

12 March 2019

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**SUPPLEMENTARY ECOLOGICAL ASSESSMENT: DA FOR ADDITIONAL
SUBDIVISION OF LOT 2, TRENTWOOD PARK, AVALON**

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Dear Sean,

It is our understanding that Gartner Trovato Architects are preparing a development application for a further subdivision of proposed Lot 2 in relation to the Masterplan/Concept Plan for the subdivision of 7 Trentwood Park, Avalon (Lot 1 DP 202857) as approved by the Land and Environment Court (LEC) in 2017.

Cumberland Ecology prepared a Flora and Fauna Assessment (FFA) for the Masterplan/Concept Plan and LEC proceedings (REF: 17043RP1), however additional impacts beyond those assessed in the FFA will occur for the additional subdivision of Lot 2. The purpose of this letter is to provide a summary of additional impacts to native vegetation, threatened species and their habitat as a result of the proposed additional subdivision of the approved Lot 2, and to provide an assessment of whether or not the project will trigger entry into the Biodiversity Offset Scheme (BOS). This assessment is intended to be read in conjunction with the previous submitted FFA (REF: 17043RP1).

Our ecological assessment is provided in **Appendix A**, supporting figures are provided in **Appendix B**, updated assessments of the likelihood of occurrence of threatened flora and fauna are provided in **Appendix C**, and updated tests of significance are provided in **Appendix D**.

If you have any queries or require further information, please do not hesitate to contact either myself, or Michael Davis, on (02) 9868 1933.

Yours sincerely,



Dr David Robertson
Director
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Appendix A

Assessment of Biodiversity Offset Scheme
Thresholds: Proposed Lot 2 Subdivision, 7
Trentwood Park, Avalon

A.1 Background

The subject land comprises Lot 1 DP 202857, and is located at 7 Trentwood Park, Avalon Beach in the Northern Beaches Local Government Area (LGA). The subject land is approximately 0.54 ha in area and is bound by Trentwood Park to the east and residential dwellings to the north, south and west. The subject land is currently utilised as a residential lot with open space and gardens.

Cumberland Ecology Pty Ltd (Cumberland Ecology) was commissioned in 2017 by Jim & Margot Dargaville (the Client) to conduct a Flora and Fauna Assessment (FFA) (REF. 17043RP1) to support a Development Application (DA) and to comply with contentions to a DA at 7 Trentwood Park, Avalon. This DA, as approved by the LEC, proposed the subdivision of the subject land into three lots, referred to as Lot 1, Lot 2 and Lot 3.

The previous three lot subdivision would have resulted in the complete clearance of approximately 0.15 ha of vegetation throughout the development footprint of all three lots. This land consists of approximately 0.14 ha of Coastal Enriched Sandstone Moist Forest and approximately 0.01 ha of Urban Native/Exotic Vegetation. The remaining area was proposed to be partially cleared and managed as the requisite asset protection zone (APZ), comprising a 0.3 ha area of Coastal Enriched Sandstone Moist Forest and a 0.09 ha area of Urban Native/Exotic vegetation across the three proposed lots.

The FFA conducted by Cumberland Ecology in 2017 concluded that no significant impacts are predicted to occur to threatened species, populations or communities as a result of the proposed development across all three lots. Therefore, the preparation of a Species Impact Statement (SIS) was not warranted. A referral to the Commonwealth Department of the Environment, under the EPBC Act was also not required.

A.2 Development Application

As outlined above, the current approved plan involves a subdivision of the subject land from one lot into three lots, with the construction of a shared driveway and the establishment of an easement for services and drainage.

The approved development is proposed to be modified as follows:

- Current Approved Lot 2 is to be further subdivided into Lot 2 and Lot 4 subject to a new DA; and
- The lot boundaries for Lot 1 and Lot 3 remain unchanged but there are minor modifications to the layout of the development footprint of the proposed house.

Separate development applications are to be submitted for the development of new houses on Lot 1 and Lot 3 as well as for the further subdivision of Lot 2.

A.2.1 Current Approved Plan

The vegetation on approved Lot 2 is comprised of a combination of Coastal Enriched Sandstone Moist Forest and Urban Native/Exotic. Under the LEC approved development, the entirety of the vegetation within the proposed Lot 2 would have been partially cleared/modified to accommodate the APZ for the three lot subdivision. This would have resulted in partial impacts to a 0.20 ha area of Coastal Enriched Sandstone Moist Forest and a 0.09 ha area of Urban Native/Exotic Vegetation.

No locally occurring threatened flora species, listed under the TSC Act or EPBC Act were recorded or are considered to have the potential to occur within the subject site. The proposed development, therefore, would not have had a significant impact upon threatened flora species. Whilst a number of threatened fauna species were considered to have the potential to access foraging resources within the subject site as part of a larger foraging range, the subject site is not considered likely to exclusively support any local populations. Subsequently the approved plan was not considered to result in significant impacts to threatened fauna species listed under the TSC Act or EPBC Act.

A.2.2 Proposed Development Application (Lot 2)

The layout of the proposed additional subdivision of Lot 2 and the proposed dwelling (indicated as the 'Proposed Development Footprint') are shown in **Figure 1** of **Appendix B**.

An additional lot (Lot4) is proposed to be created within the approved Lot 2, north of the existing dwelling. The construction of a fourth dwelling is proposed with vehicular access extending off the approved driveway that is proposed to extend from Lot 2 to Lot 3. The combined impact footprint of the dwelling and driveway is hereafter referred to as the 'subject site'. A Landscape Preservation Area is proposed along the eastern boundary of the proposed Lot 4 which will result in the long term retention of a ~0.04 ha area of Coastal Enriched Sandstone Moist Forest and a ~0.01 ha area of Urban Native/Exotic Vegetation in a fuel reduced state.

The proposed modification features a larger development footprint, in order to accommodate an additional dwelling and associated access, resulting in increased impacts to native vegetation when compared to the currently approved plan. The proposed plan will result in direct impacts to an additional ~0.04 ha area of Coastal Enriched Sandstone Moist Forest vegetation with the removal of 5 additional trees. The remaining vegetation within the proposed Lot 4 will be subject to the creation of an APZ, resulting in partial clearance of up to ~0.08 ha of Coastal Enriched Sandstone Moist Forest and up to ~0.02 ha of Urban Native/Exotic Vegetation.

i. Cumulative Impacts

The potential cumulative impacts of the Current Approved Plan and additional proposed subdivision have been assessed and are shown in **Table 1** below. The additional subdivision and associated development is likely to result in increased direct impacts (0.04 ha) and reduced APZ impacts (-0.04 ha) with no change to the total area being impacted. This is due to the additional building footprint occurring within an area subject to APZ requirements resulting from the current approved plan.

Table 1 Cumulative impacts of the current approved plan and the proposed development application

	Current Approved Plan			Cumulative impact of the four lot subdivision			Change		
	Direct Impact (ha)	APZ Impact (ha)	Total (ha)	Direct Impact (ha)	APZ Impact (ha)	Total (ha)	Direct Impact (ha)	APZ Impact (ha)	Total (ha)
Vegetation Community									
Coastal Enriched Sandstone	0.07	0.37	0.44	0.11	0.33	0.44	0.04	-0.04	0.00
Moist Forest (CESMF)									
Urban Native/Exotic	0.00	0.09	0.09	0.00	0.09	0.09	0.00	0.00	0.00

A.2.3 Relevant Legislation

The ecological assessment for the development, as approved by the LEC, was conducted under the planning provisions of the *Threatened Species Conservation Act 1995* (TSC Act).

Under the NSW Land Management and Biodiversity Conservation reform, the TSC Act has been repealed and replaced by the *Biodiversity Conservation Act 2016* (BC Act). The BC Act is now in force and applies to modifications to existing approvals including modifications to DAs approved under TSC Act and therefore would apply to the current proposed application involving the further subdivision of Lot 2. Under the BC Act, a Biodiversity Development Assessment Report (BDAR) is required if the proposed development triggers specific thresholds that require entry into the Biodiversity Offsets Scheme (BOS).

As outlined in **Section A.2.1** and **Section A.2.2.**, the proposed application within Lot 2 will result in a larger impact footprint than that for the approved DA. Therefore the proposed modification is considered to increase the impact on biodiversity values, and the impacts of the development must be assessed against the BOS entry requirements to determine whether a BDAR is required (see **Section A.3** below).

A.3 Biodiversity Offset Scheme Entry Requirements

The BOS applies to local development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act)) that is likely to significantly affect threatened species or communities or that triggers threshold levels for when assessment via the BOS is required. The threshold has three elements:

- Whether the amount of native vegetation being cleared exceeds a threshold area;

- Whether the area being cleared is mapped on the Biodiversity Values Map published by the Minister for the Environment; and
- Whether the impact on threatened species or ecological communities is deemed significant.

These three criteria are assessed in detail below.

A.3.1 Native Vegetation Clearance Threshold

The native vegetation clearing thresholds for land are defined in Part 7.2 of the *Biodiversity Conservation Regulation 2017* and are reproduced in **Table 2**. The clearing thresholds are based on the minimum lot size for the zone, and apply to the DA as a whole based on the smallest minimum lot size included therein.

Table 2 Native vegetation clearing thresholds

Minimum lot size of the land	Area of clearing
Less than 1 hectare	0.25 hectare or more
Less than 40 hectares but not less than 1 hectare	0.5 hectare or more
Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
1,000 hectares or more	2 hectares or more

The subject site is situated on land zoned as E4 – Environmental Living and has an associated minimum lot size of 700 m² under the former Pittwater Local Environmental Plan 2014. Accordingly, the area threshold would be exceeded if the project involves the clearing of 0.25 ha or more (see **Table 1**), including areas that fall within proposed Asset Protection Zones (APZ). The works relating to construction activities within the subject site are anticipated to result in the direct clearing of approximately 0.04 ha of native vegetation, entirely comprised of Coastal Enriched Sandstone Moist Forest. The remainder of the vegetation within the subject site falls within the APZ, resulting in impacts to an additional 0.08 ha of native vegetation. As a result, the total impact area of 0.14 ha does not exceed the 0.25 ha threshold and subsequently, the BOS is not triggered by this mechanism.

A.3.2 Biodiversity Values Map

The Biodiversity Values Map (BVM) identifies land with high biodiversity value, as defined by clause 7.3(3) of the *Biodiversity Conservation Regulation 2017*. The BOS applies to all clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the *Biodiversity Regulation 2017* on land identified on the map.

The BVM has not mapped areas of high biodiversity value within the subject land. The closest area of mapped high biodiversity value land occurs approximately 90 m to the south-west of the subject site as shown in **Figure 2**. Subsequently, the BOS is not triggered by this mechanism.

The project is not located within an Area of Outstanding Biodiversity Value (AOBV) as identified by the BC Act, and therefore the BOS is not triggered by this mechanism.

A.3.3 Test of Significance

No threatened flora or fauna species have been recorded within the subject land, however assessments of the likelihood of occurrence of threatened flora and fauna species recorded from the locality has been determined and tabulated in **Appendix C** and **Appendix D** respectively. These assessments indicate that several threatened fauna species have potential to occur due to recent local records and the presence of potential habitat in the subject site.

Adjacent bushland within the subject land may provide high quality habitat for several threatened fauna species such as microchiropteran bats, the Grey-headed Flying Fox (*Pteropus poliocephalus*) and the Powerful Owl (*Ninox strenua*). These highly mobile, aerial species would be expected to occasionally and opportunistically utilise the subject land as part of a larger foraging range.

Detailed 5-part Tests of Significance have been prepared for these species and are provided in **Appendix E**. These indicate that the proposed development would be unlikely to have a significant impact on these species and subsequently, the BOS is not triggered by this threshold.

A.4 Conclusion

The proposed subdivision of Lot 2 will require a larger development footprint, in order to accommodate an additional dwelling and associated access. This will result in increased impacts to native vegetation when compared to the currently approved plan. The proposed plan will result in direct impacts to an additional ~0.04 ha area of Coastal Enriched Sandstone Moist Forest vegetation with the removal of 5 additional trees. The remaining vegetation within the proposed Lot 4 will be subject to the creation of an APZ, resulting in partial clearance of up to ~0.08 ha of Coastal Enriched Sandstone Moist Forest and up to ~0.02 ha of Urban Native/Exotic Vegetation, consistent with the proposed APZ associated with the approved plan. The area of additional direct impact is located within an area proposed for partial clearance within the APZ of the approved three lot subdivision.

An assessment of the BOS entry requirements has been undertaken to determine whether the proposed development will need to be assessed under the BOS. These assessments indicate that the clearing will not occur in a declared area of outstanding biodiversity value (AOBV), nor will it occur on an area mapped within the BVM. As such, entry into the BOS is unlikely to be triggered by these thresholds. The area threshold relevant to the applicable minimum lot size (0.25 ha) has not been exceeded as the proposed additional subdivision will result in impacts to only approximately 0.14 ha of native vegetation. Tests of significance indicate that the proposed additional subdivision and dwelling construction will not result in significant impacts to

threatened ecological communities, flora or fauna within the subject site. Subsequently, entry into the BOS is not triggered by this threshold.

This assessment indicates that the proposed development will not require assessment under the BOS, and a BDAR is not required as no significant impacts are anticipated to result from the additional subdivision and development. Additionally, the total area of cumulative impacts resulting from the approved three lot subdivision and the proposed additional subdivision will not change. The creation of Lot 4 and the associated dwelling will result in direct impacts to a 0.04 ha area of vegetation already subject to the APZ requirements of the approved plan. Thus, the conclusions of this assessment are considered to align with those of the previous prepared REF (REF: 17043RP1) performed by Cumberland Ecology. Subsequently, the proposed mitigation measures proposed in the previous FFA must apply to the proposed development application.

Appendix B

Figures



- Legend**
- Subject Site
 - Subject Land
 - Proposed Lot 4 Boundary
 - Proposed Lot 2 Boundary
 - Impact Footprint
 - Asset Protection Zone
- Vegetation Community**
- Coastal Enriched Sandstone Moist Forest (CESMF)
 - Urban Native/Exotic

Image Source:
Image © Nearmap (2017)
Dated: 30/08/2019

Data Source:
Gartner Trovato Architects (2019)

Coordinate System: MGA Zone 56 (GDA 94)

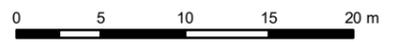


Figure 1. Impacts within the subject site



Legend

- Subject Site
- Subject Land

Biodiversity Values Category

- Biodiversity Values older than 90 days

Image Source:
Image © Nearmap (2017)
Dated: 30/08/2019

Data Source:
Gartner Trovato Architects (2019)

Coordinate System: MGA Zone 56 (GDA 94)



Figure 2. Biodiversity values map

Appendix C

**Assessment of the Likelihood of Occurrence
of Threatened Flora Species**

Table 3 Threatened Flora Likelihood of Occurrence

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Araliaceae	<i>Astrotricha crassifolia</i>	Thick-leaf Star-hair	V	V	3	Thick-leaf Star-hair occurs in dry sclerophyll woodland on sandstone. Flowers in spring. Resprouter from root suckers or basal stem buds after fire. Occurs near Patonga (Gosford LGA), and in Royal NP and on the Woronora Plateau (Sutherland and Campbelltown LGAs). There is also a record from near Glen Davis (Lithgow LGA).	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Elaeocarpaceae	<i>Tetratheca glandulosa</i>		V		41	Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone. Occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Occurs in open woodland, woodland and open forest.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Ericaceae	<i>Epacris purpurascens var. purpurascens</i>		V		1	Found in a range of habitat types, most of which have a strong shale soil influence.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Euphorbiaceae	<i>Chamaesyce psammogeton</i>	Sand Spurge	E		3	Found on the foredunes and headlands of the eastern coast from Jervis Bay to Queensland.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Fabaceae (Mimosoideae)	<i>Acacia bynoeana</i>	Bynoe's Wattle		V	0	Bynoe's Wattle grows in heath and dry sclerophyll forest. Broadly, Bynoe's Wattle is recorded in open woodland with a heath understorey or open woodland with a sparse shrub cover and a grass/sedge ground cover. It is found in open and sometimes slightly disturbed sites such as trail margins, edges of roadsides, grading spoil mounds and in recently burnt patches. The species has been recorded in the Blue Mountains NP, Royal NP, Marramorra NP and Tarlo River NP. It is also conserved in Castlereagh, Dharawal and Agnes Banks NRs and Lake Macquarie SRA. Recent vegetation surveys in the Royal and Ku-ring-gai Chase have not located the species. The habitat where it occurs includes Castlereagh Woodland. Associated overstorey species include Eucalyptus gummifera, E. haemastoma, E. parramattensis, E. sclerophylla, Banksia serrata and Angophora bakeri. Associated shrubs include Banksia spinulosa, Acacia oxycedrus, A. myrtifolia and Kunzea spp. The substrate is typically sand and sandy clay, often with ironstone gravels and is usually very infertile and well-drained. The species often grows among rock platforms. Sites are found at 0–1000 m asl, and receive more than 600 mm annual rainfall. The species is mostly recorded on flat to low-relief topography and 0–200 m AHD. The majority of the species occurs over Triassic or Permian age geology.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Geraniaceae	<i>Pelargonium sp. Striatellum</i> (G.W. Carr 10345)	Omeo Stork's-bill		E	0	Has a narrow habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Haloragaceae	<i>Haloragodendron lucasii</i>			E	0	Grows in dry sclerophyll open forest on sheltered slopes near creeks on sandstone.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Juncaginaceae	<i>Maundia triglochinooides</i>		V		1	Distributed along coastal NSW, from Sydney to Southern Queensland. Occurs in swamps, lagoons, creeks or shallow freshwater 30 - 60 cm deep.	Unlikely to occur. No suitable habitat for the species

Table 3 Threatened Flora Likelihood of Occurrence

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Lamiaceae	<i>Prostanthera densa</i>	Villous Mint-bush	V	V	1	Villous Mintbush is known from Nelson Bay to Beecroft Peninsula, NSW. This species has also been recorded from the Currarong area in Jervis Bay. Select localities are Cronulla, Garie Beach, Royal National Park, and Gan Gan Hill, Nelson Bay. Villous Mintbush grows in sclerophyll forest and shrubland on coastal headlands and nearcoastal ranges, chiefly on sandstone, and rocky slopes near the sea. Plants regenerate from rootstock after fire.	is present within the subject site. Unlikely to occur. No suitable habitat for the species is present within the subject site.
Malvaceae	<i>Lasiopetalum joyceae</i>		V	V	1	Found in heath on sandstone.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myrtaceae	<i>Callistemon linearifolius</i>	Netted Bottle Brush	V		29	Grows in dry sclerophyll forest on the coast and adjacent ranges.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myrtaceae	<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	V	V	7	Found in exposed areas on sandstone ridges, slopes and plateaus near tall coastal heath or low open woodland.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myrtaceae	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	4	Occurs in dry grassy woodland on shallow soils of slopes and ridges. Prefers infertile soils derived from granite or metasedimentary rock on the lower slopes of the landscape.	Unlikely to occur. No suitable habitat for the species is present within the subject site. This species is also commonly planted in Sydney but it was not sighted during surveys.
Myrtaceae	<i>Kunzea rupestris</i>		V	V	3	Occurs in shallow depressions on large flat sandstone rock outcrops. Typically found in short to tall shrubland or heathland.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myrtaceae	<i>Melaleuca biconvexa</i>	Biconvex Paperbark		V	0	Found in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. The species is endemic to NSW and is currently known from nine sites spanning 10km range in the Hornsby-Gordon area of the northern suburbs of Sydney. The species is reserved in Ku-ring-gai Chase and Garigal National Parks and occurs within the Hawkesbury-Nepean and Sydney Metro (NSW) Natural Resource Management Region. It occurs on Hawkesbury Sandstone in moist sandy loam soil.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myrtaceae	<i>Melaleuca deanei</i>	Deane's Melaleuca		V	0	Found in marshy heath on coastal sandstone plateaus. Restricted to sandstones of Sydney and south coast.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myrtaceae	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E	V	17	On south coast of NSW occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Unlikely to occur. No suitable habitat for the species is present within the subject site. This species is also commonly planted in Sydney but it was not sighted during surveys.
Orchidaceae	<i>Caladenia tessellata</i>	Thick-lipped Spider-		V	0	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population	Unlikely to occur.

Table 3 Threatened Flora Likelihood of Occurrence

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
		orchid				near Braidwood is in low woodland with stony soil.	No suitable habitat for the species is present within the subject site.
Orchidaceae	<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid		V	0	Occur in a wide variety of habitats including heathlands, heathy woodlands, sedgeland, Xanthorrhoea spp. plains, dry sclerophyll forests (shrub/grass sub-formation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests. Soils are generally considered to be moist and sandy, however, this species is also known to grow in dry or peaty soils. Is associated with the community Bloodwood / Scribbly Gum / Silver-top Ash Forest on the South Coast. Species is known to have occurrence associated with other <i>Cryptostylis</i> species. Flowering occurs generally from November to February.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Orchidaceae	<i>Genoplesium baueri</i>	Bauer's Midge Orchid	E	E	0	Grows in dry sclerophyll forest and moss gardens over sandstone.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Orchidaceae	<i>Microtis angusii</i>	Angus's Onion Orchid	E	E	83	Known from one disturbed site at Ingleside on ridgetop lateritic soils that would have once supported the Duffys Forest EEC.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Proteaceae	<i>Grevillea caleyi</i>	Caley's Grevillea	CE	E	407	Restricted to an 8km square around Terrey Hills, occurring as far east as Ingleside. It is associated with ridgetop lateritic soils and the Duffys Forest EEC.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Proteaceae	<i>Grevillea shiressii</i>		V	V	1	Occurs along creek banks in wet sclerophyll forest.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Proteaceae	<i>Persoonia hirsuta</i>	Hairy Geebung	E	E	5	Occurs in dry sclerophyll forest and woodland with a shrubby understorey.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Rutaceae	<i>Asterolasia elegans</i>		E	E	1	Occurs on Hawkesbury sandstone growing between sandstone boulders and rocky outcrops found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. It is currently only known from 7 populations occurring in the hills north of Maroota within a 22 km ² extent of occurrence.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Santalaceae	<i>Thesium australe</i>	Austral Toadflax		V	0	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Thymelaeaceae	<i>Pimelea curviflora var. curviflora</i>		V	V	7	Confined to the coastal area of Sydney between northern Sydney in the south and Maroota in the north-west. Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands.	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Appendix D

**Assessment of the Likelihood of Occurrence
of Threatened Fauna Species**

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Amphibia							
Hylidae	<i>Litoria aurea</i>	Green and Golden Bell Frog		V	2	The species is found in a wide range of water bodies except fast moving streams. It commonly inhabits disturbed sites such as abandoned quarries and mines, though generally breeds in habitats that include still, shallow, unpolluted water bodies, that are unshaded, contain aquatic plants and are free of Mosquito fish and other predators, with a range of diurnal shelter sites (emergent aquatic vegetation).	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Hylidae	<i>Litoria littlejohni</i>	Littlejohn's Tree Frog		V	0	Inhabits forest, coastal woodland and heath, from 100 to 950 m above sea level. It breeds in rocky streams, still water in dams, ditches, isolated pools, and temporary pools where sufficient run-off water is available.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myobatrachidae	<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	V	80	Occurs in heath, woodland and open dry sclerophyll forest on a variety of soil types. Breeding habitat for this species usually contains soaks or pools within first or second order streams.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myobatrachidae	<i>Mixophyes balbus</i>	Stuttering Frog		V		Typically found in association with permanent streams through temperate and sub-tropical rainforest, and wet sclerophyll forest. It is rarely found in dry, open, tableland, riparian vegetation, and moist gullies in dry forest.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Myobatrachidae	<i>Pseudophryne australis</i>	Red-crowned Toadlet	V		89	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter. Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Aves							
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	Mi	72	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water.	Low likelihood of occurrence. This vagile migratory species might fly over the subject site occasionally as part of its vast foraging range.
Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle	V		10	The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland, or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Accipitridae	<i>Lophoictinia isura</i>	Square-tailed Kite	V		2	Found in a variety of timbered habitats including dry woodlands and open forests. It is a specialist hunter preying on passerine birds, especially honeyeaters and targets predominately nestlings and insects occurring in the tree canopy. It nests in tree forks or on large horizontal tree limbs located mostly along or near watercourses.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V		21	Found in littoral and coastal habitats and terrestrial wetlands. They generally are found in coastal areas though will travel inland along major	Unlikely to occur. No suitable habitat for the species is present within the subject

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						water courses. They visit a wide range of wetland habitats including inshore waters, reefs, bays, coastal cliffs, estuaries, mangrove swamps, broad rivers, reservoirs, large lakes, and water holes. They feed on fish over clear, open water, and nest in trees or dead trees, generally within one kilometre of the ocean.	site.
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift		Mi	4	Species has been recorded throughout NSW, but mostly east of the Great Divide. The species is almost exclusively aerial in Australia and breeds overseas. It forages from a metre above the ground, up to hundreds of metres in altitude, and mostly occur over inland plains, though sometimes over foothills, and coastal areas.	Low likelihood of occurrence. This vagile migratory species might flight over the subject site occasionally as part of its vast foraging range.
Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail		Mi	14	Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Occur over most types of habitat, particularly above wooded areas including open forest and rainforest, between trees or in clearings and below the canopy.	Low likelihood of occurrence. This vagile migratory species might flight over the subject site occasionally as part of its vast foraging range.
Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	3	Occurs in freshwater wetlands, and more rarely, estuarine wetlands. It favours wetlands with tall, dense vegetation, and forages in shallow water up to a depth of 0.3m. It nests in deep vegetative cover over shallow pools.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Ardeidae	<i>Egretta sacra</i>	Eastern Reef Egret		Mi, Ma	3	The Eastern Reef Egret occurs along most of Australia's coastline except in Victoria, Tasmania and the coast adjacent to the Nullarbor Plain. They usually inhabit rocky shorelines and coral islands and reefs, where they forage for fish, crustaceans and molluscs by using a mixture of stealth and surprise. In northern Australia, Eastern Reef Egrets tend to breed in colonies, while further south they breed solitarily. Their nests usually comprise a platform of sticks, sometimes lined with seaweed, into which they lay two or three bluish-white eggs.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V		12	Inhabits terrestrial and estuarine wetlands, generally in areas containing permanent water and dense vegetation. The species can occur in flooded grassland, woodland, rainforest, and mangroves. It feeds on frogs, reptiles, fish, and invertebrates such as snails, dragonflies, shrimp and crayfish. It roosts during the day on the ground amongst dense reeds or within trees. It nests in branches overhanging water.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Artamidae	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V		16	In New South Wales the species is widespread from coast to inland, including the western slopes of the Great Dividing Range and farther west. The Dusky Woodswallow is found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. The species primarily eats invertebrates, mainly insects, which are captured whilst hovering and sallying above the canopy or over water.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew	E		48	Lives in open forest and woodlands with a sparse, grassy ground layer, and fallen timber. It feeds on insects and small insects and vertebrates including frogs, lizards, and snakes. Nesting is undertaken in a scrape or	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V		4	small bare patch. In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. In NSW, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Cacatuidae	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V		99	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (<i>Allocasuarina littoralis</i>), Forest She-oak (<i>A. torulosa</i>) or Drooping She-oak (<i>A. verticillata</i>) occur.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Columbidae	<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	V		1	Occurs primarily in sub-tropical and dry rainforest, and occasionally in moist eucalypt forest and swamp forest.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Columbidae	<i>Ptilinopus superbus</i>	Superb Fruit-Dove	V		5	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Cuculidae	<i>Cuculus optatus</i>	Oriental Cuckoo		Mi, Ma		Non-breeding visitor to Australia who is a brood parasite. Usually inhabits forested areas and can be found at all levels of the canopy and at a range of elevations.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Dasyornithidae	<i>Dasyornis brachypterus</i>	Eastern Bristlebird	E	E	1	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these vegetation types are fire prone.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Diomedeidae	<i>Diomedea exulans</i>	Wandering Albatross	E	E, Mi	2	Marine and pelagic species that nests on islands near coastal or inland ridges, slopes, plateaux and plains, often on marshy ground.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Diomedeidae	<i>Diomedea gibsoni</i>	Gibson's Albatross	V	V	1	Marine and pelagic species that nests on islands near coastal or inland ridges, slopes, plateaux and plains, often on marshy ground.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Diomedeidae	<i>Thalassarche cauta</i>	Shy Albatross	V	V	3	Species is marine occurring in subantarctic and subtropical waters.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Diomedeidae	<i>Thalassarche chrysostoma</i>	Grey-headed Albatross		E, Ma, Mi	1	The Grey-headed Albatross has a circum-global distribution in the southern hemisphere. The only place that the species breeds within Australian territory is on the southern and western slopes of Petrel Peak	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Diomedidae	<i>Thalassarche melanophris</i>	Black-browed Albatross	V	V	2	in the south-western corner of Macquarie Island. This nesting area has been included on the EPBC register of Critical Habitat. Marine species that breeds on subantarctic and peri-antarctic islands. Species is rarely sighted over land away from its breeding islands.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Fregatidae	<i>Fregata ariel</i>	Lesser Frigatebird		Mi, Ma	1	Vagrant marine migratory birds. Non-breeding migratory population occurs on coastal areas of eastern Australia, including coasts of NSW, Queensland, Northern Territory and north and central WA. Few records exist of individuals observed inland.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V		10	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Laridae	<i>Anous stolidus</i>	Common Noddy		Mi, Ma	1	Marine migratory species. Breeding populations in Australia have only been recorded in islands. During the breeding season is mainly coastal and during the non-breeding season is mainly marine-pelagic.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern		Mi	7	Prefers sheltered coastal embayments but is known to occur in near-coastal or inland terrestrial wetlands. Builds nests in open areas or areas with low vegetation.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Laridae	<i>Onychoprion fuscata</i>	Sooty Tern	V	Ma	1	The Sooty Tern forms large flocks that can be seen soaring, skimming and dipping but seldom plunging in off shore waters. The species breeds in large colonies in sand or coral scrapes on offshore islands and cays including Lord Howe and Norfolk Islands.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	10	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. The Regent Honeyeater is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Meliphagidae	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V		1	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), White Box (<i>E. albens</i>), Inland Grey Box (<i>E. microcarpa</i>), Yellow Box (<i>E. melliodora</i>) and Forest Red Gum (<i>E. tereticornis</i>). In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater		Mi	1	In Australia it is widespread, except in desert areas, and breeds throughout most of its range, although southern birds move north to breed. The Rainbow Bee-eater is most often found in open forests, woodlands and shrublands, and cleared areas, usually near water. It will be found on farmland with remnant vegetation and in orchards and vineyards. It will use disturbed sites such as quarries, cuttings and mines to build its	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Monarchidae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher		Mi, Ma	0	nesting tunnels. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Motacillidae	<i>Motacilia flava</i>	Yellow Wagtail		Mi, Ma	0	Species is believed to be a regular summer visitor to NSW, preferring open grassy flats near water.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Muscicapidae	<i>Monarcha melanopsis</i>	Black-faced Monarch		Mi, Ma	0	Found along the coast of eastern Australia, becoming less common further south. The Black-faced Monarch is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Muscicapidae	<i>Monarcha trivirgatus</i>	Spectacled Monarch		Mi, Ma	0	Found along the entire eastern seaboard of Australia. More often found where there is thick understorey in rainforests, wet gullies, waterside vegetation and also in mangroves.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Muscicapidae	<i>Rhipidura rufifrons</i>	Rufous Fantail		Mi, Ma	0	Found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		3	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Inhabits most of mainland Australia except the treeless deserts and open grasslands.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Petroicidae	<i>Petroica boodang</i>	Scarlet Robin	V		3	Occurs in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Habitat usually contains abundant logs and fallen timber: these are important components of its habitat. Nests are often found in a dead branch in a live tree, or in a dead tree or shrub.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Procellariidae	<i>Ardenna grisea</i>	Sooty Shearwater		Mi	1	In Australia, the Sooty Shearwater breeds on islands off New South Wales (NSW) and Tasmania. The species occurs off the coast of south-east Queensland in small numbers and is a moderately common migrant and visitor to Victoria and South Australia.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Procellariidae	<i>Ardenna pacificus</i>	Wedge-tailed Shearwater		Mi	4	Species is pelagic with only one breeding area on the mainland. The Sooty Shearwater forages in pelagic (open ocean) sub-tropical, sub-Antarctic and Antarctic waters. The species breeds in coastal areas.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Procellariidae	<i>Ardenna tenuirostris</i>	Short-tailed Shearwater		Mi, Ma	5	Is a migratory marine bird.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Procellariidae	<i>Halobaena caerulea</i>	Blue Petrel		V, Ma	1	Migratory marine bird with distribution along the marine and coastal area of	Unlikely to occur. No suitable habitat for

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						Vic, Tas, SA and southern WA.	the species is present within the subject site.
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V		10	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophoras, Melaleucas and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Also utilises isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	E	CE	14	In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Eucalyptus robusta, Corymbia maculata, C. gummifera, E. sideroxylon, and E. albens. Breeds in Tasmania in spring and summer.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot	V		6	Found at the edges of eucalypt woodland adjacent to clearings, timbered ridges and creeks in farmland. Associated with coastal scrubland, open forest and timbered grassland. Nests in hollow-bearing trees, logs or posts.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	E	E	3	Inhabits fringes of shallow inland wetlands, swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe		Mi	1	Seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Scolopacidae	<i>Limosa lapponica</i>	Bar-tailed Godwit		Mi, Ma	4	The Bar-tailed Godwit has been recorded in the coastal areas of all Australian states. The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern Curlew		CE, Mi	0	Prefers sheltered coasts, especially estuaries, bays, harbours, inlets and lagoons. Also known to occur in sewage farms, wetlands and mangroves. Species roosts on sandy spits and in low Saltmarsh or mangroves.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Scolopacidae	<i>Numenius phaeopus</i>	Whimbrel		Mi	0	Occurs primarily in intertidal mudflats or sheltered coasts, but also occurs in sheltered coastal areas and saline or brackish lakes near the coast. Nesting usually occurs in mangroves and tall coastal trees.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Scolopacidae	<i>Xenus cinereus</i>	Terek Sandpiper	V	Mi	2	Found on the coast in mangrove swamps, tidal mudflats and the seashore.	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Strigidae	<i>Ninox connivens</i>	Barking Owl	V		25	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. Nests in hollows of large, old eucalypts. Hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but when loss of tree hollows decreases these prey populations it becomes more reliant on birds, invertebrates and terrestrial mammals. Requires very large permanent territories in most habitats due to sparse prey densities.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Strigidae	<i>Ninox strenua</i>	Powerful Owl	V		271	In NSW the Powerful Owl lives in forests and woodlands occurring in the coastal, escarpment, tablelands and western slopes environments. Specific habitat requirements include eucalypt forests and woodlands on productive sites on gentle terrain; a mosaic of moist and dry types, with mesic gullies and permanent streams; presence of leafy sub canopy trees or tall shrubs for roosting; presence of large old trees to provide nest hollows. Optimal habitat includes a tall shrub layer and abundant hollows supporting high densities of arboreal marsupials.	Low likelihood of occurrence. Minor subject site for this species.
Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	V		5	Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Mammalia							
Burramyidae	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V		168	Species is found in a broad range of habitats from rainforest to wet and dry sclerophyll forests through to woodland and heath. Woodland and heath habitats are preferred. The species feeds on pollen and nectar from banksias, eucalypts, and bottlebrushes, though will eat soft fruits when flowers are unavailable, and will also eat insects throughout the year. They shelter in tree hollows, rotten stumps, holes in the ground, abandoned birds nests and Ringtail Possum dreys, and thickets of vegetation. Tree hollows are preferred for nesting but the species will also nest under tree bark and shredded bark in tree forks.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	18	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Dasyuridae	<i>Dasyurus maculatus maculatus</i>	Spotted-tailed Quoll Southeastern Mainland Population		E	0	Spot-tailed Quoll records are generally confined to within 200 km of the coast and range from the Queensland border to Kosciuszko NP. Locations include: Hunter Valley, Taree, Port Macquarie and Coffs Harbour through to the gorges and escarpments of the New England Tableland, locally abundant populations occur in the south of the state (i.e. Kosciuszko NP and coastal national parks); isolated records near Hay and several disjunct	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						populations between the Border Ranges and the Blue Mountains/Illawarra area.	
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V		1	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Low likelihood of occurrence. Minor habitat components are present within the subject site for this species.
Macropodidae	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby		V	0	Prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges, and isolated rock stacks. Vegetation types associated with the species include dense forest, wet sclerophyll forest, vine thicket, dry sclerophyll forest, and open forest.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Molossidae	<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V		7	Found in dry sclerophyll forest, woodland, swamp forest and mangrove forests east of the Great Dividing Range. Primarily roosts in tree hollows but will also utilise man-made structures.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Muridae	<i>Pseudomys novaehollandiae</i>	New Holland Mouse		V	4	Occurs in open habitats (heathland, woodland and forest) with a heath understorey and vegetated sand dunes. The species prefers deep soft top soils in order to burrow.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Peramelidae	<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	E	E	85	Within NSW, the species is rare and almost exclusively restricted to the coastal fringe of the state, from the southern side of the Hawkesbury River in the north to the Victorian border in the south. More specifically, the subspecies is considered to occur primarily in two areas: Ku-ring-gai Chase and Garigal National Parks; and in the far south-east corner of the state. Occurs within their distribution in a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider	V		7	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Widely, though sparsely, distributed in eastern Australia, from northern Queensland to western Victoria.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Petauridae		Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	E		1	Occurs in a range of habitats in NSW from low scrubby eucalypt woodland, banksia thickets, to tall wet eucalypt forest bordering on rainforest. Dens in tree hollows.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V	V	75	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred feed species. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Phascolarctidae		Koala in the Pittwater Local Government Area	E	V	3	Inhabit eucalypt woodlands and forests.	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Potoroidae	<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo (SE mainland)		V	0	Occurs in coastal heaths and dry and wet sclerophyll forests. Species prefers areas with a dense understorey with occasional open areas.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Pseudocheiridae	<i>Petauroides volans</i>	Greater Glider		V	1	Occurs in eucalypt forests and woodlands from north-eastern Queensland to the Central Highlands of Victoria. The species has a relatively small home range which consists of numerous tree hollows.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	66	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Low likelihood of occurrence. Minor habitat components are present within the subject site for this species.
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	8	The species is associated with areas dominated by sandstone escarpments; sandstone cliffs and fertile woodland valley habitat occurring in close proximity to each other is important for the species. It roosts in cliff/escarpment areas and forages in fertile forest. Roosting is predominately in arch caves with dome roofs, but has been observed in disused mines shafts, overhangs, and disused Fairy Martin nests.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V		3	Favours hollow trunks of Eucalypt trees over 20m high in wet sclerophyll forest and coastal mallee. Occasionally found in old wooden buildings.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Vespertilionidae	<i>Miniopterus australis</i>	Little Bentwing-bat	V		28	Moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bentwing-bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Low likelihood of occurrence. Minor habitat components are present within the subject site for this species.
Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V		59	Forages above the canopy and eats mostly moths. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Low likelihood of occurrence. Minor habitat components are present within the subject site for this species.
Vespertilionidae	<i>Myotis macropus</i>	Southern Myotis	V		19	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		9	Found mainly in the gullies and river systems that drain the Great Dividing Range. Usually roosts in tree hollows and buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects.	Unlikely to occur. No suitable habitat for the species is present within the subject site.
Reptilia							
Elapidae	<i>Haplocephalus bungaroides</i>	Broad-headed Snake		V	0	Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks	Unlikely to occur. No suitable habitat for the species is present within the subject

Table 4 Threatened Fauna Likelihood of Occurrence

Family Name	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Varanidae	<i>Varanus rosenbergi</i>	Rosenberg's Goanna	V		40	to shelters in crevices or hollows in large trees within 500m of escarpments site. in summer. Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component.	Unlikely to occur. No suitable habitat for the species is present within the subject site.

Appendix E

5-Part Tests of Significance

E.1 Threatened Fauna

E.1.1 Powerful Owl

The Powerful Owl (*Ninox strenua*) is listed as Vulnerable under the BC Act. It is distributed from Mackay to south western Victoria, mainly on the coastal side of the Great Dividing Range. This species occurs in many vegetation types from woodland and open sclerophyll to tall open wet forest and rainforest. It requires large tracts of native vegetation but can survive in fragmented landscapes. It roosts in dense vegetation and nests in large tree hollows.

The species could potentially forage in the subject site on occasion.

Assessment of Significance

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

The Powerful Owl could potentially utilise the subject site and surrounds as foraging habitat. It is a highly mobile species that accesses resources from across a wide area and would not depend upon resources contained on the subject site for its survival. The proposal is not likely to place a viable local population of the Powerful Owl at risk of extinction as the majority of forested vegetation will be retained, and the species commonly occurs in fragmented habitats. The Powerful Owl would also likely utilise much larger areas of intact vegetation within the locality and the broader region such as Ku-ring-gai Chase National Park.

- (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

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

Not applicable

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

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

(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

(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,

Approximately 0.04 ha of vegetation will be subject to clearing to facilitate the proposed development footprint whilst the remaining 0.10 ha will be subject to partial clearing to facilitate the creation of an APZ. This represents potential foraging habitat for the Powerful Owl. This represents a relatively small area of foraging habitat within the locality for the species. No breeding habitat will be removed as no large hollows are present within the subject site.

The habitat occurring within the subject site has previously been modified from past land clearance with the existing residential development. Vegetation within the subject site is continuous (with the exception of the existing dwelling). The proposed development will result in marginally increased fragmentation of some areas of existing habitat and therefore encroach further into remaining habitat rather than creating fragmented habitat patches. The Powerful Owl is highly mobile and would be able to move across the subject site and wider area and therefore the marginal increase in fragmentation is unlikely to affect this species.

The proposed action will not remove, modify, fragment or isolate important habitat. Although the project will require the clearing of a small area of potential foraging habitat, the species is highly mobile and would be able to continue to forage in the subject site and wider locality. The subject site would only likely provide foraging habitat as part of a wider range within the locality. Much larger areas of potential habitat occur throughout the wider locality in other areas including intact vegetation within Ku-ring-gai Chase National Park. These tracts of vegetation would provide more favourable roosting and foraging habitat for the species. It is therefore considered that the habitat provided on the subject site is not important for the long-term survival of the Powerful Owl in the wider locality.

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

No declared area of outstanding biodiversity value occurs within the subject site and will not be subject to direct or indirect impacts.

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

The following key threatening processes (KTP) are currently relevant to the Powerful Owl:

- **‘Clearing of native vegetation’:** This KTP will be triggered by removal of native vegetation and canopy trees. It is considered that the Powerful Owl has the potential to occupy the subject site occasionally as part of a larger foraging range and would not depend on resources within the subject site for its survival on the long term.
- **‘Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala*’:** A Noisy Miner was observed within the subject site during surveys. This KTP is considered likely to be already operating and the proposed development would not likely exacerbate it.
- **‘Invasion, establishment and spread of *Lantana camara*’:** Lantana is currently present within the subject site. This KTP will not be exacerbated if proper

management of this priority weed is undertaken during the construction phase of the proposed development.

- **‘Invasion of native plant communities by exotic perennial grasses’:** Exotic grasses are present within the subject site. It is not considered that this KTP would be exacerbated by the proposed development provided proper management of this grassy weeds is undertaken during the construction phase of the proposal.
- **‘Invasion of native plant communities by African Olive’:** African Olive is currently present within the subject site. It is not considered that this KTP would be exacerbated by the proposed development provided proper management of this weeds is undertaken during the construction phase of the proposal.
- **‘Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants’:** The subject site is located within an urbanised environment and residents already have planted exotic plants within it. It is unlikely that the development would significantly exacerbate this KTP relative to current levels.
- **‘Removal of dead wood and dead trees’:** Some dead trees require removal for safety reasons as they have the potential to fall.

Conclusion

The project will result in impacts to a relatively small area of potential foraging habitat (0.14 ha), but will not impact upon breeding habitat for the Powerful Owl as no large hollows are present within the subject site. No significant habitat for the species will be removed within the subject site. The proposal is not likely to place a viable local population of the Powerful Owl at risk of extinction. This species is highly mobile and would be expected to move between areas of remaining habitat within the immediate vicinity of the subject site and wider area. The project is not likely to have a significant detrimental impact upon the Powerful Owl and subsequently entry into the BOS is not triggered by impacts to this species.

E.1.2 Microchiropteran Bats

This Test of Significance covers the following threatened microbat species:

- Little Bentwing-bat (*Miniopterus australis*) (BC Act: Vulnerable, EPBC Act: Not listed);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) (BC Act: Vulnerable, EPBC Act: Not listed);
- Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*): (BC Act: Vulnerable, EPBC Act: Not listed)

The Little Bentwing-bat (*Miniopterus australis*) mainly occurs in moist areas including rainforest, melaleuca swamps, coastal forests and moist eucalypt forest. Its primary distribution is in coastal areas along most of the east coast of NSW. Within the greater Sydney metro region, a

number of populations exist with recorded occurrences of the species as far north as Brisbane Water National Park; west to Ropes Crossing, south as far as Heathcote National Park; and east to Avalon (OEH 2014). The species is listed as Vulnerable under the BC Act.

The Eastern Bentwing-bat occurs throughout the east and north-west coast of Australia. They hunt in forested areas above the canopy, and roost primarily in caves, however derelict mines, storm-water tunnels, buildings and other man-made structures can be utilised (OEH 2016a). The species is listed as Vulnerable under the BC Act.

The Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*) roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, this microbat flies high and fast over the forest canopy, but lower in more open country. The species forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown for the species; there is speculation about a migration to southern Australia in late summer and autumn (OEH 2017c). The species is listed as Vulnerable under the BC Act.

These species may use the subject site as part of a wider foraging range.

Assessment of Significance

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

The above listed microbat species are likely to use the subject site as foraging habitat as part of a much larger foraging range. They are highly mobile species that access resources from across a wide area and would not depend upon resources contained on the subject site for their survival. The proposal is not likely to place a viable local population of any of these species at risk of extinction as the majority of the potential habitat will be retained on the subject site and wider area. No potential roosting habitat (in the form of hollow-bearing trees) will be removed. These species would also likely utilise much larger areas of intact vegetation in the wider locality including Ku-ring-gai Chase National Park.

(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

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

Not applicable.

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

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

(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

(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,

Approximately 0.04 ha of vegetation will be subject to clearing to facilitate the proposed development footprint whilst the remaining 0.10 ha will be subject to partial clearing to facilitate the creation of an APZ. This represents a relatively small area of potential foraging habitat within the locality for these species. No roosting habitat will be removed as a result of the proposal.

The habitat occurring within the subject site has previously been modified from past land clearance with the existing residential development. Vegetation within the subject site is continuous (with the exception of the existing dwelling). The proposed development will result in marginally increased fragmentation of some areas of existing habitat and therefore encroach further into remaining habitat rather than creating fragmented habitat patches. Microbats are highly mobile and would be able to move across the subject site and wider area and the marginal fragmentation would not be likely to have a significant impact on these species.

The proposed action will not remove, modify, fragment or isolate important habitat. Although the project will require the clearing of some potential foraging habitat, it is not considered to be important for these species. These microbats are highly mobile and would be able to continue to forage in the subject site and wider locality. The subject site would only likely provide foraging habitat as part of a wider range within the locality. Much larger areas of potential habitat occur throughout the wider locality in other areas including intact vegetation within Ku-ring-gai Chase National Park. These tracts of vegetation would provide more favourable foraging habitat for these species. It is therefore considered that the habitat provided on the subject site is not important for the long-term survival of the Little Bentwing-bat, Eastern Bentwing-bat or Yellow-bellied Sheath-tail-bat in the wider locality.

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

No declared area of outstanding biodiversity value occurs within the subject site and will not be subject to direct or indirect impacts.

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

The following key threatening processes are likely to affect microchiropteran bats:

- **'Clearing of native vegetation'**: This KTP will be triggered by removal of native vegetation and canopy trees. The key threatening process of 'Clearing of native vegetation', potentially impact habitat for these microbat species further than current conditions as potential foraging habitat will be removed. However, the vegetation on

the subject site is not considered to constitute significant habitat for these species. As some potential suitable forage habitat will remain on the subject site and the wider area, the clearing of native vegetation is not likely to significantly impact habitat for the potentially occurring microchiropteran bats.

- **'Invasion, establishment and spread of *Lantana camara*'**: Lantana is currently present within the subject site. This KTP will not be exacerbated if proper management of this priority weed is undertaken during the construction phase of the proposed development.
- **'Invasion of native plant communities by exotic perennial grasses'**: Exotic grasses are present within the subject site. It is not considered that this KTP would be exacerbated by the proposed development provided proper management of this grassy weeds is undertaken during the construction phase of the proposal.
- **'Invasion of native plant communities by African Olive'**: African Olive is currently present within the subject site. It is not considered that this KTP would be exacerbated by the proposed development provided proper management of this weeds is undertaken during the construction phase of the proposal.
- **'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants'**: The subject site is located within an urbanised environment and residents have planted exotic plants within it. This KTP is not expected to be exacerbated beyond current levels by the proposed development.
- **'Removal of dead wood and dead trees'**: Some dead trees require removal for safety reasons as they have the potential to fall. The hollow-bearing stag (i.e. T112) with two hollows suitable as roosting habitat for microchiropteran bats will be removed. As a mitigation measure, two nest boxes suitable for microchiropteran bats are proposed to be installed on trees within the subject site.

Conclusion

The project will result in impacts to a relatively small area (0.14 ha) of potential foraging habitat for microchiropteran bat species. The proposal is not likely to place a viable local population of the Little Bentwing-bat, Eastern Bentwing-bat or Yellow-bellied Shearwater-bat at risk of extinction. These species are highly mobile and would be expected to move between areas of remaining habitat within the immediate vicinity of the subject site and wider area. The project is not likely to have a significant impact upon microchiropteran bats and subsequently entry into the BOS is not triggered by impacts to these species.

E.1.3 Grey-headed Flying Fox

The Grey-headed Flying-fox is distributed along the east coast from Bundaberg in Queensland to Melbourne, Victoria. It occurs as far west as the western slopes of the Great Dividing Range in northern NSW. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Grey-headed Flying-foxes migrate according to the availability

of native fruits, nectar and pollen. They roost in large “camps” which are generally within 20 km of a food source (NSW Scientific Committee 2004). The Grey-headed Flying-fox is listed as Vulnerable under the TSC Act and the EPBC Act.

The species could use the subject site as part of a wider foraging range. No camps are present on or adjacent to the site.

Assessment of Significance

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

The Grey-headed Flying-fox is likely to use the subject site as foraging habitat as part of a much larger foraging range. They are a highly mobile species that accesses resources from across a wide area (between 20 – 50km from roost camp) and would not depend upon resources contained on the subject site for their survival. Most of the potential foraging habitat (including large eucalypts) will be retained on the subject site, and the species is known to forage on fragmented street trees as well as much larger areas of intact vegetation. No roost camps are present on or adjacent to the subject site. Accordingly, the proposal is not likely to place a viable local population of the species 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

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

Not applicable.

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

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

(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

(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,

Approximately 0.04 ha of vegetation will be subject to clearing to facilitate the proposed development footprint whilst the remaining 0.10 ha will be subject to partial clearing to facilitate the creation of an APZ. This represents a relatively small area of foraging habitat within the

locality for the species. No roosting habitat will be removed as no camps occur within the subject site.

The habitat occurring within the subject site has previously been modified from past land clearance with the existing residential development. Vegetation within the subject site is continuous (with the exception of the existing dwelling). The proposed development will result in marginally increased fragmentation of some areas of existing habitat and therefore encroach further into remaining habitat rather than creating fragmented habitat patches. The Grey-headed Flying-fox is highly mobile and would be able to move across the subject site and wider area and therefore the minor additional fragmentation for the project is not considered likely to affect this species.

The proposed action will not remove, modify, fragment or isolate important habitat. Although the project will require the clearing of some potential foraging habitat, it is not considered to be important to this species. The Grey-headed Flying-fox is highly mobile and would be able to continue to forage in the subject site and wider locality. The subject site would only likely provide foraging habitat as part of a wider range within the locality. Much larger areas of potential habitat occur throughout the wider locality in other areas including intact vegetation within Ku-ring-gai Chase National Park. These tracts of vegetation would provide more favourable foraging habitat for the species. It is therefore considered that the habitat provided on the subject site is not important for the long-term survival of the Grey-headed Flying-fox in the wider locality.

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

No declared area of outstanding biodiversity value occurs within the subject site and will not be subject to direct or indirect impacts.

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

The following key threatening processes could potentially affect the Grey-headed Flying-fox.

- **‘Clearing of native vegetation’:** This KTP will be triggered by removal of native vegetation and canopy trees. The key threatening process of ‘Clearing of native vegetation’, potentially impact habitat the Grey-headed Flying-fox further than current conditions as potential foraging habitat (in the form of understorey and occasional canopy) will be removed. However, the vegetation on the subject site is not considered to constitute significant habitat for the species. As some potential suitable forage habitat will remain on the subject site, the clearing of native vegetation is not likely to significantly impact habitat for the species.
- **‘Invasion, establishment and spread of *Lantana camara*’:** Lantana is currently present within the subject site. This KTP will not be exacerbated if proper management of this priority weed is undertaken during the construction phase of the proposed development.

- **‘Invasion of native plant communities by exotic perennial grasses’:** Exotic grasses are present within the subject site. It is not considered that this KTP would be exacerbated by the proposed development provided proper management of grassy weeds is undertaken during the construction phase of the proposal.
- **‘Invasion of native plant communities by African Olive’:** African Olive is currently present within the subject site. It is not considered that this KTP would be exacerbated by the proposed development provided proper management of this weeds is undertaken during the construction phase of the proposal.
- **‘Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants’:** The subject site is located within an urbanised environment and residents have planted exotic plants within it. The project is not expected to exacerbate this KTP beyond current levels.

Conclusion

The project will result in impacts to a relatively small area of potential foraging habitat (0.14 ha) for the Grey-headed Flying-fox, but will not impact upon breeding habitat as a Grey-headed Flying Fox camp does not occur within the subject site. The proposal is not likely to place a viable local population of the Grey-headed Flying-fox at risk of extinction. This species is highly mobile and would be expected to move between areas of remaining habitat within the immediate vicinity of the subject site and wider area. The project is not likely to have a significant impact upon the Grey-headed Flying-fox and subsequently entry into the BOS is not triggered by impacts to this species.