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Flora and Fauna Assessment



Lot 100 // DP 1023183, Lots 1053 & 1054 // DP 752038 100 Meatworks Avenue, Oxford Falls

Proposed industrial development

Prepared for: Gelder Architects

15 October 2019 | Version: 1.0 – Final

PROJECT NUMBER	2019-014			
PROJECT NAME	Flora and Fauna Assessment			
PROJECT ADDRESS	Lot 100 // DP 1023183, Lots 1053 & 1054 // DP 752038 100 Meatworks Avenue, Oxford Falls			
PREPARED FOR	Gelder Architects			
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REVIEW	Technical	QA	Version	Date to client
	Bruce Mullins		1.0 – Draft	19 September 2019
			1.0 – Final	15 October 2019

This report should be cited as: 'Ecoplanning (2019). Flora and Fauna Assessment– Lot 100 // DP 1023183, Lots 1053 & 1054 // DP 752038 100 Meatworks Avenue, Oxford Falls. Prepared for Gelder Architects.'

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Glossary and abbreviations

Acronym	Description
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Methodology
BC Act	<i>Biodiversity Conservation Act 2016</i>
CEEC	Critically Endangered Ecological Community
DA	Development Application
DotE	Commonwealth Department of the Environment (now DotEE)
DotEE	Commonwealth Department of the Environment and Energy
DPIE	Commonwealth Department of Industry and Environment
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
ha	hectare(s)
HBT	Hollow Bearing Tree
LEP	Local Environmental Plan
LGA	Local Government Area
mm/cm/m/km	millimetres/centimetres/metres/kilometres
OEH	Office of Environment and Heritage (now Environment, Energy and Science Group)
PCT	Plant Community Type
TEC	Threatened Ecological Community, listed as vulnerable, endangered or critically endangered under either the BC Act and/or EPBC Act
WLEP	Warringah Local Environmental Plan
WoNS	Weed of National Significance
*	Denotes exotic species



1 Introduction

1.1 Purpose of report and legislative context

This flora and fauna assessment has been undertaken to accompany a Development Application (DA) relating to the construction of warehouses and associated infrastructure at part of Lot 100 // DP 1023183, Lot 1053 // DP 752038 and 1054 // DP 752038 (100 Meatworks Avenue, Oxford Falls, NSW). The purpose of this report is to identify and assess the flora and fauna within the study area and to assess the likely impacts of the proposed activity. 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* (EP&A Act).

Table 1.1: Legislative framework addressed in this report.

Instrument	Considerations	Context
Commonwealth		
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	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</i> (BC Act)	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.
Local		
Warringah Local Environmental Plan 2011 (WLEP)	Schedule 6.3	The Warringah Local Environmental Plan 2000 will continue to apply to land identified as 'Deferred matter' on the Land Application Map.
Warringah Local Environmental Plan 2000 (WLEP 2011)	Schedule 6 – Preservation of Bushland	Describes the context and specific aims of relevance to the preservation and protection of bushland.

1.2 Site description

1.2.1 Subject site and study area

Following the *Threatened Species Test of Significance Guidelines* (OEH 2018) the **subject site** is defined as the area 'directly impacted upon by the proposal' and includes the footprint of the development and any ancillary works, facilities, accesses or hazard reduction zones that support the construction or operation of the development or activity. The **study area** is defined as the subject site and additional areas which are likely to be affected by the proposal, either directly or indirectly.



The study area is identified as Lot 100 // DP 1023183 and Lots 1053 and 1054 // DP 752038 (100 Meatworks Avenue, Oxford Falls, NSW (**Figure 1.1**). It is situated in The Northern Beaches Local Government Area (LGA) and is zoned under Warringah Local Environmental Plan 2011 (WLEP) as “Deferred Matter”. The subject site comprises 0.68 hectares (ha) of land mostly consisting of cleared land, existing infrastructure and native vegetation in a range of condition classes. The study area is situated to the north east of the suburb of Frenchs Forest and is situated to the east of the Wakehurst Parkway and to the north east of Oxford Falls Grammar School. No watercourses have been mapped within the study area.

1.2.2 Surrounds

Within 5 km of the study area land is zoned predominantly as DM – Deferred Matter, RE1 – Public Recreation, SP2 – Infrastructure, E1 – National Parks and Nature Reserves, – Environmental Management and R2 – Low Density Residential under the WLEP (2011). Much of the surrounding area consists of cleared and/or disturbed lands, having historically been cleared for urban development (**Figure 1.2**). Within the surrounding area, native vegetation (~50%) primarily occurs to the north of the study area.

1.3 Description of the proposed development

The current proposal is for Stage 2 works within the south of Lot 100 // DP 1023183. This comprises the construction of 13 boutique industrial units with associated commercial space and an ancillary building (**Figure 1.3**). An Asset Protection Zone (APZ) will be established and maintained around the south of the proposed industrial units (**Figure 1.3**).



Figure 1.1: Study area and subject site.



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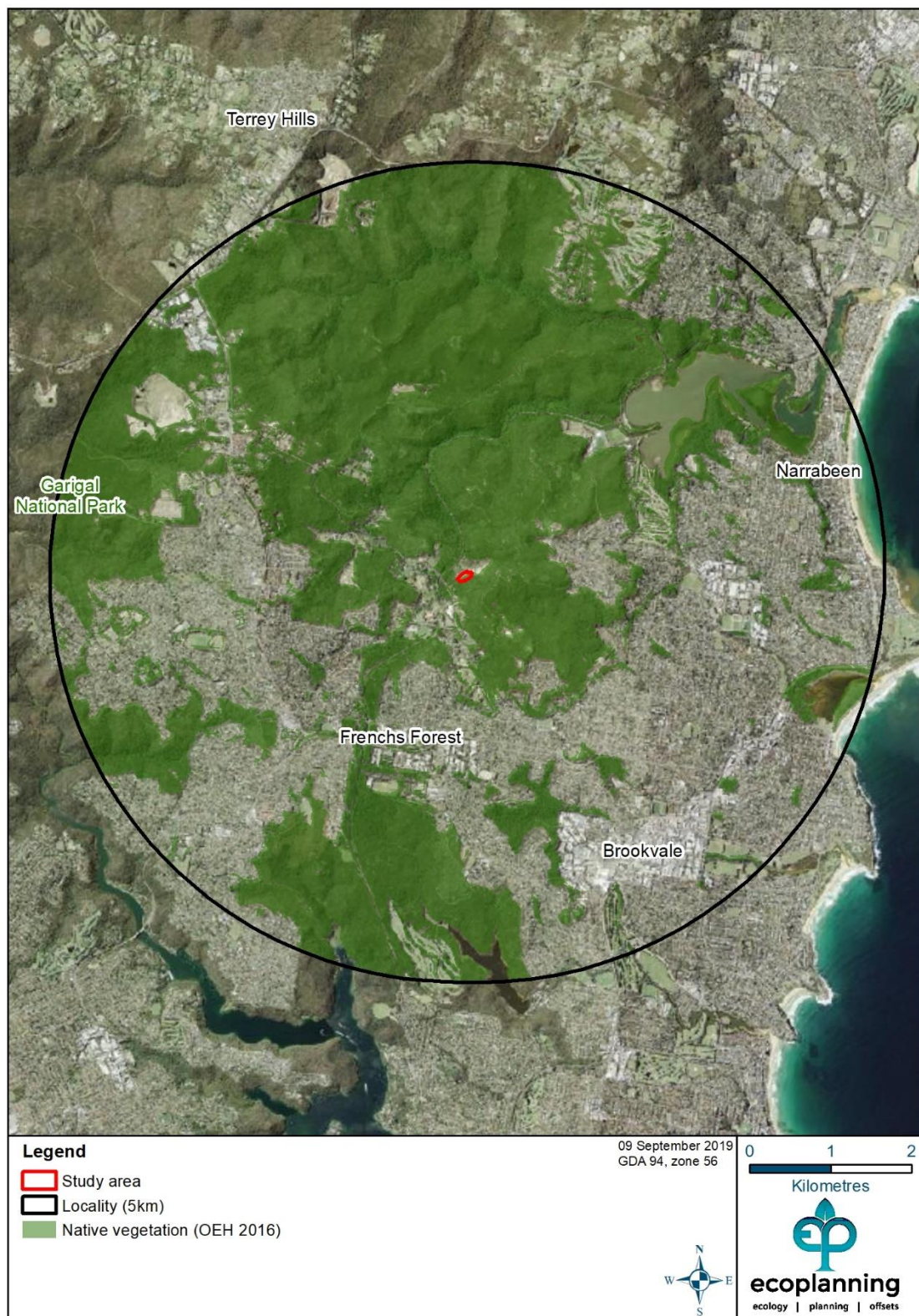


Figure 1.2: Native vegetation within the surrounding area (5 km radius of the study area).

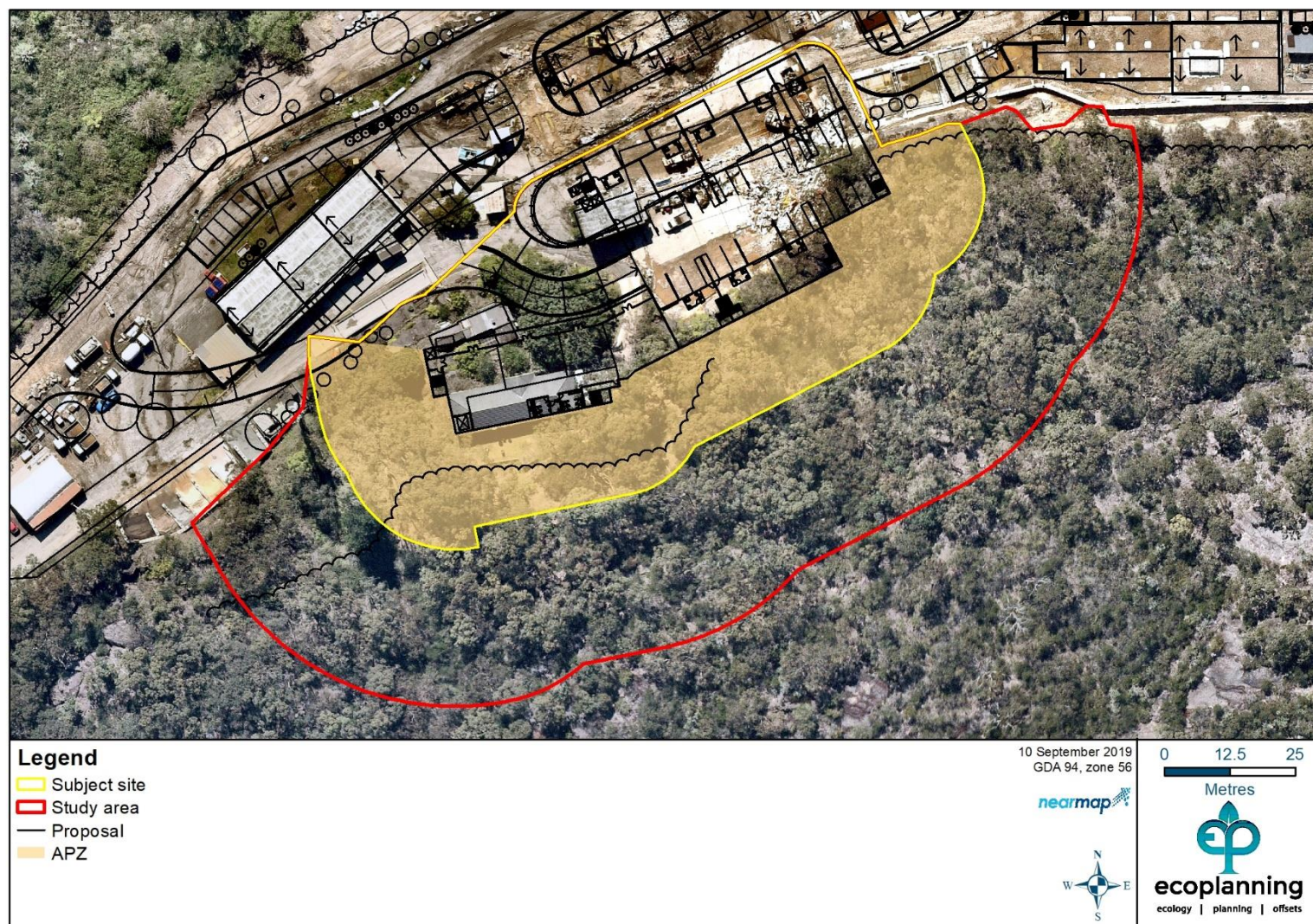


Figure 1.3: Proposed stage two layout and associated APZ.

2 Methods

2.1 Literature and database review

A site-specific literature and database review was undertaken prior to undertaking field survey and the preparation of this report. This included desktop analysis of aerial photography and regional scale information from the following sources:

- NSW Planning Viewer (NSW Dept. of Planning and Environment 2019)
- BioNet Atlas of NSW Wildlife (NSW Office of Environment and Heritage 2019)
- Protected Matters Search Tool (Commonwealth Department of Environment and Energy 2019)
- SIX Maps (LPI 2019)
- Native vegetation of the Sydney Metropolitan Catchment Management Authority (OEH 2016)
- Native Vegetation of the South East New South Wales region (Tozer et al. 2010)

Policies and guidelines relating to the proposal:

- Threatened Species Test of Significance Guidelines (OEH 2018)

Threatened species, populations and migratory species recorded within 5 km of the study area in a search of the Atlas of NSW Wildlife (OEH 2019a) were consolidated and their likelihood of occurrence was assessed by:

- review of location and date of recent (<5 years) and historical (5-20 years) records
- review of available habitat within the study area and surrounding areas
- 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 number of recent records (5-20 years) in the locality 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 in the locality

- “Not present” = suitable habitat for the species is not present onsite or adequate survey has determined species does not occur in the study area

All pelagic marine species were excluded from the likelihood of occurrence analysis given the distance of the study area from the coast.

2.2 Field Survey

Field survey was undertaken on 11 and 27 March 2019 by Thomas Hickman (Ecologist). Weather conditions on 11 March were warm with a small amount of rain recorded (2.4 mm) within four days leading up to the field survey. Weather conditions on 27 March were mild with heavy rainfall occurring in between each field survey (238.2 mm) (**Table 2.1**).

Table 2.1: Daily weather observations at Terrey Hills AWS (5.5 km north north west of the study area).

Date	Temp (°C)		Rainfall (mm)	Max wind	
	Min	Max		Direction	Speed (km/h)
11/03/2019	20.4	26.0	0	E	30
27/03/2019	13.3	22.4	0	E	24

2.2.1 Vegetation communities and flora

Field survey involved traversing the study area, whilst recording all visible flora species and identifying potential habitat for threatened flora species. Areas of intact, resilient vegetation were surveyed more extensively than degraded areas of the site. Nomenclature follows the Flora of NSW (Harden 1990-2002) and updates provided in PlantNET (RBGDT 2017).

Field survey was undertaken to validate regional vegetation mapping of OEH (2016) and Tozer et al. (2010) within the study area. Vegetation communities were checked against described Threatened Ecological Communities (TEC) listed under either the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NSW *Biodiversity Conservation Act 2016* (BC Act).

2.2.2 Fauna and fauna habitat

Opportunistic fauna survey was undertaken for birds, amphibians, reptiles and mammals, which included opportunistic observations along with signs of direct and indirect occupancy (i.e. scats, owl pellets, fur, bones, tracks, bark scratches, foliage chew marks and chewed cones of *Allocasuarina* spp. or *Pinus* spp. as well as some of the other cultivars known to be used by native fauna).

Fauna habitat searches were conducted for potential foraging, roosting, breeding or nesting habitat of nocturnal and diurnal species. This includes inspection for the presence of tree hollows, stags, bird nests, possum dreys, decorticating bark, rock shelters, rock outcrops/crevices, mature / old growth trees, food trees (*Banksia* spp., *Allocasuarina* spp., and winter-flowering eucalypts), culverts, dens, dams, riparian areas and refuge habitats of man-made structures.

Primary sources of literature accessed for species nomenclature were:

- Birds - Christidis and Boles (2008)
- Mammals - Van Dyck and Strahan (2008)
- Reptiles and amphibians - Cogger (2014)
- Terrestrial invertebrates - Australian Faunal Directory (AG 2015)

2.2.3 Survey limitations

The flora survey aimed to record as many species as possible. However, a definitive list of the flora within the study area cannot be gathered without systematic traverses and survey across a number of seasons. Additional species would be recorded during a longer survey over various seasons. However, the techniques used in this investigation are considered adequate to gather the data necessary to validate the vegetation communities and vegetation condition in the study area and assess the likelihood of occurrence of any threatened flora species.

A full fauna survey following Threatened Species Survey and Assessment Guidelines (OEH 2013) 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 habitat assessment during the field survey. Therefore, further detailed fauna surveys were not considered necessary.



3 Results

3.1 Literature and database review

3.1.1 Topography, drainage, soils and biodiversity layer

The study area does not contain any mapped watercourses. Middle Creek (2nd order watercourse) is located approximately 230 m west of the study area. The study area is sloped gently to the west and has a local relief of approximately 88 masl in the north to 110 masl in the south. Regional scale soil landscape mapping (Chapman et al. 2009) maps the entirety of the study area within the Lambert Erosional soil landscape (**Figure 3.1**). This soil landscape exhibits a characteristic sandstone bedrock which has outcrops as wide benches and scarps (Chapman et al. 2009).

The vegetation in study area is not mapped as 'Biodiversity' on the Terrestrial Biodiversity Map under the WLEP (2010), nor is the study area mapped on the Biodiversity Values Map (DPIE 2019).

3.1.2 Threatened species, populations and migratory species

A search of the relevant databases and literature identified 27 threatened or migratory species that have been previously recorded within 5 km of the study area in the last 20 years, including 15 threatened flora species and 34 threatened fauna species (two amphibians, one reptile, 18 birds, two semi-arboreal mammals, three ground dwelling mammals, one megabat and seven microbats) (**Figure 3.2**). No threatened flora or fauna species were identified as having been previously recorded within the study area.

Based on the likelihood of occurrence (**Appendix A**) and incorporating the field-based habitat assessments, six threatened fauna species have been identified as having a 'high' or 'moderate' potential to use the study area. Additionally, two threatened microbat species were recently recorded within the study area. The following threatened fauna species may be affected by the proposed works:

- *Cercartetus nanus* (Eastern Pygmy-possum) (high),
- *Pseudophyrne australis* (Red-crowned Toadlet) (moderate),
- *Miniopterus australis* (Little Bent-winged Bat) (recent record),
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat) (recent record),
- *Ninox strenua* (Powerful Owl) (moderate), and
- *Pteropus poliocephalus* (Grey-headed Flying-fox) (high).

All pelagic marine species were excluded from the likelihood of occurrence analysis given the location of the study area.

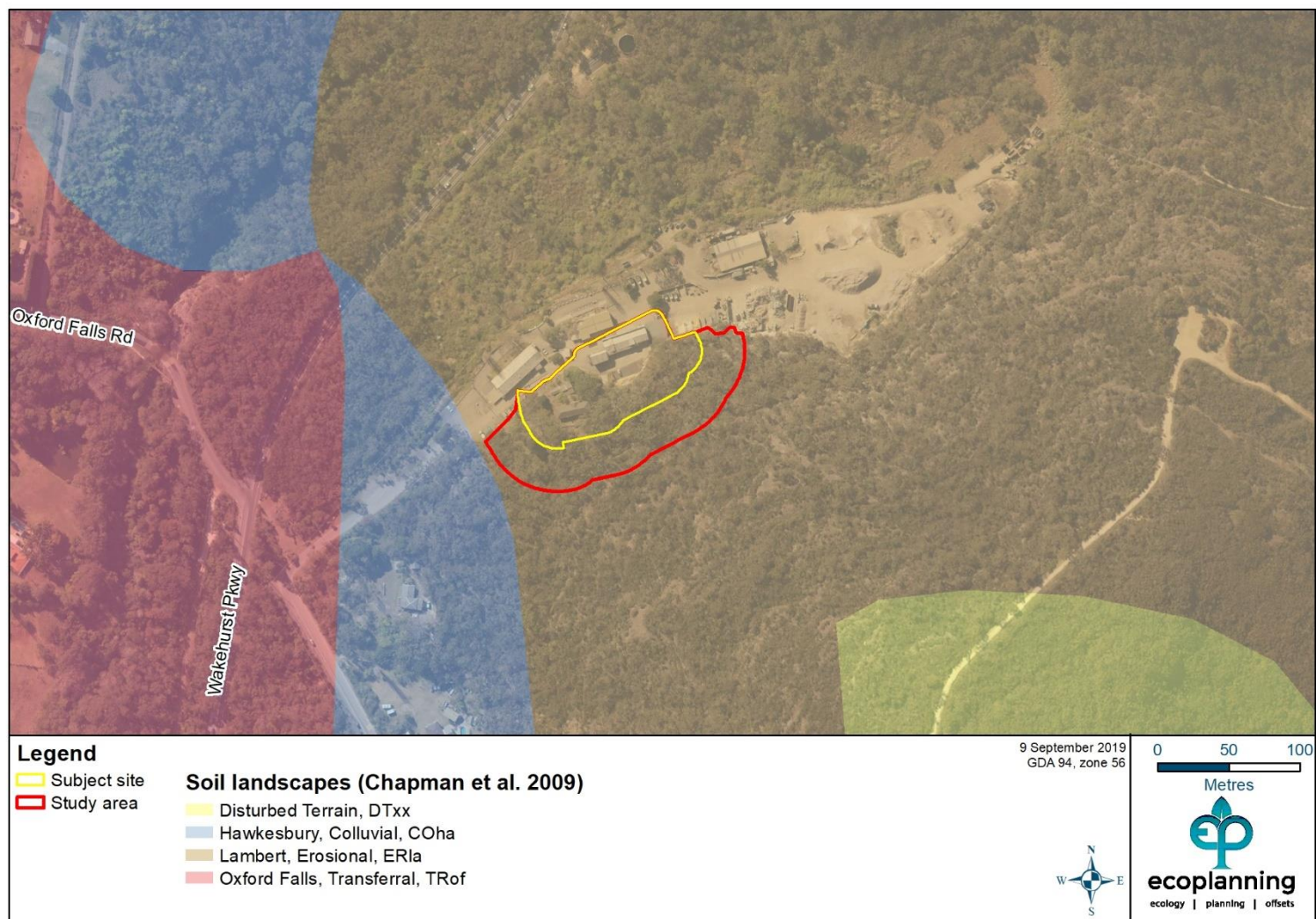


Figure 3.1: Soil landscapes

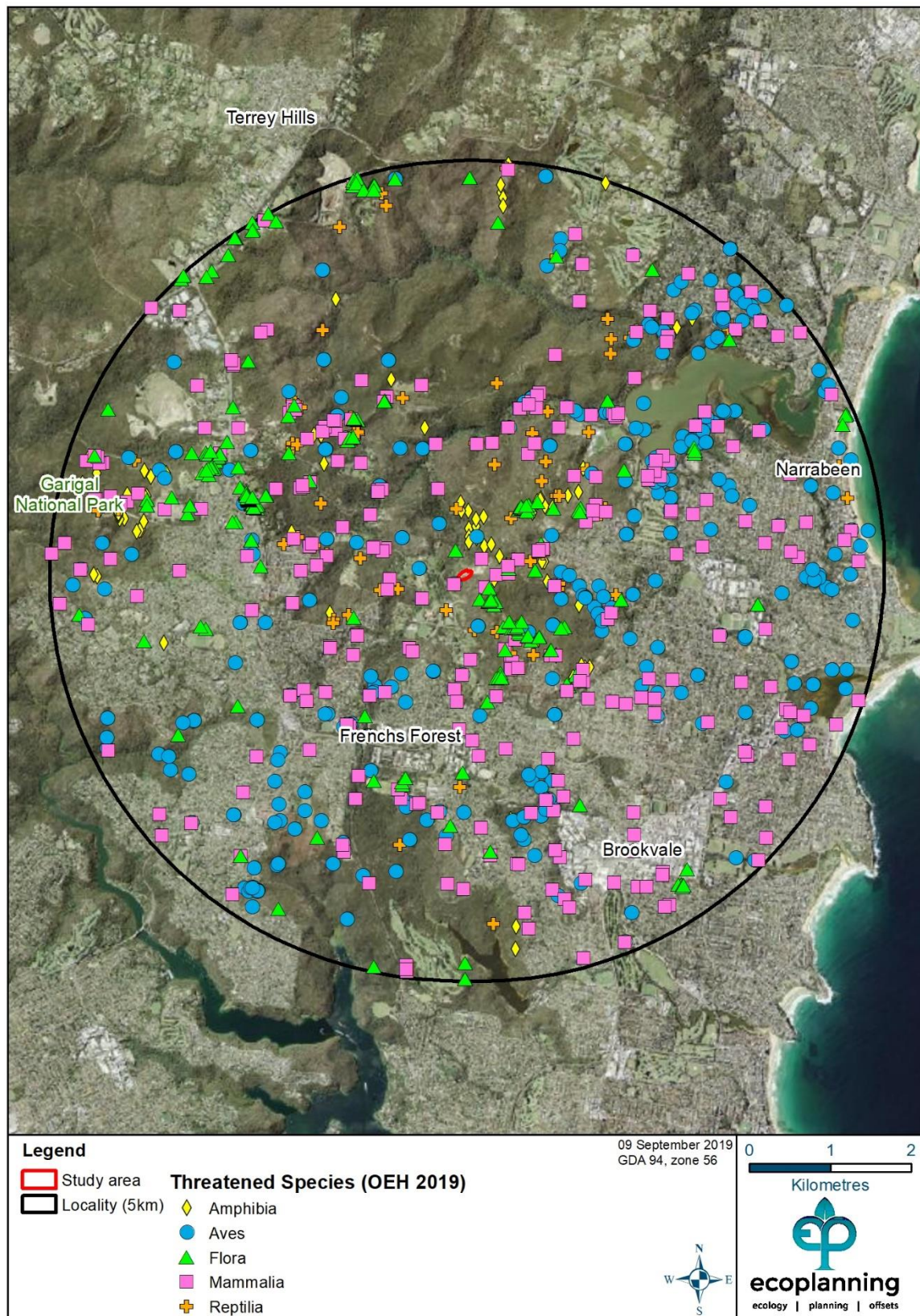


Figure 3.2: Threatened species in the locality (OEH 2019)

3.1.3 Vegetation and threatened ecological communities

A review of Tozer et al. (2010) identified three vegetation communities within the study area (**Figure 3.3**):

- Coastal Sandstone Plateaux Heath (HL p117)
- Coastal Sandstone Ridgetop Woodland (DSF p131)
- Coastal Sandstone Gully Forest (DSF p140)

The northern and western portions of the study area has been mapped as Coastal Sandstone Gully Forest (DSF p140). Coastal Sandstone Gully Forest is distributed along the eastern portion of the Hornsby and Woronora Plateaux where it occurs on the lower slopes of sandstone gullies in areas within an average rainfall band of 1,000-1,500 mm. Coastal Sandstone Plateaux Heath (HL p117) is mapped in the eastern most portion of the study area. Coastal Sandstone Plateaux Heath is widespread, but scattered across the Hornsby and Woronora plateaux, where is it restricted to shallow, damp sandy loams (Tozer et al. 2010). Coastal Sandstone Ridgetop Woodland (DSF p131) has been mapped along the southern perimeter of the study area. Coastal Sandstone Ridgetop Woodland is a widespread community occurring on sandstone geologies of the Hornsby and Woronora Plateaux and the lower Blue Mountains (Tozer et al. 2010).

Vegetation mapping by OEH (2016) also identified three vegetation communities within the study area (**Figure 3.4**):

- Sydney North Exposed Sandstone Woodland (S_DS11)
- Coastal Sandstone Heath-Mallee (S_HL08)
- Urban Exotic/Native

A majority of the vegetation along in the study area has been identified as Sydney North Exposed Woodland. Whereas, Coastal Sandstone Heath-Mallee has been identified in the southern margins of the study area. A small area has been mapped as 'Urban Exotic/Native' along the north-eastern perimeter of the study area.

The vegetation communities mapped by Tozer et al. (2010) and OEH (2016) within the study area are not Threatened Ecological Communities (TECs) under the EPBC Act or the BC Act.

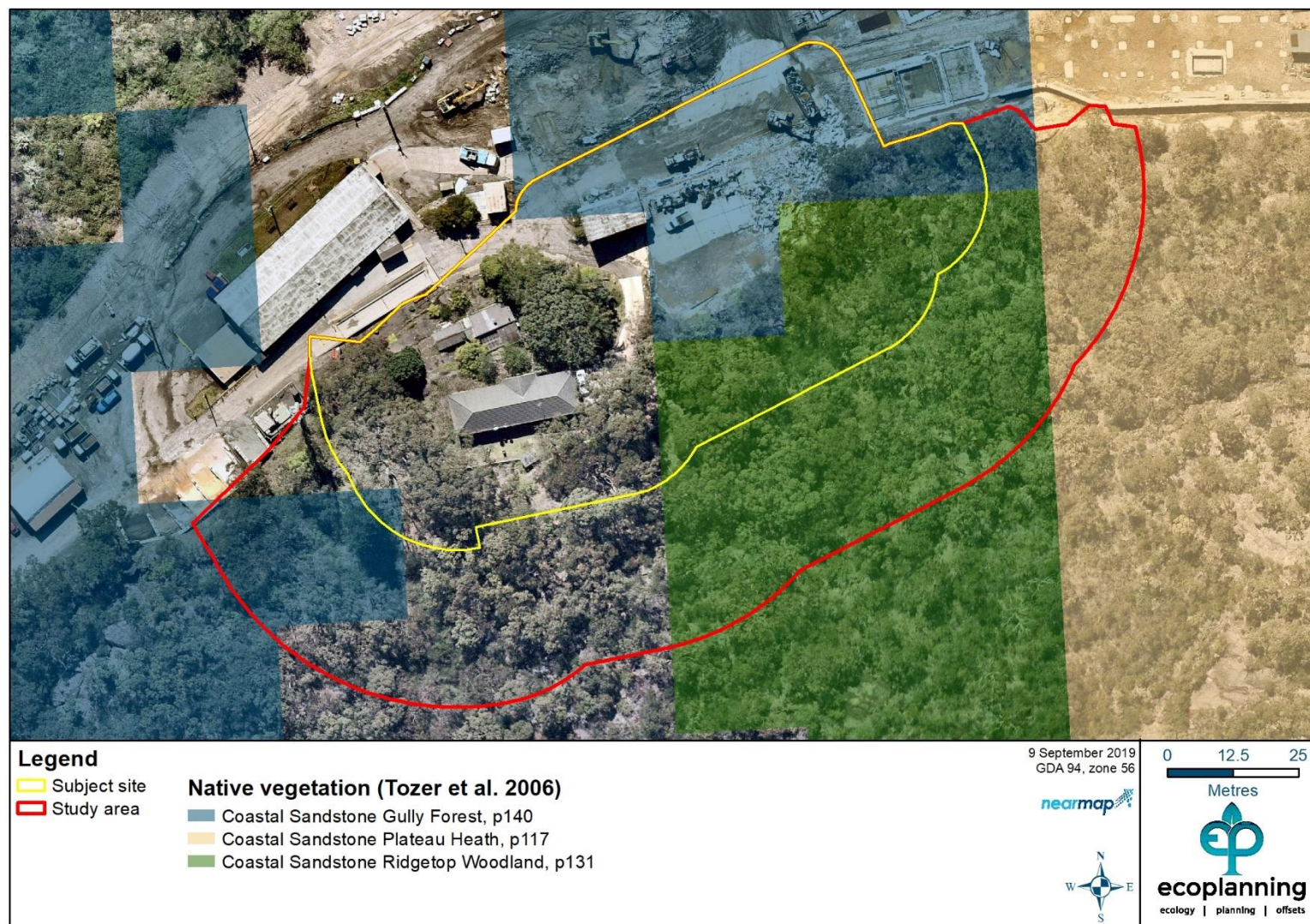


Figure 3.3: Native vegetation (Tozer et al. 2010).

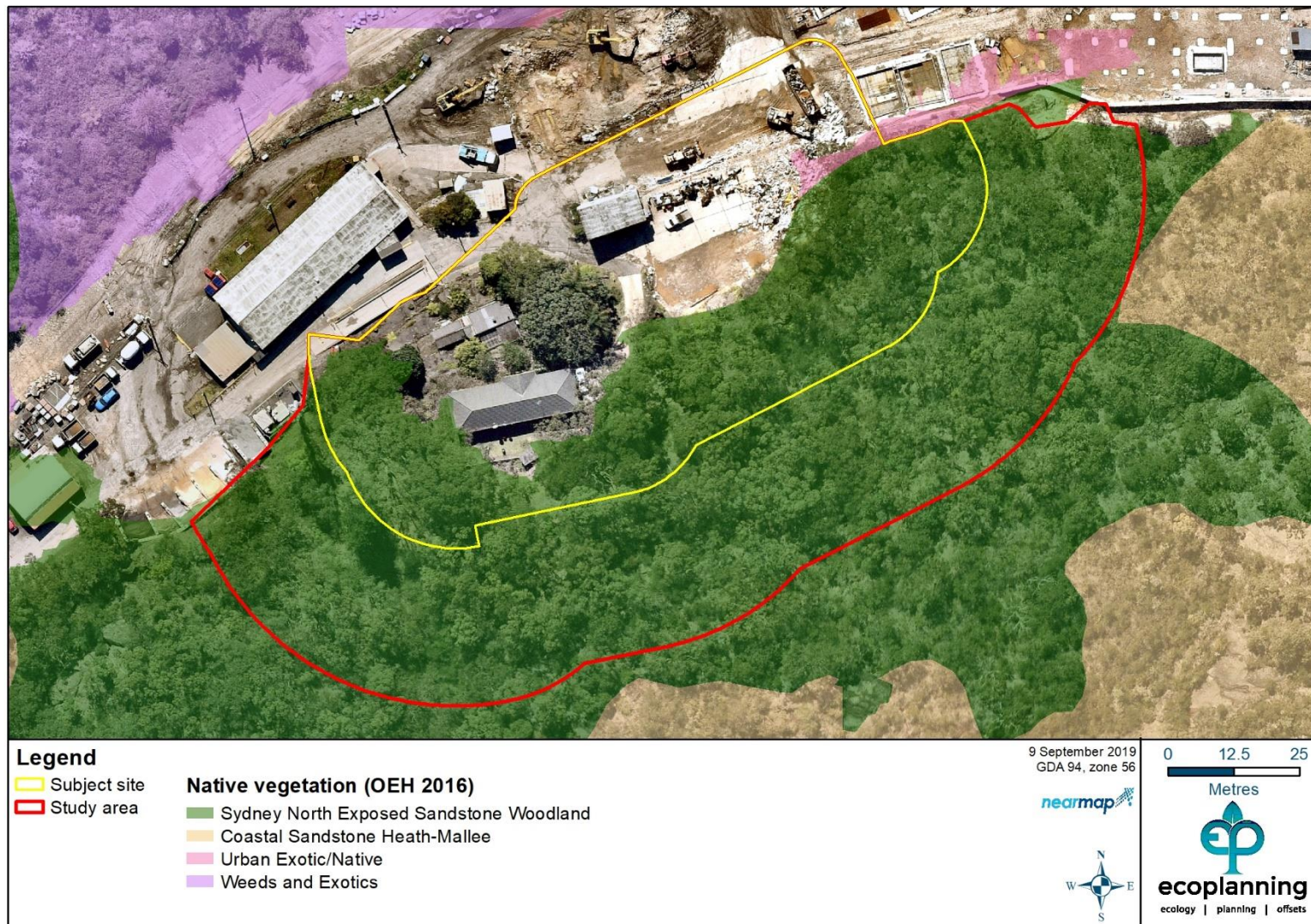


Figure 3.4: Regional native vegetation mapping (OEH 2016).

3.2 Field survey

3.2.1 Native vegetation communities

Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion (PCT 1083)

Field assessment determined the vegetation in the study area to consist of 'Red Bloodwood - Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion' (PCT 1083, HN 566) (**Figure 3.5**). Red Bloodwood – Scribbly Gum heathy woodland corresponds with Coastal Sandstone Ridgetop Woodland (DSF p131) (Tozer et al. 2010) and Sydney North Exposed Sandstone Woodland (S_DS11) (OEH 2016). The vegetation in the study area was examined for areas of 'Hairpin Banksia – Slender tea-tree heath on coastal sandstone plateaux' (PCT 882 HN 541), which corresponds with Coastal Sandstone Heath-Mallee (S_HLO8) (OEH 2016). It is possible that Hairpin Banksia – Slender tea-tree heath once occurred within the study area, although, in the absence of frequent fire, is growing into Red Bloodwood - Scribbly Gum heathy woodland.

The dominant canopy species across the study area included *Eucalyptus haemastoma* (Scribbly Gum), *Corymbia gummifera* (Red Bloodwood), *Eucalyptus punctata* (Grey Gum) and *Eucalyptus sieberi* (Silvertop Ash). The dominant midstorey species in the study area included *Baeckea diosmifolia* (Fringe Baeckea), *Banksia ericifolia* (Heath-leaved Banksia), *Allocasuarina distyla* (Scrub She-oak), *Angophora hispida* (Dwarf Apple), *Hakea gibbosa* (Needlebush), *Hakea propinqua*, *Kunzea ambigua* (Tick Bush), *Micrantheum ericoides*, *Platysace linearifolia* and *Pultenaea tuberculata* (Wreath Bush-pea). Dominant groundlayer species included *Anisopogon avenaceus* (Oat Speargrass), *Cyathochaeta diandra*, *Dampiera stricta*, *Entolasia stricta* (Wiry Panic), *Lepyrodia scariosa*, *Schoenus imberbis* and *Xanthorrhoea media* (Grass Tree).

The study area contained two distinct vegetation zones of PCT 1083 (**Table 4.1**) termed 'intact' (**Figure 3.6**) and 'disturbed' (**Figure 3.7**). **Figure 3.5** shows the spatial arrangement of the vegetation zones within the development site. The intact vegetation zone was characterised by a dense cover of midstorey and ground stratum species and a lack of exotic species. The disturbed vegetation had a lower cover of native midstorey and ground stratum species and a low-moderate cover of exotics. The disturbed vegetation had been subject to edge effects and various disturbances, nevertheless, supported a species rich assemblage of natives.

3.2.2 Other vegetation

Cleared land 'infrastructure'

Areas not supporting PCT 1083 included cleared land and existing infrastructure. The cleared land consisted of managed lawn near the existing structure in the west of the subject site, and vegetation with a high proportion of exotic grasses and herbaceous weeds across the north of the subject site. Dominant exotic grasses and herbaceous weeds included *Cortaderia* sp.*, *Hypochaeris radicata** (Catsear), *Paspalum urvillei** (Vasey Grass) and *Sonchus oleraceus** (Common Sowthistle).

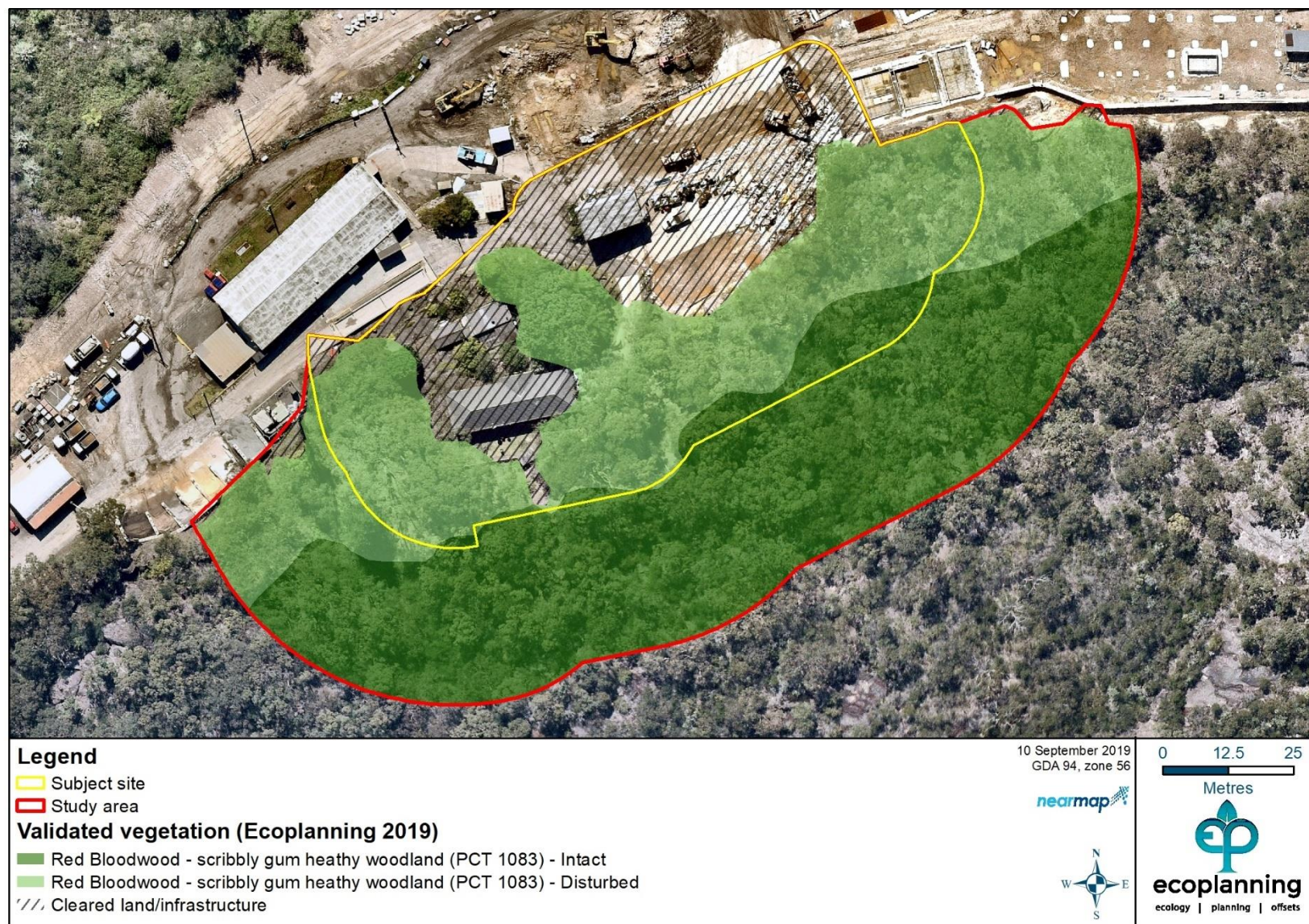


Figure 3.5: Field validated mapping in the study area (Ecoplanning 2019).



Figure 3.6: Red Bloodwood – Scribbly Gum heathy woodland (PCT 1083) in an 'intact' condition class within the study area.



Figure 3.7: Red Bloodwood – Scribbly Gum heathy woodland (PCT 1083) in a 'disturbed' condition class within the study area.

3.2.3 Flora species

A total of 87 flora species were identified within the study area, of which 68 were native, 19 were exotic/non-indigenous and one was unknown (**Appendix C**). This is not a comprehensive list of all flora species present within the study area, but rather represents those species identified whilst undertaking searches for threatened flora species, including their habitats. No threatened flora species listed under the EPBC Act or BC Act were recorded within the subject site and based upon the habitats present and the level of survey completed, none are considered likely to occur within the subject site or study area.

Three weeds listed under the NSW *Biosecurity Act 2015* for the Northern Beaches LGA were recorded in the study area, two of which are Weeds of National Significance (WoNS) (**Table 3.1**).

Table 3.1: Priority weeds and Weeds of National Significance (WoNS).

Common name	Scientific name	WoNS	Duty
Ground Asparagus	<i>Asparagus aethiopicus</i>	Y	Prohibition on dealings <i>Must not be imported into the State or sold</i> General Biosecurity Duty All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.
Lantana	<i>Lantana camara</i>	Y	
African Olive	<i>Olea europaea</i> subsp. <i>cuspidata</i>	N	

3.2.4 Fauna species

A total of 23 fauna species were recorded within or were heard calling from areas in proximity to the subject site (**Appendix C**). Fifteen (15) of these species were native bird species, seven were native microbats and one was a native skink. Two threatened microbat species, the Large Bent-winged Bat (*Miniopterus orianae oceanensis*) and the Little Bent-winged Bat (*Miniopterus australis*), were recorded within the study area as part of Anabat analysis.

3.2.5 Fauna habitat

Fauna habitat values identified within the study area that may provide refuge for a small to moderate range of native fauna included those associated with native woodland. The fauna habitat features identified within the subject site are listed in

Table 3.2.

Table 3.2: Key fauna habitat features present across the study area.

Habitat features	Fauna species	Photo
Mature trees	Diurnal and nocturnal birds, arboreal mammals and microchiropteran bats	Figure 3.8
Dense ground litter	Ground mammals, reptiles and amphibians	Figure 3.9
Artificial drainage channel	Amphibians	-

Based on the habitat values within the study area, a suite of fauna species are likely to use the study area for foraging purposes, while woody debris and a dense ground layer may provide potential refuge, nesting or breeding habitat for birds and mammals. It is possible that the more disturbed areas of native vegetation provided potential foraging habitat for disturbance tolerant and highly mobile species that rely on large areas for food resources, such as microbats and the Grey-headed Flying-fox.

No hollow bearing trees (HBTs) were observed within or near the proposed development. Therefore, the study area does not provide suitable roosting or nesting habitat for hollow roosting microchiropteran bat species or hollow-dependent bird species, including the Gang-gang Cockatoo (*Callocephalon fimbriatum*), and larger forest owls, such as the Powerful Owl (*Ninox strenua*) and the Barking Owl (*Ninox connivens*). The absence of HBTs also limited the potential for hollow-dependent arboreal mammals (e.g. possums and gliders), lizards and frogs to utilise the study area for breeding or refugia. Similarly, no large stick nests were observed within the study area and, therefore, the study area does not represent breeding habitat for threatened birds of prey, such as the Square-tailed Kite (*Lophoictinia isura*).

Based on the small size of the study area and the widespread distribution of the vegetation community that was identified in the study area, the Koala (*Phascolarctos cinereus*) was considered as having a 'low' likelihood of occurrence within the study area and to be unlikely to use the study area on anything more than an intermittent or transient basis. The nearby vegetation is likely to be of higher quality and suitable for Koala. Therefore, the small area of foraging habitat within the study area was unlikely to be important to the long-term survival of this species.

Based on the likelihood of occurrence (**Appendix A**) and incorporating the field-based habitat assessments, six threatened fauna species have been identified as having a 'high' or 'moderate' potential to use the study area. Additionally, two threatened microbat species were recently recorded within the study area. The following threatened fauna species may be affected by the proposed works:

- *Cercartetus nanus* (Eastern Pygmy-possum) (high),
- *Pseudophryne australis* (Red-crowned Toadlet) (moderate),
- *Miniopterus australis* (Little Bent-winged Bat) (recent record),
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat) (recent record),
- *Ninox strenua* (Powerful Owl) (moderate), and
- *Pteropus poliocephalus* (Grey-headed Flying-fox) (high).



Figure 3.8: Mature trees within the study area.



Figure 3.9: Dense ground litter.

4 Impact Assessment

This section outlines the anticipated direct and indirect impacts of the development on the ecological values of the study area.

4.1 Direct impacts

4.1.1 Vegetation clearing

Under the current proposal there will be two types of impact to the study area.

- Complete clearing within the subject site.
- Vegetation thinning in the APZ.

The subject site constitutes approximately 0.68 ha of land, of which 0.36 ha will be directly impacted by the current proposal (**Table 4.1, Figure 4.1**). For this impact assessment, the majority of the impact footprint will be to area of land mapped as Cleared land/infrastructure (0.27 ha). The proposed development will also result in the removal of 0.10 ha of PCT 1083 in a 'disturbed' condition.

A total of 0.31 ha will also be impacted to accommodate the proposed APZ. This includes 0.24 ha (approximately 36% of the subject site) of PCT 1083 in an 'disturbed' condition and 0.04 ha (approximately 7% of the subject site) in an 'intact' condition. The vegetation type and condition class requiring removal under the proposal is shown in **Table 4.1**.

Table 4.1: Details of PCTs within the study area including area of vegetation zones.

Plant Community Types (PCTs)	Vegetation Formation & class	Vegetation zones	Area (ha)*		
			Study area	Subject site	
				Complete Clearance	APZ
PCT 1083 - Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion	Dry Sclerophyll Forests (Shrubby sub-formation) – Sydney Coastal Dry Sclerophyll Forests	Intact	0.56	0.00	0.04
		Disturbed	0.48	0.10	0.24
Total native vegetation			1.04	0.10	0.29
Cleared land /infrastructure'	N/A	N/A	0.30	0.27	0.02
Total area			2.38	0.36	0.31

* Rounding errors may occur as calculations were done to 6 decimal places and reported to 2 decimal places

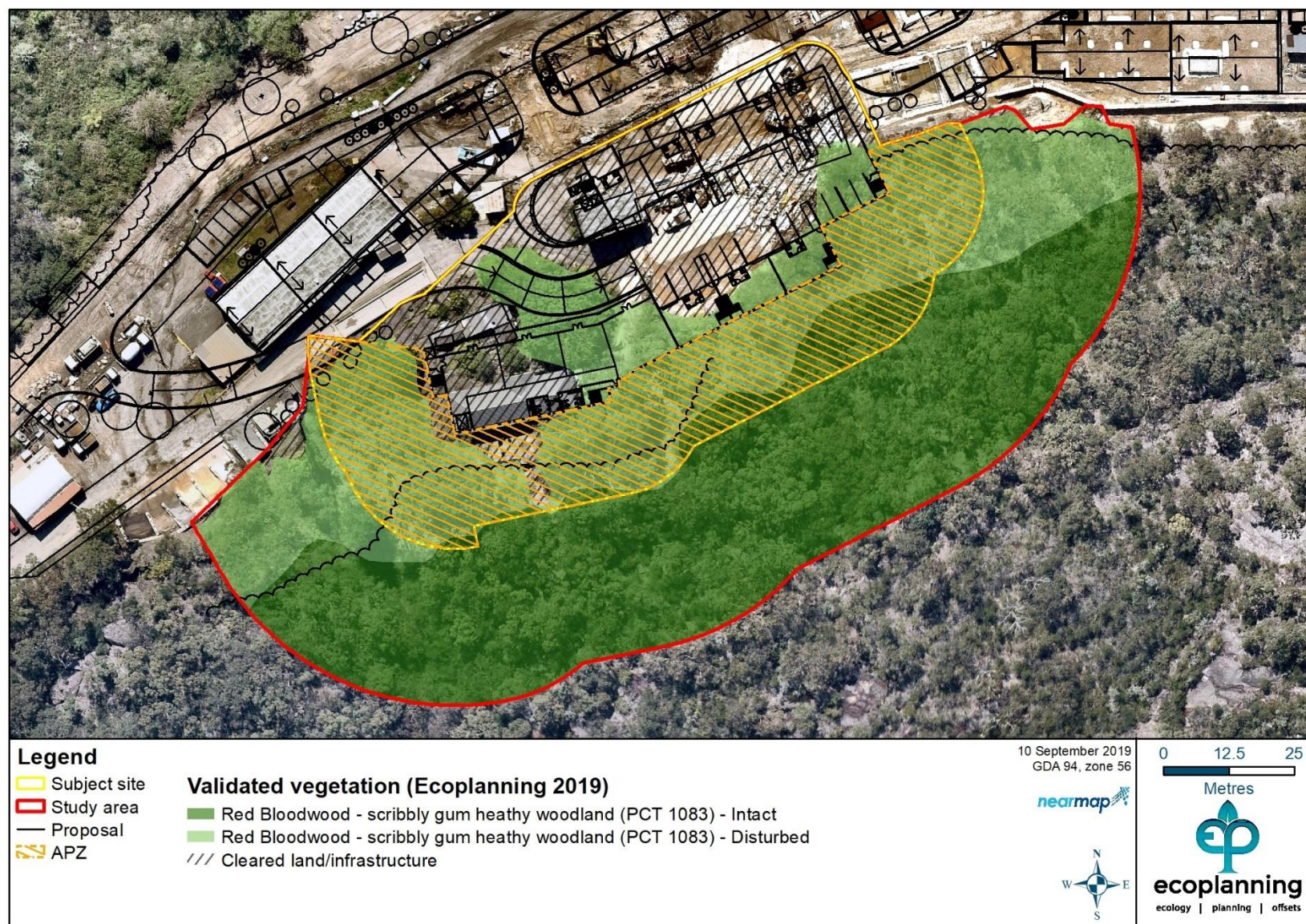


Figure 4.1: Development footprint over mapped vegetation.

4.1.2 Loss of fauna habitat

The proposal would require the complete clearance of 0.10 ha of Red Bloodwood – Scribbly Gum heathy woodland to accommodate the stage 2 proposal. This vegetation is of limited habitat value for fauna species with no HBTs recorded within the subject site. The loss of fauna habitat will not substantially reduce the available habitat for fauna as the vegetation within the study area is well represented in the locality, including the area of intact vegetation south of the study area. An additional impact will be from the proposed APZ, which will manage potential fauna habitat in the form of ‘disturbed’ and ‘intact’ condition classes to meet APZ standards. Given the small area of subject site and amount of native vegetation proposed for removal overall, the habitat removal is likely to have a negligible impact on local fauna. Nevertheless, it is possible that the subject site could be used by threatened native fauna for foraging purposes, particularly those assessed as having a ‘moderate’ and ‘high’ likelihood of occurring in the study area.

4.2 Indirect Impacts

It is difficult to quantify indirect impacts associated with the project, but these may include impacts such as noise and/or erosion associated with the construction phase of the project. The project is considered unlikely to reduce viability of any adjacent native vegetation or habitat due to edge effects, noise dust or light spill, or disturbance to breeding habitats. Further, within adjacent areas of native vegetation and habitat, the project is unlikely to cause any increase in trampling of flora, rubbish dumping, firewood or bush rock collection or introduce any pests, weeds or pathogens to the adjacent areas of native vegetation and habitat. The proposed APZ provides a sufficient buffer to the adjoining intact native vegetation to prevent indirect impacts from occurring in this area.

4.3 Avoidance and mitigation

4.3.1 Vegetation clearing

A total of 0.10 ha (approximately 14% of the subject site) of Red Bloodwood - Scribbly Gum heathy woodland in a ‘disturbed’ condition would be completely cleared under the proposal. An additional 0.24 ha of ‘disturbed’ and 0.04 ha of ‘intact’ Red Bloodwood - Scribbly Gum heathy woodland would be managed as an APZ. The following avoidance and mitigation measures are recommended to avoid and minimise potential impacts to threatened species and the environment more broadly:

- Areas of native vegetation outside of the subject site will be “No Go-Zones” for people and machinery and will be clearly delineated.
- Any exotic biomass cleared within the subject site will be removed from the study area and disposed of at an approved facility.
- Develop a Construction Environmental Management Plan to address pollution and contamination issues, such as silt control, and oil/fuel/chemical storage/spill management, which could arise during construction.
- Erosion and sediment control measures will be established before work begins and maintained in effective working order throughout the duration of the works, and until the study area has been stabilised to prevent off-site transport of eroded sediments.

4.3.2 Pre-clearance protocols

No HBTs or stag trees were identified in the subject site or study area. 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 non-threatened fauna species such as birds, arboreal mammals and amphibians are likely to 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. These protocols are discussed below and should be included as a component of the Construction Environmental Management Plan.

4.3.3 Construction Environmental Management Plan (CEMP)

To avoid potential indirect offsite impact during construction, an appropriate erosion and sedimentation control plan should be in place following best practice protocols such as Landcom (2004). It is recommended that this is included in a site specific CEMP, prior to any construction works taking place. The CEMP will be required to span the pre, during and post-construction period, and will include the above pre-clearance and fauna management protocols.

4.4 Legislative context

4.4.1 Commonwealth listings

One threatened species listed under the EPBC Act was assessed as having a 'high' likelihood of occurring within the subject site, the Grey-headed Flying-fox (*Pteropus poliocephalus*). Assessment of the potential impact upon this species was assessed against the relevant components of the Significant Impact Guidelines (Commonwealth Department of the Environment (DotE) 2013; **Appendix B**). It was concluded that a significant impact upon this species is unlikely and a referral is not required for the Grey-headed Flying-fox.

4.4.2 State listings

No TECs will be directly impacted by this proposal. Impact assessments (**Appendix A**) in accordance with Section 7.3 of the BC Act (i.e.: Test of Significance) and associated guidelines (OEH 2018) were undertaken for the following six threatened species that were identified as having a 'recent record', a 'moderate', or 'high' likelihood of using the subject site. These were:

- *Cercartetus nanus* (Eastern Pygmy-possum) (high),
- *Pseudophryne australis* (Red-crowned Toadlet) (moderate),
- *Miniopterus australis* (Little Bent-winged Bat) (recent record),
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat) (recent record),
- *Ninox strenua* (Powerful Owl) (moderate), and
- *Pteropus poliocephalus* (Grey-headed Flying-fox) (high).

The assessments found that a significant impact is unlikely to the six threatened fauna species as a result of the proposal.

5 Conclusion and recommendations

The proposed development includes the construction of several industrial units within part of Lot 100 // DP 1023183 and Lots 1053 and 1054 // DP 752038 (100 Meatworks Avenue, Oxford Falls, NSW 2100). The proposal will result in the complete clearance of 0.10 ha of Red Bloodwood – Scribbly Gum heathy woodland in a 'disturbed' condition. An APZ is required around the southern margin of the development. A total of 0.31 ha will also be impacted to accommodate the proposed APZ (**Figure 4.1**). This includes 0.24 ha (approximately 36% of the subject site) of PCT 1083 in an 'disturbed' condition and 0.04 ha (approximately 7% of the subject site) in an 'intact' condition.

No threatened species listed under the EPBC Act or BC Act were recorded within the study area. Based on records of threatened species from a 5 km radius around the study area and incorporating the field-based habitat assessments, six threatened species that were identified as having a 'recent record', a 'moderate', or 'high' likelihood of using study area. The likelihood of these species being significantly impacted was assessed against the 'Test of Significance' in accordance with section 7.3 of the BC Act and where relevant the Significant Impact Guidelines for matters listed under the EPBC Act. It was concluded that the proposed works would not have a significant impact on these species and an SIS or BDAR is not required under the BC Act. Additionally, no referral to the DotEE is required.

Potential indirect impacts associated with the proposal have been mitigated through appropriate avoidance and mitigation measures (see **Section 4.3**).

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Appendix A Species likelihood of occurrence

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 study area, the potential for species to utilise 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 utilised 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) in the locality 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 in the locality
- “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 proximity and date	Most recent proximity and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
KINGDOM: Animalia; CLASS: Amphibia						
<i>Heleioporus australiacus</i> Giant Burrowing Frog	EPBC Act: V BC Act: V	10	1.07 km (12/06/2017)	1.07 km (12/06/2017)	Moderate	Low
<i>Pseudophryne australis</i> Red-crowned Toadlet	BC Act: V	90	0.33 km (12/06/2017)	0.33 km (12/06/2017)	High	Moderate
KINGDOM: Animalia; CLASS: Aves						
<i>Burhinus grallarius</i> Bush Stone-curlew	BC Act: E1	7	3.47 km (18/12/2008)	3.47 km (18/12/2008)	Low	Low
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	BC Act: V	1	4.50 km (17/08/2013)	4.50 km (17/08/2013)	Low	Low
<i>Calyptorhynchus lathami</i> Glassy Black-Cockatoo	BC Act: V	58	0.43 km (15/04/2015)	3.88 km (8/07/2019)	High	Low
<i>Daphoenositta chrysoptera</i> Varied Sittella	BC Act: V	2	1.03 km (15/12/2011)	1.03 km (15/12/2011)	Low	Low
<i>Glossopsitta pusilla</i> Little Lorikeet	BC Act: V	4	1.69 km (16/08/2011)	3.80 km (17/08/2018)	Low	Low
<i>Hieraaetus morphnoides</i> Little Eagle	BC Act: V	1	4.82 km (30/03/2015)	4.82 km (30/03/2015)	Low	Low
<i>Hirundapus caudacutus</i> White-throated Needletail	EPBC Act: C, J, K	6	1.83 km (3/02/2010)	2.26 km (11/03/2014)	Low	Low
<i>Lathamus discolor</i> Swift Parrot	EPBC Act: CE BC Act: E1	15	1.66 km (27/10/2013)	2.61 km (2/05/2014)	Low	Low

Scientific Name Common Name	Legal Status	Number of records	Closest proximity and date	Most recent proximity and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
<i>Lophictinia isura</i> Square-tailed Kite	BC Act: V	4	2.79 km (1/05/2018)	2.79 km (1/05/2018)	Low	Low
<i>Neophema pulchella</i> Turquoise Parrot	BC Act: V	1	0.99 km (3/10/2017)	0.99 km (3/10/2017)	Low	Low
<i>Ninox connivens</i> Barking Owl	BC Act: V	11	0.97 km (18/09/2017)	0.97 km (18/09/2017)	Moderate	Low
<i>Ninox strenua</i> Powerful Owl	BC Act: V	224	0.08 km (23/08/2012)	2.75 km (24/08/2018)	High	Moderate
<i>Petroica boodang</i> Scarlet Robin	BC Act: V	1	2.90 km (26/11/2007)	2.90 km (26/11/2007)	Low	Low
<i>Ptilinopus superbus</i> Superb Fruit-Dove	BC Act: V	1	4.06 km (1/05/2017)	4.06 km (1/05/2017)	Low	Low
<i>Tyto tenebricosa</i> Sooty Owl	BC Act: V	2	1.47 km (14/11/2011)	1.59 km (27/04/2012)	Low	Low
KINGDOM: Animalia; CLASS: Mammalia						
<i>Cercartetus nanus</i> Eastern Pygmy-possum	BC Act: V	111	0.08 km (9/07/2012)	2.63 km (21/12/2018)	High	High
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	BC Act: V EPBC Act: V	4	1.60 km (7/02/2013)	2.80 km (1/05/2018)	Low	Low
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	BC Act: V EPBC Act: E	11	1.06 km (19/09/2001)	1.76 km (14/01/2018)	Moderate	Low
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	BC Act: V	1	4.37 km (26/07/2018)	4.37 km (26/07/2018)	Low	Low

Scientific Name Common Name	Legal Status	Number of records	Closest proximity and date	Most recent proximity and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
<i>Isodon obesulus obesulus</i> Southern Brown Bandicoot (eastern)	BC Act: E1 EPBC Act: E	16	1.42 km (27/03/2009)	4.39 km (17/07/2015)	Low	Low
<i>Micronomus norfolkensis</i> Eastern Coastal Free-tailed Bat	BC Act: V	3	1.45 km (9/01/2002)	2.34 km (8/03/2018)	Low	Low
<i>Miniopterus australis</i> Little Bent-winged Bat	BC Act: V	21	1.10 km (20/10/2011)	4.85 km (1/05/2018)	Moderate	Recent Record
<i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat	BC Act: V	89	0.20 km (23/08/2015)	4.36 km (26/07/2018)	High	Recent Record
<i>Myotis macropus</i> Southern Myotis	BC Act: V	26	1.42 km (19/01/2011)	2.34 km (8/03/2018)	Moderate	Low
<i>Phascolarctos cinereus</i> Koala	BC Act: V EPBC Act: V	3	1.93 km (23/02/1997)	4.72 km (6/08/2013)	Low	Low
<i>Pseudomys novaehollandiae</i> New Holland Mouse	EPBC Act: V	2	0.99 km (3/10/2017)	0.99 km (3/10/2017)	Moderate	Low
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox	BC Act: V EPBC Act: V	148	0.46 km (17/05/2011)	4.88 km (14/05/2018)	High	High
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	BC Act: V	3	1.85 km (20/01/2012)	4.36 km (26/07/2018)	Low	Low
KINGDOM: Reptillia						
<i>Varanus rosenbergi</i> Rosenberg's Goanna	BC Act: V	84	0.41 km (11/03/2016)	0.97 km (3/10/2017)	High	Low
KINGDOM: Plantae						

Scientific Name Common Name	Legal Status	Number of records	Closest proximity and date	Most recent proximity and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
<i>Acacia terminalis</i> subsp. <i>terminalis</i> Sunshine Wattle	BC Act: E1 EPBC Act: E	10	1.34 km (12/08/2002)	4.52 km (2/04/2009)	Low	Not present
<i>Callistemon linearifolius</i> Netted Bottle Brush	BC Act: V	3	2.06 km (2/03/2002)	2.38 km (13/09/2010)	Low	Not present
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	BC Act: V	1	2.30 km (29/05/2019)	2.30 km (29/05/2019)	Low	Not present
<i>Eucalyptus camfieldii</i> Camfield's Stringybark	BC Act: V EPBC Act: V	15	1.01 km (9/10/2010)	1.19 km (14/01/2018)	Low	Not present
<i>Eucalyptus nicholii</i> Narrow-leaved Black Peppermint	BC Act: V EPBC Act: V	3	3.14 km (10/10/2007)	3.95 km (9/09/2008)	Low	Not present
<i>Genoplesium baueri</i> Bauer's Midge Orchid	BC Act: E1 EPBC Act: E	1	3.70 km (31/03/2017)	3.70 km (31/03/2017)	Low	Not present
<i>Grevillea caleyi</i> Caley's Grevillea	BC Act: E4A EPBC Act: CE	174	2.43 km (22/02/2002)	2.63 km (1/07/2016)	Low	Not present
<i>Hibbertia superans</i>	BC Act: E1	1	3.07 km (16/01/2008)	3.07 km (16/01/2008)	Low	Not present
<i>Microtis angusii</i> Angus's Onion Orchid	BC Act: E1 EPBC Act: E	87	2.58 km (1/11/2018)	2.58 km (1/11/2018)	Low	Not present
<i>Persoonia hirsuta</i> Hairy Geebung	BC Act: E1 EPBC Act: E	23	0.40 km (18/10/2001)	0.75 km (19/04/2007)	Low	Not present
<i>Pimelea curviflora</i> var. <i>curviflora</i>	BC Act: V EPBC Act: V	20	0.80 km (10/03/2001)	1.15 km (18/10/2017)	Low	Not present
<i>Prostanthera densa</i> Villous Mint-bush	BC Act: V EPBC Act: V	1	4.31 km (24/10/2012)	4.31 km (24/10/2012)	Low	Not present

Scientific Name Common Name	Legal Status	Number of records	Closest proximity and date	Most recent proximity and date	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
<i>Prostanthera marifolia</i> Seaforth Mintbush	BC Act: E4A EPBC Act: CE	4	0.27 km (3/10/2002)	4.93 km (18/03/2007)	Low	Not present
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	BC Act: E1 EPBC Act: V	8	2.61 km (21/11/2016)	4.90 (17/01/2017)	Low	Not present
<i>Tetratheca glandulosa</i>	BC Act: V	90	0.29 km (18/10/2017)	2.56 km (24/10/2017)	Moderate	Not present

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, E1 = Endangered, E2 = Endangered Population, E4A = Critically Endangered, C = China and Australia Migratory Bird Agreement (CAMBA), J = Japan and Australia Migratory Bird Agreement (JAMBA); BC Act = Biodiversity Conservation Act 2016, EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Appendix B Assessments of Significance

Commonwealth listings under the EPBC Act

The EPBC Act Matters of National Environmental Significance (EPBC Act Significant Impact Guidelines) (DotE 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 Matter of National Environmental Significance and subsequently the need for referral. Matters of National Environmental Significance identified within the study area have been addressed below.

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

The Grey-headed Flying-fox is a large, wide-ranging bat species which feeds on the nectar and pollen of native trees and fruits of rainforest trees and vines. It occurs within 200 km of the eastern coastline of Australia, from Rockhampton in Queensland to Adelaide in South Australia. They have a preference for subtropical and temperate rainforest, tall sclerophyll forests and woodlands, as well as heaths and swamps. Roosting areas are often selected based on 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 Grey-headed Flying-fox can travel up to 50 km from camp to forage (typically <20 km), where they feed on the native fruits of *Eucalyptus*, *Banksia* and *Melaleuca* species, but also regularly feed on the fruits of exotic species.

Threats to this species include:

- Loss of roosting and foraging site
- Heat stress
- Electrocutation 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:

- a. lead to a long-term decrease in the size of an important population of a species

An 'important population' is defined by DotE (2013) as: a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

There is no population in the study area that is identified in any recovery plan or that is significant for breeding and survival of the Grey-headed Flying-fox. Furthermore, the site does not contain a camp of Grey-headed Flying-fox. The closest Nationally Important Flying-fox Camp is located in Gordan, approximately 8.4 km south-west of the study area (DotEE 2015). The most recent record of the species was made on 14 May 2018 approximately 4.9 km from

the study area and the closest record of the species was made within 460 m of the study area on 17 March 2011 (OEH 2019). As such, it is likely that the Grey-headed Flying-fox may occasionally utilise the study area for foraging. However, the proposed development will only remove 0.10 ha of native vegetation. This will not significantly impact on foraging habitat and lead to a decrease in the size of an important population of the Grey-headed Flying-fox.

b. reduce the area of occupancy of an important population

This proposal will not reduce the area of occupancy for the Grey-headed Flying-fox, as no resident population occur within the study area or immediate surrounds. Furthermore, the species could continue to fly over the study area, or forage in the remaining large canopy trees that will be retained in the southern portion of the study area.

c. fragment an existing important population into two or more populations

This proposal will not lead to the fragmentation of a Grey-headed Flying-fox population, as the effects of fragmentation on Grey-headed Flying-fox is more important in areas directly surrounding roosting habitat. Furthermore, the ability for Grey-headed Flying-fox to travel large distances makes them less susceptible to the impacts of fragmentation. The study area is sufficiently far enough away from the closest known Grey-headed Flying-fox population in Gordon so as to not substantially fragment an important population of this species (DotEE 2015).

d. adversely affect habitat critical to the survival of a species

According to the Draft National Recovery Plan for the Grey-headed Flying-fox, 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)

Eucalyptus haemastoma and *Eucalyptus sieberi* occur in the study area, which are spring flowering species and, therefore, could provide foraging habitat for the Grey-headed Flying-fox during this period. It is possible that the study area may be utilised during food bottlenecks. However, given that there is a large amount of foraging resources available in the locality, including Lane Cove National Park, the importance of the habitat for removal is substantially reduced. Therefore, proposal is not likely to adversely affect habitat critical to the survival of this species.

e. disrupt the breeding cycle of an important population

The proposed development is unlikely to disrupt the breeding cycle of an important population given that the study area and adjoining areas of bushland do not contain a roosting camp of Grey-headed Flying-fox. The closest Nationally Important Flying-fox Camp is located in Gordan, approximately 8.5 km south-west of the study area (DotEE 2015).

f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline



The proposed development would result in the removal of 0.10 ha of Red Bloodwood – Scribbly Gum heathy woodland. Additionally, it would result in the management of 0.29 ha of Red Bloodwood – Scribbly Gum heathy woodland in two condition classes as an APZ. Most canopy species in the study area are in a fair condition. The most intact vegetation in the study area located in the southern portion of the study area. Given that a relatively small amount of vegetation is being removed, the proposal will not remove habitat to an extent that will cause a decline in the Grey-headed Flying-fox. Furthermore, the locality contains a high proportion of vegetated land, which contains more extensive areas of foraging habitat for this species.

- g. 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.

- h. 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.

- i. interfere substantially with the recovery of the species.

The proposal is unlikely to substantially interfere with the recovery of the species as the amount of potential habitat to be impacted is very small and a substantial amount of potential foraging habitat for the species remains adjacent to the study area.

Conclusion of EPBC Act Significant Impact Guidelines (DotE 2013) for Grey-headed Flying-fox.

A referral is not recommended for the Grey-headed Flying-fox, as:

- no breeding or roosting habitat would be removed,
- the proposal is unlikely to impact on the breeding cycle of any important populations,
- the proposal would not affect critical habitat (e.g. further fragment the surrounding bushland or remove essential habitat), and
- the amount of vegetation proposed for removal is relatively small (0.10 ha) and more suitable foraging habitat is found in the locality.

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 2019a).

Eastern Pygmy-possum (*Cercartetus nanus*) – vulnerable species

The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. It is found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. This species feeds largely on nectar and



pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.

It shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. It appears to be mainly solitary, each individual using several nests, with males having non-exclusive home-ranges of about 0.68 ha and females about 0.35 ha. They are agile climbers, but can be caught on the ground in traps, pitfalls or postholes. They are generally nocturnal.

- 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.*

Trees in the study area provide potential refugia for the Eastern Pygmy-possum. 0.10 ha of native vegetation will be completely cleared proposed development, with an additional 0.29 ha managed as an APZ. This impact is a low proportion of the total foraging habitat available for the local population of the species within the locality. No HBTs that could be used by Eastern Pygmy-possum for shelter would be removed in the study area. Based on the relatively small amount of native vegetation and lack of hollows being removed, the proposal is unlikely to have an adverse effect on the lifecycle of Eastern Pygmy-possum to an extent that may place a viable 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*

Not applicable.

- c. in relation to the habitat of a threatened species, population 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,*
 - (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 proposed development will not result in the fragmentation or isolation of other areas of habitat. The 0.10 ha of native vegetation proposed for complete clearance and the 0.29 ha managed as an APZ within the subject site occurs along the southern edge of intact vegetation. The vegetation proposed for removal represents potential, albeit marginal foraging habitat for the species. It does, however, represent potential nesting habitat for the species. Most of the canopy trees proposed for removal are situated in a disturbed section of the study area, which contains exotic grasses and herbaceous weeds. The higher quality vegetation that occurs in the southern of the study area will remain and will provide connectivity to the surrounding intact native vegetation.

It is possible that the Eastern Pygmy-possum could use the study area as foraging and breeding habitat, particularly the vegetation along the southern boundary of the study area. Eastern Pygmy-possum rely on broad habitat features for breeding. Additionally, nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. These features are found within the subject site, however, the habitat proposed for removal is considered of low importance for the long-term survival of the species in the locality, given the small amount of vegetation proposed for removal and the large extent of intact native vegetation that would remain within the locality.

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

The 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 these species:

- Clearing of native vegetation.

The proposed development would result in the removal of 0.10 ha and APZ management of 0.29 ha of Red Bloodwood – Scribbly Gum heathy woodland

Conclusion of test of significance for the Eastern Pygmy-possum.

The proposed development is unlikely to have a significant impact on the Eastern Pygmy-possum, as:

- a relatively small amount of native vegetation would be impacted (0.10 under the current proposal, and
- the habitat proposed for removal in the study area is likely to be of low importance for the long-term survival of these species.

Cave roosting microchiropteran bat species: Little Bent-winged 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 Large 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.

The Large Bent-winged Bat occupies a range of forested environments (including wet and dry sclerophyll forests), along the coastal portion of eastern Australia, and through the Northern Territory and Kimberley area (subject to subdivision of this species). This species forages from

just above the tree canopy, to many times the canopy height in forested areas, and will use open areas where it is known to forage at lower levels. Moths appear to be the main dietary component. This highly mobile species is capable of large regional movements in relation to seasonal differences in reproductive behaviour and winter hibernation. Though, individuals often use numerous roosts (including, mines, culverts, stormwater channels, buildings, and occasionally tree-hollows), it congregates in large numbers at a small number of nursery caves to breed and hibernate.

- 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.*

Trees in the study area provide potential foraging habitat for cave-roosting microchiropteran bat species. 0.10 ha of native vegetation will be removed for the proposed development. Additionally, the proposal requires the management of 0.29 ha of native vegetation in two condition classes as an APZ. This is a low proportion of the total foraging habitat available for the local population of the species within the locality. No HBTs that could be used by microbats for roosting or nesting would be removed in the study area. Based on the relatively small amount of native vegetation and lack of hollows being removed, the proposal is unlikely to have an adverse effect on the lifecycle of these species of microbat to an extent that may place a viable 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*

Not applicable.

- c. in relation to the habitat of a threatened species, population 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,*
 - (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 proposed development will not result in the fragmentation or isolation of other areas of habitat for the three microbat species. The 0.10 ha of native vegetation proposed for removal and 0.29 ha proposed for APZ management within the study area occurs along the southern edge of intact vegetation. The vegetation proposed for removal represents potential, albeit marginal foraging habitat for the three species of microbat. However, it does not represent potential roosting or breeding habitat for the species, as no suitable HBTs are proposed for removal. The canopy trees proposed for removal are situated in a disturbed section of the study area, which has a heavy abundance and cover of exotic grasses and herbaceous weeds. The higher quality vegetation that occurs in the southern portion of the study area will remain and will provide connectivity to the surrounding intact native vegetation. However, the study area does not constitute roosting or breeding habitat, as it does not contain caves or rock crevices in cliffs, which are required breeding habitat for the species.

It is possible that the three species of microbats could use the study area as foraging habitat, particularly the vegetation along the northern boundary of the study area. Nevertheless, the habitat proposed for removal in the study area is of low importance for the long-term survival of the species, given that no breeding habitat occurs and also the large extent of intact native vegetation that would remain within the locality.

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

The 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 these species:

- Clearing of native vegetation.

The proposed development would result in the removal of 0.10 ha and APZ management of 0.29 ha of Red Bloodwood – Scribbly Gum heathy woodland

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

The proposed development is unlikely to have a significant impact on the Little Bent-winged Bat and Large Bent-winged Bat, as:

- a relatively small amount of native vegetation would be impacted (0.10 under the current proposal,
- the habitat proposed for removal in the study area is likely to be of low importance for the long-term survival of these species, and
- no caves, cliffs, rock crevices or HBTs are proposed for removal, which could represent roosting or breeding habitat for these species.

Powerful Owl (*Ninox strenua*) – vulnerable species

The Powerful Owl lives in forests and woodlands occurring in the coastal, escarpment, tablelands and western slopes environments of NSW. Powerful Owl occur primarily in densely vegetated gullies of open and tall open forest, but they are also found in a wider range of habitats, including forests and woodlands within the metropolitan regions of cities. However, optimal habitat requires large tracts of forest or woodland habitat, including a tall shrub layer and abundant hollows supporting high densities of arboreal marsupial prey species.

Powerful Owl nest in large hollows (greater than 45 cm wide and greater than 100 cm deep) in eucalypts in unlogged, unburnt gullies and lower slopes within 100 m of streams or minor drainage lines. Nest trees are typically emergent and are often the largest and oldest in a stand. Powerful Owls are faithful to traditional nesting hollows but can also use other hollows within the nesting gully. Pairs of birds occupy large home ranges (300-1,500 ha), using various portions of this area at different times, depending on the local abundance of arboreal mammals as a food source. Powerful Owls prey particularly on the Greater Glider and Ringtail Possum although the relative importance of prey items appears to vary regionally, with other prey such as Sugar Gliders, Brushtail Possums, Grey-headed Flying-foxes, insects and birds also used.

- 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.*

A large number of Powerful Owl records (224) have been recorded within 5 km of the study area, with the most recent sighting on 24 August 2018 approximately 2.75 km from the study area and the closest record made on 23 August 2012 approximately 80 m away (OEH 2019a). The entire subject site may provide potential foraging habitat for the species. The Powerful Owl is a territorial species with a foraging home range of 150-300 ha. Therefore, it is likely to use the entire vegetated study area for foraging and roosting, and potentially other bushland areas including vegetation that extends in all directions from the study area.

No HBTs were recorded within the subject site. Consequently, the subject site is not suitable for use as Powerful Owl nest sites. Furthermore, as the Powerful Owl has a high nest fidelity, and there are no records of the species nesting onsite, it is unlikely the study area are of importance to the species. Given the substantial areas of vegetation in an intact condition adjacent to the subject site, the vegetation within the subject site is considered unlikely to be of high importance to the survival of the Powerful Owl. Therefore, the proposal is unlikely to have an adverse effect on the lifecycle of the Powerful Owl, to an extent that may place the local population at risk of extinction, given forested areas nearby are considered more appropriate nesting and roosting sites for the Powerful Owl.

- 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*

Not applicable.

- c. *in relation to the habitat of a threatened species, population 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,*
 - 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 proposed development will not result in the fragmentation or isolation of other areas of habitat for the Powerful Owl. The 0.10 ha of native vegetation proposed for removal and 0.29 ha proposed for APZ management within the study area occurs along the southern edge of intact vegetation. No potential breeding habitat will be removed or indirectly impacted on. The proposed development will not result in the fragmentation or isolation of other areas of habitat for the Powerful Owl. The canopy trees proposed for removal are situated in a disturbed section of the study area, which has a heavy abundance and cover of exotic grasses and herbaceous weeds. The higher quality vegetation that occurs in the southern portion of the study area will remain and will provide connectivity to the surrounding intact native

vegetation. The subject site is surrounded by an intact vegetated habitat corridor extending in south of the subject site. Thus, connectivity to the surrounding intact native vegetation would remain in the same condition.

It is possible that the Powerful Owl may use the subject site as foraging habitat, particularly the native vegetation in the 'intact' condition class. The importance of the habitat to be removed for the long-term survival of the Powerful Owl in the local area is likely to be low. The vegetation proposed for removal is likely to be, at most, marginal foraging habitat for the Powerful Owl, and provide a negligible amount of potential foraging habitat that is available to this species, both locally and across a broader geographical area. The Powerful Owls that use the subject site for foraging are likely to be more dependent on habitat adjacent to the subject site, which will not be impacted by the proposed development. Thus, the foraging habitat proposed for removal in the study area is likely to be of low importance for the long-term survival of this 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 proposed development would result in the removal of 0.10 ha of native vegetation with an additional 0.29 ha proposed for APZ management .

Conclusion of test of significance for Powerful Owl

The proposed development will not result in a significant impact on the Powerful Owl, as:

- the amount of habitat to be impacted is very small, and there are no HBTs proposed for removal that are of suitable size for use as nest sites,
- large areas of vegetation are present in the local area that provide more suitable nesting, breeding and foraging habitat, and

Red-crowned Toadlet (*Pseudophryne australis*) – vulnerable species

This species has been considered to have a 'moderate' potential to be impacted by the proposed works based upon the presence of a constructed drainage channel which represents possible habitat.

The Red-crowned Toadlet has a restricted distribution, confined to the Sydney Basin from Pokolbin in the north, to the Nowra area in the south. This species occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. The Red-crowned Toadlet inhabits periodically wet drainage lines below sandstone ridges and shelters under rocks and amongst masses of dense vegetation. Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters. Red-crowned Toadlets are usually found as small colonies scattered along ridges coinciding with the positions of suitable refuges near breeding sites.

- 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.*

Impacts likely to have an adverse effect on the life cycle of the Red-crowned Toadlet that would place a viable local population of the species at risk of extinction would include impacts to large areas of favoured breeding or refuge sites. The proposed works would not involve direct impacts to a drainage line. However, a relatively small area of vegetation within the study area (limited to 0.10 ha) adjacent to the constructed drainage channel will be impacted, including vegetation which may act as potential refuge habitat. Similar habitat, including wet drainage lines below sandstone ridges and ephemeral creeks, are available in adjacent areas and throughout the surrounding bushland.

While impacts may remove potential refuge habitat from within the study area, the breeding and other refuge habitat of any local viable population of this species that occurs outside of the study area will not be removed and it is likely that individuals within such a population will be able to continue to undertake their life-cycle processes. Therefore, impacts within study area are unlikely to place any local viable populations 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 proposed development will not result in the fragmentation or isolation of other areas of habitat for the Red-crowned Toadlet. The 0.10 ha of native vegetation proposed for removal and 0.29 ha proposed for APZ management within the study area occurs along the southern edge of intact vegetation. The proposed vegetation clearing would be to predominately areas of 'disturbed' native vegetation and would not fragment or isolate any other areas of interconnected habitat. The small area of vegetation within the study area is unlikely to be important to the long-term survival of the species given the availability of similar habitat adjacent to the study area and throughout nearby bushland.

- 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 works would not directly or indirectly impact upon any declared areas 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.*

The proposed works would constitute one key threatening process, 'clearing of native vegetation', however, the scale of this impact is minor, limited to 0.10 ha with an additional 0.29 ha managed as an APZ.

Conclusion of test of significance for Red-crowned Toadlet

The proposed development will not result in a significant impact on the Red-crowned Toadlet, as:

- the amount of habitat to be impacted is very small, and there are no drainage lines on site,
- large areas of vegetation and drainage lines are present in the local area that provide more suitable refuge, breeding and foraging habitat, and

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

Details regarding the ecology of this species is present in the assessment under the EPBC Act.

- 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 study area and adjacent areas of bushland do not contain a roosting camp of Grey-headed Flying-fox. The most recent record of the species was made on 14 May 2018 approximately 4.9 km from the study area and the closest record of the species was made within 460 m of the study area 17 May 2011 (OEH 2019a). As such, it is likely that the Grey-headed Flying-

fox may occasionally use the study area for foraging. Larger areas of potential foraging habitat containing favoured feed trees for the species occur outside the study area. Given these factors, it is most unlikely that the proposed development will have an impact on the life cycle of the species, to an extent that may place a viable 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*

Not applicable.

- c. in relation to the habitat of a threatened species, population 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,*
 - (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 proposed development will not result in the fragmentation or isolation of other areas of habitat for the Grey-headed Flying-fox. The 0.10 ha of native vegetation proposed for removal within the study area occurs along the northern edge of intact vegetation. The vegetation proposed for removal represents potential, albeit marginal foraging habitat for the species of microbats. Several native canopy trees proposed for removal to accommodate the building development and APZ requirements are *Eucalyptus* species. However, given that there is a large amount of foraging resources available in the locality, the importance of the habitat for removal is relatively low. The canopy trees proposed for removal are located in a disturbed section of the study area, which has a heavy abundance and cover of exotic grasses and herbaceous weeds. The higher quality vegetation that occurs in the northern portion of the study area will remain and will provide connectivity to the surrounding intact native vegetation.

It is possible that the Grey-headed Flying-fox could use the study area as foraging habitat, particularly the vegetation along the northern boundary of the study area. *Eucalyptus haemastoma* and *Eucalyptus sieberi* occur in the study area, which are spring flowering species and therefore could provide foraging habitat for the Grey-headed Flying-fox during this period. Nevertheless, the habitat proposed for removal in the study area is considered to be of low importance for the long-term survival of the species, given that there is a large amount of foraging resources available in the locality.

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

The 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 proposed development would result in the removal of 0.10 ha and APZ management of 0.29 ha of Red Bloodwood – Scribbly Gum heathy woodland

Conclusion of test of significance for Grey-headed Flying-fox

The proposed development will not have a significant impact on the Grey-headed Flying-fox, as:

- no roosts or camps were identified in the study area or adjoining areas during field assessment,
- the low importance of the vegetation proposed for removal, given the large amount of native vegetation in the locality,
- no known camp sites would be impacted.

Appendix C Flora and fauna species inventories

Flora

Family	Scientific Name	Common name
Apiaceae	<i>Actinotus minor</i>	Lesser Flannel Flower
Apiaceae	<i>Platysace linearifolia</i>	
Apiaceae	<i>Xanthosia pilosa</i>	Woolly Xanthosia
Apiaceae	<i>Xanthosia tridentata</i>	Rock Xanthosia
Apocynaceae	<i>Araujia sericifera</i>	Moth Vine
Apocynaceae	<i>Parsonsia straminea</i>	Common Silkpod
Asparagaceae	<i>Asparagus aethiopicus</i>	Ground Asparagus
Asteraceae	<i>Ageratina adenophora</i>	Crofton Weed
Asteraceae	<i>Bidens pilosa</i>	Cobblers Pegs
Asteraceae	<i>Conyza</i> sp.	
Asteraceae	<i>Hypochaeris radicata</i>	Catsear
Asteraceae	<i>Ozothamnus diosmifolius</i>	Rice Flower
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle
Cannabaceae	<i>Trema tomentosa</i>	Native Peach
Casuarinaceae	<i>Allocasuarina distyla</i>	Scrub She-oak
Cyperaceae	<i>Cyathochaeta diandra</i>	
Cyperaceae	<i>Lepidosperma</i> sp.	
Cyperaceae	<i>Schoenus imberbis</i>	
Elaeocarpaceae	<i>Elaeocarpus reticulatus</i>	Blueberry Ash
Ericaceae - Epacridoideae	<i>Epacris pulchella</i>	Wallum Heath
Ericaceae - Epacridoideae	<i>Leucopogon microphyllus</i>	
Ericaceae - Epacridoideae	<i>Leucopogon</i> sp.	
Fabaceae - Caesalpinioideae	<i>Senna pendula</i> var. <i>glabrata</i>	
Fabaceae - Faboideae	<i>Bossiaea heterophylla</i>	Variable Bossiaea
Fabaceae - Faboideae	<i>Dillwynia retorta</i>	
Fabaceae - Faboideae	<i>Hovea linearis</i>	
Fabaceae - Faboideae	<i>Pultenaea stipularis</i>	Handsome Bush-pea
Fabaceae - Faboideae	<i>Pultenaea tuberculata</i>	Wreath Bush-pea
Fabaceae - Mimosoideae	<i>Acacia longifolia</i>	
Fabaceae - Mimosoideae	<i>Acacia terminalis</i>	Sunshine Wattle
Goodeniaceae	<i>Dampiera stricta</i>	
Lamiaceae	<i>Hemigenia purpurea</i>	



Family	Scientific Name	Common name
Lauraceae	<i>Cassytha glabella</i>	
Lindsaeaceae	<i>Lindsaea microphylla</i>	Lacy Wedge Fern
Lomandraceae	<i>Lomandra cylindrica</i>	Needle Mat-rush
Lomandraceae	<i>Lomandra glauca</i>	Pale Mat-rush
Lomariopsidaceae	<i>Nephrolepis cordifolia</i>	Fishbone Fern
Myrtaceae	<i>Angophora crassifolia</i>	
Myrtaceae	<i>Angophora hispida</i>	Dwarf Apple
Myrtaceae	<i>Baeckea diosmifolia</i>	Fringed Baeckea
Myrtaceae	<i>Corymbia gummifera</i>	Red Bloodwood
Myrtaceae	<i>Darwinia fascicularis</i> subsp. <i>fascicularis</i>	
Myrtaceae	<i>Eucalyptus haemastoma</i>	Scribbly Gum
Myrtaceae	<i>Eucalyptus oblonga</i>	Narrow-leaved Stringybark
Myrtaceae	<i>Eucalyptus punctata</i>	Grey Gum
Myrtaceae	<i>Eucalyptus sieberi</i>	Silvertop Ash
Myrtaceae	<i>Kunzea ambigua</i>	Tick Bush
Myrtaceae	<i>Leptospermum squarrosum</i>	Peach Blossom Tea-tree
Myrtaceae	<i>Leptospermum trinervium</i>	Flaky-barked Tea-tree
Ochnaceae	<i>Ochna serrulata</i>	Mickey Mouse Plant
Oleaceae	<i>Ligustrum sinense</i>	Small-leaved Privet
Oleaceae	<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive
Orchidaceae	<i>Cryptostylis subulata</i>	Large Tongue Orchid
Orchidaceae	<i>Cryptostylis erecta</i>	Bonnet Orchid
Passifloraceae	<i>Passiflora edulis</i>	Common Passionfruit
Phormiaceae	<i>Dianella caerulea</i> var. <i>producta</i>	Blue Flax-lily
Phormiaceae	<i>Dianella prunina</i>	
Picrodendraceae	<i>Micrantheum ericoides</i>	
Pittosporaceae	<i>Billardiera scandens</i>	Hairy Apple Berry
Pittosporaceae	<i>Pittosporum undulatum</i>	Native Daphne
Poaceae	<i>Andropogon virginicus</i>	Whisky Grass
Poaceae	<i>Anisopogon avenaceus</i>	Oat Speargrass
Poaceae	<i>Cortaderia</i> sp.	
Poaceae	<i>Digitaria sanguinalis</i>	Summer Grass
Poaceae	<i>Entolasia stricta</i>	Wiry Panic
Poaceae	<i>Microlaena stipoides</i>	Weeping Grass
Poaceae	<i>Paspalum urvillei</i>	Vasey Grass



Family	Scientific Name	Common name
Proteaceae	<i>Banksia ericifolia</i>	Heath-leaved Banksia
Proteaceae	<i>Banksia oblongifolia</i>	Fern-leaved Banksia
Proteaceae	<i>Banksia serrata</i>	Old-man Banksia
Proteaceae	<i>Grevillea buxifolia</i>	Grey Spider Flower
Proteaceae	<i>Grevillea speciosa</i>	Red Spider Flower
Proteaceae	<i>Hakea gibbosa</i>	Needlebush
Proteaceae	<i>Hakea propinqua</i>	
Proteaceae	<i>Hakea teretifolia</i>	Needlebush
Proteaceae	<i>Lambertia formosa</i>	Mountain Devil
Pteridaceae	<i>Cheilanthes</i> sp.	
Restionaceae	<i>Lepyrodia scariosa</i>	
Rutaceae	<i>Boronia ledifolia</i>	Showy Boronia
Rutaceae	<i>Crowea saligna</i>	
Rutaceae	<i>Eriostemon australasius</i>	Pink Wax Flower
Rutaceae	<i>Phebalium squamulosum</i>	Scaly Phebalium
Schizaeaceae	<i>Schizaea bifida</i>	Forked Comb Fern
Smilacaceae	<i>Smilax glyciphylla</i>	Sweet Sarsparilla
Solanaceae	<i>Solanum nigrum</i>	Black-berry Knightshade
Verbenaceae	<i>Lantana camara</i>	Lantana
Xanthorrhoeaceae	<i>Xanthorrhoea media</i>	Grass Tree



Fauna

Family	Scientific name	Common name	Native/ Exotic	Ecoplanning
Birds				
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird	Native	W
Artamidae	<i>Strepera graculina</i>	Pied Currawong	Native	W
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Native	W
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Native	W
Corvidae	<i>Corvus coronoides</i>	Australian Raven	Native	W
Eupetidae	<i>Psophodes olivaceus</i>	Eastern Whipbird	Native	W
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	Native	W
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird	Native	OW
Meliphagidae	<i>Lichenostomus leucotis</i>	White-eared Honeyeater	Native	OW
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner	Native	W
Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's Honeyeater	Native	W
Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater	Native	W
Meliphagidae	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	Native	OW
Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote	Native	W
Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	Native	W
Mammals				
Miniopteridae	<i>Miniopterus australis</i>	Little Bent-winged Bat	Native	U
Miniopteridae	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Native	U
Molossidae	<i>Austronomus australis</i>	White-striped freetail Bat	Native	U
Molossidae	<i>Mormopterus (Ozimops) ridei</i>	Eastern Freetail-bat	Native	U
Rhinolophidae	<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat	Native	U
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	Native	U
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	Native	U
Reptiles				
Scincidae	<i>Eulamprus quoyii</i>	Eastern Water Skink	Native	O

Observation type = O (seen), W (heard call), U (Ultrasonic device)

