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Flora and Fauna Assessment



Lot 1142 // DP 752064 and Lot 1 // DP 225581, 147 Garnet Road, Kareela, NSW 2232

Proposed rezoning and future development

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Glossary and abbreviations

Abbreviation	Description
APZ	Asset Protection Zone
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DoE	Commonwealth Department of the Environment (now DAWE)
DoEE	Commonwealth Department of the Environment and Energy (now DAWE)
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
GHFF	Grey-headed Flying-fox
ha	hectares
MNES	Matters of National Environmental Significance
mm/cm/m/km	millimetres/centimetres/metres/kilometres
WoNS	Weeds of National Significance
*	Denotes exotic and/or introduced non-remnant Australian native species

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1 Introduction

1.1 Purpose of report and legislative context

This Flora and Fauna Assessment has been undertaken for the proposed rezoning and future development of Lot 1142 // DP 752064 and Lot 1 // DP 225581 (147 Garnet Road), Kareela, New South Wales. The purpose of this report is to identify and assess the flora and fauna within the study area, and the likely impacts of the proposed rezoning and future development. This report addresses the legislative context provided in **Table 1.1** and the proposal is to be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*.

Table 1.1: Legislative framework addressed in this report.

Instrument	Considerations	Context
Commonwealth		
<i>Environment Protection and Biodiversity Conservation (EPBC) Act 1999</i>	Matters of National Environmental Significance	An action will require approval from the Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance.
State (New South Wales)		
<i>Biosecurity Act 2015</i>	Priority weeds	Describes the state and regional priorities for weeds in New South Wales.
<i>Biodiversity Conservation Act 2016 (BC Act)</i>	Part 7.3	Assessment of the potential for an action or activity to have a significant effect on threatened species, populations or ecological communities, or their habitats.

1.2 Site description

Following the *Threatened Species Test of Significance Guidelines* (OEH 2018) the **subject site** is defined as the area 'directly impacted upon by the proposal'. The **study area** is defined as the subject site and all areas that are indirectly impacted upon by the proposal. For the purposes of this report, the study area consists of Lot 1142 // DP 752064 and Lot 1 // DP 225581, (147 Garnet Road, Kareela, NSW) (**Figure 1.1**). The subject site is situated within the study area and includes the area that will be directly impacted by the proposed rezoning and potential future development, including the Asset Protection Zone (APZ).

The study area comprises 1.46 hectares (ha) of land, is situated in the Sutherland Shire Local Government Area (LGA) and is currently zoned as SP2 Special Purpose Infrastructure under the Sutherland Shire Local Environmental Plan (SSLEP) (2015). The central portion of the site is mostly occupied by buildings, roads and carparking areas, while on the boundaries of the site, native vegetation is present. A Childcare Centre is located in the southern portion of the study area.

1.2.1 Local area

The area within 5 km of the subject site includes urban areas, recreational open space and remnant bushland (**Figure 1.2**). Adjoining the study area is residential development on the western boundary, a council reserve to the south, Joseph Banks Native Plants Reserve to the north and Bates Drive Public School to the east. Native vegetation within 5 km of the study area is primarily associated with the Royal National Park to the south and steep valleys in the west (**Figure 1.2**).

1.3 Description of the proposed development and approval pathway

Sylvanvale propose to rezone the study area to R2 Low Density Residential with the provisions of R3 Medium Density Residential applying to height and floor space ratio. Development of residential units on part of the property and leaving the Childcare Centre in its current position to continue operation is also proposed (**Figure 1.3**).

The NSW *Biodiversity Conservation Act 2016* (BC Act) establishes the biodiversity assessment requirements for proposed developments and land use change. Part 6 of the BC Act establishes an offsets scheme which aims to ensure there is no net loss of biodiversity values. Entry into the offset scheme is triggered by exceeding the clearing thresholds as outlined in Part 7 of the NSW *Biodiversity Conservation Regulation 2017* (BC Reg), by being identified on the Biodiversity Values Map, or being State Significance Development. The clearing threshold includes all proposed clearing of native vegetation including for the APZ.

The proposed rezoning and future development of the site, as described in this report, would not trigger the Biodiversity Offsets Scheme. Therefore, the impact of the proposal can be assessed via a Flora and Fauna Assessment.



Figure 1.1: Location of the study area



Figure 1.2: Native vegetation in the locality (OEH 2016)



Figure 1.3: Potential future layout

2 Methods

2.1 Literature and database review

A literature review and database review were undertaken for the study area which included the following sources:

- NSW Planning Viewer (DPIE 2020)
- BioNet Atlas of NSW Wildlife (OEH 2020)
- Regional vegetation mapping (OEH 2016)
- Protected Matters Search Tool (DoEE 2019a)
- SIX Maps (LPI 2019)

Polices and guidelines relating to the proposal:

- Threatened Species Test of Significance Guidelines (OEH 2018)

Threatened species, populations and migratory species recorded during the literature and database review were consolidated and their likelihood of occurrence was considered by:

- Review of available habitat within the study area and surrounding area
- Review of the scientific literature pertaining to each species and population
- Applying expert knowledge of each species

The potential for threatened species, populations and/or migratory species to occur was then considered and the necessity for targeted field surveys was determined. Following field survey and review of available habitat within the study area, the potential for species to use the site and to be affected directly or indirectly by the proposal were considered as either:

- “Recent record” = Species has been recorded in the study area within the past 5 years
- “High” = Species has previously been recorded in the study area (>5 years ago) or in proximity to (for mobile species), and/or habitat is present that is likely to be used by a local population.
- “Moderate” = Suitable habitat for a species is present onsite but no evidence of a species detected and relatively high numbers of recent records (5-20 years) within 5 km of the study area or species highly mobile.
- “Low” = Suitable habitat species for a species is present onsite but limited or highly degraded, no evidence of a species detected and relatively low number of recent records within 5 km of the study area.
- “Not present” = suitable habitat for the species is not present onsite or adequate survey has determined species does not occur in the study area.

2.2 Field survey

A field survey was undertaken on 3 October 2019 by Bruce Mullins (Principal Ecologist). The field survey included a general flora and fauna habitat, and vegetation community assessment. Weather conditions on the day were warm (**Table 2.1**).

Table 2.1: Daily Weather Observations at Kirrawee, New South Wales

Date	Temp (°C)		Rainfall (mm)	Max wind gust	
	Min	Max		Direction	Speed (km/h)
3/10/2019	13.5	31.1	0	NE	41

2.2.1 Vegetation communities and flora

Field survey involved traversing the study area to validate vegetation community mapping, assess the structure and condition of vegetation, and to compile a list of visible flora species. Nomenclature follows the Flora of NSW (Harden 1990-2002) and updates provided in PlantNET (RBGDT 2019).

These vegetation communities were checked against described Threatened Ecological Communities (TEC) listed under either the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the NSW *Biodiversity Conservation Act 2016* (BC Act).

2.2.2 Fauna and fauna habitat

Opportunistic fauna survey was undertaken and included observations along with searches for signs of indirect occupancy use (i.e. scats, owl pellets, fur, bones, tracks, bark scratches, foliage chew marks and chewed capsules).

Additionally, fauna habitat searches were conducted for potential foraging, roosting, breeding or nesting habitat of nocturnal and diurnal species. This included inspection of the geology, vegetation structure, tree hollows, stags, decorticating bark, mature / old growth trees and winter-flowering eucalypts.

2.2.3 Survey limitations

A full fauna survey following *Threatened Species Survey and Assessment Guidelines* (OEH 2018) was not undertaken as sufficient detail to determine the likelihood of occurrence of threatened and migratory species for the purpose of this report was achieved through a targeted survey and a habitat assessment during the field survey.

3 Results

3.1 Literature and database review

3.1.1 Topography, biodiversity and mapping

The nearest mapped watercourse to the site is a 1st order stream located approximately 20 m to the south-east (**Figure 1.1**). The study area is gently sloped to the north-east, becoming steeper in the western portion of the site.

A review of the Terrestrial Biodiversity Map (SSLEP 2015) found that the site was not mapped as 'Biodiversity', therefore, no further consideration was required.

3.1.2 Threatened species, populations and migratory species

A search of relevant databases and literature identified a potential 32 threatened or migratory fauna species with 5 km of the study area. This included two threatened flora species and 30 threatened or migratory fauna species (19 birds, one amphibian, five bats, two arboreal mammals, one terrestrial mammal and one reptile) (**Figure 3.1; Appendix A**). This number also included a number of migratory shorebirds, however, due to an absence of suitable habitat, were noted as 'not present'.

The likelihood of occurrence analysis undertaken prior to the field survey reduced the primary list to seven threatened species that have a 'moderate' likelihood to use the study area, and thus may be impacted by the proposed works. Field survey further reduced this list to ten species (**Appendix A**), including:

- Threatened birds
 - *Ninox strenua* (Powerful Owl)
- Threatened bats
 - *Miniopterus australis* (Little Bent-winged Bat)
 - *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
 - *Pteropus poliocephalus* (Grey-headed Flying-fox (GHFF))
 - *Saccolaimus flaviventris* (Yellow-bellied Sheath-tail-bat)
 - *Scoteanax rueppellii* (Greater Broad-nosed Bat)

Desktop assessment of threatened flora identified one species; *Callistemon linearifolius*, that had been recorded in the area. However, the species was not identified during the field inspection. *Syzygium paniculatum* (Magenta Cherry) was observed on site, however, it was deemed to be a planted specimen as *Syzygium paniculatum* is a species associated with Littoral Rainforest and thus not associated with the mapped vegetation community. The plant is located in the proposed APZ on the northern boundary and can be retained. Given that the species is likely to have been planted, the assessment of significance was not applied to this species. The likelihood analysis is included in **Appendix A**.

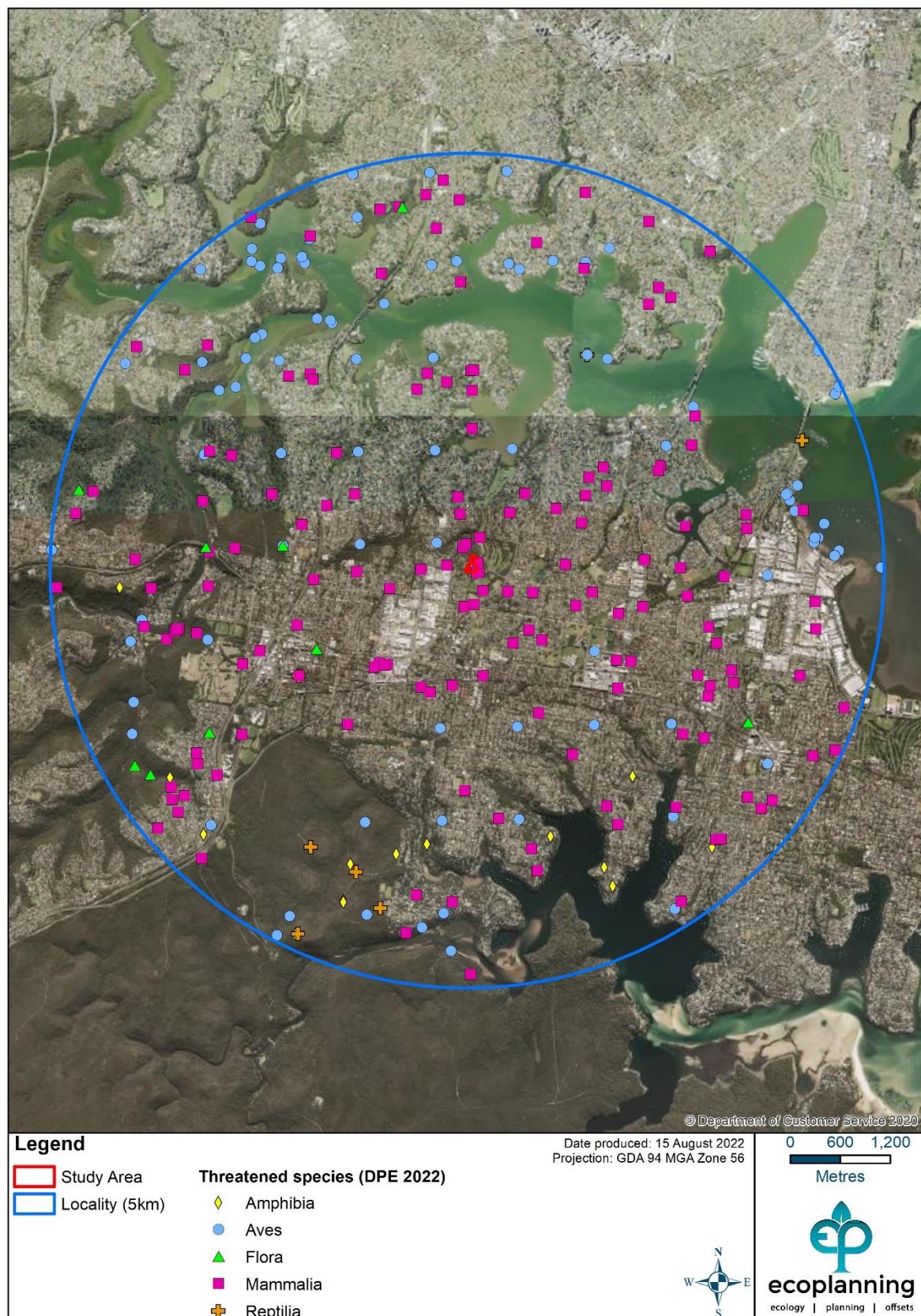


Figure 3.1: Threatened species in the locality (OEH 2022)

3.2 Field survey

3.2.1 Native vegetation communities

Regional vegetation mapping determined the native vegetation in the study area was S_DSFO4 Coastal Enriched Sandstone Dry Forest, which is equivalent to PCT 1776 (OEH 2016) (**Figure 3.2**). This native vegetation was largely restricted to the boundaries of the site, and contiguous with larger patches of native vegetation outside the study area.

Field assessment confirmed native canopy species included *Eucalyptus pilularis* (Blackbutt), *Corymbia gummifera* (Red Bloodwood) and *Angophora costata* (Sydney Red Gum) with a mid-storey dominated by *Pittosporum undulatum* (Sweet Pittosporum) and by exotic species, and an exotic dominated ground cover of *Ehrharta erecta*, *Bromus catharticus*, *Hypochaeris radicata* and *Bidens pilosa*. The north-east corner of the property had a very low cover of exotic species, and the native species *Ceratopetalum gummifera* (Christmas Bush), *Eustrephus latifolius* (Wombat Berry), *Bossiaea heterophylla*, *Lomandra cylindrica*, *Hibbertia bracteata*, *Billardiera scandens*, *Ptilothrix deusta*, *Grevillea sericea* and *Polyscias sambucifolia* were common. These species are typical of the Coastal Enriched Sandstone Dry Forest community and thus previous regional mapping appears to be valid, although there were also native species present that are more consistent with dry rainforest communities (e.g. *Ficus macrophylla*, *F. coronata*, *Glochidion ferdinandi*) (**Figure 3.3**). The native vegetation on the site covers an area of approximately 0.55 ha.

A list of species observed on site is included in **Appendix B**.

3.2.2 Flora species

A total of 96 flora species were identified in the study area during the field survey, of which 63 were native and 33 were exotic (**Appendix B**). Three weeds recorded in the study area were priority weeds for the Greater Sydney Region listed under the NSW *Biosecurity Act 2015*, and one is also a Weed of National Significance (WoNS) (**Table 3.1**).

Table 3.1: Priority weeds and Weeds of National Significance

Common name	Scientific name	WoNS	Duty
Lantana	<i>Lantana camara</i>	Y	Prohibition on dealings Must not be imported into the State or sold
Ground asparagus	<i>Asparagus aethiopicus</i>	N	
Lady of the Night	<i>Cestrum parqui</i>	N	Regional Recommended Measure* Land managers should mitigate the risk of new weeds being introduced to land used for grazing livestock. Land managers should mitigate spread from their land. Plant should not be bought, sold, grown, carried or released into the environment.



Figure 3.2: Vegetation on the study site (OEHS 2016)



Figure 3.3: Validated vegetation map

3.2.3 Fauna habitat

While the study area contained potential shelter, forage and roosting habitat for native fauna, there appeared to be no hollow bearing trees, caves or aquatic habitats such as ponds or streams on the site. Mapping showed that the closest watercourse was a first-order stream, located approximately 20 m to the southeast. **Table 3.2** summarises the habitat on site and the broad fauna groups for which it provides habitat.

Table 3.2: Fauna habitats within the study area

Feature	Fauna groups
Forest with structural complexity	Birds, mammals, reptiles
Leaf litter	Reptiles, small mammals, amphibians
Rock outcrops	Reptiles and small mammals

3.2.4 Fauna species

The field survey identified a total of 13 fauna species, including 12 birds and one reptile (**Appendix B**). All species are common in urban landscapes and none are listed threatened species. Of note is that *Pteropus poliocephalus* (Grey-headed Flying-fox (GHFF)) were observed roosting in vegetation in an adjacent lot to the southeast. It was subsequently confirmed on the National Flying-fox monitoring viewer, that these individuals are part of a registered camp (DoEE 2020). Numbers of GHFF in the camp are frequently in the 2,500 to 10,000 range, however, most records during 2019 were in the 500 to 2,500 range. Records note that at certain times of the year the camp can be empty. During an inspection of the camp on 17 March 2022, GHFF were observed roosting between 5 m and 10 m above ground level, with the resident population numbers on the day of the survey between 90 and 140 individuals. However, a more recent inspection of the camp (12 August 2022) failed to record any individuals or evidence of recent use.

4 Impact assessment

This section outlines the anticipated direct and indirect impacts of the proposed development on the ecological values of the study area. Avoidance and mitigation measures are also proposed.

The assessment is based on the proposal to rezone the study area and plans to construct residential units on part of the subject site, while leaving the existing Childcare Centre in its current location. This assessment considers the potential vegetation to be removed or modified by the development and APZ.

4.1 Direct impacts

4.1.1 Vegetation clearing

The proposed rezoning is not likely to require vegetation clearing, however, development of the proposed units and APZ will remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest (**Figure 4.1**). The assessment is potentially a worst case scenario as there may be opportunities to retain more native vegetation, and APZs are not likely to remove all vegetation. **Figure 4.2** shows the trees that are likely to be removed by the future development.

The vegetation type requiring removal and/or modification to facilitate the proposed rezoning and development is displayed in **Table 4.1**.

Table 4.1: Direct impacts of the proposed works

Plant Community Type	BC Act	EPBC Act	Study area (ha)	Development footprint (ha)*
Coastal Enriched Sandstone Dry Forest (PCT 1776)	No	No	0.55	0.48
Total vegetation			0.55	0.48

Note: subject to rounding errors.

4.1.2 Loss of fauna habitat

The proposed rezoning and future development will remove up to 0.48 ha of fauna habitat (i.e. structural complexity, leaf litter, outcropping rock) within the study area. This provide potential shelter, forage and roosting habitat for a suite of fauna, including birds, bat and arboreal mammal species.

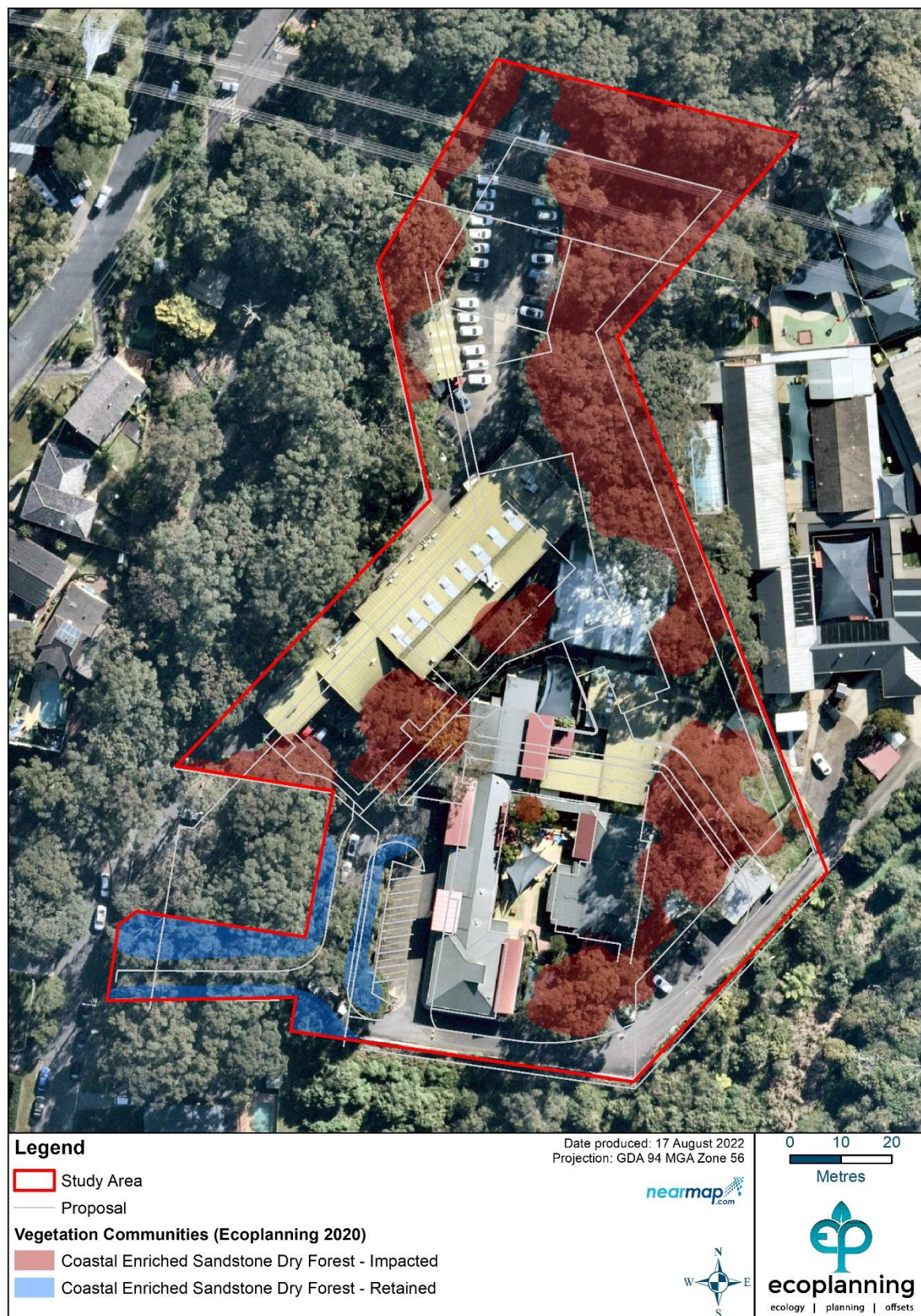


Figure 4.1: Vegetation that may be impacted and retained by the proposed rezoning and development

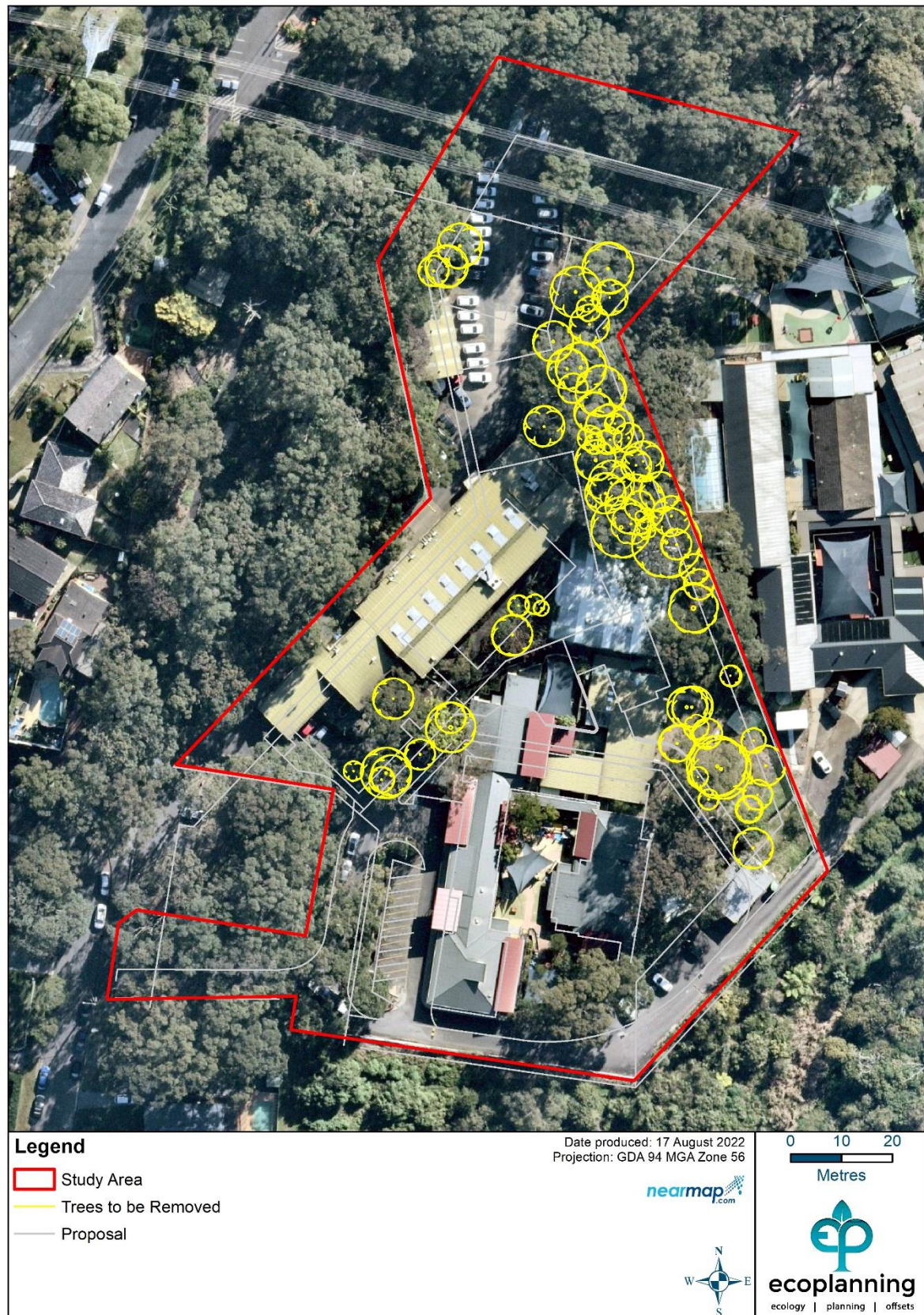


Figure 4.2: Trees likely to be removed for future development

4.2 Indirect impacts

It is difficult to quantify indirect impacts of the proposed alterations, but these may include impacts such as erosion and impacts on the nearby GHFF camp.

Future development of the site may introduce new edge effects, shading and increase soil nutrients that could affect the remaining vegetation on site.

The GHFF, listed as vulnerable under the BC Act and EPBC Act, has a registered camp residing in vegetation immediately to the east of the study area. Limitations should be placed on developments that can occur within approximately 300 m of flying-fox camps to safeguard against significant impacts on camps (DoEE 2017). Given that the entire study area is well within the 300 m buffer of a GHFF camp, it is likely that this camp will be impacted to some degree.

A Plan of Management (PoM) has been developed for this GHFF camp (ELA 2013). The PoM makes specific mention in regard to minimising the impact to the GHFF camp by any redevelopment of the 'adjacent schools'.

4.3 Avoidance and mitigation

4.3.1 Vegetation clearing

Up to 0.48 ha of Coastal Enriched Sandstone Dry Forest would be impacted by the current proposal. Some of this vegetation would be cleared, while some will be modified to create an APZ. A total of 0.55 ha of Coastal Enriched Sandstone Dry Forest occurs in the study area.

Development of the site should seek to minimise vegetation clearing, and seek to use species characteristic of Coastal Enriched Sandstone Dry Forest in landscaping.

4.3.2 Pre-clearance protocols

No hollow bearing trees were identified on the subject site. As such, it is not necessary for an ecologist to be present onsite during the removal of the native vegetation proposed for removal in the subject site. However, several fauna species such as birds, arboreal mammals and amphibians may be present in the subject site. Appropriate pre-clearance protocols will be put in place at the time of construction to avoid and mitigate any potential harm or injury to these individuals.

4.3.3 Grey-headed Flying-fox

Demolition of the existing buildings and building the future development will create excessive dust and noise that may affect the camp. A fauna management plan is required to guide the demolition and construction period to minimise impacts to GHFF in a manner consistent with the relevant policy and plans, such as DoEE (2017) and ELA (2015).

The fauna management plan will (amongst other things):

- identify times of year when GHFF may be more susceptible to disturbance
- nominate start and end times for workers

- describe appropriate monitoring of the camp during time when excessive dust or noise will be generated
- preferentially retain winter flowering *Eucalyptus* sp. and *Corymbia* sp.
- include triggers for stop work
- detail a monitoring program.

4.4 Legislative context

4.4.1 Commonwealth listings

The significance of the impact that the proposal would have on Commonwealth listed threatened flora/fauna and migratory species assessed as having a 'moderate' likelihood of occurring (**Appendix A**) was considered by applying the Significant Impact Criteria (**Appendix C**). The species assessed was *Pteropus poliocephalus* (Grey-headed Flying-fox).

Assessment of the threatened species against the relevant components of the Significant Impact Guidelines Commonwealth Department of the Environment (DoE) (2013) concluded that, provided construction was conducted following a clear set of protocols (i.e. a fauna management plan) endorsed by council, impacts to the camp are unlikely.

4.4.2 State listings

Biodiversity Conservation Act 2016

The significance of the impact of the proposal on state listed threatened species was considered by applying the Test of Significance. The following threatened species listed under the BC Act may be impacted by the proposal:

- Threatened species
 - *Ninox strenua* (Powerful Owl)
 - *Pteropus poliocephalus* (Grey-headed Flying-fox)
 - *Miniopterus australis* (Little Bent-winged Bat)
 - *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
 - *Saccolaimus flaviventris* (Yellow-bellied Sheath-tail-bat)
 - *Scoteanax rueppellii* (Greater Broad-nosed Bat)

The Test of Significance was not applied to *Syzygium paniculatum* as the species is known to occur in Littoral Rainforest as opposed to Coastal Enriched Sandstone Dry Forest, therefore, given the size of the individual, the species is likely to have been planted on site.

Impact assessment in accordance with Part 7.3 of the BC Act (i.e. the 'Test of Significance') and the associated guidelines (OEH 2017) have been undertaken. These assessments found that the proposal was not likely to result in a significant impact. Specifically, impact to GHFF were not considered significant assuming that construction would be undertaken in accordance with a clear set of protocols (i.e. a fauna management plan) endorsed by council.

5 Conclusion and recommendations

This report considered the potential impacts to threatened species, populations and ecological communities with respect to the proposed rezoning and future development of units at Lot 1142 // DP 752064 and Lot 1 // DP 225581 (147 Garnet Road, Kareela, NSW 2232). The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest.

No threatened flora species listed under the EPBC Act or BC Act were identified in the study area during field assessment.

One threatened fauna species listed under the BC Act and EPBC Act, the GHFF, was recorded adjacent to the study area during field assessment. A GHFF camp is located adjacent to the site. The camp is the subject of regular monitoring and the population is often numbers 2,500 to 10,000 individuals, however, monitoring during 2019 consistently counted 500 to 2,500 individuals. During an inspection of the camp on 17 March 2022, GHFF were observed roosting between 5 m and 10 m above ground level, with the resident population numbers on the day of the survey between 90 and 140 individuals. However, a more recent inspection of the camp (12 August 2022) failed to record any individuals or evidence of recent use.

An additional five threatened fauna species were assessed as having a 'moderate' likelihood of occurring in the study area. Impacts to these threatened and migratory species will not be significant in accordance with Section 7.3 of the BC Act and the EPBC Act Significance Assessments (**Appendix C**).

Mitigation measures have been recommended in **Section 4.3**. To avoid the potential for the proposal to significantly impact the GHFF camp, a Council approved fauna management plan is required to prescribe the actions necessary to minimise potential impacts during the demolition and construction phases. The fauna management plan will:

- identify times of year when GHFF may be more susceptible to disturbance
- nominate start and end times for workers
- describe appropriate monitoring of the camp during time when excessive dust or noise will be generated
- preferentially retain winter flowering *Eucalyptus* sp. and *Corymbia* sp.
- include triggers for stop work
- detail a monitoring program.

In addition, future landscape planting of the study area should use flora species characteristic of Coastal Enriched Sandstone Dry Forest.

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Appendix A Likelihood of occurrence for threatened species

The potential for each threatened species, population and/or migratory species to occur was then considered and the necessity for targeted field surveys was determined. Following field surveys and review of available habitat within the Subject site, the potential for species to use the site and be affected directly or indirectly by the proposal were considered as either:

- “Recent record” = species has been recorded in the study area within the past 5 years
- “High” = species has previously been recorded in the study area (<5 years ago) or in proximity (for mobile species), and/or habitat is present that is likely to be used by a local population
- “Moderate” = suitable habitat for a species is present onsite but no evidence of a species detected and relatively high number of recent records (5-20 years) within the region or species is highly mobile
- “Low” = suitable habitat for a species is present onsite but limited or highly degraded, no evidence of a species detected and relatively low number of recent records within the region
- “Not present” = suitable habitat for the species is not present onsite or adequate survey has determined species does not occur in the study area

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent record and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment ¹
KINGDOM: Animalia; CLASS: Aves						
<i>Ardea ibis</i> Cattle Egret	EPBC Act: C,J	1	3.56 km (31/08/2016)	3.56 km (31/08/2016)	Not present	Not present
<i>Puffinus tenuirostris</i> Short-tailed Shearwater	EPBC Act: J,K	2	4.28 km (19/10/2013)	4.11 km (22/10/2013)	Not present	Not present
<i>Arenaria interpres</i> Ruddy Turnstone	EPBC Act: C,J,K	3	4.41 km (14/11/2009)	4.41 km (16/01/2010)	Not present	Not present
<i>Burhinus grallarius</i> Bush Stone-curlew	BC Act: E	1	0.79 km (31/12/2014)	0.79 km (31/12/2014)	Low	Low
<i>Circus assimilis</i> Spotted Harrier	BC Act: V	1	3.6 km (16/09/2017)	3.6 km (16/09/2017)	Low	Low
<i>Daphoenositta chrysoptera</i> Varied Sittella	BC Act: V	1	4.93 km (9/07/2015)	4.93 km (9/07/2015)	Low	Low
<i>Egretta sacra</i> Eastern Reef Egret	EPBC Act: C	1	2.41 km (12/05/2016)	2.41 km (12/05/2016)	Not present	Not present
<i>Glossopsitta pusilla</i> Little Lorikeet	BC Act: V	1	2.34 km (11/01/2014)	2.34 km (11/01/2014)	Low	Low
<i>Haematopus longirostris</i> Pied Oystercatcher	BC Act: E	6	4.19 km (14/11/2009)	4.4 km (15/03/2018)	Not present	Not present
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	BC Act: V EPBC Act: C	3	3.1 km (19/05/2011)	3.94 km (22/01/2017)	Low	Low
<i>Hirundapus caudacutus</i> White-throated Needletail	EPBC Act: C,J,K	2	1.75 km (15/02/2012)	4.43 km (8/11/2014)	Low	Low
<i>Limosa lapponica</i> Bar-tailed Godwit	EPBC Act: C,J,K	4	3.93 km (16/01/2010)	3.67 km (25/02/2010)	Not present	Not present
<i>Lophoictinia isura</i> Square-tailed Kite	BC Act: V	3	4.84 km (16/03/2012)	4.83 km (21/02/2016)	Low	Low
<i>Ninox strenua</i> Powerful Owl	BC Act: V	91	4.63 km (20/01/2010)	3.25 km (11/08/2017)	Moderate	Moderate
<i>Numenius phaeopus</i> Whimbrel	EPBC Act: C,J,K	2	4.56 km (20/01/2010)	4.4 km (15/03/2018)	Not present	Not present
<i>Pandion cristatus</i> Eastern Osprey	BC Act: V	5	3.64 km (24/02/2012)	4.6 km (31/08/2015)	Low	Low
<i>Pluvialis squatarola</i> Grey Plover	EPBC Act: C,J,K	2	4.41 km (17/11/2011)	1.81 km (12/09/2015)	Not present	Not present

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent record and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment ¹
<i>Sternula albifrons</i> Little Tern	BC Act: E EPBC Act: C,J,K	1	4.32 km (4/12/2010)	4.32 km (4/12/2010)	Not present	Not present
<i>Tringa brevipes</i> Grey-tailed Tattler	EPBC Act: C,J,K	4	3.56 km (31/08/2016)	4.4 km (15/03/2018)	Not present	Not present
KINGDOM: Animalia; CLASS: Amphibia						
<i>Pseudophryne australis</i> Red-crowned Toadlet	BC Act: V	1	4.34 km (23/11/2013)	4.34 km (23/11/2013)	Low	Low
KINGDOM: Animalia; CLASS: Mammalia						
<i>Cercartetus nanus</i> Eastern Pygmy-possum	BC Act: V	5	2.36 km (4/12/2017)	4.72 km (28/07/2012)	Moderate	Low
<i>Miniopterus australis</i> Little Bent-winged Bat	BC Act: V	2	3.65 km (7/11/2012)	4.68 km (7/12/2013)	Moderate	Moderate
<i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat	BC Act: V	3	1.23 km (24/03/2015)	1.23 km (24/03/2015)	Moderate	Moderate
<i>Myotis macropus</i> Southern Myotis	BC Act: V	1	4.28 km (1/06/2017)	4.28 km (1/06/2017)	Moderate	Low – no open water
<i>Phascolarctos cinereus</i> Koala	BC Act: V,P EPBC Act: V	3	4.72 km (1/01/1900)	2.8 km (13/12/2017)	Low	Low
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	BC Act: V,P EPBC Act: V	255	0.16 km (17/11/2017)	0.25 km (7/06/2017)	Moderate	Moderate
<i>Saccolaimus flaviventris</i> Yellow-bellied Sheath-tail-bat	BC Act: V	1	1.53 km (5/11/2013)	1.53 km (5/11/2013)	Moderate	Moderate
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	BC Act: V	1	1.53 km (5/11/2013)	1.53 km (5/11/2013)	Moderate	Moderate
KINGDOM: Reptilia						
<i>Varanus rosenbergi</i> Rosenberg's Goanna	BC Act: V	3	3.8 km (17/12/2009)	3.85 km (25/10/2015)	Low	Low
KINGDOM: Plantae						
<i>Callistemon linearifolius</i> Netted Bottle Brush	BC Act: V	4	3.73 km (18/11/2015)	3.73 km (18/11/2015)	Moderate	Not present

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent record and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment ¹
<i>Hibbertia stricta</i> subsp. <i>furcatula</i>	BC Act: E	1	4.75 km (1/05/2017)	4.75 km (1/05/2017)	Low	Not present
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	BC Act: E EPBC Act: V	2	4.42 km (15/10/2015)	2.04 km (30/11/2016)	Low	Present – planted specimen

Unless other stated, text is taken from the OEH Threatened Species (<http://www.environment.nsw.gov.au/threatenedspecies/>); Legal Status codes from the Atlas of NSW Wildlife: V = Vulnerable, E = Endangered, C = China and Australia Migratory Bird Agreement (CAMBA), J = Japan and Australia Migratory Bird Agreement (JAMBA); K = Republic of Korea and Australia Migratory Bird Agreement (ROKAMBA), BC Act = NSW *Biodiversity Conservation Act 2016*, EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Appendix B Flora and Fauna species inventories

Flora

Family	Scientific Name	Common Name	Native or Exotic
Agavaceae	<i>Agave attenuata</i> *	Foxtail Agave	Exotic
Amaryllidaceae	<i>Agapanthus praecox</i> *	Agapanthus	Exotic
Apiaceae	<i>Hydrocotyle bonariensis</i> *	Largeleaf Pennywort	Exotic
Apiaceae	<i>Cyclospermum leptophyllum</i> *	Slender Celery	Exotic
Apiaceae	<i>Platysace linearifolia</i>		Native
Apiaceae	<i>Xanthosia pilosa</i>	Woolly Xanthosia	Native
Araceae	<i>Monstera deliciosa</i> *	Fruit Salad Plant	Exotic
Araliaceae	<i>Polyscias sambucifolia</i>	Elderberry Panax	Native
Asparagaceae	<i>Asparagus</i> sp.*		Exotic
Asteraceae	<i>Sonchus oleraceus</i> *	Common Sowthistle	Exotic
Asteraceae	<i>Osteospermum</i> sp.*		Exotic
Asteraceae	<i>Lactuca serriola</i> *	Prickly Lettuce	Exotic
Asteraceae	<i>Erigeron karvinskianus</i> *	Bony-tip Fleabane	Exotic
Asteraceae	<i>Gamochaeta</i> sp.*		Exotic
Asteraceae	<i>Hypochaeris radicata</i> *	Catsear	Exotic
Asteraceae	<i>Conyza</i> sp.*		Exotic
Asteraceae	<i>Ageratina adenophora</i> *	Crofton Weed	Exotic
Asteraceae	<i>Bidens pilosa</i> *	Cobbler's Pegs	Exotic
Campanulaceae	<i>Wahlenbergia</i> sp.		Native
Caryophyllaceae	<i>Cerastium glomeratum</i> *	Mouse-ear Chickweed	Exotic
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black She-Oak	Native
Convolvulaceae	<i>Ipomoea indica</i> *	Morning Glory	Exotic
Cunoniaceae	<i>Ceratopetalum gummiferum</i>	Christmas Bush	Native
Cunoniaceae	<i>Callicoma serratifolia</i>	Black Wattle	Native
Cunoniaceae	<i>Ceratopetalum gummiferum</i>	Christmas Bush	Native
Cyperaceae	<i>Ptilothrix deusta</i>		Native
Cyperaceae	<i>Lepidosperma laterale</i>	Variable Sword-sedge	Native
Davalliaceae	<i>Nephrolepis cordifolia</i>	Fishbone Fern	Native
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken	Native
Dilleniaceae	<i>Hibbertia dentata</i>	Twining Guinea Flower	Native
Dilleniaceae	<i>Hibbertia bracteata</i>		Native
Dilleniaceae	<i>Hibbertia dentata</i>	Twining Guinea Flower	Native
Elaeocarpaceae	<i>Elaeocarpus reticulatus</i>	Blueberry Ash	Native
Ericaceae	<i>Epacris pulchella</i>	Wallum Heath	Native
Euphorbiaceae	<i>Homalanthus populifolius</i>	Bleeding Heart	Native
Euphorbiaceae	<i>Euphorbia peplus</i> *	Petty Spurge	Exotic
Fabaceae (Caesalpinioideae)	<i>Senna pendula</i> *	Cassia	Exotic
Fabaceae (Faboideae)	<i>Bossiaea heterophylla</i>	Variable Bossiaea	Native
Fabaceae (Faboideae)	<i>Bossiaea obcordata</i>	Spiny Bossiaea	Native
Fabaceae (Faboideae)	<i>Vicia</i> sp.*		Exotic

Family	Scientific Name	Common Name	Native or Exotic
Fabaceae (Mimosoideae)	<i>Acacia suaveolens</i>	Sweet Wattle	Native
Fabaceae (Mimosoideae)	<i>Acacia longifolia</i>	Sydney Golden Wattle	Native
Fabaceae (Mimosoideae)	<i>Acacia myrtifolia</i>	Red-stemmed Wattle	Native
Fabaceae (Mimosoideae)	<i>Acacia linifolia</i>	White Wattle	Native
Fabaceae (Mimosoideae)	<i>Acacia elata</i>	Mountain Cedar Wattle	Native
Haloragaceae	<i>Gonocarpus tetragynus</i>		Native
Lauraceae	<i>Cassytha glabella</i>		Native
Lauraceae	<i>Cinnamomum camphora</i> *	Camphor laurel	Exotic
Lomandraceae	<i>Lomandra cylindrica</i>		Native
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Native
Luzuriagaceae	<i>Eustrephus latifolius</i>	Wombat Berry	Native
Malvaceae	<i>Brachychiton acerifolius</i>	Illawarra Flame Tree	Native
Meliaceae	<i>Melia azedarach</i>	White Cedar	Native
Moraceae	<i>Ficus coronata</i>	Creek Sandpaper Fig	Native
Moraceae	<i>Ficus macrophylla</i>	Moreton Bay Fig	Native
Myrtaceae	<i>Corymbia gummifera</i>	Red Bloodwood	Native
Myrtaceae	<i>Eucalyptus piperita</i>	Sydney Peppermint	Native
Myrtaceae	<i>Callistemon</i> sp. (planted)		Native
Myrtaceae	<i>Eucalyptus</i> sp. (planted)		Native
Myrtaceae	<i>Eucalyptus pilularis</i>	Blackbutt	Native
Myrtaceae	<i>Eucalyptus grandis</i>	Flooded Gum	Native
Myrtaceae	<i>Eucalyptus microcorys</i>	Tallow wood	Native
Myrtaceae	<i>Angophora costata</i>	Sydney Red Gum	Native
Myrtaceae	<i>Syzygium</i> sp.		Native
Ochnaceae	<i>Ochna serrulata</i> *	Mickey Mouse Plant	Exotic
Oleaceae	<i>Ligustrum sinense</i> *	Small-leaved Privet	Exotic
Oleaceae	<i>Ligustrum lucidum</i> *	Large-leaved Privet	Exotic
Orchidaceae	<i>Dendrobium speciosum</i>	Rock Lily	Native
Orchidaceae	<i>Acianthus fornicatus</i>	Pixie Caps	Native
Orchidaceae	<i>Dendrobium</i> sp.		Native
Phormiaceae	<i>Dianella caerulea</i>	Blue Flax-lily	Native
Phyllanthaceae	<i>Glochidion ferdinandi</i>	Cheese Tree	Native
Pittosporaceae	<i>Billardiera scandens</i>	Hairy Apple Berry	Native
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet Pittosporum	Native
Plantaginaceae	<i>Plantago lanceolatum</i> *	Lamb's Tongue	Exotic
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass	Native
Poaceae	<i>Entolasia stricta</i>	Wiry Panic	Native
Poaceae	<i>Cynodon dactylon</i>	Common Couch	Native
Poaceae	<i>Anisopogon avenacea</i>	Oat Spear Grass	Native
Poaceae	<i>Bromus catharticus</i> *	Prairie Grass	Exotic
Poaceae	<i>Stenotaphrum secundatum</i> *	Buffalo Grass	Exotic
Poaceae	<i>Briza maxima</i> *	Quaking Grass	Exotic

Family	Scientific Name	Common Name	Native or Exotic
Poaceae	<i>Ehrharta erecta</i> *	Panic Veldtgrass	Exotic
Poaceae	<i>Opismenus aemulus</i>	Australian Basket Grass	Native
Polygonaceae	<i>Acetosa sagittata</i> *	Rambling Dock	Exotic
Proteaceae	<i>Persoonia laevis</i>		Native
Proteaceae	<i>Telopea speciosissima</i>	Waratah	Native
Proteaceae	<i>Grevillea sericea</i>	Pink Spider Flower	Native
Proteaceae	<i>Banksia serrata</i>	Old-man Banksia	Native
Rutaceae	<i>Zieria</i> sp.		Native
Smilacaceae	<i>Smilax glycyphylla</i>	Sweet Sarsaparilla	Native
Solanaceae	<i>Cestrum parqui</i> *	Lady of the Night	Exotic
Theaceae	<i>Camellia sasanqua</i> *	Sasanqua Camellia	Exotic
Thymelaeaceae	<i>Pimelea linifolia</i>	Slender Rice Flower	Native
Verbenaceae	<i>Lantana camara</i> *	Lantana	Exotic

Fauna

Scientific Name	Common Name
<i>Alisterus scapularis</i>	Australian King-Parrot
<i>Anthochaera carunculata</i>	Red Wattlebird
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo
<i>Cacatua sanguinea</i>	Little Corella
<i>Corvus coronoides</i>	Australian Raven
<i>Cracticus torquatus</i>	Grey Butcherbird
<i>Dacelo novaeguineae</i>	Laughing Kookaburra
<i>Lampropholis delicata</i>	Delicate Skink
<i>Malurus cyaneus</i>	Superb Fairy Wren
<i>Manorina melanocephala</i>	Noisy Miner
<i>Platycercus eximius</i>	Eastern Rosella
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (off site)
<i>Strepera graculina</i>	Pied Currawong
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet

Appendix C Assessments of Significance

Commonwealth listings under the EPBC Act

The EPBC Act Matters of National Environmental Significance (MNES) (EPBC Act Significant Impact Guidelines) (DoE 2013) provides 'Significant Impact Criteria' that are to be used to assist in determining whether a proposed action is likely to have a significant impact on a MNES and subsequently the need for referral. MNES identified within the study area have been addressed below.

Grey-headed Flying-fox (*Pteropus poliocephalus*) – vulnerable species

GHFF occurs within 200 km of the eastern coastline of Australia, from Rockhampton in Queensland to Adelaide in South Australia. They prefer subtropical and temperate rainforest, tall sclerophyll forests and woodlands, as well as heaths and swamps. Roosting areas are often selected upon their proximity to a regular food source (within 20 km), often in gullies, close to water, or in vegetation with a dense canopy. This species roosts communally in large, established camps which can support several thousand individuals. The GHFF can travel up to 50 km from camp to forage (typically <20 km), where they feed on nectar and pollen from *Eucalyptus*, *Banksia* and *Melaleuca* spp., as well as the fruits of native and exotic species (DoEE 2017).

Threats to this species include:

- Loss of roosting and foraging site
- Heat stress
- Electrocution on powerlines and entanglement in netting.

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

The study site is adjacent to a GHFF camp, which is located south-east of the study area. It is likely that the species may use the study area for foraging due to the camp's proximity. The proposal will remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest, and demolition and construction works may impact the species. A fauna management plan is recommended to direct demolition and construction activities to minimise impacts to GHFF. With appropriate management of demolition and construction activities, the proposed rezoning and development will not lead to a decrease in the population of the GHFF.

- Reduce the area of occupancy of an important population

The proposed rezoning and development will remove and modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest near a registered Grey-headed Flying Fox camp. While it is likely that the vegetation within the study site is used as foraging habitat, preparation and implementation of a Council endorsed fauna management plan for the demolition and construction phases should mean that the proposal is not likely to reduce the occupancy of the population.

- Fragment an existing important population into two or more populations

The proposal would not lead to the fragmentation of the GHFF population. The ability for GHFF to travel large distances makes them less susceptible to the impacts of fragmentation.

- Adversely affect habitat critical to the survival of a species

According to the Draft National Recovery Plan for the GHFF, foraging habitat that meets at least one of the following criteria can be explicitly identified as habitat critical to survival, or essential habitat (DECCW 2009), including:

- productive during winter and spring when food bottlenecks have been identified
- known to support populations of > 30 000 individuals within an area of 50 km radius (the maximum foraging distance of an adult)

The dominant canopy species in the study area includes *Angophora costata* (Smooth-barked Apple), *Corymbia gummifera* (Red Bloodwood) and *Eucalyptus piperita* (Sydney Peppermint). While the Smooth-barked Apple and Sydney Peppermint flower in the summer months, Red Bloodwood is an autumn and winter flowering species and, therefore, could provide foraging habitat for the GHFF during this period. It is possible that the study area may be used during food availability bottlenecks. The Kareela population supported approximately 500 to 2,500 individuals in August 2019 (DoEE 2020). Therefore, the vegetation in the study area likely constitutes habitat critical to the survival of the species. During an inspection of the camp on 17 March 2022, GHFF were observed roosting between 5 m and 10 m above ground level, with the resident population numbers on the day of the survey between 90 and 140 individuals. However, a more recent inspection of the camp (12 August 2022) failed to record any individuals or evidence of recent use.

- Disrupt the breeding cycle of an important population

The proposal may affect the breeding cycle of the population if excessive noise and dust is generated during key periods of the breeding cycle. GHFF give birth in October or November and lactate approximately to March (DECCW 2009). To avoid and minimise the potential for the proposal to impact the breeding cycle of GHFF, a fauna management plan will be prepared to guide the proposal.

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

The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest. The species could continue to use the vegetation in the study area for foraging, as complete vegetation removal will not be required, and a number of canopy trees would remain. Given this, the proposal would not remove habitat to an extent that will cause a decline in the GHFF.

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

The proposed works are unlikely to result in invasive species that are harmful.

- Introduce disease that may cause the species to decline, or

The proposed works are unlikely to introduce disease that may cause the species to decline.

- Interfere substantially with the recovery of the species.

The proposal may interfere with the recovery of the species as the potential habitat requiring removal is close to a registered GHFF camp.

Conclusion of EPBC Act Significant Impact Guidelines (DoE 2013) for GHFF.

The proposal has the potential to impact GHFF. However, by preparing a fauna management plan that will guide the demolition and construction of the site to minimise the potential for GHFF to be impacted, the proposal is unlikely to impact the species.

Winter flowering species should be preferentially retained in the APZ to minimise the potential impact on foraging resources.

State listings under the BC Act

The following factors listed under Part 7.3 of the BC Act must be taken into account when deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats. The below assessments have been prepared in accordance with the appropriate guidelines (OEH, 2018).

Powerful Owl (*Ninox strenua*) - Vulnerable

The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria (OEH 2020f). The species inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. Their main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider (OEH 2020f; NSW 2006).

- 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,

Powerful Owl have not been recorded on site, however, there are several records of the species in the Sutherland Shire. The often will roost in vegetated gullies and forage widely in surrounding areas.

The presence of large old trees to provide nest hollows do not exist on the site. As such, the proposal is unlikely to have an adverse effect on the life cycle of the Powerful Owl to an extent that may place the local population 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,

The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest. The study area does not contain suitable nesting hollows, however, prey species are likely to occur, along with the GHFF camp on the adjoining property.

The Powerful Owl is a highly mobile species. The removal or modification of 0.48 ha of potential habitat is not likely to isolate or fragment the species.

Vegetation on site is similar to many disturbed patches of bushland in the area. The study area is next to Joseph Banks Native Plant Reserve where there are extensive areas of similar habitat that would offer similar habitat. The proposed impacts in the study area are not likely to affect the long-term survival of the species.

- 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 proposed activity would not have any adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

- 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.

There is one key threatening processes of relevance to this species; clearing of native vegetation.

The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest.

Conclusion of test of significance for the Powerful Owl

The proposed rezoning and development would not have a significant impact on the Powerful Owl, as:

- the study area lacked hollow bearing trees
- size of the impacted area is small (0.48 ha)
- presence of similar habitat in the locality

Cave roosting microbats: Little Bent-wing Bat (*Miniopterus australis*) and Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – vulnerable species

The Little Bent-winged Bat occurs along the east coast of Australia ranging from Cape York Qld south to Wollongong, NSW. They are generally found in well-timbered areas of moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. It can be distinguished from the Common Bent-winged Bat by its smaller size. They roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts and bridges with foraging occurring at night for small insects beneath the canopy of densely vegetated habitats (OEH 2020).

The Large Bent-winged Bat occurs along the east and north-west coasts of Australia. Caves are their primary roosting habitat, however, they are opportunistic, also using derelict mines, storm-water tunnels, buildings and other man-made structures. The species typically hunt in forested areas, catching moths and other flying insects above the tree tops (OEH 2020e).

- 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,

It is possible that the vegetation in the study area provides potential foraging habitat for the species. The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest. The species could continue to use the remaining vegetation in the study area for foraging, as complete vegetation removal will not be required, and a number of canopy trees will be retained. The study area does not constitute roosting or breeding habitat, as it does not contain caves or rock crevices in cliffs, which are required roosting habitat for the species. As such, the proposal is unlikely to have an adverse effect on the lifecycle of the Little Bent-winged Bat or the Large Bent-winged Bat, such that a viable local population is 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,

The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest. These species could continue to use the vegetation in the study area for foraging, as complete vegetation removal will not be required, and a number of canopy trees will be retained. The species could continue to use the vegetation in the study area for foraging only. As the study area does not contain caves or rock crevices in cliffs which are required roosting habitat for both species, it does not constitute roosting or breeding habitat.

The proposed development would not result in the fragmentation or isolation of other areas of habitat for the species and vegetation that would be removed by the proposed works is unlikely to further fragment or isolate the habitat in the study area from adjoining areas of habitat.

It is possible that the Little Bent-winged Bat or the Large Bent-winged Bat could use the study area as foraging habitat. However, the importance of the habitat to be removed for the long-term survival of the two species is low, given the lack of potential roosting or breeding habitat within the study area.

- 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 proposed activity would not have any adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

- 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.

There is one key threatening processes of relevance to this species; clearing of native vegetation.

The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest.

Conclusion of test of significance for the Little Bent – winged Bat and Large Bent-winged Bat

The proposed development would not have a significant impact on the Little Bent-winged Bat and Large Bent-winged Bat, as:

- no caves, cliffs or rock crevices or vegetation in close proximity of these features will be impacted by the proposal, and
- the proposal would not affect the life cycle of the species such that a viable population will be placed at risk of extinction.

Tree-hollow roosting microbats: Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) and Greater Broad-nosed Bat (*Scoteanax rueppellii*) – vulnerable species

The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. Roosts singly or in groups of up to six, in tree hollows and buildings. The species forages in most habitats across its very wide range, with and without trees; appearing to defend an aerial territory (OEH 2020d).

The Greater Broad-nosed Bat occurs from north-eastern Victoria to the Atherton Tableland. In NSW, it occurs along the entire east coast but does not occur at altitudes above 500 m. It uses a variety of habitat from woodlands through to moist and dry eucalypt forest and rainforest. It is most commonly found in tall wet forest. It usually roosts in tree hollows but has also been found in buildings (OEH 2020b).

- 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,

It is possible that the vegetation in the study area provides potential foraging habitat for these species. The proposal would result in the removal or modification of up to 0.48 ha of Coastal Enriched Sandstone Dry Forest. These species could continue to use the vegetation in the study area for foraging, as complete vegetation removal will not be required, and a number of canopy trees will be retained. Given the mobility of these species, it is unlikely that the proposal will constitute a substantial loss of foraging resources for a viable local population of these species.

No nesting hollows are found onsite, hence, it is unlikely that the area represents roosting and/or breeding habitat. As such, the proposal will not adversely affect the lifecycle of these two species to an extent that may place the local population 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,

The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest. The species could continue to use the remaining 0.12 ha of vegetation in the study area for foraging and, as complete vegetation removal will not be required, these species could continue to use a number of canopy trees that will also be retained.

Given the mobility of these species, it is unlikely that the proposal would result in the fragmentation or isolation of habitat for the two species.

It is possible that the species could continue to use the study area for foraging. The study area is not known to be important habitat for either species.

- 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 proposed activity would not have any adverse effect (either directly or indirectly) on any declared area of outstanding biodiversity value.

- 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.

There is one key threatening processes of relevance to this species; clearing of native vegetation.

The proposal would remove or modify up to 0.48 ha of Coastal Enriched Sandstone Dry Forest.

Conclusion of test of significance for the Yellow-bellied Sheathtail-bat and Greater Broad-nosed Bat

The proposed development would not have a significant impact on the Yellow-bellied Sheathtail-bat or Greater Broad-nosed Bat, as:

- the proposal would not affect the life cycle of the species such that a viable population will be placed at risk of extinction, and
- no hollow bearing are present on site which could represent roosting or breeding habitat for the species.