

Transport for NSW

# Turrella Station Upgrade

## Biodiversity Assessment



Artist's impression of the Turrella Station upgrade subject to detailed design.

## Briefing Note

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Date: 09/09/2021

**Subject: Turrella Station Biodiversity Assessment**

### Purpose

This briefing note has been prepared by Umwelt on behalf of Transport for New South Wales (Transport for NSW) to provide a biodiversity assessment in the form of a desktop review for the proposed upgrades to Turrella Station.

### Outcomes/Key messages

No threatened biodiversity values were identified within the study area. Native vegetation was identified on aerial imagery and Google Street View in one location, occurring around the proposed compound to the north-east of the study area. This native vegetation is not expected to be impacted. The buildings may provide roosting habitat for threatened bat species, however it is unlikely they will utilise this habitat due to disturbance from trains and traffic. No threatened species or threatened species habitat are likely to be impacted by the proposed development, however threatened bird and bat species are likely to utilise the airspace above the study area as they fly and forage between Wolli Creek Regional Park and urban vegetation. The proposed upgrade is unlikely to have impacts on any threatened ecological communities (TECs), threatened species, or endangered populations listed under either the *NSW Biodiversity Conservation Act 2016* (BC Act) or *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

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**Attachment A – Likelihood of Occurrence Table**

## 1.0 Introduction

As part of the Transport Access Program (TAP), Transport for New South Wales (Transport for NSW) proposes to upgrade Turrella Station to improve accessibility and amenities for customers. The proposed works include the following key elements:

- a new lift providing access from the Reede Street bridge to the station platform
- a new station entrance from the Reede Street bridge. The new station entrance would include:
  - demolition of the existing station access stair and the section of the eastern platform canopy in order to accommodate the new stairs, lift, landing and canopy
  - construction of a new station entrance landing area
  - construction of new stairs between the proposed landing and the station platform
- internal modifications to the existing station building including
  - provision of a new unisex ambulant toilet in the location of the existing female toilets
  - provision of a new family accessible toilet in the location of the existing male toilets
- modifications to kerb and line markings to accommodate the construction of a new kiss and ride bay along Turrella Street
- upgrades along the footpath located on the northern side of Turrella Street to provide an accessible and safe path of travel to the new station entrance including installation of traffic barriers
- localised platform regrading and the installation of new tactiles along the platforms
- ancillary work including improvements to station lighting and CCTV to improve safety and security, electrical upgrades for the new infrastructure, landscaping and adjustments to wayfinding signage.

The location of the study area is shown in **Figure 1**.

Umwelt (Australia) Pty Ltd (Umwelt) has been engaged by Transport for NSW to conduct a desktop ecological assessment to determine if the proposed works would have an impact on any threatened species, migratory species or threatened ecological communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).





FIGURE 1  
Site Locality Map



## **2.0 Assessment methodology**

A study area was determined to capture all potential direct and indirect impacts caused by the proposed works. The study area was produced by buffering the development footprint of the proposed works by 10 metres in all directions (**Figure 1**).

### **2.1 Desktop assessment**

A review of relevant public databases and literature was undertaken to identify threatened and migratory species, endangered populations, TECs and their habitats that have previously been recorded within the locality (a 10-km radius around the proposed works). Threatened species, migratory species, endangered populations and TECs (listed under the BC Act, NSW *Fisheries Management Act 1994* (FM Act) and EPBC Act) that have the potential to occur within the locality were also considered based on the type of habitat present and the NSW bioregion within which the study area occurs.

Databases and literature reviewed as part of this ecological assessment include:

- a search of the Department of Planning, Industry, and Environment (DPIE) BioNet Atlas based on a 10-km radius around the proposed works
- a search of the Commonwealth Department of Agriculture, Water, and the Environment (DAWE) Protected Matters Search Tool (PMST) based on a 10-km radius around the proposed works
- BioNet Threatened Biodiversity Data Collection (TBDC)
- BioNet Vegetation Classification
- the Biodiversity Values Map Threshold Tool (BVMTT)
- DPIE's Central Resource for Sharing and Enabling Environmental Data (SEED) in NSW
- a search of the National Flying-fox monitoring viewer accessed by the DAWE Interactive Flying-fox Web Viewer.

### **2.2 Vegetation mapping**

A review of regional broadscale mapping was carried out at part of the desktop assessment. The *Native Vegetation of the Sydney Metropolitan Area, Version 3.0* (OEH 2016) was considered to inform the assessment of the vegetation communities present within the study area.

### **2.3 Site visit**

A site visit was not completed for the project as a result of the restrictions associated with the ongoing COVID-19 pandemic. Instead, the presence of fauna habitat and potential habitat for threatened flora within the study area was assessed as part of the desktop assessment. As a site visit was not completed, vegetation and fauna habitat were assessed by reviewing Google Street View and recent aerial imagery. Specific attention was paid to the potential occurrence of culverts, bridges and derelict buildings that may provide shelter for microbats.

### 3.0 Results

#### 3.1 Desktop assessment

A total of 115 threatened species, one threatened population and 48 migratory species were identified from the BioNet Atlas and PMST searches as known or predicted to occur within the locality. Of those, 24 were identified as marine species. A total of 30 TECs were also identified from the BioNet Atlas and PMST searches as known or predicted to occur within the locality. One area of native vegetation was identified from aerial imagery and Google Street View surrounding the compound in the north-east of the study area. This area of native vegetation was not covered by *The Native Vegetation of the Sydney Metropolitan Area* Version 3.0 (OEH 2016).

#### 3.2 Vegetation communities

One native vegetation community has been mapped within the study area (**Figure 2** and **Figure 3**). This native vegetation community is not covered by *The Native Vegetation of the Sydney Metropolitan Area*, Version 3.0 (OEH 2016). Given that a site visit has not been conducted and that the area of native vegetation is not covered by the baseline mapping, it has precautionarily been mapped as 'native vegetation'. Subsequently, this vegetation community could not be identified to a PCT or to a TEC listed under the BC Act or EPBC Act.

Aerial imagery suggests that exotic vegetation may have once occurred between the railway tracks and southern retaining wall, however Google Street View suggests it has been removed.



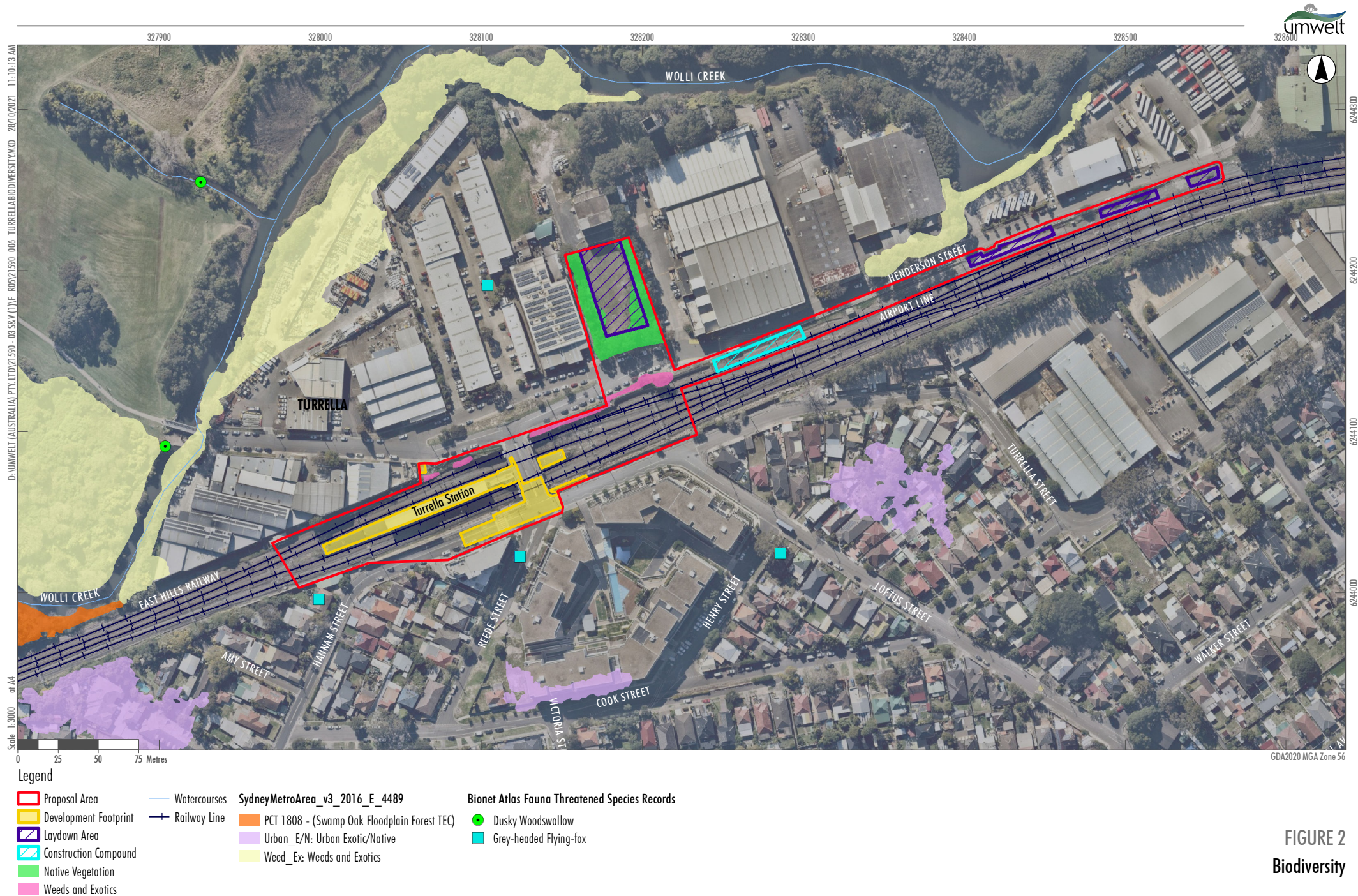


FIGURE 2  
Biodiversity





### FIGURE 3 Biodiversity



### 3.3 Threatened species

#### 3.3.1 Threatened flora

The desktop assessment identified 28 threatened flora species known or predicted to occur within the locality. Of these, six threatened flora species have been recorded within ten kilometres of the study area. Each of these species was assessed as having a low likelihood of occurrence within the study area due to the likely absence of potential habitat. The area mapped as 'native vegetation' is highly fragmented, disconnected from larger areas of native vegetation, and surrounded by residential and commercial development making it highly unlikely it would support the occurrence of threatened flora.

As no site visit was carried out for this assessment, no targeted surveys have been carried out within the study area.

#### 3.3.2 Threatened fauna

No targeted surveys were undertaken, however a desktop habitat assessment was conducted to determine the potential for threatened species to utilise the study area. No threatened fauna habitat was identified with the potential for threatened species to utilise within the study area. Threatened microbat species may utilise cracks in concrete and small openings in buildings as roosting sites, although they are unlikely to utilise these spaces due to the excessive noise created by traffic and trains passing through Turrella Station. These microbat species include:

- *Micronomus norfolkensis* (eastern coastal free-tailed bat)
- *Miniopterus orianae oceanensis* (large bent-winged bat)
- *Myotis macropus* (southern myotis)
- *Saccolaimus flaviventris* (yellow-bellied sheath-tail-bat)

Nearby forest and wetlands associated with Wolli Creek and Wolli Creek Regional Park may provide suitable habitat for threatened fauna including bird and bat species that may fly over the study area. Grey-headed flying-fox is likely to utilise the airspace over the study area as it leaves the camp in search of food and have been recorded in nearby urban vegetation (**Figure 3**). The nearest Grey-headed Flying Fox camp is located within four-hundred metres of the study to the west in Wolli Creek Regional Park. Species with a moderate or higher likelihood of occurrence are listed **Table 3.1**. These species may utilise the airspace above the study area as they move between Wolli Creek Regional Park and urban vegetation, however they are unlikely to forage or utilise habitat within the study area.



**Table 3.1 Likelihood of occurrence table**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence
<b>Birds</b>				
<i>Anthochaera phrygia</i>	regent honeyeater	Critically endangered	Critically endangered	Moderate
<i>Artamus cyanopterus cyanopterus</i>	dusky woodswallow	Vulnerable	-	Moderate
<i>Botaurus pociptilus</i>	australasian bittern	-	Vulnerable	Moderate
<i>Calyptorhynchus lathamii</i>	glossy black-cockatoo	Vulnerable	-	Moderate
<i>Glossopsitta pusilla</i>	little lorikeet	Vulnerable	-	Moderate
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle	Vulnerable	-	Moderate
<i>Hieraaetus morphnoides</i>	little eagle	Vulnerable	-	Moderate
<i>Hirundapus caudacutus</i>	white-throated needletail	-	Vulnerable	Moderate
<i>Ixobrychus flavicollis</i>	black bittern	Vulnerable	-	Moderate
<i>Lathamus discolor</i>	swift parrot	Endangered	Critically endangered	Moderate
<i>Neophema pulchella</i>	turquoise parrot	Vulnerable	-	Moderate
<i>Ninox strenua</i>	powerful owl	Vulnerable	-	Moderate
<i>Numenius madagascariensis</i>	eastern curlew	-	Critically endangered	Moderate
<i>Petroica boodang</i>	scarlet robin	Vulnerable	-	Moderate
<i>Petroica phoenicea</i>	flame robin	Vulnerable	-	Moderate
<i>Ptilinopus superbus</i>	superb fruit-dove	Vulnerable	-	Moderate
<i>Rostratula australis</i>	australian painted snipe	-	Endangered	Moderate
<i>Stagonopleura guttata</i>	diamond firetail	-	-	Moderate
<i>Tyto novaehollandiae</i>	masked owl	Vulnerable	-	Moderate
<b>Mammals</b>				
<i>Chalinolobus dwyeri</i>	large-eared pied bat	Vulnerable	Vulnerable	Moderate
<i>Miniopterus orianae oceanensis</i>	large bent-winged bat	Vulnerable	-	High
<i>Myotis macropus</i>	southern myotis	Vulnerable	-	Moderate
<i>Pteropus poliocephalus</i>	grey-headed flying-fox	Vulnerable	Vulnerable	High
<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail-bat	Vulnerable	-	Moderate

A full likelihood of occurrence table has been included in **Attachment A**.

### 3.3.3 Migratory species

The study area does not provide habitat for any migratory species. Wolli Creek Regional Park contains a creek and forest that may constitute suitable habitat for migratory bird species. These bird species may utilise the airspace above the study area as they migrate up and down the coast, stopping to rest or forage at Wolli Creek Regional Park. The migratory species with a moderate or higher likelihood of occurrence have been listed in **Table 3.2**.

**Table 3.2** Likelihood of occurrence table, migratory species

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Likelihood of Occurrence
<i>Actitis hypoleucos</i>	common sandpiper	-	Migratory	Moderate
<i>Apus pacificus</i>	fork-tailed swift	-	Migratory	Moderate
<i>Arenaria interpres</i>	ruddy turnstone	-	Migratory	Moderate
<i>Calidris acuminata</i>	sharp-tailed sandpiper	-	Migratory	Moderate
<i>Calidris alba</i>	sanderling	-	Migratory	Moderate
<i>Calidris melanotos</i>	pectoral sandpiper	-	Migratory	Moderate
<i>Calidris ruficollis</i>	red-necked stint	-	Migratory	Moderate
<i>Calidris subminuta</i>	long-toed stint	-	Migratory	Moderate
<i>Charadrius bicinctus</i>	double-banded plover	-	Migratory	Moderate
<i>Charadrius veredus</i>	oriental plover	-	Migratory	Moderate
<i>Cuculus optatus</i>	oriental cuckoo	-	Migratory	Moderate
<i>Gallinago hardwickii</i>	latham's snipe	-	Migratory	Moderate
<i>Gallinago stenura</i>	pin-tailed snipe	-	Migratory	Moderate
<i>Limicola falcinellus</i>	broad-billed sandpiper	-	Migratory	Moderate
<i>Limosa lapponica</i>	bar-tailed godwit	-	Migratory	Moderate
<i>Limosa limosa</i>	black-tailed godwit	-	Migratory	Moderate
<i>Monarcha melanopsis</i>	black-faced monarch	-	Migratory	Moderate
<i>Monarcha trivirgatus</i>	spectacled monarch	-	Migratory	Moderate
<i>Myiagra cyanoleuca</i>	satin flycatcher	-	Migratory	Moderate
<i>Numenius minutus</i>	little curlew	-	Migratory	Moderate
<i>Numenius phaeopus</i>	whimbrel	-	Migratory	Moderate
<i>Pandion haliaetus</i>	osprey	Vulnerable	Migratory	Moderate
<i>Philomachus pugnax</i>	ruff	-	Migratory	Moderate
<i>Pluvialis fulva</i>	pacific golden plover	-	Migratory	Moderate
<i>Pluvialis squatarola</i>	grey plover	-	Migratory	Moderate
<i>Rhipidura rufifrons</i>	rufous fantail	-	Migratory	Moderate
<i>Tringa brevipes</i>	grey-tailed tattler	-	Migratory	Moderate
<i>Tringa incana</i>	wandering tattler	-	Migratory	Moderate
<i>Tringa nebularia</i>	common greenshank	-	Migratory	Moderate
<i>Tringa stagnatilis</i>	marsh sandpiper	-	Migratory	Moderate
<i>Xenus cinereus</i>	terek sandpiper	-	Migratory	Moderate



## 4.0 Impact assessment

### 4.1 Direct impacts

#### 4.1.1 Direct impacts to vegetation

The proposed works are not expected to have a direct impact or clear any native vegetation (**Figure 1**). Access to the compound located in the north-east of the study area (along Henderson Street) would be via an existing driveway, with storage of all materials in an existing cleared area. Access to the compounds within the rail corridor would not require the clearance of any native vegetation with storage of all materials occurring in existing cleared areas.

#### 4.1.2 Direct impacts to threatened flora

As outlined within **Section 3.3.1**, the study area does not contain suitable habitat for any threatened flora species known or predicted to occur within 10 kilometres of the study area. No threatened flora species have been previously recorded within the study area. As such, no threatened flora species are expected to be directly impacted by the proposed works.

#### 4.1.3 Direct impacts to threatened fauna

As outlined in **Section 3.3.2**, no potential habitat for threatened fauna species has been assessed as occurring within the study area. The proposed works are unlikely to impact any resident fauna, but birds/bats may utilise airspace above the study area.

### 4.2 Indirect impacts

There is the potential for light, noise and vibrations to have an indirect impact on biodiversity. This could have an impact on the health and behaviour of fauna in Wollie Creek Regional Park, or any bird and bat species that may fly over the study area while foraging. Given these impacts are already generated by traffic and frequently passing trains, it is unlikely the proposed construction activities will result in additional impacts on biodiversity.

## 5.0 Mitigation measures

While no biodiversity is expected to be impacted by the proposed works, the following mitigation measures could be implemented:

- An exclusion zone is to be setup surrounding the native vegetation adjacent the compound in the north-east of the study area. The exclusion zone should be marked and delineated with fluorescent flagging tape.
- The vegetation surrounding the compound in the north-east should be inspected to rule out the occurrence of any threatened species or ecological communities.
- All construction workers should be briefed on the location of the native vegetation exclusion zone prior to the beginning of works.

## **6.0 Offset requirements**

Direct impacts to the TECs and threatened species habitat occurring within the study area would require offsetting in accordance with Transport for NSW policies and procedures. As no threatened species, threatened species habitat, PCTs (native vegetation) or TECs would be directly impacted within the study area, there is no expected requirement for offsetting. Additionally, no trees – native or exotic – are expected to be cleared which would require offsets as per the Transport for NSW Vegetation Offsets Guide (TfNSW 2019)

## **7.0 Conclusion**

This briefing note addresses impacts to biodiversity as a result of the proposed works for upgrades to Turrella Station.

One native vegetation community has been identified within the study area however it cannot be identified to the PCT-level without a site visit. This native vegetation is not expected to be impacted by the proposed works. No threatened flora species habitat is present within the study area, therefore the proposed upgrade is unlikely to impact any threatened flora species.

It was determined that threatened bird and bat species may fly above the study area as they travel between Wolli Creek Regional Park and nearby urban vegetation. No habitat was identified for these species within the study area and impacts to these species habitats is expected to be negligible. As such, Assessments of significance were not conducted on any threatened fauna species.

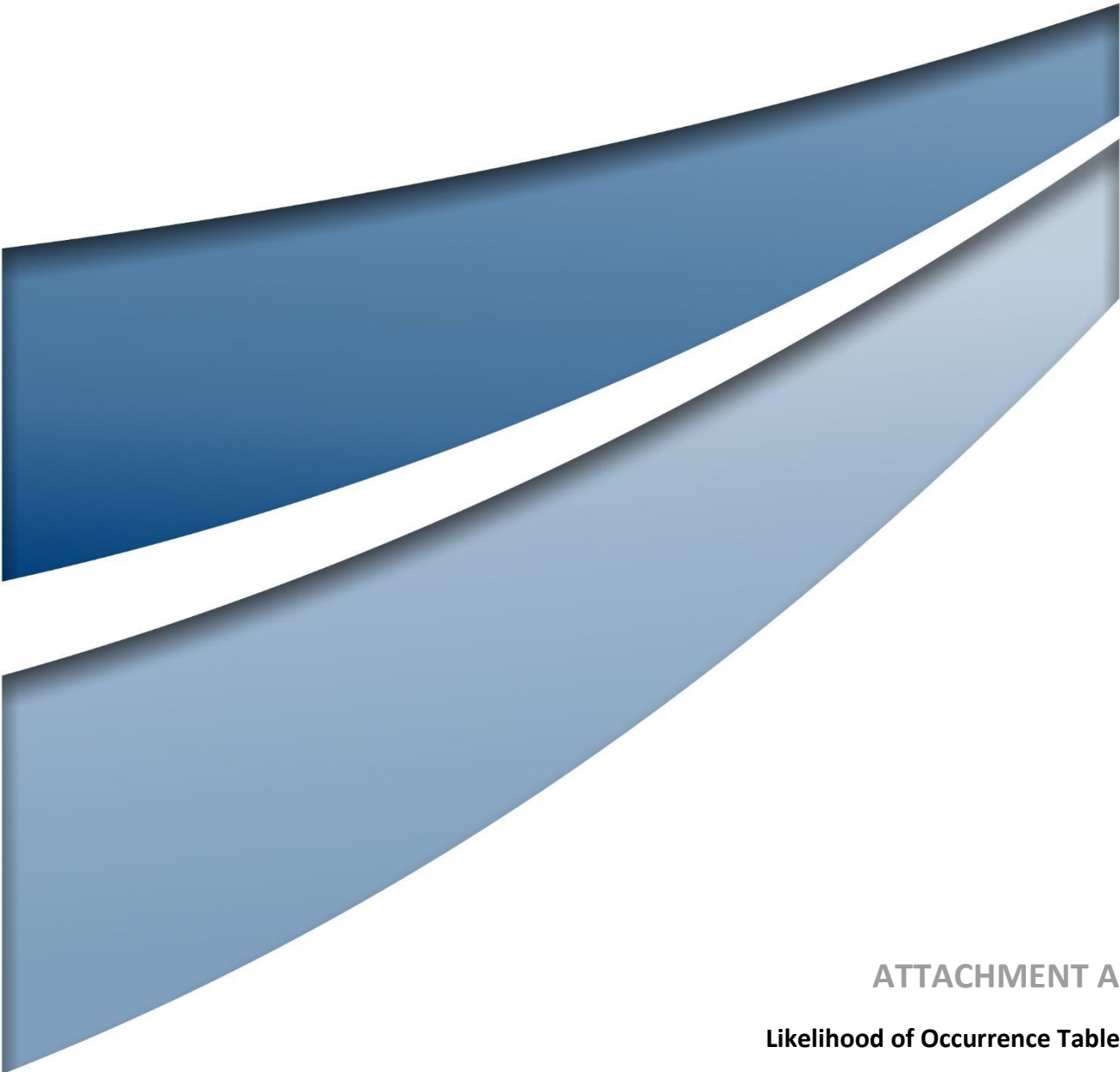
Any residual impacts are not expected to significantly impact upon the biodiversity occurring within the study area.

## **References**

Office of Environment and Heritage (OEH), 2016, *The Native Vegetation of the Sydney Metropolitan Area*. VIS\_ID 4489, NSW Government, Sydney.

TfNSW, 2019, Vegetation Offset Guide, Sydney





**ATTACHMENT A**

**Likelihood of Occurrence Table**

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<b>Threatened ecological communities</b>						
Agnes Banks Woodland in the Sydney Basin Bioregion		Critically endangered	Endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions		Endangered	-	BioNet	-	<b>Low:</b> habitat not in study area.
Blue Gum High Forest in the Sydney Basin Bioregion		Critically endangered	Endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion		Endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion		Vulnerable	Endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		Endangered	Vulnerable	BioNet	-	<b>Low:</b> habitat not in study area.
Coastal Swamp Oak ( <i>Casuarina glauca</i> ) Forest of New South Wales and South East Queensland ecological community		-	Endangered	PMST	-	<b>Low:</b> habitat not in study area. The TEC has been mapped as occurring to the east of the study area, and may occur along Wolli Creek.
Coastal Upland Swamps in the Sydney Basin Bioregion		Endangered	Endangered	PMST	-	<b>Low:</b> habitat not in study area.
Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion		Endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Cumberland Plain Woodland in the Sydney Basin Bioregion		Critically endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion		Critically endangered	Endangered	PMST	-	<b>Low:</b> habitat not in study area.
Elderslie Banksia Scrub Forest		Critically endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		Endangered	-	BioNet	-	<b>Low:</b> habitat not in study area.
Kurnell Dune Forest in the Sutherland Shire and City of Rockdale		Endangered	-	BioNet		<b>Low:</b> habitat not in study area.
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		Endangered	Critically endangered	PMST	-	<b>Low:</b> habitat not in study area.
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions		Endangered	Critically endangered	BioNet		<b>Low:</b> habitat not in study area.
Moist Shale Woodland in the Sydney Basin Bioregion		Endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion		Endangered	-	BioNet	-	<b>Low:</b> habitat not in study area.
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion		-	Endangered	PMST	-	<b>Low:</b> habitat not in study area.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		Endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area. Suitable habitat may be present along Wolli Creek.
Shale Gravel Transition Forest in the Sydney Basin Bioregion		Endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Shale Sandstone Transition Forest in the Sydney Basin Bioregion		Critically endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion		Endangered	-	BioNet	-	<b>Low:</b> habitat not in study area.
Subtropical and Temperate Coastal Saltmarsh		-	Vulnerable	PMST	-	<b>Low:</b> habitat not in study area.
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		Endangered	Endangered	BioNet	-	<b>Low:</b> habitat not in study area. The TEC has been mapped as occurring to the east of the study area, and may occur along Wolli Creek.
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		Endangered	-	BioNet	-	<b>Low:</b> habitat not in study area. Suitable habitat may be present along Wolli Creek.
Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion		Critically endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion		-	Endangered	PMST	-	<b>Low:</b> habitat not in study area.
Themeda grassland on seaciffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions		Endangered	-	BioNet	-	<b>Low:</b> habitat not in study area.
Western Sydney Dry Rainforest in the Sydney Basin Bioregion		Endangered	Critically endangered	BioNet	-	<b>Low:</b> habitat not in study area.
<b>Flora</b>						
<i>Acacia bynoeana</i>	Bynoe's Wattle	Endangered	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Acacia pubescens</i>	Downy Wattle	Vulnerable	Vulnerable	BioNet	4	<b>Low:</b> habitat not in study area.
<i>Acacia terminalis</i> subsp. <i>Eastern Sydney</i>	Sunshine wattle	Endangered	Vulnerable	BioNet	9	<b>Low:</b> habitat not in study area.
<i>Allocasuarina glareicola</i>	-	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Asterolasia elegans</i>	-	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid	Endangered	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Darwinia biflora</i>	-	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.



Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Deyeuxia appressa</i>	-	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	Vulnerable	Vulnerable	BioNet	1	<b>Low:</b> habitat not in study area.
<i>Genoplesium baueri</i>	Bauer's Midge Orchid	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Macadamia integrifolia</i>	Macadamia Nut	-	Vulnerable	BioNet	1	<b>Low:</b> habitat not in study area.
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Melaleuca deanei</i>	Deane's Melaleuca	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Persicaria elatior</i>	Knotweed	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Persoonia hirsuta</i>	Hairy Geebung	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Pimelea spicata</i>	Spiked Rice-flower	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Pomaderris brunnea</i>	Rufous Pomaderris	Endangered	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Pterostylis saxicola</i>	Sydney Plains Greenhood	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Rhizanthella slateri</i>	Eastern Underground Orchid	Vulnerable	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	Critically endangered	Critically endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Rhodomyrtus psidioides</i>	Native Guava	-	Critically endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Endangered	Vulnerable	BioNet	14	<b>Low:</b> habitat not in study area.
<i>Tetratheca juncea</i>	Black-eyed Susan	Vulnerable	Vulnerable	BioNet	18	<b>Low:</b> habitat not in study area.
<i>Thelymitra kangaloonica</i>	Kangaloon Sun Orchid	-	Critically endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Thesium australe</i>	Austral Toadflax	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<b>Invertebrates</b>						
<i>Pommerhelix duralensis</i>	Dural Land Snail	Endangered	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<b>Amphibians</b>						
<i>Caretta caretta</i>	Loggerhead Turtle	Endangered	Endangered	BioNet	1	<b>Nil:</b> marine species.
<i>Chelonia mydas</i>	Green Turtle	-	Vulnerable	PMST	0	<b>Nil:</b> marine species.
<i>Crinia tinnula</i>	Wallum Froglet	Vulnerable	-	BioNet	1	<b>Low:</b> habitat not in study area.
<i>Dermochelys coriacea</i>	Leatherback Turtle	-	Endangered	PMST	0	<b>Nil:</b> marine species.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	-	Vulnerable	PMST	0	<b>Nil:</b> marine species.
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	Vulnerable	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Hoplocephalus bungaroides</i>	Broad-Headed Snake	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Litoria aurea</i>	Green and Golden Bell Frog	Endangered	Vulnerable	BioNet	209	<b>Low:</b> habitat not in study area.
<i>Litoria raniformis</i>	Southern Bell Frog	Endangered	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Natator depressus</i>	Flatback Turtle	-	Vulnerable	PMST	0	<b>Nil:</b> marine species.
<b>Birds</b>						
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically endangered	Critically endangered	PMST	0	<b>Moderate:</b> species may rarely utilise airspace above study area.
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Vulnerable	-	BioNet	2	<b>Moderate:</b> species may utilise airspace above study area.
<i>Botaurus pociptilus</i>	Australasian Bittern	-	-	BioNet	1	<b>Moderate:</b> species may utilise airspace above study area.
<i>Calidris canutus</i>	Red Knot	-	Endangered	PMST	0	<b>Low:</b> suitable habitat absent within the study area.
<i>Calidris ferruginea</i>	Curlew Sandpiper	-	Critically endangered	PMST	0	<b>Low:</b> suitable habitat absent from the study area.
<i>Calidris tenuirostris</i>	Great Knot	-	Critically endangered	PMST	0	<b>Low:</b> suitable habitat absent from the study area.
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	Vulnerable	-	BioNet	2	<b>Moderate:</b> species may utilise airspace above study area.
<i>Charadrius leschenaultii</i>	Greater Sand-plover	Vulnerable	Vulnerable	BioNet	3	<b>Low:</b> suitable habitat absent from the study area.
<i>Charadrius mongolus</i>	Lesser Sand Plover	-	Endangered	PMST	0	<b>Low:</b> suitable habitat absent from the study area.
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	-	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Diomedea antipodensis</i>	Antipodean Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Diomedea antipodensis gibsoni</i>	Gibson's Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Diomedea epomophora</i>	Southern Royal Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Diomedea exulans</i>	Wandering Albatross	Endangered	Endangered	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Diomedea sanfordi</i>	Northern Royal Albatross	-	Endangered	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Falco hypoleucos</i>	Grey Falcon	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Fregetta grallaria grallaria</i>	White-bellied Storm-Petrel	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Glossopsitta pusilla</i>	Little Lorikeet	Vulnerable	-	BioNet	1	<b>Moderate:</b> species may utilise airspace above study area.
<i>Grantiella picta</i>	Painted Honeyeater	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	Vulnerable	-	BioNet	1	<b>Low:</b> habitat not in study area.
<i>Haematopus longirostris</i>	Pied Oystercatcher	Endangered	-	BioNet	3	<b>Low:</b> habitat not in study area.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Vulnerable	-	BioNet	1	<b>Moderate:</b> species may utilise airspace above study area.
<i>Hieraaetus morphnoides</i>	Little Eagle	Vulnerable	-	BioNet	2	<b>Moderate:</b> species may utilise airspace above study area.
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	Vulnerable	PMST	0	<b>Moderate:</b> species may utilise airspace above study area.
<i>Ixobrychus flavicollis</i>	Black Bittern	Vulnerable	-	BioNet	2	<b>Moderate:</b> species may utilise airspace above study area.
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Critically endangered	PMST	0	<b>Moderate:</b> species may utilise airspace above study area on occasion.
<i>Limosa lapponica baueri</i>	Nunivak Bar-tailed Godwit	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Macronectes giganteus</i>	Southern Giant-Petrel	-	Endangered	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Macronectes halli</i>	Northern Giant Petrel	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	-	Critically endangered	PMST	0	<b>Low:</b> outside of species core range.
<i>Neophema pulchella</i>	Turquoise Parrot	Vulnerable	-	BioNet	1	<b>Moderate:</b> species may utilise airspace above study area.



Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Ninox strenua</i>	Powerful Owl	Vulnerable	-	BioNet	20	<b>Moderate:</b> species may utilise airspace above study area.
<i>Numenius madagascariensis</i>	Eastern Curlew	-	Critically endangered	PMST	0	<b>Moderate:</b> species may utilise airspace above study area.
<i>Pachyptila turtur subantarctica</i>	Fairy Prion (southern)	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Petroica boodang</i>	Scarlet Robin	Vulnerable	-	BioNet	2	<b>Moderate:</b> species may utilise airspace above study area.
<i>Petroica phoenicea</i>	Flame Robin	Vulnerable	-	BioNet	2	<b>Moderate:</b> species may utilise airspace above study area.
<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel	-	Endangered	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Pterodroma neglecta neglecta</i>	Kermadec Petrel (western)	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Ptilinopus superbus</i>	Superb Fruit-Dove	Vulnerable	-	BioNet	6	<b>Moderate:</b> species may utilise airspace above study area.
<i>Rostratula australis</i>	Australian Painted Snipe	-	Endangered	PMST	0	<b>Moderate:</b> species may utilise airspace above study area.
<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable	-	BioNet	1	<b>Moderate:</b> species may utilise airspace above study area.
<i>Sternula nereis nereis</i>	Australian Fairy Tern	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Thalassarche bulleri</i>	Buller's Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Thalassarche bulleri platei</i>	Northern Buller's Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Thalassarche cauta</i>	Shy Albatross	-	Endangered	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Thalassarche eremita</i>	Chatham Albatross	-	Endangered	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Thalassarche impavida</i>	Campbell Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Thalassarche melanophris</i>	Black-browed Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Thalassarche salvini</i>	Salvin's Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Thalassarche steadi</i>	White-capped Albatross	-	Vulnerable	PMST	0	<b>Low:</b> marine species. Habitat not in study area.
<i>Thinornis cucullatus cucullatus</i>	Eastern Hooded Plover	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Tyto novaehollandiae</i>	Masked Owl	Vulnerable	-	BioNet	1	<b>Moderate:</b> species may utilise airspace above study area.
<b>Mammals</b>						
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Vulnerable	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Phascolarctos cinereus</i>	Koala	Vulnerable	Vulnerable	BioNet	2	<b>Low:</b> habitat not in study area.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable	BioNet	965	<b>High:</b> species is likely to fly over the study area and has the potential to feed on flowering and fruiting eucalypts and <i>Acmena</i> . Camp is located along Wolli Camp, approximately 400m from study area.
<i>Myotis macropus</i>	Southern Myotis	Vulnerable	-	BioNet	2	<b>Moderate:</b> study area is within 300m of a water body (hunting habitat). Species may roost in man-made structures and fly over the study area.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Vulnerable	-	BioNet	25	<b>High:</b> species is likely to hunt for insects within and over the study area.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Vulnerable	PMST	0	<b>Moderate:</b> species may hunt for insects within and over the study area.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Perameles nasuta</i>	Long-nosed Bandicoot population in inner western Sydney	-	Endangered population	BioNet	23	<b>Low:</b> habitat not in study area.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	Vulnerable	-	BioNet	4	<b>Moderate:</b> species may hunt for insects within and over the study area.
<i>Dugong dugon</i>	Dugong	Endangered	Migratory	BioNet	1	<b>Nil:</b> marine species.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	Vulnerable	-	BioNet	1	<b>Nil:</b> marine species.
<i>Petauroides volans</i>	Greater Glider	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	-	Vulnerable	PMST	0	<b>Low:</b> habitat not in study area.
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot	-	Endangered	PMST	0	<b>Low:</b> habitat not in study area.
<i>Eubalaena australis</i>	Southern Right Whale	-	Endangered	PMST	0	<b>Nil:</b> marine species.
<i>Megaptera novaeangliae</i>	Humpback Whale	-	Vulnerable	PMST	0	<b>Nil:</b> marine species.
<i>Balaena glacialis australis</i>	Southern Right Whale	-	Endangered	PMST	0	<b>Nil:</b> marine species.
<i>Balaenoptera musculus</i>	Blue Whale	-	Endangered	PMST	0	<b>Nil:</b> marine species.
<b>Migratory</b>						
<i>Apus pacificus</i>	Fork-tailed Swift	-	Migratory	PMST	-	<b>Moderate:</b> may fly over the study area on occasion.
<i>Anous stolidus</i>	Common Noddy	-	Migratory	PMST	-	<b>Low:</b> habitat not in study area.
<i>Ardenna carneipes</i>	Flesh-footed Shearwater	-	Migratory	PMST	-	<b>Low:</b> habitat not in study area.
<i>Ardenna grisea</i>	Sooty Shearwater	-	Migratory	PMST	-	<b>Low:</b> habitat not in study area.
<i>Calonectris leucomelas</i>	Streaked Shearwater	-	Migratory	PMST	-	<b>Low:</b> habitat not in study area.
<i>Fregata ariel</i>	Lesser Frigatebird	-	Migratory	PMST	-	<b>Low:</b> habitat not in study area.
<i>Fregata minor</i>	Great Frigatebird	-	Migratory	PMST	-	<b>Low:</b> habitat not in study area.
<i>Cuculus optatus</i>	Oriental Cuckoo	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Monarcha melanopsis</i>	Black-faced Monarch	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Monarcha trivirgatus</i>	Spectacled Monarch	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Motacilla flava</i>	Yellow Wagtail	-	Migratory	PMST	-	<b>Low:</b> habitat not in study area.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.



Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Actitis hypoleucos</i>	Common Sandpiper	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Arenaria interpres</i>	Ruddy Turnstone	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Calidris alba</i>	Sanderling	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Calidris ruficollis</i>	Red-necked Stint	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Calidris subminuta</i>	Long-toed Stint	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Charadrius bicinctus</i>	Double-banded Plover	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Charadrius veredus</i>	Oriental Plover	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Gallinago hardwickii</i>	Latham's Snipe	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Gallinago megala</i>	Swinhoe's Snipe	-	Migratory	PMST	-	<b>Low:</b> study area outside core range of species.
<i>Gallinago stenura</i>	Pin-tailed Snipe	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Limosa lapponica</i>	Bar-tailed Godwit	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Limosa limosa</i>	Black-tailed Godwit	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Numenius minutus</i>	Little Curlew	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
<i>Numenius phaeopus</i>	Whimbrel	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Philomachus pugnax</i>	Ruff	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Pluvialis fulva</i>	Pacific Golden Plover	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Pluvialis squatarola</i>	Grey Plover	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Tringa brevipes</i>	Grey-tailed Tattler	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Tringa incana</i>	Wandering Tattler	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Tringa stagnatilis</i>	Marsh Sandpiper	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Xenus cinereus</i>	Terek Sandpiper	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Pandion haliaetus</i>	Osprey	Vulnerable	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<i>Tringa nebularia</i>	Common Greenshank	-	Migratory	PMST	-	<b>Moderate:</b> species may utilise airspace above study area.
<b>Fish</b>						
<i>Hippocampus whitei</i>	White's Seahorse	-	Endangered	PMST	-	<b>Nil:</b> marine species.
<i>Macquaria australasica</i>	Macquarie Perch	-	Endangered	PMST	-	<b>Low:</b> habitat not in study area.
<i>Epinephelus daemeli</i>	Black Rockcod	-	Vulnerable	PMST	-	<b>Low:</b> habitat not in study area.
<i>Prototroctes maraena</i>	Australian Grayling	-	Vulnerable	PMST	-	<b>Low:</b> habitat not in study area.
<b>Sharks</b>						
<i>Carcharias taurus (east coast population)</i>	Grey Nurse Shark (east coast population)	-	Critically endangered	PMST	-	<b>Nil:</b> marine species.
<i>Carcharodon carcharias</i>	Great White Shark	-	Vulnerable	PMST	-	<b>Nil:</b> marine species.
<i>Rhincodon typus</i>	Whale Shark	-	Vulnerable	PMST	-	<b>Nil:</b> marine species.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Records	Likelihood of Occurrence
Migratory Marine						
<i>Carcharhinus longimanus</i>	Oceanic Whitetip Shark	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Balaenoptera edeni</i>	Bryde's Whale	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Caperea marginata</i>	Pygmy Right Whale	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Lagenorhynchus obscurus</i>	Dusky Dolphin	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Lamna nasus</i>	Mackerel Shark	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Manta alfredi</i>	Reef Manta Ray	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Manta birostris</i>	Giant Manta Ray	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Sousa chinensis</i>	Indo-Pacific Humpback Dolphin	-	Migratory	PMST	-	<b>Nil:</b> marine species.
<i>Pelamis platurus</i>	Yellow-bellied Seasnake	-	Migratory	PMST	-	<b>Nil:</b> marine species.