the hollow was being utilised by a pair of Rainbow Lorikeets. It is recommended that future removal of any hollows is to be replaced by quality nest boxes in nearby retained trees.



Photo 5 – Hollow-bearing tree with Rainbow Lorikeet usage.

3.3 Threatened fauna species

BC Act – A search of the Atlas of NSW Wildlife (DPIE, 2021) provided a list of threatened fauna species previously recorded within a 10 km radius of the development footprint. These species are listed in Table 9 (Appendix 2) and are considered for potential habitat within the study area.

EPBC Act – A review of the schedules of the *EPBC Act* identified a list of threatened fauna species or species habitat likely to occur within a 10 km radius of the development footprint. These species have also been listed in Table 9.

In accordance with Table 9 (Appendix 2) the following state and nationally listed threatened fauna species are considered to have suitable habitat with varying potential to occur within the study area. The state listed species will be considered in the test of significance (Appendix 3):

Table 3 lists threatened fauna species with suitable habitat present

Table 3 – Threatened fauna species with suitable habitat present

Common name	<i>BC Act</i>	<i>EPBC Act</i>	Potential to occur
Little Eagle	V	-	Y
Gang-gang Cockatoo	V	-	Y
Little Lorikeet	V	-	Y
Swift Parrot	E	E	Y
Barking Owl	V	-	Y
Powerful Owl	V	-	Y
Masked Owl	V	V	Y

Common name	<i>BC Act</i>	<i>EPBC Act</i>	Potential to occur
White-throated Needle-tail	-	V	Y
Regent Honeyeater	E4A	CE	Y
Varied Sittella	V	-	Y
Dusky Woodswallow	V	-	Y
Spotted-tailed Quoll	V	E	Y
Koala	V	V	Y
Grey-headed Flying-fox	V	V	Y
Yellow-bellied Sheath-tail-bat	V	-	Y
Eastern Coastal Free-tailed Bat	V	-	Y
Large-eared Pied Bat	V	V	Y
Eastern False Pipistrelle	V	-	Y
Little Bent-winged Bat	V	-	Y
Large Bent-winged Bat	V	-	Y
Southern Myotis	V	-	Y
Greater Broad-nosed Bat	V	-	Y
Sooty Owl	V	-	Unlikely

The state test of significance assessment (Appendix 3) and a review of *EPBC* impact criteria (Appendix 4) has concluded that the proposal will not have a significant impact on threatened fauna species. Therefore, (a) a Species Impact Statement is not required in respect to fauna for the proposal.

Fisheries Management Act (FM Act) – No habitats suitable for threatened aquatic species were observed within the study area and as such the provisions of this act do not require any further consideration.

3.4 Protected migratory species (National)

The *EPBC Act* Protected Matters Report provides additionally listed terrestrial, wetland and marine migratory species of national significance likely to occur, or with habitat for these species likely to occur, within a 10 km radius of the development footprint. The habitat potential of migratory species is considered in Table 10 (Appendix 2). The habitat potential of threatened migratory species are instead considered with other threatened species in Table 9 (Appendix 2).

Following a review of the impact criteria for protected migratory bird species under the *EPBC Act* (Appendix 4), it is concluded that the proposal will not likely significantly impact on any nationally listed protected migratory species with considered potential to occur.

3.5 Endangered fauna populations

There are two (2) endangered fauna population of consideration within the Hornsby LGA.

Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai local government areas

The Gang-gang Cockatoo occurs within a variety of forest and woodland types, usually frequenting forested areas with old growth attributes required for nesting and roosting purposes. It also utilises less heavily timbered woodlands and urban fringe areas to forage, but appears to favour well-timbered country dominated by eucalypts, typically with an *Acacia* understory. The major threats to this population include:

- Urban development resulting in clearing of forest and woodland habitat and the loss of connectivity to other populations of the species.
- Loss of nesting trees from clearing and frequent fire. The species requires nesting hollows with specific attributes (hollow shape, position and structure) and individual pairs show high fidelity to selected ones.
- Ongoing disturbance by humans and human activities to nesting and roosting areas.
- Competition for nesting hollows with other native and introduced species.
- Low population size could result in inbreeding depression over time.
- Predation by cats and collision with vehicles, as the species ventures into urbanised areas to feed on seasonally available resources and flies between fragmented habitat areas.

A major activity to assist with the recovery of this population (as it relates to this development proposal) is to restrict development that requires further clearing of or encroachment on habitat or disturbance to any identified nesting or roosting sites. No individuals or nesting/roosting sites were identified within the study area during survey.

Given this, as well as the species' preference for well-timbered old growth forest inconsistent with the vegetation on site, it is not anticipated that the development proposal will have an impact on this endangered population.

White-fronted Chat population in the Sydney Metropolitan Catchment Management Area

White-fronted Chats are usually found foraging on bare or grassy ground in wetland or saltmarsh areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground.

Two (2) isolated sub-populations of White-fronted Chats are currently known from the Sydney Metropolitan Catchment Management Authority area; one at Newington Nature Reserve on the Parramatta River and one at Towra Point Nature Reserve in Botany Bay. These sub-populations are separated from each other by 25 km of urbanised land, across which the Chats are unlikely to fly. The nearest extant populations outside Sydney Metropolitan CMA are at Ash Island north of Newcastle and Lake Illawarra, south of Wollongong.

The study area is not considered to be or close to the preferred habitat for this species; therefore, the development proposal is not expected to have an impact on this endangered population.

3.6 State Environmental Planning Policy (Koala Habitat Protection) 2021

State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala SEPP 2021) applies to land within LGAs listed under Schedule 1 of the Policy. As the study area falls under the Hornsby LGA, it is considered that Koala SEPP 2021 applies to this development proposal.

Land to which this policy applies in accordance with Clause 6 of the SEPP 2021 is as follows:

- (1) This Policy applies to each local government area listed in Schedule 1.*

- (2) *The whole of each local government area is—*
- (a) *in the koala management area specified in Schedule 1 opposite the local government area, or*
 - (b) *if more than 1 koala management area is specified, in each of those koala management areas.*
- (3) *Despite subclause (1), this Policy does not apply to—*
- (a) *land dedicated or reserved under the National Parks and Wildlife Act 1974, or acquired under Part 11 of that Act, or*
 - (b) *land dedicated under the Forestry Act 2012 as a State forest or a flora reserve, or*
 - (c) *land on which biodiversity certification has been conferred, and is in force, under Part 8 of the Biodiversity Conservation Act 2016, or Land use zone Permitted land uses RU1 Primary Production Primary production, including agriculture and a diverse range of primary industry enterprises RU2 Rural Landscape Compatible rural land uses, including extensive agriculture RU3 Forestry land uses and other development compatible with forestry land uses*
 - (d) *land in the following land use zones, or an equivalent land use zone, unless the zone is in a local government area marked with an * in Schedule 1—*
 - (i) *Zone RU1 Primary Production,*
 - (ii) *Zone RU2 Rural Landscape,*
 - (iii) *Zone RU3 Forestry.*

The land is listed in Schedule 1 as the Hornsby LGA and is zoned B5 – Business Development; therefore, SEPP 2021 applies. Please Note that SEPP 2020 applies in lands zoned as RU1, RU2 and RU3 in accordance with SEPP 2020.

There is currently no approved Koala Plan of Management (KPoM) for the LGA that this site is located in. Therefore, before council may grant consent to a development application for consent to carry out development on the land, Council must assess whether the development is likely to have any impact on Koalas or Koala habitat.

If Council is satisfied that the development is likely to have low or no impact on Koalas or Koala habitat, the council may grant consent to the development application. If the council is satisfied that the development is likely to have a higher level of impact on Koalas or Koala habitat, the council must, in deciding whether to grant consent to the development application, take into account a Koala assessment report for the development.

As of August 2021, the nearest Koala record to the study area was a record in 2017 approximately 2.5 km to the east of site. According to the *BioNet* search tool, there are a total of 10 Koala records within a 10 km radius of the site that occurred within the last 18 years (18 years being the longest generally-accepted lifespan of Koalas in the wild). No evidence of Koala activity was recorded during the fauna survey.

Under Schedule 1 of Koala SEPP 2021, Hornsby LGA falls within the Central Coast Koala Management Area. Ten (10) tree species were recorded in the study area which are considered to be Koala use tree species within this Management Area under Schedule 2 of Koala SEPP 2021. These species are *Angophora floribunda*, *Casuarina glauca*, *Corymbia maculata*, *Eucalyptus acmenoides*, *E. paniculata*, *E. pilularis*, *E. robusta*, *E. saligna*, *Melaleuca quinquenervia* and *Syncarpia glomulifera*.

The diverse range of Koala use tree species in the study area may be of use to any resident Koalas within the locality. However, given the sporadic nature of recent Koala records, it is considered that this study area does not comprise Core Koala Habitat. In addition, the presence of major roads, a railway and moderately dense development in the surrounding area

with no direct connectivity to conserved bushland would significantly reduce the site's capacity to be a host for this species.



Figure 8 – Flora & fauna survey effort & results

3.7 Connectivity

The vegetation within the development footprint does not provide any connective value besides cross-site movement of birds and arboreal mammals. Connectivity to the site is broken to all sides by roads and a railway. There is some arboreal connectivity to the south and south-west which provides tenuous arboreal passage through to other urban vegetation to the east - this connectivity will not be broken by the proposal. Local connectivity is shown in Figure 9 below.



Figure 9 – Local connectivity

4. WATERCOURSES & WETLANDS

4.1 Endangered wetland communities

A number of wetland communities have been listed as an 'endangered ecological community' under the NSW *BC Act*.

Impacts on wetland communities must be assessed under the *BC Act* and if present the management of wetland communities must be given due consideration in accordance with the objectives and principles of management as contained within the NSW Wetlands Policy (2010), and appropriate management as determined by NSW DPIE - Office of Water in their general terms of approval. This may include but not limited to the provision of buffers, management of stormwater runoff and maintenance of natural inflows or runoff into those wetland communities.

- Artesian springs ecological community
- Castlereagh Swamp Woodland Community
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions
- Coastal Upland Swamp in the Sydney Basin bioregion
- Coolibah–Black Box woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain and Mulga Lands bioregions
- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions
- Kurri sand swamp woodland in the Sydney Basin Bioregion
- Lagunaria swamp forest on Lord Howe Island
- Maroota Sands swamp forest
- Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions
- The shorebird community occurring on the relict tidal delta sands at Taren Point
- Upland wetlands of the drainage divide of the New England Tableland Bioregion
- Wingecarribee Swamp

No endangered wetland communities were present within the study area or within 40m of the proposed (future) development and therefore a referral to NRAR is not required for impacts on waterfront land.

4.2 Groundwater dependent ecosystems (GDEs)

Groundwater dependent ecosystems are communities of plants, animals and other organisms whose extent and life processes are dependent on groundwater. Some examples of ecosystems which depend on groundwater are:

- wetlands;
- red gum forests, vegetation on coastal sand dunes and other terrestrial vegetation;
- ecosystems in streams fed by groundwater;
- limestone cave systems;
- springs; and

- hanging valleys and swamps.

Groundwater dependent ecosystems are therefore ecosystems which have their species composition and their natural ecological processes determined by groundwater (NSW State Groundwater Dependent Ecosystems Policy April 2002).

Groundwater Dependent Ecosystems (GDEs) were not observed within the study area and therefore the policy does not require any further consideration. A referral to NRAR is not required for impacts on waterfront land.

4.3 Watercourse assessment

The proposal will not impact on watercourses or drainage lines. No further consideration of watercourses is required.

5. BIODIVERSITY IMPACT ASSESSMENT

5.1 Biodiversity Offsets Scheme (BOS)

The *BC Act* repeals the *Threatened Species Conservation Act 1995*, the *Nature Conservation Trust Act 2001* and the animal and plant provisions of the *National Parks and Wildlife Act 1974*. Together with the [Biodiversity Conservation Regulation 2017](#), the *BC Act* establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS). Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the Biodiversity Assessment Method (BAM).

Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the BAM.

The Biodiversity Offsets Scheme applies to:

- local development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*) that triggers the Biodiversity Offsets Scheme Threshold or is likely to significantly affect threatened species based on the test of significance in section 7.3 of the *Biodiversity Conservation Act 2016*
- state significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning, Industry and Environment and the environment agency head determine that the project is not likely to have a significant impact
- biodiversity certification proposals
- clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the Biodiversity Offsets Scheme threshold and does not require development consent
- clearing of native vegetation that requires approval by the Native Vegetation Panel under the Local Land Services Act 2013
- activities assessed and determined under Part 5 of the *Environmental Planning and Assessment Act 1979* (generally, proposals by government entities) if proponents choose to 'opt in' to the Scheme.

Proponents will need to supply evidence relating to the triggers for the Biodiversity Offsets Scheme Threshold and the test of significance (where relevant) when submitting their application to the consent authority.

5.2 Threshold assessment

The BOS includes three (3) elements to the threshold test – an area trigger, a Biodiversity Values Land Map trigger and the Test of Significance. If impacts exceed at least one of these triggers, the Biodiversity Offset Scheme applies to the proposed clearing.

5.2.1 Biodiversity Values Land Map

Biodiversity Values Land has been mapped within the study area. Figure 10 shows the site (blue) in relation to those areas (purple) as having biodiversity values. The BOS is triggered if

there is any clearing of native vegetation within the mapped biodiversity values areas. The development footprint shown in red below is in relation to where construction works are considered likely on site. The boundary is indicative only. The biodiversity values along boundary road may be protected, however the trees in the south will be impacted.



Figure 10 – Biodiversity values land (purple) relative to the development footprint (red)

(Source: DPIE – Biodiversity Values Map – Aug 2021)

5.2.2 Area clearing threshold

The area threshold varies depending 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).

Table 4 – BOS Entry Threshold Report

Date of Calculation	20/08/2021 3:21 PM	BDAR Required*
Total Digitised Area	0.32 ha	
Minimum Lot Size Method	Lot size	
Minimum Lot Size	0.65 ha	
Area Clearing Threshold	0.25 ha	
Area clearing trigger Area of native vegetation cleared	Unknown #	Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	yes	yes
Date of the 90 day Expiry	N/A	

Table 4 identifies that the BOS entry threshold report has determined the area threshold based on the minimum lot size of 0.65 ha, and the area clearing threshold for which the BOS applies is 0.25 ha. Clearing of 'native vegetation' that exceeds 0.25 ha will require a biodiversity offset to be obtained. Note that 'native vegetation' includes planted native species. The development

proposal will not impact more than 0.25 ha of native vegetation, therefore offsetting will not be required under this trigger.

5.2.3 Test of Significance

A detailed test of significance has been applied to the recorded Blue Gum High Forest within Appendix 3 in accordance with Section 7.2 of the *BC Act*. The test of significance for threatened entities has concluded a non-significant impact.

5.2.4 Areas of Outstanding Biodiversity Value

Areas of Outstanding Biodiversity Value (AOBV) are special areas with irreplaceable biodiversity values that are important to the whole of New South Wales, Australia or globally.

The relevant legislative provisions for AOBV are Part 3, *BC Act* 2016 and Part 3, *BC reg.* 2017.

AOBV declarations in New South Wales include the following:

Gould's Petrel – critical habitat declaration

Little penguin population in Sydney's North Harbour – critical habitat declaration

Mitchell's Rainforest Snail in Stotts Island Nature Reserve – critical habitat declaration

Wollemi Pine – critical habitat declaration

None of the above occur within the development footprint or will be indirectly impacted.

5.2.5 BOS conclusion

Based on the currently DPIE biodiversity values map, the proposal would trigger the BOS and a detailed BDAR will be required which is contrary to our original advice as biodiversity values mapping was not originally indicated for any part of the site, and the other thresholds would not have been triggered.

Given that the proposal would impact less than 1 ha, a streamlined assessment under BAM may be applied. Only SAIL entities require assessment for species credits. If other species credit species are incidentally recorded, these will acquire credits also, but no specific target searches are required unless the proposal is a State Significant Development (SSD).

5.3 Potential ecological impacts

The direct, indirect and cumulative ecological impacts have been considered in respect to recorded biodiversity, threatening processes and extent of impact as a result of the proposed works. For the planning proposal, we have assumed that most vegetation within 3 m of the proposed outer building edge (or existing building edge if the footprint is not expanded) is likely to be impacted by construction vehicles and traffic. Most trees within that zone of influence will be removed, however many may be subject to further assessment at the DA stage and final plans. The total impact as stated below is an estimate based on the planning proposal.

5.3.1 Direct impacts

The direct impacts of the proposal within the development footprint are considered as:

- Removal of 0.121 ha of native vegetation commensurate with highly disturbed PCT 1237 - Blue Gum High Forest (TEC) (estimate only subject to final proposed layout),

- Removal of a stag containing at least two (2) small (0-5 cm) hollow entrances with considered habitat potential,
- Shading of retained vegetation, particularly on the southern aspect, may limit growth and regeneration,
- Estimated loss of approximately 17 trees subject to a final detailed arborist report and proposed layout. Tree loss may be partly compensated through native species landscaping.

5.3.2 Indirect impacts

The potential indirect impacts of the proposal are considered as:

- Edge effects such as weed incursions caused from soil disturbance, repeated clearing and landscaping species becoming a nuisance in the adjacent remnant bushland.
- Increased soil nutrients from changes to runoff that may provide further opportunities for weed plumes,

5.3.3 Cumulative impacts

The potential cumulative impacts (combined results of past, current and future activities) of the proposal are considered as:

- Cumulative loss of Blue Gum High Forest
- Increased risk of weed invasion and fungal mobilisation or infections
- Cumulative loss of foraging and roosting habitat for native fauna

5.3.4 Serious & Irreversible Impacts (SAlls)

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community most at risk of extinction. Threatened species and communities that are potential for serious and irreversible impacts are outlined in Appendix 2 of *Guidance to assist a decision-maker to determine a serious and irreversible impact* (DPIE 2017). The principles for determining serious and irreversible impacts are set out under Section 6.7.2 of the *BC Reg*. Assessment of potential SAll entities must be included within any BDAR prepared for future DA.

SAll entities recorded or with potential to occur within the study area include:

Table 5 – SAll species recorded or with potential to occur

Species / TEC (Scientific Name)	Species (Common Name)	BC Act	Potential to occur	Impact
Blue Gum High Forest	-	CE	recorded	Removal of 0.121 ha
<i>Anthochaera phrygia</i>	Regent honeyeater	CE	Y	Removal of potential foraging habitat
<i>Lathamus discolor</i>	Swift parrot	E	Y	Removal of potential foraging habitat
<i>Miniopterus schreibersii</i> subsp. <i>oceanensis</i>	Large Bent-winged Bat	V	Y	Removal of potential roosting habitat

Species / TEC (Scientific Name)	Species (Common Name)	BC Act	Potential to occur	Impact
<i>Chalinolobus dwyeri</i>	Large-eared pied-bat	V	Y	Removal of potential roosting habitat
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	Y	Removal of potential roosting habitat

5.4 Avoidance actions

The following avoidance actions have been undertaken to either avoid or minimise impacts on biodiversity values:

- development has been located to maximise usage of the exiting building footprint, already cleared areas, and to minimise impacts on native vegetation,
- approximately 17 trees would be removed for the proposal as these are mostly within the development footprint or the tree protection zones would be too far impacted to be retained in a safe manner. This generally means that most of the trees within the first 3 m of the future building would be removed. The younger trees in the north-western portion of the site which have not been assessed as they should not be impacted by the proposal, they will be retained. There are approximately 30-40 trees in this small area that may be utilised as a future pocket park. New plantings will be established as part of the future landscaping works to provide additional visual amenity and to counterbalance some of the trees that would be removed. All tree plantings are to be of Blue Gum High Forest origin.

5.5 Mitigation measures

The following mitigation measures are recommended to avoid, minimise or ameliorate the above potential ecological impacts, address threatening processes and to guide a more positive ecological outcome for threatened species and their associated habitats.

Action / Technique	Outcome	Timing / Frequency	Responsibility
(a) Sediment and erosion control measures in accordance with Managing Urban Stormwater: Soils and Construction (Landcom 2004) to minimise impact of possible sedimentation to local drainage lines.	Maintain integrity of nearby bushland habitat and natural topsoil soil by preventing deposition	Prior to any clearing works. Ongoing during all exposed soil stages until landscaping is completed	Project Ecologist / Contractors
(b) Temporary fencing - Where they adjoin the development areas, the boundaries of the conserved vegetation areas shall be clearly marked out on-site to ensure their protection. All areas of natural vegetation retention shall be protected by fencing, prior to construction, to ensure that these areas are not damaged during the construction phase.	Maintain integrity of remaining natural habitat	Prior to construction / habitat clearance	Project Ecologist / Contractors
(c) Prior to any habitat removal, a comprehensive search for fauna and habitat is to be undertaken to relocate any terrestrial individuals and identify any important nesting to be protected until fledging.	Reduce potential for impact on native species	Immediately prior to land clearance	Project Ecologist
(d) Management of hollows and hollow-dependent fauna: <ul style="list-style-type: none"> The felling of hollow-bearing trees is to be conducted under the supervision of a fauna ecologist to ensure appropriate animal welfare procedures are taken, particularly for threatened species. Hollows of high quality or with fauna recorded residing within should be dismantled for relocation and all hollows should be inspected for occupation, signs of previous activity and potential for reuse. 	Protection of hollow-dependent wildlife	At time of removal. Note, that no hollow-bearing trees were observed in the development footprint at the time of survey, however they may appear after storm activity breaks through a trunk or branch	Project Ecologist

Action / Technique	Outcome	Timing / Frequency	Responsibility
<ul style="list-style-type: none"> Subsequent hollows of retention value are to be relocated to nearby conserved habitat areas. If these are placed as on ground habitat and are not reattached to a new recipient tree then they are to be replaced with appropriately sized nest boxes affixed to a retained tree. 	Maintain quality denning / hollow shelter opportunities	At time of removal	Project Ecologist
<ul style="list-style-type: none"> Constructed nest boxes should as priority target recorded hollow-dependent threatened species (and their prey species). Boxes should be constructed all of weatherproof timber (marine ply), fasteners and external paint and appropriately affixed to a recipient tree under the guidance of a fauna ecologist. 	Protection of hollow-dependent wildlife	Prior to hollow removal	Project Ecologist
<ul style="list-style-type: none"> If a threatened species is found to be occupying the hollow at the time of removal then this hollow section is to be reattached to a recipient tree within the nearby conservation areas as selected and directed by the fauna ecologist. The welfare and temporary holding of the residing animal(s) is at the discretion of the fauna ecologist. 	Priority protection of hollow-dependent threatened species	At time of removal	Project Ecologist
<ul style="list-style-type: none"> The relocated hollow section and nest boxes should be well secured in the recipient tree in a manner that will not compromise the current or future health of that tree. 	Ensure hollow integrity is maintained	Time of installation	Project Ecologist
<ul style="list-style-type: none"> Monitoring of nest boxes and relocated hollows 	Ensure hollow integrity is maintained	Each year for 5 years	Project Ecologist
(e) Management of any other displaced fauna	Prevent direct impacts on nesting and terrestrial native fauna species	Prior to and during habitat removal / Adaptive management required	Project Ecologist
(f) If any fauna species, a nest or roost is located during development works, then works should cease until safe relocation can be advised by a contact fauna ecologist	Prevent direct impacts on nesting and terrestrial native fauna species	At time of removal / Adaptive management required	Project Ecologist / Contractors

6. SUITABILITY OF THE PROPOSAL

Given that the existing land use zoning is mapped as B5 – Business Development, the proposal is appropriate in terms of its usage. This indicative development concept will largely be contained within the existing building footprint, in addition to mitigation measures being designed to limit the impact of the proposal on biodiversity in the locality. These measures include:

- Protection of remnant BGHF within the study area, including tree protection measures and restoration of understorey vegetation. A pocket park of vegetation is to be maintained around the City View Road / Boundary Road intersection that will retain close to 50 trees and may include further native species planting for further enhancement.
- Ongoing monitoring and compliance monitoring of vegetation integrity specific to BGHF / *PCT 1237*.
- A fauna management program, aimed at protecting local native fauna while controlling invasive species such as Indian Mynas.

7. CONCLUSION

Ecological survey and assessment has been undertaken in accordance with relevant legislation including the *Environmental Planning and Assessment Act 1979*, the *Biodiversity Conservation Act 2016*, the commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the *Fisheries Management Act 1994*.

In respect of matters required to be considered under the *Environmental Planning and Assessment Act 1979* and relating to the species and provisions of the *Biodiversity Conservation Act 2016*, no threatened fauna species, no threatened flora species, no endangered populations and one (1) TEC, Blue Gum High Forest, were recorded within the study area.

The state assessment of significance (Appendix 3) has concluded that the proposal will not have a significant impact on any threatened species, populations or TECs. Therefore, a Species Impact Statement is not required for the proposal.

Offsetting under the Biodiversity Offsets Scheme (BOS) is required for the proposal as the study area is located on lands mapped as Biodiversity Values Land (Figure 10).

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation Act 1999*, no threatened fauna species, no protected migratory bird species and no threatened flora species. One (1) TEC, Blue Gum High Forest, was recorded within the study area.

The proposal was not considered to have a significant impact on matters of national environmental significance. As such a referral to Department of Agriculture, Water and the Environment should not be required.

In respect of matters relative to the *Fisheries Management Act 1994*, no suitable habitat for threatened marine or aquatic species was observed within the development footprint and there are no matters requiring further consideration under this Act.

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Appendix 1. Flora & Fauna Species Lists

Table 6 – Flora species recorded (Appendix 1)

Family	Scientific name	Common name
TREES		
Myrtaceae	<i>Acmena smithii</i>	Lillypilly
Myrtaceae	<i>Angophora floribunda</i>	Rough-barked Apple
Arecaceae	<i>Archontophoenix alexandrae</i>	Alexandra Palm
Sterculiaceae	<i>Brachychiton acerifolius</i>	Illawarra Flame Tree
Casuarinaceae	<i>Casuarina glauca</i>	Swamp Oak
Ulmaceae	<i>Celtis sinensis</i> *	Chinese Hackberry
Lauraceae	<i>Cinnamomum camphora</i> *	Camphor Laurel
Myrtaceae	<i>Corymbia maculata</i>	Spotted Gum
Cyatheaceae	<i>Cyathea australis</i>	Rough Tree-fern
Eleocarpaceae	<i>Elaeocarpus reticulatus</i>	Blueberry Ash
Fabaceae	<i>Erythrina sykesii</i> *	Coral Tree
Myrtaceae	<i>Eucalyptus acmenoides</i>	White Mahogany
Myrtaceae	<i>Eucalyptus paniculata</i> subsp. <i>paniculata</i>	Grey Ironbark
Myrtaceae	<i>Eucalyptus pilularis</i>	Blackbutt
Myrtaceae	<i>Eucalyptus robusta</i>	Swamp Mahogany
Myrtaceae	<i>Eucalyptus saligna</i>	Sydney Blue Gum
Proteaceae	<i>Grevillea robusta</i>	Silky Oak
Bignoniaceae	<i>Jacaranda mimosifolia</i> *	Jacaranda
Arecaceae	<i>Livistona australis</i>	Cabbage Tree Palm
Myrtaceae	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark
Meliaceae	<i>Melia azedarach</i> var. <i>australasica</i>	White Cedar
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet Pittosporum
Araliaceae	<i>Schefflera actinophylla</i> *	Umbrella Tree
Myrtaceae	<i>Syncarpia glomulifera</i>	Turpentine
Myrtaceae	<i>Syzygium</i> sp.	-
SHRUBS		
Mimosaceae	<i>Acacia floribunda</i>	Sally Wattle
Buxaceae	<i>Buxus</i> sp.	Box
Rutaceae	<i>Coleonema pulchellum</i> *	Pink Diosma
Oleaceae	<i>Ligustrum lucidum</i> *	Large-leaved Privet
Oleaceae	<i>Ligustrum sinense</i> *	Small-leaved Privet
Berberidaceae	<i>Nandina domestica</i> 'Nana'	Dwarf Sacred Bamboo
Ochnaceae	<i>Ochna serrulata</i> *	Mickey Mouse Plant
Oleaceae	<i>Olea europaea</i> subsp. <i>cuspidata</i> *	African Olive
Phytolaccaceae	<i>Phytolacca octandra</i> *	Inkweed
Euphorbiaceae	<i>Ricinus communis</i> *	Castor Oil Plant
Fabaceae	<i>Senna pendula</i> var. <i>glabrata</i> *	-
Solanaceae	<i>Solanum mauritianum</i> *	Wild Tobacco
Cannabaceae	<i>Trema tomentosa</i>	Native Peach, Poison Peach
GROUNDCOVERS		

Family	Scientific name	Common name
Polygonaceae	<i>Acetosa sagittata</i> *	Turkey Rhubarb
Liliaceae	<i>Agapanthus praecox</i> *	Agapanthus
Asparagaceae	<i>Asparagus aethiopicus</i> *	Asparagus Fern
Poaceae	<i>Avena fatua</i> *	Wild Oats
Asteraceae	<i>Bidens pilosa</i> *	Cobbler's Pegs
Brassicaceae	<i>Brassica juncea</i> *	Mustard weed
Poaceae	<i>Bromus cartharticus</i> *	Prairie Grass
Gentianaceae	<i>Centaurium erythraea</i> *	Pink Stars
Asteraceae	<i>Cirsium vulgare</i> *	Spear Thistle
Commelinaceae	<i>Commelina cyanea</i>	Native Wandering Jew
Asteraceae	<i>Conyza bonariensis</i> *	Flaxleaf Fleabane
Asteraceae	<i>Conyza sumatrensis</i> *	Fleabane
Apiaceae	<i>Cyclospermum leptophyllum</i> *	Slender Celery
Cyperaceae	<i>Cyperus eragrostis</i> *	Umbrella Sedge
Phormiaceae	<i>Dianella caerulea</i> var. <i>caerulea</i>	Flax Lily
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed
Iridaceae	<i>Dietes grandiflora</i> *	Wild iris
Poaceae	<i>Echinochloa crus-galli</i> *	Barnyard Grass
Poaceae	<i>Ehrharta erecta</i> *	Panic Veldtgrass
Chenopodiaceae	<i>Einadia hastata</i>	Berry Saltbush
Chenopodiaceae	<i>Einadia polygonoides</i>	-
Asteraceae	<i>Erechtites valerianifolia</i> *	Brazilian Fireweed
Euphorbiaceae	<i>Euphorbia peplus</i> *	Spurge
Fumariaceae	<i>Fumaria muralis</i> *	Wall Fumitory
Asteraceae	<i>Gamochaeta calviceps</i> *	-
Geraniaceae	<i>Geranium homeanum</i>	Northern Cranesbill
Poaceae	<i>Imperata cylindrica</i> var. <i>major</i>	Blady Grass
Asteraceae	<i>Lactuca serriola</i> *	Prickly Lettuce
Primulaceae	<i>Lysimachia arvensis</i> *	Scarlet Pimpernel
Malvaceae	<i>Malva sylvestris</i> *	Tall Mallow
Fabaceae	<i>Medicago polymorpha</i> *	Burr Medic
Poaceae	<i>Microlaena stipoides</i>	Weeping grass
Malvaceae	<i>Modiola caroliniana</i> *	Red-flowered Mallow
Poaceae	<i>Oplismenus aemulus</i>	Basket Grass
Oxalidaceae	<i>Oxalis corniculata</i> *	Yellow Wood Sorrel
Oxalidaceae	<i>Oxalis latifolia</i> *	Pink Fishtail
Euphorbiaceae	<i>Phyllanthus tenellus</i> *	-
Plantaginaceae	<i>Plantago lanceolata</i> *	Ribwort
Polygonaceae	<i>Rumex crispus</i> *	Curled Dock
Poaceae	<i>Rytidosperma</i> sp.	-
Malvaceae	<i>Sida rhombifolia</i> *	Paddy's Lucerne
Asteraceae	<i>Sigesbeckia orientalis</i>	Indian Weed
Solanaceae	<i>Solanum americanum</i>	Glossy Nightshade
Solanaceae	<i>Solanum nigrum</i> *	Black Nightshade
Asteraceae	<i>Soliva sessilis</i> *	Jojo
Asteraceae	<i>Sonchus oleraceus</i> *	Common Sow-thistle

Family	Scientific name	Common name
Asteraceae	<i>Taraxacum officinale</i> *	Dandelion
Commelinaceae	<i>Tradescantia fluminensis</i> *	Wandering Jew
Scrophulariaceae	<i>Verbascum virgatum</i> *	Twiggy Mullein
Agavaceae	<i>Yucca aloifolia</i> *	-
Asteraceae	<i>Sigesbeckia orientalis</i>	Indian Weed
VINES		
Basellaceae	<i>Anredera cordifolia</i> *	Madeira Vine
Apocnyaceae	<i>Araujia sericifera</i> *	Mothvine
Vitaceae	<i>Cayratia clematidea</i>	Native Grape
Vitaceae	<i>Cissus antarctica</i>	Kangaroo Vine
Araliaceae	<i>Hedera helix</i> *	English Ivy
Convolvulaceae	<i>Ipomoea indica</i> *	Blue Morning Glory
Fabaceae	<i>Vicia sativa</i> subsp. <i>sativa</i> *	Common Vetch
* denotes exotic species		

It should be noted that not all garden, cultivar or landscape species have been identified as part of this assessment.

Table 7 – Fauna species recorded (Appendix 1)

Common name	Scientific name	Method observed
Birds		23/08/21
Australian King Parrot	<i>Alisterus scapularis</i>	O W
Australian Magpie	<i>Cracticus tibicen</i>	W
Grey Butcherbird	<i>Cracticus torquatus</i>	W
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	O
Noisy Miner	<i>Manorina melanocephala</i>	O W
Pied Currawong	<i>Strepera graculina</i>	O W
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	O W
Sulphur Crested Cockatoo	<i>Cacatua galerita</i>	O W
Mammals		
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	U ^{PR}
All species listed are identified to a high level of certainty unless otherwise noted as:		
^{PR} indicates species identified to a 'probable' level of certainty – more likely than not		
E - Nest/roost	H - Hair/feathers/skin	P - Scat
F-Tracks/scratchings	K- Dead	Q- Camera
FB - Burrow	O - Observed	T - Trapped/netted
G - Crushed cones	OW- Obs & heard call	U- Anabat/ultrasound

Appendix 2. Threatened Flora & Fauna Habitat Assessment

Table 8 – Threatened flora species habitat assessment (Appendix 2)

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Acacia bynoeana</i> DPIE EPBC	E1	V	Erect or spreading shrub to 0.3m high growing in heath and dry sclerophyll open forest on sandy soils. Often associated with disturbed areas such as roadsides. <i>Distribution limits N-Newcastle S-Berrima.</i>	no	poor	4 km W	2014	unlikely	yes
<i>Acacia clunes-rossiae</i> DPIE EPBC	V	-	Shrub to 2m tall, flowering in September. Grows in dry sclerophyll forest in valleys and on rocky slopes from the Kowmung River and adjacent Coxs River district.	no	no	n/a	n/a	no	no
<i>Acacia pubescens</i> DPIE	V	V	Spreading shrub 1-4m high open sclerophyll growing in open forest and woodlands on clay soils. <i>Distribution limits N-Bilpin S-Georges River.</i>	no	no	n/a	n/a	no	no
<i>Acacia terminalis</i> subsp. <i>terminalis</i> DPIE	E1	E	Erect shrub to 2m tall, flowers from March to July. Occurs in eucalypt woodland or forest, usually in sandy soil on creek banks, hillslopes or in shallow soil in rock crevices and sandstone platforms on cliffs. <i>Typically restricted to the Port Jackson and eastern suburbs of Sydney.</i>	no	no	n/a	n/a	no	no
<i>Allocasuarina glareicola</i> EPBC	E1	E	Small shrub 1-2m high growing in open sclerophyll forest on lateritic soils derived from tertiary alluviums. <i>Distribution limits Castlereagh NR region.</i>	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Asterolasia elegans</i> EPBC	E1	E	Erect shrub 1-3m high growing in moist sclerophyll forests on Hawkesbury sandstone slopes hillsides. <i>Distribution limits Maroota region.</i>	no	no	n/a	n/a	no	no
<i>Caladenia tessellata</i> EPBC	E1	V	Terrestrial orchid. Clay-loam or sandy soils. LHCCREMS guidelines suggest the species grows in Map Unit 34 – Coastal Sand Wallum Woodland - Heath. Flowers in September – November. <i>Distribution limits N-Swansea S-south of Eden.</i>	no	no	n/a	n/a	no	no
<i>Callistemon linearifolius</i> DPIE	V	-	Shrub to 4m high. Dry sclerophyll forest on coast and adjacent ranges. <i>Distribution limits N-Nelson Bay S-Georges River.</i>	no	Poor	no	yes	unlikely	yes
<i>Camarophyllopsis kearneyi</i> DPIE	E1	-	Small gilled fungus. <i>Known only from Lane Cove Bushland Park in Sydney.</i>	no	no	n/a	n/a	no	no
<i>Cryptostylis hunteriana</i> DPIE EPBC	V	V	Saprophytic orchid. Grows in swamp heath on sandy soils. <i>Distribution limits N-Gibraltar Range S-south of Eden.</i>	no	no	n/a	n/a	no	no
<i>Cynanchum elegans</i> EPBC	E1	E	Climber or twiner to 1m. Grows in rainforest gullies, scrub & scree slopes. <i>Distribution limits N-Gloucester S-Wollongong.</i>	no	no	n/a	n/a	no	no
<i>Darwinia biflora</i>	V	V	Erect or spreading shrub to 0.8m high. Grows in heath or understorey of woodland on or near shale-	no	poor	900 m S	yes	unlikely	yes

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
DPIE EPBC			capped ridges underlain by Hawkesbury sandstone. <i>Distribution limits N-Gosford S-Cheltenham.</i>						
<i>Darwinia peduncularis</i> DPIE	V	-	Divaricate shrub to 1.5m high. Grows in dry sclerophyll forest on sandstone hillsides and ridges. <i>Distribution limits N-Glen Davis S-Hornsby.</i>	no	no	n/a	n/a	no	no
<i>Deyeuxia appressa</i> DPIE EPBC	E1	E	Erect grass to 0.9m high. Grows on wet ground. <i>Distribution limits N-Hornsby S-Bankstown.</i>	no	no	n/a	n/a	no	no
<i>Dillwynia tenuifolia</i> DPIE	V	-	Erect shrub 0.6-1m high. Grows in woodlands and open forest on sandstone shale or laterite. <i>Distribution limits N-Howes Valley S-Cumberland Plain.</i>	no	no	n/a	n/a	no	no
<i>Epacris purpurascens</i> var. <i>purpurascens</i> DPIE	V	-	Erect shrub to 1.5m high growing in sclerophyll forest and scrub and near creeks and swamps on sandstone. <i>Distribution limits N-Gosford S-Blue Mountains.</i>	no	sub-optimal	2km NE	yes	low	yes
<i>Eucalyptus camfieldii</i> DPIE EPBC	V	V	Stringybark to 10m high. Grows on coastal shrub heath and woodlands on sandy soils derived from alluviums and Hawkesbury sandstone. <i>Distribution limits N-Norah Head S-Royal NP.</i>	no	no	n/a	n/a	no	no
<i>Eucalyptus nicholii</i> DPIE	V	-	This species is widely planted as an urban street tree and in gardens but is quite rare in the wild. <i>It is confined to the New England Tablelands of</i>	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
			NSW, where it occurs from Nundle to north of Tenterfield, largely on private property.						
<i>Eucalyptus scoparia</i> DPIE	E1	V	Smooth-barked tree only known from vicinity of Bald Rock.	no	no	n/a	n/a	no	no
<i>Eucalyptus</i> sp. Cattai DPIE	E1	-	Tree to 4.5m high. Rare emergent in scrub heath and low woodland on sandy soils usually flat areas or ridge tops. <i>Distribution limits N-Colo Heights S-Castle Hill.</i>	no	no	n/a	n/a	no	no
<i>Galium australe</i> DPIE EPBC	E1	-	Tangled Bedstraw is a straggling and inter-twining herb with weak, hairy stems to 60 cm long. The leaves are in whorls of four; each is up to 12 mm long by 4 mm wide. Has been recorded in Turpentine forest and coastal Acacia shrubland.	no	no	n/a	n/a	no	no
<i>Genoplesium baueri</i> DPIE EPBC	E1	E	A terrestrial orchid that grows in sparse sclerophyll forest and moss gardens over sandstone. Flowers Feb–Mar. <i>Distribution limits N – Hunter Valley S – Nowra.</i>	no	no	n/a	n/a	no	no
<i>Genoplesium plumosum</i> DPIE	CE	E	Terrestrial Orchid that grows on shallow soils exclusively in heathland, generally dominated by Violet Kunzea (<i>Kunzea parvifolia</i>), Common Fringe-myrtle (<i>Calytrix tetragona</i>) and parrot-peas (<i>Dillwynia</i> spp.). Flowers late Feb – Mar. <i>Tallong area and Moreton NP.</i>	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Grammitis stenophylla</i> DPIE	E1	-	A small lithophytic fern with fronds generally <5cm. Occurs in rainforest and wet sclerophyll forest in the coastal divisions of NSW. Usually grown on rocks.	no	no	n/a	n/a	no	no
<i>Grevillea caleyi</i> DPIE	E1	E	Shrub mostly 1-3m high. Grows in laterite. Distribution limits Terrey Hills-Belrose area.	no	no	n/a	n/a	no	no
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> DPIE	V	-	Erect to spreading shrub 0.5-1.5m tall. Grows on laterite and Tertiary alluvium. Distribution limits St Marys-Londonderry-Prospect.	no	no	n/a	n/a	no	no
<i>Haloragis exalata</i> subsp. <i>exalata</i> DPIE EPBC	V	V	Shrub to 1.5m high. Grows in damp places near watercourses. Distribution limits N-Tweed Heads S-south of Eden.	no	no	n/a	n/a	no	no
<i>Haloragodendron lucasii</i> DPIE EPBC	E1	E	Straggling shrub to 1.5m high. Grows in open forest on sheltered slopes near creeks. Distribution limits Ku-ring-gai Plateau and Mt Wilson.	no	no	n/a	n/a	no	no
<i>Hibbertia spanantha</i> DPIE	E4 A	CE	Grows in forest with canopy species including <i>E. pilularis</i> , <i>E. resinifera</i> , <i>C. gummifera</i> and <i>A. costata</i> . The understorey is open with species of Poaceae, Orchidaceae, Fabaceae and Liliaceae. Flowers Oct-Nov with odd flowers throughout the year. Substrate is identified as a light clay occurring on a shale sandstone soil transition.	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Hibbertia superans</i> DPIE	E1	-	Small spreading shrub to 0.3m high. Grows on sandstone, usually in or near SSTF. <i>Distribution limits N-Glenorie S-Kellyville disjunct Mt Boss.</i>	no	sub-optimal	6km SW	2015	unlikely	yes
<i>Hygrocybe austropratensis</i> DPIE	E1	-	Small gilled fungus known only from Lane Cove Bushland Park.	no	no	n/a	n/a	no	no
<i>Hygrocybe anomala</i> var. <i>inanthinomarginata</i> DPIE	V	-	Small gilled fungus known only from Lane Cove Bushland Park, Blue Mountains National Park and Royal National Park.	no	no	n/a	n/a	no	no
<i>Hygrocybe aurantipes</i> DPIE	V	-	Small gilled fungus known only from Lane Cove Bushland Park and Blue Mountains National Park.	no	no	n/a	n/a	no	no
<i>Hygrocybe lanecovens</i> DPIE	E1	-	Small gilled fungus known only from Lane Cove Bushland Park.	no	no	n/a	n/a	no	no
<i>Hygrocybe reesia</i> DPIE	V	-	Small gilled fungus known only from Lane Cove Bushland Park and Blue Mountains National Park on moss covered banks under closed canopy.	no	no	n/a	n/a	no	no
<i>Hygrocybe rubronivea</i>	V	-	Known in a few locations including in Lane Cove Bushland Park and the Blue Mountains in NSW and in areas of south-east Queensland. Little	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
DPIE			<p>information exists for populations outside Lane Cove Bushland Park. Occurs in gallery warm temperate forests dominated by <i>Acmena smithii</i>, <i>Backhousia myrtifolia</i>, <i>Glochidion ferdinandi</i> and <i>Pittosporum undulatum</i>.</p> <p>Associated with alluvial sandy soils of the Hawkesbury Soil Landscapes.</p> <p>Occur as individuals or in groups, terrestrial rarely on wood and only if extremely rotten; substrates include soil, humus, or moss.</p> <p>Does not produce above ground fruiting bodies (fungus) all year round. Fruiting bodies begin appearing mid May to mid-July sometimes to August.</p>						
<i>Kunzea rupestris</i> DPIE	V	V	<p>Shrub to 1.5m high. Grows in cracks and fissures on Hawkesbury Sandstone rock platforms.</p> <p><i>Distribution limits N-Maroota S-Glenorie.</i></p>	no	no	n/a	n/a	no	no
<i>Lasiopetalum joyceae</i> DPIE EPBC	V	V	<p>Erect shrub to 2m high. Grows in heath and open forest on Hawkesbury sandstone. <i>Distribution limits Hornsby Plateau.</i></p>	no	no	n/a	n/a	no	no
<i>Leptospermum deanei</i> DPIE EPBC	V	V	<p>Shrub to 5m high. Grows on forested slopes.</p> <p><i>Distribution limits near watershed of Lane Cove River.</i></p>	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> DPIE	E1	-	Shrub to 1.8m high growing in woodland on lateritic soils. Distribution limits N-St Albans S-Springwood.	no	no	n/a	n/a	no	no
<i>Melaleuca biconvexa</i> DPIE EPBC	V	V	Tall shrub. Grows in wetlands adjoining perennial streams and on the banks of those streams, generally within the geological series known as the Terrigal Formation. <i>Distribution limits N-Port Macquarie S-Jervis Bay.</i>	no	no	n/a	n/a	no	no
<i>Melaleuca deanei</i> DPIE EPBC	V	V	Shrub to 3m high. Grows in heath on sandstone. <i>Distribution limits N-Gosford S-Nowra.</i>	no	no	n/a	n/a	no	no
<i>Persoonia hirsuta</i> DPIE EPBC	E1	E	Erect to decumbent shrub. Grows in dry sclerophyll forest and woodland on Hawkesbury sandstone with infrequent fire histories. <i>Distribution limits N-Glen Davis S-Hill Top.</i>	no	no	n/a	n/a	no	no
<i>Persoonia mollis</i> subsp. <i>maxima</i> DPIE EPBC	E1	E	Erect to prostrate shrub. Grows in moist to wet sclerophyll forests on Hawkesbury sandstone. <i>Distribution limits N-Cowan S-Hornsby.</i>	no	no	n/a	n/a	no	no
<i>Pimelea curviflora</i> var. <i>curviflora</i> DPIE EPBC	V	V	Woody herb or sub-shrub to 0.2-1.2m high. Grows on Hawkesbury Sandstone near shale outcrops. <i>Distribution Sydney.</i>	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Pimelea spicata</i> DPIE EPBC	E1	E	Decumbent or erect shrub to 0.5m high. Occurs principally in woodland on soils derived from Wianamatta Shales. <i>Distribution limits N-Lansdowne S-Shellharbour.</i>	no	no	n/a	n/a	no	no
<i>Pomaderris brunnea</i> DPIE	V	V	Shrub to 3m high. <i>Confined to Upper Nepean and Colo Rivers where it grows in open forest.</i>	no	no	n/a	n/a	no	no
<i>Prostanthera marifolia</i> DPIE	E4 A	CE	Erect shrub to 0.3m high. Woodland dominated by Eucalyptus sieberi and Corymbia gummifera. In deeply weathered clay soil with ironstone nodules. <i>Has been recorded previously in the Sydney Harbour region.</i>	no	no	n/a	n/a	no	no
<i>Pterostylis nigricans</i> DPIE	V	-	Terrestrial orchid. Prefers coastal heathland with Heath Banksia (Banksia ericifolia), and lower-growing heath with lichen-encrusted and relatively undisturbed soil surfaces, on sandy soils. <i>The Dark Greenhood occurs in north-east NSW north from Evans Head, and in Queensland.</i>	no	no	n/a	n/a	no	no
<i>Pterostylis saxicola</i> DPIE EPBC	E1	E	Terrestrial orchid. Grows in shallow sandy soil above rock shelves, usually near Wianamatta / Hawkesbury transition. <i>Distribution limits N-Hawkesbury River S-Campbelltown.</i>	no	no	n/a	n/a	no	no
<i>Rhizanthella slateri</i> DPIE EPBC	V	E	Underground orchid that is poorly known. Grows in sclerophyll forests. Usually only seen if the soil is disturbed. Flowers in Oct – Nov.	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
<i>Rhodamnia rubescens</i> DPIE	E4 A	-	Shrub to small tree to 25m tall. Widespread in warmer rainforest and on rainforest margins on range of volcanically derived and sedimentary soils. Mainly coastal areas; north from Batemans Bay. Flowers late winter to spring.	no	no	n/a	n/a	no	no
<i>Syzygium paniculatum</i> DPIE EPBC	V	V	Small tree. Subtropical and littoral rainforest on sandy soil. <i>Distribution limits N-Forster S-Jervis Bay.</i>	no	sub-optimal	700 m NE	yes	low	yes
<i>Tetradlea glandulosa</i> DPIE	V	-	Spreading shrub to 0.2m high. Sandy or rocky heath or scrub. <i>Distribution limits N-Mangrove Mountain S-Port Jackson.</i>	no	no	n/a	n/a	no	no
<i>Thesium australe</i> EPBC	V	V	Erect herb to 0.4m high. Root parasite. Themeda grassland or woodland often damp. <i>Distribution limits N-Tweed Heads S-south of Eden.</i>	no	no	n/a	n/a	no	no
<i>Triplarina imbricata</i> DPIE	E1	E	A shrub to 2.8m tall, flowers from Nov-Dec. Occurs in heath, often in damp places along creek lines; coast and adjacent ranges. <i>Known from the Tabulum and Nymboida districts in NE NSW.</i>	no	no	n/a	n/a	no	no
<i>Wilsonia backhousei</i> DPIE	V	-	Perennial subshrub with procumbent branches. Grows in coastal saltmarshes. <i>Wilsonia backhousei</i> is salt tolerant and is found in intertidal saltmarshes and, more rarely, on	no	no	n/a	n/a	no	no

Scientific name DATABASE SOURCE	BC Act	EPBC Act	Growth form and habitat requirements Distribution limit	Recorded on site (y/n)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (y/n)	Nearby and / or high number of record(s) (y/n) Notes 1,2 & 3	Record(s) from recent years (y/n) Notes 1,2 & 3	Potential to occur	
			seacliffs. In New South Wales <i>Wilsonia backhousei</i> is scattered along the coast, reaching a northern limit at Wamberal Lagoon. In the Sydney region there has been a considerable decline in the abundance of the species over the last 100yrs, largely as a result of loss of habitat. <i>Distribution limits N-Sydney S-South of Eden.</i>						
<i>Zannichellia palustris</i> DPIE	E1	-	Submerged herb. Fresh or slightly saline stationary or slow-flowing water. <i>Distribution limits N-Tweed Heads S-Newcastle.</i>	no	no	n/a	n/a	no	no
DPIE	- Denotes species listed within 10 km of the development footprint on the Atlas of NSW Wildlife								
EPBC	- Denotes species listed within 10 km of the development footprint in the <i>EPBC Act</i> habitat search								
V	- Denotes vulnerable listed species under the relevant Act								
E or E1	- Denotes endangered listed species under the relevant Act								
E4a or CE	- Denotes critically endangered listed species under the relevant Act								
NOTE:	This field is not considered if no suitable habitat is present within the development footprint 'records' refer to those provided by the Atlas of NSW Wildlife 'nearby' or 'recent' records are species specific accounting for home range, dispersal ability and life cycle								

Table 9 – Threatened fauna species habitat assessment (Appendix 2)

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (Y/N)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (Y/N)	Nearby and/or high number of record(s) (Y/N) <i>Notes 1,2 & 3</i>	Record(s) from recent years (Y/N) <i>Notes 1,2 & 3</i>	Potential to occur	
Giant Burrowing Frog <i>Heleioporus australiacus</i> BVC	V	V	Inhabits open forests and riparian forests along non-perennial streams, digging burrows into sandy creek banks. <i>Distribution limit: N-Near Singleton S-South of Eden.</i>	N	N	N/A	N/A	Not likely	N
Stuttering Frog <i>Mixophyes balbus</i> BVC	E	V	Terrestrial inhabitant of rainforest and wet sclerophyll forests. <i>Distribution limit: N-near Tenterfield S-South of Bombala.</i>	N	N	N/A	N/A	Not likely	N
Giant Barred Frog <i>Mixophyes iteratus</i> BVC	E	E	Terrestrial inhabitant of rainforest and open forests. <i>Distribution limit: N-Border Ranges National Park. S-Narooma.</i>	N	N	N/A	N/A	Not likely	N
Red-crowned Toadlet <i>Pseudophryne australis</i> BVC	V	-	Prefers sandstone areas, breeds in grass and debris beside non-perennial creeks or gutters. Individuals can also be found under logs and rocks in non-breeding periods. <i>Distribution limit: N-Pokolbin. S-near Wollongong.</i>	N	N	N/A	N/A	Not likely	N
Green and Golden Bell Frog <i>Litoria aurea</i> BVC	E	V	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. <i>Distribution limit: N-Byron Bay S-South of Eden.</i>	N	N	N/A	N/A	Not likely	N
Green-thighed Frog <i>Litoria brevipalmata</i> BVC	V	-	Found in rainforests and open forests within or at the edge of streams, swamps, lagoons, dams and ponds. <i>Distribution limit: N-Border Ranges National Park. S-Near Gosford.</i>	N	N	N/A	N/A	Not likely	N

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (Y/N)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (Y/N)	Nearby and/or high number of record(s) (Y/N) <i>Notes 1,2 & 3</i>	Record(s) from recent years (Y/N) <i>Notes 1,2 & 3</i>	Potential to occur	
Rose-crowned Fruit-dove <i>Ptilinopus regina</i> DPIE	V	-	Occurs in dense rainforests with a substantial understorey where it feeds entirely on fruit. <i>Distribution limit: N-Tweed Heads. S-Wollongong.</i>	N	N	N/A	N/A	Not likely	N
Superb Fruit-dove <i>Ptilinopus superbus</i> BVC	V	-	Rainforests, adjacent mangroves, eucalypt forests, scrubland with native fruits. <i>Distribution limit: N-Border Ranges National Park. S-Batemans Bay.</i>	N	N	N/A	N/A	Not likely	N
Little Eagle <i>Hieraaetus morphnoides</i> BVC	V	-	Utilises plains, foothills, open forests, woodlands and scrublands; river red gums on watercourses and lakes. <i>Distribution limit - N-Tweed Heads. S-South of Eden.</i>	N	Y	Y	Y	Y	N
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> BVC	V	-	Prefers wetter forests and woodlands from sea level to > 2,000m on the Great Dividing Range, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. <i>Distribution limit: mid north coast of NSW to western Victoria.</i>	N	Y	Y	Y	Y	N
Glossy Black-Cockatoo <i>Calyptrorhynchus lathamii</i> BVC	V	-	Open forests with <i>Allocasuarina</i> species and hollows for nesting. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	N	N	N/A	N/A	Not likely	N
Little Lorikeet <i>Glossopsitta pusilla</i> BVC	V	-	Inhabits forests, woodlands; large trees in open country; timbered watercourses, shelterbeds, and street trees. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	N	Y	Y	Y	Y	N
Swift Parrot <i>Lathamus discolor</i> BVC	E	E	Inhabits eucalypt forests and woodlands with winter flowering eucalypts. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	N	Y	Y	Y	Y	N

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (Y/N)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (Y/N)	Nearby and/or high number of record(s) (Y/N) <i>Notes 1,2 & 3</i>	Record(s) from recent years (Y/N) <i>Notes 1,2 & 3</i>	Potential to occur	
Barking Owl <i>Ninox connivens</i> BVC	V	-	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting. <i>Distribution limit: N-Border Ranges National Park. S-Eden.</i>	N	Y	Y	Y	Y	N
Powerful Owl <i>Ninox strenua</i> BVC	V	-	Forests containing mature trees for shelter or breeding and densely vegetated gullies for roosting. <i>Distribution limits: N-Border Ranges National Park. S-Eden.</i>	N	Y	Y	Y	Y	N
Masked Owl <i>Tyto novaehollandiae</i> BVC	V	-	Open forest and woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. <i>Distribution limit: N-Border Ranges National Park. S-Eden.</i>	N	Y	Y	Y	Y	N
Sooty Owl <i>Tyto tenebricosa</i> BVC	V	-	Tall, dense, wet forests containing trees with very large hollows. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	N	Y	N	N	Unlikely	N
White-throated Needletail ^{MS} <i>Hirundapus caudacutus</i> BVC	-	V	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns; companies often forage along favoured hilltops and timbered ranges. Breeds Siberia, Himalayas, east to Japan. Summer migrant to eastern Australia. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	N	Y	Y	Y	Y	N
Regent Honeyeater <i>Xanthomyza phrygia</i> BVC	E4A	CE	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts. <i>Distribution limit: N-Urbanville. S-Eden.</i>	N	Y	Y	Y	Y	N
Varied Sittella <i>Daphoenositta chrysoptera</i> BVC	V	-	Open eucalypt woodlands / forests (except heavier rainforests); mallee, inland acacia, coastal tea-tree scrubs; golf courses, shelterbelts, orchards, parks, scrubby gardens. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	N	Y	Y	Y	Y	N

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (Y/N)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (Y/N)	Nearby and/or high number of record(s) (Y/N) <i>Notes 1,2 & 3</i>	Record(s) from recent years (Y/N) <i>Notes 1,2 & 3</i>	Potential to occur	
Dusky Woodswallow <i>Artamus cyanopterus</i> <i>cyanopterus</i> BVC	V	-	Found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Prefers habitat with an open understorey. Often observed in farmland tree patches or roadside remnants. <i>Widespread in eastern, southern and south-western Australia.</i>	N	Y	Y	Y	Y	N
Spotted-tailed Quoll <i>Dasyurus maculatus</i> BVC	V	E	Dry and moist open forests containing rock caves, hollow logs or trees. <i>Distribution limit: N-Mt Warning National Park. S-South of Eden.</i>	N	Y	Y	Y	Y	N
Koala <i>Phascolarctos cinereus</i> BVC	V	V	Inhabits both wet and dry eucalypt forest on high nutrient soils containing preferred feed trees. <i>Distribution limit: N-Tweed Heads. S-South of Eden.</i>	N	Y	Y	Y	Y	N
Eastern Pygmy Possum <i>Cercatetus nanus</i> BVC	V	-	Found in a variety of habitats from rainforest through open forest to heath. Feeds on insects but also gathers pollen from banksias, eucalypts and bottlebrushes. Nests in banksias and myrtaceous shrubs. <i>Distribution limit: N-Tweed Heads. S-Eden.</i>	N	N	N/A	N/A	Not likely	N
Yellow-bellied Glider <i>Petaurus australis</i> BVC	V	-	Tall mature eucalypt forests with high nectar producing species and hollow bearing trees. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	N	N	N/A	N/A	Not likely	N
Greater Glider <i>Petauroides volans</i> BVC	-	V	Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Population density is optimal at elevation levels at 845 m above sea level. Prefer overstorey basal areas in old-growth tree stands. Highest abundance typically in taller,	N	N	N/A	N/A	Not likely	N

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (Y/N)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (Y/N)	Nearby and/or high number of record(s) (Y/N) <i>Notes 1,2 & 3</i>	Record(s) from recent years (Y/N) <i>Notes 1,2 & 3</i>	Potential to occur	
			montane, moist eucalypt forests, with relatively old trees and abundant hollows <i>Distribution limit: N-Border Ranges National Park. S- South of Eden.</i>						
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> BVC	V	V	Found in a variety of habitats including rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Forms camps commonly found in gullies and in vegetation with a dense canopy. <i>Distribution limit: N-Tweed Heads. S-Eden.</i>	N	Y	Y	Y	Y	N
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i> BVC	V	-	Rainforests, sclerophyll forests and woodlands. <i>Distribution limit: N-North of Walgett. S-Sydney.</i>	N	Y	Y	Y	Y	N
Eastern Coastal Free-tailed Bat <i>Micronomus norfolkensis</i> BVC	V	-	Inhabits open forests and woodlands foraging above the canopy and along the edge of forests. Roosts in tree hollows, under bark and buildings. <i>Distribution limit: N-Woodenbong. S-Pambula.</i>	N	Y	Y	Y	Y	N
Large-eared Pied Bat <i>Chalinolobus dwyeri</i> BVC	V	V	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies of up to 30 animals. <i>Distribution limit: N-Border Ranges National Park. S-Wollongong.</i>	N	Y	Y	Y	Y	N
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i> BVC	V	-	Recorded roosting in caves, old buildings and tree hollows. <i>Distribution limit: N-Border Ranges National Park. S-Pambula.</i>	N	Y	Y	Y	Y	N

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (Y/N)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (Y/N)	Nearby and/or high number of record(s) (Y/N) <i>Notes 1,2 & 3</i>	Record(s) from recent years (Y/N) <i>Notes 1,2 & 3</i>	Potential to occur	
Golden-tipped Bat <i>Kerivoula papuensis</i> BVC	V	-	Rainforest and adjoining moist open forest habitats, roosting in tree hollows and dense vegetation. <i>Distribution limit: N-Border Ranges Nation Park. S-South of Eden.</i>	N	N	N/A	N/A	Not likely	N
Little Bent-winged Bat <i>Miniopterus australis</i> BVC	V	-	Roosts in caves, old buildings and structures in the higher rainfall forests along the south coast of Australia. <i>Distribution limit: N-Border Ranges National Park. S-Sydney.</i>	N	Y	Y	Y	Y	N
Large Bent-winged Bat <i>Miniopterus orianae oceanensis</i> BVC	V	-	Prefers areas where there are caves, old mines, old buildings, stormwater drains and well-timbered areas. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	N	Y	Y	Y	Y	N
Southern Myotis <i>Myotis macropus</i> BVC	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water. <i>Distribution limit: N-Border Ranges National Park. S-South of Eden.</i>	N	Y	Y	Y	Y	N
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i> BVC	V	-	Inhabits areas containing moist river and creek systems, especially tree lined creeks. <i>Distribution limit: N-Border Ranges National Park. S-Pambula.</i>	N	Y	Y	Y	Y	N
Dural Land Snail <i>Pommerhelix duralensis</i> BVC	E	E	Occurs on shale-sandstone transitional forest landscapes within the Blue Mountains, Penrith, The Hills, Wollondilly, Hornsby and Parramatta LGA's. Occurs in low abundance and shelters under rocks or inside curled-up bark, beneath leaves and light woody debris.	N	N	N/A	N/A	Not likely	N

Common name <i>Scientific name</i> Database source	BC Act	EPBC Act	Preferred habitat <i>Distribution limit</i>	Recorded on site (Y/N)	If not recorded on site				Considered in test of significance test (✓) Refer to Appendix 3
					Suitable habitat present (Y/N)	Nearby and/or high number of record(s) (Y/N) <i>Notes 1,2 & 3</i>	Record(s) from recent years (Y/N) <i>Notes 1,2 & 3</i>	Potential to occur	
			<i>Distribution limit: St Albans to Mulgoa with most records from The Hills LGA.</i>						
BVC	- Denotes species listed within PCT 1237 of BioNet Vegetation Classification toll								
V	- Denotes vulnerable listed species under the relevant Act								
E or E1	- Denotes endangered listed species under the relevant Act								
E4a or CE	- Denotes critically endangered listed species under the relevant Act								
NOTE:	1. This field is not considered if no suitable habitat is present within the development footprint 2. 'records' refer to those provided by the <i>Atlas of NSW Wildlife</i> 3. 'nearby' or 'recent' records are species specific accounting for home range, dispersal ability and life cycle								
Unlikely	Represents such a low margin but not enough to 100% rule it one. A test of significance is required.								
Not likely	Means 0% change of occurring, despite there being potential habitat. A test of significance is not applied to these species.								

A detailed assessment in accordance with Section 1.7 of the *EPA Act* will be completed for these species in Appendix 3 of this report.

Table 10 provides an assessment of potential habitat within the study area for nationally *protected* migratory fauna species recorded within 10 km on the *EPBC Act* Protected Matters Tool. Nationally *threatened* migratory species are instead considered above in Table 9.

Table 10 – Protected migratory bird habitat assessment (Appendix 2)

Common name <i>Scientific name</i>	Preferred habitat <i>Migratory breeding</i>	Suitable habitat present (Y/N)	Recorded on site (Y/N)	Further Consideration Required (Y/N)
Oriental Cuckoo (<i>Cuculus optatus</i>)	Mainly inhabits forests, occurring in coniferous, deciduous and mixed forest. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as well as on the ground.	N	N	N

Common name Scientific name	Preferred habitat <i>Migratory breeding</i>	Suitable habitat present (Y/N)	Recorded on site (Y/N)	Further Consideration Required (Y/N)
White-bellied Sea Eagle (<i>Haliaeetus leucogaster</i>)	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands. Presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. Mostly recorded in coastal lowlands, but can occupy habitats up to 1400 m above sea level on the Northern Tablelands of NSW. Has been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds. Also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding has been recorded on the coast, at inland sites, and on offshore islands. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land.	N	N	N
Osprey (<i>Pandion haliaetus</i>)	Occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They exhibit a preference for coastal cliffs and elevated islands in some parts of their range, but may also occur on low sandy, muddy or rocky shores and over coral cays. They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging sites. Eastern Ospreys occur sympatrically and sometimes interact with White-bellied Sea-Eagles.	N	N	N
White-throated Needletail (<i>Hirundapus caudacutus</i>)	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns; companies often forage along favoured hilltops and timbered ranges. <i>Breeds Siberia, Himalayas, east to Japan. Summer migrant to eastern Australia.</i>	Y	N	N
Fork-tailed Swift (<i>Apus pacificus</i>)	Aerial: over open country, from semi-arid deserts to coasts, islands; sometimes over forests, cities. <i>Breeds Siberia, Himalayas, east to Japan south east Asia. Summer migrant to east Australia. Mass movements associated with late summer low pressure systems into east Australia. Otherwise uncommon.</i>	Y	N	N
Orange-bellied Parrot (<i>Neophema chrysogaster</i>)	On the mainland favours small islands, peninsulas in coastal areas, with saltmarsh plants, coastal pastures, gold courses, crop of millet and sunflowers, dunes and beaches. In NSW inhabits tidal flats, salt marshes and heath, and pastures close to shore. <i>Breeds in south-west Tasmania during November- December. Migrates north in March-April.</i>	N	N	N

Common name <i>Scientific name</i>	Preferred habitat <i>Migratory breeding</i>	Suitable habitat present (Y/N)	Recorded on site (Y/N)	Further Consideration Required (Y/N)
Rainbow Bee-eater (<i>Merops ornatus</i>)	Open woodlands with sandy, loamy soil; sandridges, sandspits, riverbanks, road cuttings, beaches, dunes, cliffs, mangroves, rainforest, woodlands, golf courses. <i>Breeding resident in northern Australia. Summer breeding migrant to south east and south west Australia.</i>	Y	N	N
Black-faced Monarch (<i>Monarcha melanopsis</i>)	Rainforests, eucalypt woodlands; coastal scrubs; damp gullies in rainforest, eucalypt forest; more open woodland when migrating. <i>Summer breeding migrant to coastal south east Australia, otherwise uncommon.</i>	Y	N	N
Spectacled Monarch (<i>Monarcha trivirgatus</i>)	Understorey of mountain / lowland rainforest, thickly wooded gullies, waterside vegetation, mostly well below canopy. <i>Summer breeding migrant to south-east Qld and north-east NSW down to Port Stephens from Sept / Oct to May. Uncommon in southern part of range.</i>	N	N	N
Satin Flycatcher (<i>Myiagra cyanoleuca</i>)	Heavily vegetated gullies in forests, taller woodlands, usually above shrub-layer; during migration, coastal forests, woodlands, mangroves, trees in open country, gardens. <i>Breeds mostly south-east Australia and Tasmania over warmer months, winters in north east Qld.</i>	N	N	N
Rufous Fantail (<i>Rhipidura rufifrons</i>)	Undergrowth of rainforests / wetter eucalypt forests / gullies; monsoon forests, paperbarks, sub-inland and coastal scrubs; mangroves, watercourses; parks, gardens. On migration, farms, streets buildings. <i>Breeding migrant to south-east Australia over warmer months. Altitudinal migrant in north-east NSW in mountain forests during warmer months.</i>	N	N	N
Yellow Wagtail (<i>Motacilla flava</i>)	The yellow wagtail typically forages in damp grassland and on relatively bare open ground at edges of rivers, lakes and wetlands, but also feeds in dry grassland and in fields of cereal crops.	N	N	N
Painted Snipe (<i>Rostratula australis</i>)	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum or canegrass or sometimes tea-tree. The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber. Breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover. Has also been recorded nesting in and near swamps, canegrass swamps, flooded areas including samphire, grazing land, among cumbungi, sedges, grasses, salt water couch (<i>Paspalum</i>), saltbush (<i>Halosarcia</i>) and grass, also in ground cover of water-buttons and grasses, at the base of tussocks and under low saltbush.	N	N	N

Common name Scientific name	Preferred habitat <i>Migratory breeding</i>	Suitable habitat present (Y/N)	Recorded on site (Y/N)	Further Consideration Required (Y/N)
Swinhoe's Snipe (<i>Gallinago megala</i>)	During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, eg. wet paddy fields, swamps and freshwater streams. Also known in grasslands, drier cultivated areas and market gardens. Habitat specific to Australia includes the dense clumps of grass and rushes around the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. Also found in drying claypans and inundated plains pitted with crab holes. <i>Breeds in central Siberia and Mongolia and moving south for the boreal winter.</i>	N	N	N
Pin-tailed Snipe (<i>Gallinago stenura</i>)	During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not normally in saline or inter-tidal wetlands. <i>Breeds in Russia. Australian distribution is not well understood. There are confirmed records from NSW, with a single banded bird reported near West Wyalong.</i>	N	N	N
Latham's Snipe (<i>Gallinago hardwickii</i>)	Soft wet ground or shallow water with tussocks and other green or dead growth; wet parts of paddocks; seepage below dams; irrigated areas; scrub or open woodland from sea-level to alpine bogs over 2,000m; samphire on saltmarshes; mangrove fringes. <i>Breeds Japan. Regular summer migrant to Australia. Some overwinter.</i>	N	N	N
Common Greenshank (<i>Tringa nebularia</i>)	Found in a wide variety of inland wetlands and sheltered coastal habitats (with large mudflats and saltmarsh, mangroves or seagrass) of varying salinity. Habitats include embayments, harbours, river estuaries, deltas and lagoons. It uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. Also artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. In NSW the Hunter River estuary has been identified as a site of international importance. <i>Breeds in Eurasia, the northern British Isles, Scandinavia, east Estonia and north-east Belarus, through Russia and east.</i>	N	N	N
Black-winged Stilt (<i>Himantopus himantopus</i>)	A social species usually found in small groups. Black-winged Stilts prefer freshwater and saltwater marshes, mudflats, and the shallow edges of lakes and rivers.	N	N	N
Little Curlew (<i>Numenius minutus</i>)	Feeds in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used. When resting, congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. Prefers pools with bare dry mud and they do not use pools if they are totally dry, flooded or heavily vegetated. <i>Breeds in Russia.</i>	N	N	N

Appendix 3. Test of Significance

Flora and fauna survey and habitat assessments of the study area have resulted in the identification of suitable habitat for the following threatened biodiversity that was recorded present or considered otherwise with varying potential to occur. The potential for any direct or indirect impacts on species has been considered and noted.

Table 11 – Threatened flora impact summary (Appendix 3)

Scientific name	BC Act	Potential to occur	Potential habitat impact
Blue Gum High Forest	CE	recorded	Removal of 0.121 ha *

**estimate only*

Table 12 – Threatened fauna impact summary (Appendix 3)

Common name	BC Act	Potential to occur	Potential habitat impact
Little Eagle	V	Y	Direct – on potential foraging / roosting / breeding
Gang-gang Cockatoo	V	Y	Direct – on potential foraging / roosting / breeding
Little Lorikeet	V	Y	Direct – on potential foraging / roosting / breeding
Swift Parrot	E	Y	Direct – on potential foraging / roosting / breeding
Barking Owl	V	Y	Direct – on potential foraging and unlikely roosting / breeding
Powerful Owl	V	Y	Direct – on potential foraging and unlikely roosting / breeding
Masked Owl	V	Y	Direct – on low potential foraging and unlikely roosting / breeding
Regent Honeyeater	E4A	Y	Direct – on potential foraging
Varied Sittella	V	Y	Direct – on potential foraging
Dusky Woodswallow	V	Y	Direct – on potential seasonal foraging
Spotted-tailed Quoll	V	Y	None anticipated
Koala	V	Y	Direct – on unlikely foraging
Grey-headed Flying-fox	V	Y	Direct – on potential foraging
Yellow-bellied Sheath-tail-bat	V	Y	Direct – on potential foraging/ roosting / breeding
Eastern Coastal Free-tailed Bat	V	Y	Direct – on potential foraging/ roosting / breeding
Large-eared Pied Bat	V	Y	Direct – on potential foraging/ roosting / breeding
Eastern False Pipistrelle	V	Y	Direct – on potential foraging/ roosting / breeding
Little Bent-winged Bat	V	Y	Direct – on potential foraging/ roosting / breeding

Common name	BC Act	Potential to occur	Potential habitat impact
Large Bent-winged Bat	V	Y	Direct – on potential foraging/ roosting / breeding
Southern Myotis	V	Y	Direct – on unlikely roosting/breeding
Greater Broad-nosed Bat	V	Y	Direct – on potential foraging/ roosting / breeding
Sooty Owl	V	Unlikely	Direct – on unlikely foraging / roosting / breeding

Endangered populations

- Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai local government areas
- White-fronted Chat population in the Sydney Metropolitan Catchment Management Area

Threatened ecological communities

- None

BC ACT 2016 - SECTION 7.3

TEST OF SIGNIFICANCE

As outlined in Section 7.2 of the *BC Act* development or an activity is *likely to significantly affect threatened species* if:

- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in Section 7.3, or
- The development exceeds the threshold if the BOS applies to the impacts of the development on biodiversity values, or
- It is carried out in a declared area of outstanding biodiversity value.

With respect to (a) above, and outlined in Section 7.3 of the *BC Act*, the following *test of significance* is a set of five main considerations, with sub-considerations for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

- 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 direct and indirect impacts of the proposal are considered within Section 5.3.

With consideration to the relative direct and indirect impacts on all threatened species with varying potential to occur, it is considered that the proposal is unlikely to disrupt the life cycle for any of these listed species such that a viable local population would be placed at risk of extinction.

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

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

One (1) TEC – Blue Gum High Forest in the Sydney Basin Bioregion (BGHF) – was observed within the development footprint.

The BGHF occurs throughout the vegetated areas of the site, in association with PCT 1237. This community occupies approximately 0.26 ha of the site. According to a Blue Gum High Forest Fact Sheet prepared by Hornsby Shire Council, approximately 37 ha of BGHF occurs within the Hornsby LGA. DOE (2012) give a slightly smaller area of 34.6 ha of BGHF within Hornsby LGA, based on data from NPWS (2002). Interestingly, mapping by OEH (2016) shows over 50 ha of PCT 1237 within the LGA, suggesting the former values may be underestimates. Based on these values and the concept masterplan, the proposal will impact on 0.121 ha of BGHF, which equates to c. 0.2% (0.3-0.4%) of the BGHF within the LGA.

The Threatened Species Test of Significance Guidelines (OEH 2018) define local occurrence as:

“the ecological community that occurs within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.”

Based on mapping by OEH (2016), the patches of BGHF in the local area and LGA are scattered but close enough to likely allow significant genetic transfer via seed and pollen dispersal. As such it is reasonable to assume that most, if not all, BGHF in the LGA is part of the “local occurrence” for this TEC.

In isolation, an impact of c. 0.3–0.4% is not likely to place the local occurrence of BGHF at immediate risk of extinction. However, as a cumulative impact in combination with further clearing of BGHF in the locality, it may contribute to a serious impact such that its local occurrence is likely to be placed at risk of extinction.

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

The proposal will completely remove 0.121 ha of BGHF, but will not adversely modify the composition of the retained BGHF vegetation on site. The current condition of BGHF on site is very low, with virtually no native shrub layer and a highly disturbed ground layer with little native species richness or cover. The proposal will likely improve on the condition of the retained BGHF through implementation of a VMP, and this will be augmented by landscaping works. It is recommended that a VMP be prepared that targets weed control and restoration within the retained BGHF.

It is unlikely that the proposal will adversely modify the composition of this community such that its local occurrence is likely to be placed at risk of extinction.

(c) In relation to the habitat of threatened species or ecological community:

It is considered that the habitat attributes of the development footprint provide known or potential habitat for Blue Gum High Forest, Gang-Gang Cockatoo, Swift Parrot, Powerful Owl,

Barking Owl, Masked Owl, Regent Honeyeater, Spotted-tailed Quoll, Koala, Grey-headed Flying-fox, Large-eared Pied Bat, Eastern False Pipistrelle, East-coast Freetail Bat, Greater Broad-nosed Bat, Little Bentwing-bat, Eastern Coastal Free-tailed Bat and Yellow-bellied Sheath-tail-bat.

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

The proposal is likely to remove approximately 0.121 ha of native vegetation providing habitat for the aforementioned species.

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 provided by the site is currently of low value and does not provide any connective value besides cross-site movement of birds and arboreal mammals. Connectivity to the site is broken to all sides by roads and a railway. There is some arboreal connectivity to the south and south-west - this will not be broken by the proposal.

Therefore, it is considered that known habitat for a threatened species, population or ecological community within the local area and region is unlikely to become isolated or fragmented as a result of the proposal.

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

In respect to threatened fauna species recorded or with potential to occur the proposed area of impact is not likely of high quality, of any breeding importance or central to the home range requirements of any species such that behaviour or ecology of these species will be significantly altered in any way.

The proposal is likely to impact approximately 0.121 ha or 47% of the site's existing natural habitats.

The BGHF within the site is in poor condition, with virtually no midstorey and a highly disturbed ground layer. This is typical of BGHF remnants, all of which are now surrounded by urban development and many exhibit highly modified understories (New South Wales Scientific Committee 2011). Nonetheless, it is still part of a critically endangered ecological community (CEEC), which by definition is facing an extremely high risk of extinction in Australia in the immediate future. All areas of this CEEC are therefore important for the long-term survival of the ecological community, and although the impact of 0.121 ha is minor in isolation, it must be considered with the cumulative impact of additional proposed or future impacts caused by unrelated proposals.

(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 development footprint is not within any declared area of outstanding biodiversity value. Therefore, the proposal will not have any adverse effects on any declared area of outstanding biodiversity value (either directly or indirectly).

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

A key threatening process is defined as a process that threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities.

The current list of key threatening processes, and whether the proposed activity is recognised as a threatening process, is shown below.

Table 13 – Key threatening processes (Appendix 3)

Listed key threatening process	Development a threatening process?		
	Likely	Possible	Unlikely
Aggressive exclusion of birds by Noisy Miners (<i>Manorina melanoccephala</i>)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic Climate Change		✓	
Bushrock removal			✓
Clearing of native vegetation	✓		
Competition and habitat degradation by feral goats			✓
Competition and grazing by the feral European Rabbit (<i>Oryctolagus cuniculus</i>)			✓
Competition from feral honeybees			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in, or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life-cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓
Importation of red imported fire ants into NSW			✓
Infection by <i>Psittacine circoviral</i> (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	
Infection of native plants by <i>Phytophthora cinnamomi</i>		✓	
Introduction of the large earth bumblebee (<i>Bombus terrestris</i>)			✓
Invasion and establishment of exotic vines and scramblers			✓

Listed key threatening process	Development a threatening process?		
Invasion and establishment of Scotch Broom (<i>Cytisus scoparius</i>)			✓
Invasion and establishment of the Cane Toad (<i>Bufo marinus</i>)			✓
Invasion, establishment and spread of <i>Lantana camara</i>			✓
Invasion of native plant communities by bitou bush & boneseed <i>Chrysanthemoides monilifera</i>			✓
Invasion of native plant communities by exotic perennial grasses		✓	
Invasion of native plant communities by African Olive (<i>Olea europaea</i> subsp. <i>cuspidata</i>)			✓
Invasion of the Yellow Crazy Ant (<i>Anoplolepis gracilipes</i>)			✓
Loss of Hollow-bearing trees			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓	
Loss and/or degradation of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (<i>Canis lupus familiaris</i>)			✓
Predation by the European Red Fox (<i>Vulpes vulpes</i>)			✓
Predation by the Feral Cat (<i>Felis catus</i>)			✓
Predation by <i>Gambusia holbrooki</i> Girard, 1859 (plague minnow or mosquito fish)			✓
Predation by the Ship Rat (<i>Rattus rattus</i>) on Lord Howe Island			✓
Predation, habitat degradation, competition & disease transmission from Feral pigs (<i>Sus scrofa</i>)			✓
Removal of dead wood and dead trees	✓		

The above key threatening processes have been considered in reference to the proposal. It was considered that the proposal may contribute to a small degree to a number these processes as described below. It was not considered that the proposal will have a large or significant impact on any of the following key threatening processes. Some mitigation measures have been listed under each process to minimise or reduce such impacts upon those processes.

Summary of “likely” or “possible” Key Threatening Processes

This section identifies what mitigation measures can be implemented to address threatening processes.

Human-caused Climate Change

The proposal will require the removal of a small amount of vegetation which will result in a negative or positive contribution to climate change. Vegetation is considered to act as a sink for a range of greenhouse gases but in particular Carbon Dioxide. The maintenance of native vegetation cover is a key strategy to combat the contributing impacts of the proposed action on Climate Change. Increased risk of bushfire, flooding and storms are to be considered as part of the proposed action. This issue requires total systems management including consideration of energy use throughout the lifecycle of the proposed action including all aspects of the actions processes, materials supply and production. Whilst almost insignificant in size, the proposal is part of the accumulative effect and thus should be considered as contributing to this threatening process.

Clearing of native vegetation

The proposal is of a class of development recognised as a threatening process. It is generally recommended that all sites should aim to achieve a maintain or improve outcome on the quality and quantity of native vegetation cover through protection and restoration measures. The vegetation management process is to be undertaken in accordance with the conditions of consent and any required vegetation and tree management plans for the proposal. Offsetting the loss of native vegetation including trees is to be considered as part of the proposed works. The removal of native vegetation on the development footprint is not likely to significantly affect the biodiversity of the local area due to the extent of better-quality natural vegetation within the local area and the small area of vegetation to be removed.

*Infection of native plants by *Phytophthora cinnamomi**

The proposal may temporarily increase the risk of fungal infection on site as it may be spread via vehicular movement and relocation of soil and vegetation. Consequently, standard *Phytophthora cinnamomi* protocol applies to the cleaning of all plant, equipment, hand tools and work boots prior to delivery onsite to ensure that there is no loose soil or vegetation material caught under or on the equipment and within the tread of vehicle tyres or tracks. Any equipment found to contain soil or vegetation material from offsite is to be cleaned in a quarantined work area or wash station and treated with anti-fungal pesticides prior to commencing work.

Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae

‘Myrtle Rust’ may be spread via machinery, animals and humans as well as by environmental factors such as wind. The presence of machinery and construction works is likely to slightly increase the potential for spread of this key threatening process. Similar protocols as to *Phytophthora cinnamomi* should be applied.

Invasion of native plant communities by exotic perennial grasses

The proposal could potentially be a class of development recognised as a threatening process if exotic lawn such as *Axonopus fissifolius* (Narrow-leafed Carpet Grass) and *Stenotaphrum secundatum* (Buffalo Grass) are utilised as part of the landscaping and allowed to spread into retained vegetation. It is therefore recommended that native ground covers be utilised as part of the future landscaping works and weed control is applied to reduce the potential for spread and establishment of exotic perennial grasses.

Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants

The proposal could potentially be a class of development recognised as a threatening process if invasive garden plants are utilised as part of the landscaping and allowed to spread into retained vegetation. It is therefore recommended that native plant species commensurate with BGHF be utilised as part of the future landscaping works and weed control is applied to reduce the potential for spread and establishment of invasive garden plants.

Appendix 4. EPBC significance assessment criteria

EPBC ACT SIGNIFICANCE ASSESSMENT CRITERIA

Under the *EPBC Act* an action will require approval from the Australian Government Environment Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance. The following significant impact criteria were sourced from the *EPBC Act* Policy Statement 1.1 (May 2006):

CRITICALLY ENDANGERED AND ENDANGERED SPECIES

Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population;
- Reduce the area of occupancy of the species;
- Fragment an existing population into two or more populations;
- Adversely affect habitat critical to the survival of a species;
- Disrupt the breeding cycle of a population;
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- Introduce disease that may cause the species to decline; or
- Interfere with the recovery of the species.

What is a population of a species?

A 'population of a species' is defined under the *EPBC Act* as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations; or
- a population, or collection of local populations, that occurs within a particular bioregion.

What is habitat critical to the survival of a species or ecological community?

- What is habitat critical to the survival of a species or ecological community?
- 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:
 - For activities such as foraging, breeding, roosting, or dispersal;
 - For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
 - To maintain genetic diversity and long-term evolutionary development; or
 - For the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the *EPBC Act*.

VULNERABLE SPECIES

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:

- 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 vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

What is an important population of a species?

An 'important population' is a population that is 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.

CRITICALLY ENDANGERED AND ENDANGERED ECOLOGICAL COMMUNITIES

Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- 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.

MIGRATORY SPECIES

Significant impact criteria

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- 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.

What is important habitat for a migratory species?

An area of 'important habitat' for a migratory species is:

- a) Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- b) Habitat that is of critical importance to the species at particular life-cycle stages; and/or
- c) Habitat utilised by a migratory species which is at the limit of the species range; and/or
- d) Habitat within an area where the species is declining.

What is an ecologically significant proportion?

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

What is the population of a migratory species?

'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.