Biodiversity Assessment Report

Hunter River High School, Heatherbrae

Prepared for

APP Corporation Pty Ltd

Final / 23 April 2023

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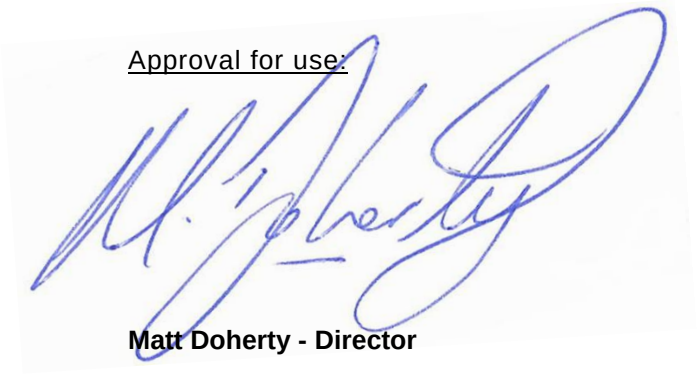

Matt Doherty - Director

23 April 2023

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EXECUTIVE SUMMARY

MJD Environmental has been engaged by APP Corporation Pty Ltd on behalf of School Infrastructure NSW to prepare a Biodiversity Assessment Report to accompany a Development Application (DA) for a proposed building upgrade on existing infrastructure at Lot 1 DP 120189, Lot 1 DP 540114, and Lot 1 DP 579028 – associated with Hunter River High School at 36 Elkin Avenue, Heatherbrae, and hereafter referred to as the 'Study area'.

This report has been prepared in relation to the proposed development of Hunter River High School located at 36 Elkin Avenue, Heatherbrae. This report has been prepared to support:

a) A development application for the construction of a Construction of gymnasium (Block Y), consisting of a basketball court, equipment storage, canteen kitchen, staff room, first aid room and change room amenities, construction of hardstand civic space north of the gymnasium, construction of full-size rugby field, the construction of new carpark consisting of sixty-five (65) parking spaces (including 6 accessible parking spaces) and the construction and connection of a reticulated sewer pipe.
b) A Part 5 Activity Approval, development permitted without consent, for the construction of a new administration building, student learning hub and provision of essential services.
c) A Part 5 Activity Approval, development permitted without consent, for the construction of a new linking road and kiss and drop bay between Adelaide Street and Elkin Avenue.

The objective of the assessment was also to examine the likelihood of the proposal having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Biodiversity Conservation Act 2016* (BC Act). This assessment recognises the relevant requirements of the *EP&A Act 1979* as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Preliminary assessment was also made with regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An appraisal of the Study area to determine the appropriate assessment pathway under the BC Act determined the proposal on site does not trigger a Biodiversity Offset Scheme (BOS) entry threshold and on this basis an assessment of significance is required including application of the 5-part test.

The ecological field assessment found the maximum associated impacts to comprise of:

- 0.092 ha of Native Remnant Canopy
- 0.008 ha of Native Planted Canopy
- 1.021 ha of Endemic & Exotic Planted Canopy
- 3.096 ha of Managed Lawn - Exotic dominated

Note, the maximum associated impacts include all removed and potentially retained trees within the impact boundary. As such, the impact of the current design will be lower should the trees noted within the arborist report be retained.

No threatened flora or fauna species listed under the BC Act 2016 and EPBC Act 1999 were recorded on Study area.

No hollow bearing trees were detected at the time of the site assessment. Significant trees on site have been further assessed in the Comprehensive Koala Plan of Management in **Appendix 6**.

An assessment of significance determined the proposal is unlikely to have a significant impact to threatened species, populations or ecological communities assessed.

Recommendations have been provided to mitigate potential impacts arising from the construction phase of the proposal.

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GLOSSARY OF TERMS AND ABBREVIATIONS

Term / Abbreviation	Meaning
BAM	Biodiversity Assessment Method 2020
BC Act	Biodiversity Conservation Act 2016
BOS	Biodiversity Offset Scheme
Council	Port Stephens Council
DCP	Port Stephens Development Control Plan
DoE	Commonwealth Department of the Environment
DPIE	Department of Planning, Industry & Environment
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	hectare
LGA	Local Government Area
OEH	NSW Office of Environment and Heritage *[former]*
PSC	Port Stephens Council
TSC Act	NSW Threatened Species Conservation Act 1995 (as repealed)

1 Introduction

MJD Environmental has been engaged by engaged by APP Corporation Pty Ltd to prepare a Biodiversity Assessment Report to accompany a Development Application (DA) for a proposed building construction and upgrade on existing infrastructure at Lot 1 DP 120189, Lot 1 DP 540114, and Lot 1 DP 579028 – associated with Hunter River High School at 36 Elkin Avenue, Heatherbrae (**Figure 1**), hereafter referred to as the 'Study Area.

1.1 Description of Proposal

This report has been prepared in relation to the proposed development of Hunter River High School located at 36 Elkin Avenue, Heatherbrae. This report has been prepared to support:

d) A development application for the construction of a Construction of gymnasium (Block Y), consisting of a basketball court, equipment storage, canteen kitchen, staff room, first aid room and change room amenities, construction of hardstand civic space north of the gymnasium, construction of full-size rugby field, the construction of new carpark consisting of sixty-five (65) parking spaces (including 6 accessible parking spaces) and the construction and connection of a reticulated sewer pipe.

e) A Part 5 Activity Approval, development permitted without consent, for the construction of a new administration building, student learning hub and provision of essential services.

f) A Part 5 Activity Approval, development permitted without consent, for the construction of a new linking road and kiss and drop bay between Adelaide Street and Elkin Avenue.

The area inclusive of the impacts associated with the proposal will hereafter be referred to as the "Subject Land" The proposal will require several trees within the subject land to be removed, in addition to ground disturbance across a large extent of the Lot 1 DP120189 and Lot 1 DP540114 for the development of the associated school infrastructure. Within the subject land, the proposed development is expected to disturb up to 0.01 ha of existing native vegetation (Refer to **Appendix 1**).

1.2 Aims & Scope

The assessment aims to examine the likelihood of the proposed building construction and upgrades having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Biodiversity Conservation Act 2016* (BC Act). This assessment recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The scope of this flora and fauna assessment is to:

- Determine the appropriate assessment pathway under the NSW BC Act
- Identify vascular plant species occurring within the site, including any threatened species listed under the BC Act and/or EPBC Act;
- Identify and map the extent of vegetation communities within the site, including any Endangered Ecological Communities (EEC) listed under the BC Act or EPBC Act;
- Identify any fauna species including threatened and migratory species, populations or their habitats, occurring within the site and are known or likely to occur within 10 km of the site (locality);
- Assess the potential of the proposed development to have a significant impact on any threatened species, populations or ecological communities (or their habitats) identified from the site; and

- Describe measures to be implemented to avoid, minimise, manage or monitor potential impacts of the proposal.
- In addition to the survey work conducted within the site, consideration for the broader habitat within the Study area has been accounted for when assessing threatened entities, including an assessment of potential direct and indirect impacts the proposal may have of those entities.

1.3 Site Particulars

Locality	The Study area is located in Heatherbrae, NSW
Land Title	Lot 1 DP 120189, Lot 1 DP 540114, and Lot 1 DP 579025
LGA	Port Stephens Council
Area	Study Area (Lot) – 9.15 ha Subject Land (Impact Area) – 4.217 ha
Minimum Lot Size	0.05 ha
Zoning	The lots are currently zoned as R2 Low Density Residential
Boundaries	The study area is comprised of several lots, situated near the central part of the Heatherbrae suburb, with the Pacific Highway running parallel to the south-eastern boundary (Refer to **Figure 1**). The study area is zoned as R2 Low Density Residential, with an additional low density residential zoned area abutting the northern boundary. Abutting the westernmost boundary is a zoned Public Recreation (RE1) area encompassing a modified rural landscape. Along the southwestern boundary are large lot residential (R5) homes.
Current Land Use	The study area contains existing infrastructure associated with the high school including administrative buildings, classrooms, recreational areas, parking lots, and managed fields such as recreational lawns or pastures. The majority of the site is subject to frequent management (e.g. mowing). A modified canopy is present throughout much of the study area, with predominantly planted exotic canopy species, although endemic plantings are present. The groundcover is heavily managed and there is a sparse to absent midstratum. The altered understory and canopy are largely a consequence of past modifications related to the development of the school and current management to maintain the school grounds.
Topography	Most of the study area is situated within a low-lying area with an elevation of 8m ADH, however, there is a small decline in elevation down to 2m in the western section of the lot.

1.4 Qualifications & Licencing

Qualifications

Field investigations and reporting were conducted by Dr Simone-Louise Yasui (B.Sc., M.Sc., PhD), Maddy Walsh (B. Env. Bio. Hons), & Matt Doherty (BLMC) of MJD Environmental (Aust) Pty Ltd.

Licencing

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101684 (Valid 31 March 2023).
- Animal Research Authority (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2023).
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2023).

HUNTER RIVER HIGH SCHOOL,
HEATHERBRAE

FIGURE 1:
SITE LOCATION

Legend

- Site Boundary
- Cadastral Boundary

0 40 80 120 160

Metres

1:2500

MJD Environmental

Aerial: Nearmap (2022) | Data: MJD Environmental, NSW Spatial Services (2022) | Datum/Projection: GDA94 / MGA zone 56 | Date: 12/04/2023 | Version: 2 | HS & Irrawang HS\QGZ\HRHS | This plan should not be relied upon for critical design dimension.

2 Biodiversity Assessment Pathway

The requirement to undertake a biodiversity assessment is a prerequisite for all Part 4 local developments (EPA Act), to assess potential development impacts on threatened species and threatened ecological communities.

The NSW Biodiversity reforms have delivered a new assessment pathway based on the understanding of the amount of clearing proposed, how the proposal will avoid and minimise impacts, and if required provide a strategy to offset the impacts in the form of biodiversity credits.

The following section provides guidance on the biodiversity assessment pathway selected for this project to reflect the amount of clearing associated with the proposal.

2.1 Assessment Methodology

The current biodiversity assessment pathway for proposed development activities requires determining the extent of native vegetation clearing with consideration of the minimum lot size (as outlined in the Local Environment Policy (LEP) for the local government area (LGA) and whether the proposal will have a significant impact on threatened species and/or threatened ecological communities.

To determine the biodiversity assessment pathway required for the development activity, the Biodiversity Offset Scheme (BOS) threshold is used to determine whether the Biodiversity Assessment Method (BAM) is applied to assess the impacts of the proposal and calculate required biodiversity credits to ensure no net loss of biodiversity occurs in the locality.

The *Biodiversity Conservation Regulation 2017* outlines when clearing of native vegetation for a development exceeds the threshold, it will trigger entry into the Biodiversity Offset Scheme and the use of the BAM method.

Thresholds for BOS entry are:

- Whether to amount of native vegetation being cleared exceeds a threshold area set out in section 7.2 (4); and/or
- Whether the impacts occur on an area mapped on the Biodiversity Values map published by the minister for the Environment.

In the cases where the extent of native vegetation clearing does not exceed the BOS entry threshold and the site is not mapped on the Biodiversity Values Map, a Test of Significance (ToS) is required to be carried in accordance with Section 7.3 of the *Biodiversity Conservation Act 2016*.

The study area is not mapped as an area of high biodiversity value on the NSW OEH Biodiversity Values Map (BVM).

Using the Table in Clause 7.2 (4) of the *Biodiversity Conservation Regulation 2017*, the proposed development:

- Has a minimum lot size of less than one hectare; and
- The development proposal does not exceed the 0.25 ha threshold of native vegetation clearing, and therefore does not exceed this BOS threshold.

Therefore, the proposal does not trigger automatic entry into the BOS and a Test of Significance Assessment is the applicable assessment pathway.

3 Methodology

This biodiversity assessment has been prepared in accordance with Section 7.3 of the *Biodiversity Conservation Act 2016*. This ecological assessment has been prepared in accordance with Part B2 Natural Resources of the Port Stephens Development Control Plan (DCP).

The techniques employed to inform this impact assessment are described in further detail below.

3.1 Desktop Assessment

A review of ecological information was undertaken to provide context and understanding of ecological values occurring on the site. Information reviewed included:

Online database searches involving a 10-km buffer around the site were undertaken from the:

- NSW BioNet Atlas (Accessed 3rd November 2022); and
- EPBC Act Protected Matters Search (Accessed 3rd November 2022).

The searches provided a current list of potentially occurring threatened flora and fauna and migratory species under both the BC Act and EPBC Act.

3.2 Field Survey

Field survey was undertaken on the 7th, of October 2022 by MJD Environmental Senior Ecologist Maddy Walsh and Ecologist Dr Simone-Louise Yasui. The prevailing weather conditions during the survey are presented in **Table 1** below.

Table 1 Prevailing Weather Conditions

Date	Min Temp (ºC)	Max Temp (ºC)	Rain (mm)	Wind (km/h)	Sunrise-Sunset
7th October 2022	11.7	21.7	0.2	N 9km/h to NNE 9km/h	0457-1608

Sources: http://www.bom.gov.au/climate/dwo/202210/html/IDCJDW2145.202210.shtml

https://moonphases.willyweather.com.au/nsw/hunter/williamtown.html

3.2.1 Vegetation & Significant Flora Survey

Desktop analysis of regional mapping of the Study area and its surrounds was informed by large-scale vegetation mapping projects and aerial photography, including:

- Preliminary consultation of the DPE regional mapping - Lower Hunter & Central Coast Regional vegetation survey (VIS_ID 2227) to determine the broad categorisation of the site; and
- Preliminary consultation of the NSW State Vegetation Type Map (DPIE 2022)
- GIS analysis including - Aerial Photograph Interpretation (API) and consultation of topographic map (Scale 1:25,000) layers for the site.

Vegetation communities were delineated within the study area based on the above-mentioned desktop information coupled with ground truthing of vegetation through a species inventory list. Surveys were recorded on the Study area using Avenza Maps (Version 4.1.1) with a handheld GPS.

The study area was traversed by two MJD ecologist on the 7th of October 2022 (**Figure 2**) for the purposes of producing a description of native vegetation present and to assess the potential for threatened flora species to occur and identify the presence of threatened flora within the study area.

Threatened flora assessment was informed by a random meander over the study area during the initial site assessment. Targeted searches for threatened flora assessed suitability of habitat for cryptic species outside their detectible periods, while comprehensive searches of the study area verified presence/absence of more conspicuous species. No threatened flora species were identified likely to occur under the Likelihood of Occurrence and Impact Assessment (Refer to **Table 3**). Based on the vegetation survey carried out by MJD Environmental, native vegetation within the study area is chiefly present in the form of few remaining native canopy species void of a native understory resulting from management practices. A full compilation of flora species recorded during survey is provided as **Appendix 2**.

Although, the proposed development is not located on land of environmental significance, it does lie within 500 m buffer of Preferred and Supplementary Koala habitat which are items of environmental significance. However, as described in Section 5, this proposal does not pose a significant impact on these items of environmental significance and will satisfy Clause B2.1 of the DCP. Furthermore we note that the north-western portion of the study area encroaches on a mapped wetland, as per the Port Stephens Local Environmental Plan 2013 (PSLEP), therefore clause 7.9 of the LEP applies. See Section 5.3.3 for assessment under clause 7.9 of PSLEP.

3.2.2 Fauna

A desktop assessment of the potential use of the study area by threatened fauna species (as listed under the BC Act and EPBC Act) identified from the vicinity was undertaken prior to the commencement of field surveys (refer to **section 3.1**).

Fauna habitat values were assessed during flora surveys. The site has been heavily disturbed with the majority of the site represented by limited canopy and shrub coverage, with a groundcover layer that was predominately comprised of exotic ground species. A limited number of remnant native canopy species are present in the north-west section of the site, along with some native planted trees, all of which provide limited connectivity to the broader landscape.

In accordance with the SEPP (Biodiversity & Conservation) 2021 and the *Port Stephens Comprehensive Koala Plan of Management* (CKPoM), no fauna surveys were undertaken for Phascolarctos cinereus (Koala), as the site represents poor habitat that is unlikely to be utilised by this species. For a detailed justification of this decision, refer to the desktop assessment in **Appendix 6**.

Secondary Indications and Incidental Observations

Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of resident fauna were noted. Such indicators included:

- Distinctive scats left by mammals;
- Scratch marks made by various types of arboreal animals;
- Nests made by various guilds of birds;
- Feeding scars on Eucalyptus trees made by Gliders;
- Whitewash, regurgitation pellets and prey remains from Owls;
- Recognition of bird and frog calls;
- Skeletal material of vertebrate fauna; and
- Searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, and diggings).

3.2.3 Habitat Survey

An assessment of the relative habitat value present within the site was undertaken. This assessment focused primarily on the identification of specific habitat types and resources in the site favoured by

known threatened species from the locality. The assessment also considered the potential value of the site (and surrounds) for all major guilds of native flora and fauna. Habitat assessment included:

- presence, size and types of tree hollows;
- presence of rocks, logs, caves, rocky outcrops, leaf litter, overhangs and crevices;
- vegetation complexity, structure and quality;
- presence of freshwater or estuarine aquatic habitats, noting permanency;
- connectivity to adjacent areas of habitat;
- extent and types of disturbance;
- presence of foraging opportunities such as flowering eucalypts, fruits, seeds or other nectar bearing native plants; and
- presence and abundance of various potential prey species

Habitat assessment was based on the specific habitat requirements of each threatened fauna species in regard to home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

3.3 Limitations

Limitations associated with this Biodiversity Assessment report are presented herewith. The limitations have been taken into account specifically in relation to threatened species assessments, results and conclusions.

In these instances, a precautionary approach has been adopted; whereby 'assumed presence' of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

Seasonality & Conditions

Threatened flora species should be surveyed within their respective flowering periods to ensure accurate identification.

The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. As a consequence, threatened species may be absent from some areas where potential habitat exists for extended periods and this might be the case for nomadic and opportunistic species.

Data Availability & Accuracy

The collated threatened flora and fauna species records provided by Bionet Species Sightings Search of NSW Wildlife are known to vary in accuracy and reliability. This is usually due to the reliability of information provided to the National Parks and Wildlife Service (NPWS) for collation and/or the need to protect specific threatened species locations. During the review of threatened species records sourced from OEH BioNet Atlas, consideration has been given to the date and accuracy of each threatened species record in addition to an assessment of habitat suitability within the site.

Similarly, EPBC Protected Matters Searches provide a list of threatened species and communities that have been recorded within 10 km of the Study area, or which have suitable habitat within the wider area, and are subject to the same inherent inaccuracy issues as the State derived databases.

In order to address these limitations in respect to data accuracy, threatened species records have only been used to provide a guide to the types of species that occur within the locality of the Study area. Consequently, habitat assessment and the results of surveys conducted within the site have been used to assess the likelihood of occurrence of threatened species, populations and ecological communities to occur therein.

HUNTER RIVER HIGH SCHOOL,
HEATHERBRAE

FIGURE 2:
SURVEY EFFORTS

Legend

- Site Boundary
- Cadastral Boundary
- Survey Transect
- Survey Waypoints

N
W E
S

0 25 50 75 100

Metres

1:1650

MJD Environmental

Aerial: Nearmap (2022) | Data: MJD Environmental, NSW Spatial Services (2022) | Datum/Projection: GDA94 / MGA zone 56 | Date: 12/04/2023 | Version: 2 | HS & Irrawang HS\QGZ\HRHS | This plan should not be relied upon for critical design dimension.

4 Results

4.1 Desktop Assessment

Using the NSW Wildlife Atlas database BioNet, and EPBC Act Protected Matters Search (3rd November 2022), a list of potentially occurring threatened species, populations and ecological communities from the locality (10 km radius) has been compiled (**Table 2**). A total of 170 entities have been recorded of which 31 threatened flora species, 72 fauna species, 7 ecological communities, 38 migratory species and 22 marine species have either been detected or have the potential to occur within the locality.

Note: Included in **Table 2** below are the numbers of records (not the number of individuals) for each species within the locality taken from the NSW Bionet Species Sightings Search database. The EPBC Act Protected Matters Search does not provide number of records within the locality. Therefore, the record count related only to those BC Act listed species that were detected within 10 km of the site. It is also noted that due to the terrestrial nature of the site, marine species were not considered under this ecological assessment and have not been included in the list.

Table 2 Threatened Flora & Fauna Database Search Results.

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Notes & Source
Threatened Ecological Communities					
Central Hunter Valley eucalypt forest and woodland		-	CE	L	Community may occur within area[1]
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community		-	E	L	Community likely to occur within area[1]
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland		-	E	L	Community likely to occur within area[1]
Lowland Rainforest of Subtropical Australia		-	CE	L	Community likely to occur within area[1]
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria		-	CE	L	Community likely to occur within area[1]
Subtropical and Temperate Coastal Saltmarsh		-	V	L	Community likely to occur within area[1]
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions		E	E	L	Community likely to occur within area[1]
Flora					
Angophora inopina	Charmhaven Apple	-	V	-	Species or species habitat likely to occur within area[1]
Arthraxon hispidus	Hairy-joint Grass	-	V	-	Species or species habitat may occur within area[1]
Asperula asthenes	Trailing Woodruff	-	V	K	Species or species habitat known to occur within area[1]
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs		V	-	Species or species habitat likely to occur within area[1]
Callistemon linearifolius	Netted Bottle Brush	V	-	252	Recorded within 10km of the Site[2];
Commersonia prostrata	Dwarf Kerrawang	-	E	K	Species or species habitat known to occur within area[1]
Cryptostylis hunteriana	Leafless Tongue-orchid	-	V	L	Species or species habitat likely to occur within area[1]

Cynanchum elegans	White-flowered Wax Plant	E	E	2	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Dichanthium setosum	Bluegrass	-	V	L	Species or species habitat likely to occur within area[1]
Dillwynia tenuifolia		E		1	Recorded within 10km of the Site[2]
Diuris praecox	Newcastle Doubletail	V	V	L	Species or species habitat likely to occur within area[1]
Eucalyptus camaldulensis	Eucalyptus camaldulensis population in the Hunter catchment	E	-	2	Recorded within 10km of the Site[2]
Eucalyptus camfieldii	Camfield's Stringybark	V	V	K	Species or species habitat known to occur within area[1]
Eucalyptus glaucina	Slaty Red Gum	-	V	-	Species or species habitat may occur within area[1]
Eucalyptus parramattensis subsp. decadens	Earp's Gum, Earp's Dirty Gum	--	V	1	Species or species habitat known to occur within area[1]
Euphrasia arguta		-	CE	-	Species or species habitat may occur within area[1]
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	2	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Melaleuca biconvexa	Biconvex Paperbark	-	V	-	Species or species habitat may occur within area[1]
Maundia triglochinoides		V	-	4	Recorded within 10km of the Site[2]
Persicaria elatior	Knotweed, Tall Knotweed	-	V	-	Species or species habitat known to occur within area[1]
Pomaderris brunnea	Rufous Pomaderris, Brown Pomaderris	-	V	-	Species or species habitat may occur within area[1]
Prasophyllum sp. Wybong (C.Phelps ORG 5269)	a leek-orchid	-	CE	-	Species or species habitat may occur within area[1]
Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	-	E	-	Species or species habitat may occur within area[1]
Rhizanthella slateri	Eastern Underground Orchid	-	E	-	Species or species habitat may occur within area[1]
Rhodamnia rubescens	Scrub Turpentine	CE	CE	2	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Rhodomyrtus psidioides	Native Guava	-	CE	L	Species or species habitat likely to occur within area[1]
Rutidosis heterogama	Heath Wrinklewort	-	V	L	Species or species habitat likely to occur within area[2]
Syzygium paniculatum	Magenta Lilly Pilly	E	V	K	Species or species habitat known to occur within area[1]
Tetratheca juncea	Black-eyed Susan	V	V	1	Species or species habitat likely to occur within area[1]; Recorded within 10km of the Site[2]
Thesium australe	Austral Toadflax, Toadflax	-	V	-	Species or species habitat may occur within area[1]
Zannichellia palustris		E	-	19	Recorded within 10km of the Site[2]

Birds					
Anseranas semipalmata	Magpie Goose	V	-	63	Recorded within 10km of the Site[2]
Anthochaera phrygia	Regent Honeyeater	CE	CE	K	Species or species habitat known to occur within area[1]
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	1	Recorded within 10km of the Site[2];
Botaurus poiciloptilus	Australasian Bittern	-	E	32	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	1	Recorded within 10km of the Site[2]; Species or species habitat known to occur within area[1]
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	-	7	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Chthonicola sagittata	Speckled Warbler	V	-	2	Recorded within 10km of the Site[2];
Circus assimilis	Spotted Harrier	V	-	23	Recorded within 10km of the Site[2]
Daphoenositta chrysoptera	Varied Sittella	V	-	33	Recorded within 10km of the Site[2]
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	171	Recorded within 10km of the Site[2]
Epthianura albifrons	White-fronted Chat	V	-	574	Recorded within 10km of the Site[2];
Erythrotriorchis radiatus	Red Goshawk	-	V	-	Species or species habitat may occur within area[1]
Falco hypoleucos	Grey Falcon	-	V	-	Species or species habitat may occur within area[1]
Falco subniger	Black Falcon	V	-	14	Recorded within 10km of the Site[2];
Gallinago hardwickii	Latham's Snipe	-	-	102	Recorded within 10km of the Site[2]
Gelochelidon nilotica	Gull-billed Tern	-	C	6	Recorded within 10km of the Site[2];
Glareola maldivarum	Oriental Pratincole	-	-	6	Recorded within 10km of the Site[2];
Glossopsitta pusilla	Little Lorikeet	V	-	21	Recorded within 10km of the Site[2];
Grantiella picta	Painted Honeyeater	-	V	L	Species or species habitat likely to occur within area[1]
Haematopus longirostris	Pied Oystercatcher	E	-	7	Recorded within 10km of the Site[2];
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	473	Recorded within 10km of the Site[2];
Hieraaetus morphnoides	Little Eagle	V	-	14	Recorded within 10km of the Site[2];
Hydroprogne caspia	Caspian Tern	-	J	130	Recorded within 10km of the Site[2];
Irediparra gallinacea	Comb-crested Jacana	V	-	2	Recorded within 10km of the Site[2];
Lathamus discolor	Swift Parrot	E	CE	3	Recorded within 10km of the Site[2]; Species or species habitat known to occur within area[1]
Lophoictinia isura	Square-tailed Kite	V	-	6	Recorded within 10km of the Site[2];

Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	2	Recorded within 10km of the Site[2];
Neophema pulchella	Turquoise Parrot	V	-	3	Recorded within 10km of the Site[2];
Ninox strenua	Powerful Owl	V	-	6	Recorded within 10km of the Site[2];
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	65	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Oxyura australis	Blue-billed Duck	V	-	4	Recorded within 10km of the Site[2]
Pachyptila turtur subantarctica	Fairy Prion (southern)	-	V	K	Species or species habitat known to occur within area[1]
Pandion cristatus	Eastern Osprey	V	-	43	Recorded within 10km of the Site[2];
Petroica boodang	Scarlet Robin	V	-	1	Recorded within 10km of the Site[2];
Petroica phoenicea	Flame Robin	V	-	-	Recorded within 10km of the Site[2];
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	74	Recorded within 10km of the Site[2];
Ptilinopus magnificus	Wompoo Fruit-Dove	V	-	1	Recorded within 10km of the Site[2]
Ptilinopus regina	Rose-crowned Fruit-Dove	V	-	1	Recorded within 10km of the Site[2]
Ptilinopus superbus	Superb Fruit-Dove	V	-	1	Recorded within 10km of the Site[2]
Pycnoptilus floccosus	Pilotbird	-	V	-	Species or species habitat may occur within area[1]
Rostratula australis	Australian Painted Snipe	-	E	10	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Sterna hirundo	Common Tern	-	-	33	Recorded within 10km of the Site[2];
Sternula albifrons	Little Tern	E	-	20	Recorded within 10km of the Site[2];
Sternula nereis nereis	Australian Fairy Tern	-	V	L	Species or species habitat may occur within area[1]
Stictonetta naevosa	Freckled Duck	V	-	6	Recorded within 10km of the Site[2];
Tyto longimembris	Eastern Grass Owl	V	-	9	Recorded within 10km of the Site[2];
Tyto novaehollandiae	Masked Owl	V	-	4	Recorded within 10km of the Site[2];
Mammals					
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	-	V	K	Species or species habitat known to occur within area[1]
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	-	E	K	Species or species habitat known to occur within area[1]
Dasyurus maculatus	Spotted-tailed Quoll	V	E	3	Recorded within 10km of the Site[2]
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	18	Recorded within 10km of the Site[2];
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	143	Recorded within 10km of the Site[2]

Miniopterus australis	Little Bent-winged Bat	V	-	72	Recorded within 10km of the Site[2];
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	46	Recorded within 10km of the Site[2]
Myotis macropus	Southern Myotis	V	-	48	Recorded within 10km of the Site[2];
Notamacropus parma	Parma Wallaby	-	V	-	Species or species habitat may occur within area[1]
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	1	Recorded within 10km of the Site[2];
Petauroides volans	Greater Glider	-	E	L	Species or species habitat likely to occur within area[1]
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	-	V	L	Species or species habitat likely to occur within area[1]
Petaurus norfolcensis	Squirrel Glider	V	-	22	Recorded within 10km of the Site[2];
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	7	Recorded within 10km of the Site[2];
Phascolarctos cinereus	Koala	E	E	1018	Recorded within 10km of the Site[2];
Phascolarctos cinereus (combined populations of QLD, NSW, and the ACT)	Koala (combined populations of QLD, NSW, and the ACT)	-	E	K	Species or species habitat known to occur within area[1]
Potorous tridactylus tridactylus	Long-nosed Potoroo (northern)	V	V	K	Species or species habitat known to occur within area[1]
Pseudomys novaehollandiae	New Holland Mouse	-	V	1	Species or species habitat known to occur within area[1]
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	101	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	10	Recorded within 10km of the Site[2];
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	33	Recorded within 10km of the Site[2];
Vespadelus troughtoni	Eastern Cave Bat	V	-	1	Recorded within 10km of the Site[2];
Amphibians					
Litoria aurea	Green and Golden Bell Frog	-	V	9565	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2];
Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	-	V	-	Species or species habitat may occur within area[1]
Uperoleia mahonyi	Mahony's Toadlet	-	E	K	Species or species habitat known to occur within area[1]
Listed Migratory Species					
Migratory Terrestrial Birds					
Cuculus optatus	Oriental Cuckoo, Horsfield's Cuckoo	-	-	6	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2];
Hirundapus caudacutus	White-throated Needletail	-	V	10	Recorded within 10km of the Site[2]; Species or species habitat known to occur within area[1]
Monarcha melanopsis	Black-faced Monarch	-	-	K	Species or species habitat known to occur within area[1]
Motacilla flava	Yellow Wagtail	-	-	32	Species or species habitat known to occur within area[1];

					Recorded within 10km of the Site[2]
Myiagra cyanoleuca	Satin Flycatcher	-	-	K	Species or species habitat known to occur within area[1]
Rhipidura rufifrons	Rufous Fantail	-	-	K	Species or species habitat known to occur within area[1]
Symposiachrus trivirgatus	Spectacled Monarch	-	-	K	Species or species habitat known to occur within area[1]
Migratory Wetland Birds					
Actitis hypoleucos	Common Sandpiper	-	-	18	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Arenaria interpres	Ruddy Turnstone	-	-	6	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Calidris acuminata	Sharp-tailed Sandpiper	-	-	463	Recorded within 10km of the Site[2];
Calidris canutus	Red Knot, Knot	-	E	26	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Calidris ferruginea	Curlew Sandpiper	-	CE	124	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Calidris melanotos	Pectoral Sandpiper	-	-	10	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Calidris ruficollis	Red-necked Stint	-	-	159	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Calidris subminuta	Long-toed Stint	-	-	1	Recorded within 10km of the Site[2]
Calidris tenuirostris	Great Knot	-	CE	2	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Charadrius bicinctus	Double-banded Plover	-	-	K	Roosting known to occur within area[1]
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	-	V	L	Species or species habitat likely to occur within area[1]
Charadrius mongolus	Lesser Sand Plover, Mongolian Plover	-	E	4	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Charadrius veredus	Oriental Plover	-	-	4	Recorded within 10km of the Site[2]
Chlidonias leucopterus	White-winged Black Tern	-	-	14	Recorded within 10km of the Site[2]
Limicola falcinellus	Broad-billed Sandpiper	-	-	3	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Limosa lapponica	Bar-tailed Godwit	-	-	129	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	-	V	-	Species or species habitat may occur within area1
Limosa limosa	Black-tailed Godwit	-	-	51	Roosting known to occur within area[1]

Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	22	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Numenius minutus	Little curlew, Little Whimbrel	-	-	L	Roosting likely to occur within area[1]
Numenius phaeopus	Whimbrel	-	-	35	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Pandion haliaetus	Osprey	-	-	K	Species or species habitat known to occur within area[1]
Philomachus pugnax	Ruff (Reeve)	-	-	6	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Pluvialis fulva	Pacific Golden Plover	-	-	124	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Pluvialis squatarola	Grey Plover	-	-	3	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Thalasseus bergii	Greater Crested Tern	-	-	33	Recorded within 10km of the Site[2]
Tringa brevipes	Grey-tailed Tattler	-	-	4	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Tringa glareola	Wood Sandpiper	-	-	8	Recorded within 10km of the Site[2]
Tringa nebularia	Common Greenshank, Greenshank	-	-	343	Species or species habitat known to occur within area[1]; Recorded within 10km of the Site[2]
Tringa stagnatilis	Marsh Sandpiper, Little Greenshank	-	-	225	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Xenus cinereus	Terek Sandpiper	-	-	3	Roosting known to occur within area[1]; Recorded within 10km of the Site[2]
Listed Marine Species					
Birds					
Anous stolidus	Common Noddy	-	-	L	Species or species habitat likely to occur within area[1]
Apus pacificus	Fork-tailed Swift	-	-	3	Species or species habitat likely to occur within area[1]; Recorded within 10km of the Site[2]
Ardenna pacifica	Wedge-tailed Shearwater	-	-	1	Recorded within 10km of the Site[2]
Andenna grisea	Sooty Shearwater	-	-	L	Species or species habitat likely to occur within area[1]
Calonectris leucomelas	Streaked Shearwater	-	-	K	Species or species habitat known to occur within area[1]
Diomedea antipodensis	Antipodean Albatross	-	V	L	Foraging, feeding or related behaviour likely to occur within area[1]
Diomedea epomophora	Southern Royal Albatross	-	V	L	Foraging, feeding or related behaviour likely to occur within area[1]
Diomedea exulans	Wandering Albatross	-	V	L	Foraging, feeding or related behaviour likely to occur within area[1]

Diomedea sanfordi	Northern Royal Albatross	-	E	L	Species or species habitat may occur within area[1]
Fregata ariel	Lesser Frigatebird, Least Frigatebird	-	-	K	Species or species habitat known to occur within area[1]
Fregata minor	Great Frigatebird, Greater Frigatebird	-	-	1	Species or species habitat likely to occur within area[1]; Recorded within 10km of the Site[2]
Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel	-	E	-	Species or species habitat may occur within area[1]
Macronectes halli	Northern Giant Petrel	-	V	L	Foraging, feeding or related behaviour likely to occur within area[1]
Phaethon lepturus	White-tailed Tropicbird	-	-	M	Species or species habitat may occur within area[1]
Thalassarche bulleri	Buller's Albatross, Pacific Albatross	-	V	M	Species or species habitat may occur within area[1]
Thalassarche bulleri platei	Northern Buller's Albatross, Pacific Albatross	-	V	-	Species or species habitat may occur within area[1]
Thalassarche cauta	Shy Albatross	-	E	L	Foraging, feeding or related behaviour likely to occur within area[1]
Thalassarche eremita	Chatham Albatross	-	E	L	Foraging, feeding or related behaviour likely to occur within area[1]
Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross	-	V	M	Species or species habitat may occur within area[1]
Thalassarche melanophris	Black-browed Albatross	-	V	L	Foraging, feeding or related behaviour likely to occur within area[1]
Thalassarche salvini	Salvin's Albatross	-	V	L	Foraging, feeding or related behaviour likely to occur within area[1]
Thalassarche steadi	White-capped Albatross	-	V	K	Foraging, feeding or related behaviour known to occur within area[1]

Key:

V = Vulnerable
E = Endangered
M = Migratory
CE = Critically Endangered

K = Known where there are confirmed records, specimens or otherwise verified sightings in any CMA subregion overlapping the search area

L = Likely to occur in area

1 - Commonwealth Protected Matters Search Tool, Department of the Environment (Accessed 3-11-2022)

2 - *Atlas of NSW Wildlife*, Office of Environment and Heritage (Accessed 3-11-2022).

4.2 Flora Survey

4.2.1 Vegetation Mapping & Delineation

The vegetation was broadly compared to local Plant Community Types (PCT) by reviewing the NSW State Vegetation Type Map (DPIE 2022) which predicted the presence of *PCT 3083: Lower Hunter Tuckeroo Riparian Rainforest* and *PCT 4004: Northern Melaleuca quinquenervia Swamp Forest.*

Informed by the characteristics of these vegetation classes, following a detailed site walkover, during which the floristic composition and structure of vegetation communities present across the entire Study area were characterised, the vegetation was delineated into vegetation zones and mapped (refer to **Figure 3**). The vegetation observed was predominantly characterised as being heavily modified with a history of clearance, lacking a midstory and containing a understory dominated by exotic groundcover species. While the Study area contained few remnant canopy trees, due to highly modified condition of vegetation present, no vegetation communities were determined present within the site. Predicted PCTs as per the NSW State Vegetation Type Map (DPIE 2022) were used as a guide to determine whether planted vegetation within the Study area is considered native vegetation for the purpose of the BOS clearing threshold.

The study area is mapped as containing:

- VZ1 – Remnant Canopy;
- VZ2 – Native Planted Canopy;
- VZ3 – Endemic and Exotic Planted Canopy; and
- VZ4 – Managed Lawn

Floristic descriptions and calculations of the overall area for each vegetation zone within the development footprint are provided below (also refer to **Figure 3**).

Vegetation Zones

Native Vegetation	
VZ1_Remnant Canopy	
Floristic Description	This vegetation zone consisted of the few remnant canopy species that were observed on the Study area including a single *Eucalyptus robusta* (Swamp Mahogany) in the east section of the site, two individuals of *Eucalyptus saligna* (Sydney Blue Gum) in the west section, and a few individuals of *Eucalyptus tereticornis* (Forest Red Gum) within the north and east of the site. These three canopy species are associated with PCT 4004. Given the heavy disturbance, this vegetation zone lacked a midstory, and the groundcover was dominated exotic grasses and forbs. Despite the presence of the listed remnant canopy species, these individuals were highly fragmented across the manicured site and totalled to so few individuals that the vegetation could not be reasonably delineated into a PCT.
Area within study area	0.092 ha-

VZ2_Native Planted Canopy	
Floristic Description	This vegetation zone consisted of planted native canopy species that were associated with the local PCT. This included individuals of *Casuarina cunninghamiana* (River She-oak) and *Corymbia maculata* (Spotted Gum) which were associated with PCT 3083, and a single native planted individual of *Casuarina glauca* (Swamp She-oak). Similar to the previous vegetation zone, the heavy disturbance of the Study area has resulted in lack of a midstory, and a groundcover layer that is dominated exotic grasses and forbs.
Area within study area	0.008 ha

VZ3_Endemic & Exotic Planted Canopy	
Floristic Description	This vegetation zone consists of the other endemic planted canopy species observed within the Study area including *Angophora costata* (Sydney Red Gum), *Araucaria heterophylla* (Norfolk Pine), *Eucalyptus microcorys* (Tallowwood), *Eucalyptus scoparia* (Wallangarra white gum), *Grevillea robusta* (Silky Oak), *Lophostemon confertus* (Brushbox), *Syzygium australe* (Lilly Pilly), and *Xylomelum pyriforme* (Woody Pear). Several of these endemic planted species represent commonly planted landscape trees. In particular, *E. scoparia* is a listed engendered species under the BC Act, however, it represents a commonly grown ornamental tree, explaining its presence within the Study area. Species including *A. costata* and *E. microcorys* are indigenous to the locality, however, are not associated with predicted PCTs of which were likely present prior to landscape modification. Therefore, these species were not considered in the area of cleared native vegetation in regard to the BOS. Exotic planted canopy species were also grouped into this vegetation zone and was generally characterised by the dominance of *Jacaranda mimosifolia* (Jacaranda), with scatterings of *Pinus canariensis* (Canary Island Pine) and *Cinnamomum camphora* (Camphor laurel). Like the previous vegetation zones, this vegetation zone presented with no midstory and a groundcover layer that was dominated exotic grasses and forbs.
Area within study area	1.021 ha

VZ4_Managed Lawn	
Floristic Description	The last vegetation zone to be delineated for the Study area encompassed the managed lawns that were dominated by exotic *Poa annua* (Winter Grass), but other exotic grasses present included *Bromus cartharticus* (Prairie Grass), *Ehrharta erecta* (Panic Veldtgrass), *Festuca arundinacea* (Tall Fescue), and *Lolium perrenne* (Perennial Ryegrass). Co-occurring several exotic forbs species included Arctotheca calendula (Capeweed), Cirsium vulgare (Spear Thistle), Gamochaeta americana (Cudweed), *Senecio madagascariensis* (Madagascar ragwort), Soliva sessilis (Bindi Weed), *Stellaria media* (Chickweed), Dichondra repens, *Modiola caroliniana* (Red-flowered Mallow), *Plantago lanceolata* (Plantain), *Lysimachia arvensis* (Scarlet Pimpernel), and *Solanum nigrum* (Black-berry Nightshade). Floristic structure and composition described in this VZ is comparable to the vegetation of all vegetation zones.
Area within study area	3.096 ha
	

4.2.2 Significant Flora Survey and Random Meander

No formal threatened flora surveys were undertaken due to the highly disturbed nature of the study area, which consisted of exotic vegetation and native canopy with modified or disturbed understory. A random meander was undertaken over the entire Study area to survey for potential threatened flora habitat, and to aid the likelihood of occurrence test (**Table 3**). No flora species listed under the BC Act or EPBC Act were identified during these searches.

4.3 Fauna Survey

No fauna surveys were conducted on the site. A full list of the fauna species recorded incidentally within the site is provided as **Appendix 3**.

4.3.1 Mammals

Arboreal

No arboreal mammal species were recorded within the site.

Terrestrial

Oryctolagus cuniculus (Rabbit) was observed during the site inspection.

4.3.2 Avifauna

Species common to open, disturbed landscapes and residential areas were observed during the site inspection. Species observed include *Acridotheres tristis* (Common Myna), *Columba livia* (Rock dove), *Eolophus roseicapilla* (Galah), *Falco cenchroides cenchroides* (Nankeen Kestrel), *Grallina cyanoleuca* (Magpie-Lark), *Gymnorhina tibicen* (Australian Magpie), *Malurus cyaneus* (Superb Fairywren), *Manorina melanocephala* (Noisy Miner), *Ocyphaps lophotes* (Crested Pigeon*), Pelecanus conspicillatus* (Australian Pelican), *Platycercus eximius* (Eastern Rosella), *Psephotus haematonotus* (Willie wagtail), *Threskiornis moluccus* (Australian White Ibis), *Trichoglossus haematodus* (Rainbow Lorikeet), and *Vanellus miles* (Masked Lapwings).

4.3.3 Herpetofauna

No herpetofauna were observed or heard during the site inspection.

4.4 Habitat Survey

The proposed lots cover approximately 9.15 ha, however much current condition of the study area consists primarily of managed lawns dominated exotic grasses and forbs with endemic and exotic planted vegetation exotic and a lack of a midstory layer. Moreover, the native vegetation present within the upper canopy stratum is highly fragmented across the study area. Native vegetation to be impacted through the proposal is present in form of remnant and planted native canopy species. This vegetation provides marginal foraging opportunities for native fauna and little to no suitable habitat features such as hollows were observed during the site inspection.

Connectivity

The study area is highly modified offering little connectivity across the landscape. Although canopy species are present across the study area, the mid stratum was not present and the groundcover was dominated by exotic species, further eliminating any connectivity within the site. Overall, the study area has limited connectivity within the broader landscape. For instance, abutting the site boundary to the south-east is the Pacific Highway, while along the westernmost boundary is a zoned Public Recreation (RE1) area encompassing a modified rural landscape. Along the southwestern boundary are large lot residential (R5) homes. The lack of connectivity reduces the sites viability to support local species as potential habitat. While the proposal will impact several the canopy present on site, the proposed development will not create new points of fragmentation within the broader landscape.

HUNTER RIVER HIGH SCHOOL,
HEATHERBRAE

FIGURE 3:
VEGETATION MAP

Legend

- Site Boundary
- Cadastral Boundary
- Impact Footprint

Vegetation Zones

- Buildings
- VZ1 - Remnant Canopy
- VZ2 - Native Planted Canopy
- VZ3 - Endemic & Exotic Planted Canopy
- VZ4 - Managed Lawn

N
W E
S

0 25 50 75 100

Metres

1:1650

MJD Environmental

Aerial: Nearmap (2022) | Data: MJD Environmental, NSW Spatial Services, Terras (2022) | Datum/Projection: GDA94 / MGA zone 56 | Date: 12/04/2023 | Version: 2 | HS & Irrawang HS\QGZ\HRHS | This plan should not be relied upon for critical design dimension.

5 Impact Assessment

The following section provides an overview of the potential direct, indirect and cumulative impacts associated with the proposal. This overview has been used to inform a likelihood of occurrence and potential for impacts to occur to threatened species, populations and ecological communities. In such instances, this has determined the need for further assessment of significance (5-part test).

5.1 Potential Impacts

Based on the ecological survey results over the site, the following direct and indirect impacts have been generated to inform impact assessment over the subject land.

Direct Impacts

The ecological field assessment found that the proposal will remove/modify up to:

- 0.092 ha of Native Remnant Canopy
- 0.008 ha of Native Planted Canopy
- 1.021 ha of Endemic & Exotic Planted Canopy
- 3.096 ha of Managed Lawn - Exotic dominated.

Flora

No threatened flora species or potential habitat was identified within the subject land.

Fauna

No suitable habitat for threatened fauna was identified within the subject land.

Indirect Impacts

The proposal may have the following indirect impacts associated with the proposed residential development:

- Introduction and/or dispersal of existing exotic flora species;
- Potential for increased sediment flows during construction in the absence of erosion and nutrient control devices being installed to industry best practice and maintained for the duration of construction / soil stabilisation works.

Mitigation measures have been recommended in **Section 6** to ameliorate these indirect impacts.

5.2 Threatened Species & Communities Likelihood of Occurrence Assessment

Threatened flora and fauna species (listed under the BC Act and/or EPBC Act) that have been gazetted and recorded within a 10 km radius of the site have been considered within the assessment contained in **Table 3**. Each species / community is considered for its likelihood to occur on the site and potential for impact arising from the proposal. Where a potential for impact is considered, the entity has been nominated for further assessment under the BC act with a Test of Significance (ToS) in **Appendix 4**, or under the EBPC Act with a EPBC Act Test of Significance in **Appendix 5**.

'**Species / Community**' – Lists each threatened species / EEC known from the locality (10 km radius). The status and number of records along with source and notes for each threatened entity under the BC Act and the EPBC Act are also provided.

'**Habitat / Species Descriptions**' – for up-to-date threatened species profiles including habitat descriptions and other key ecological information reference is made to the following online resources:

NSW OEH Threatened Species Profile Search -
http://www.environment.nsw.gov.au/threatenedSpeciesApp/

Commonwealth Biodiversity: Species Profile and Threats Database (SPRAT) -
http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

'**Likelihood of Occurrence on Site**' – Assesses the likelihood of each locally recorded species and EEC to occur within the site, using knowledge of each species' habitat and lifecycle requirements and with regard the habitat types present within the site, results of the literature review and database searches and field investigations. The location and number of records of the species (OEH Atlas of NSW Wildlife) were also considered in determining probability of occurrence.

'**Potential for Impact**' – Assesses the likelihood of impacts to each species / community that would result from the proposed development, taking into account direct and indirect short and long-term impacts.

Database searches were conducted of the NSW Wildlife Atlas (03-11-2022) and Commonwealth Protected Matters Tool (03-11-2022).

Note: marine species (bird, reptile, fish, mammal) recorded on the Protected Matters search have not been listed or assessed herewith.

Table 3 Likelihood of Occurrence and Impact Assessment

Scientific Name	Common Name	BC Act	EPBC Act	No. of Records	Habitat Description	Likelihood of Occurrence	Potential Impacts	ToS Required
Threatened Ecological Communities								
Central Hunter Valley eucalypt forest and woodland		-	CE	L	The Central Hunter Valley eucalypt forest and woodland ecological community generally occurs on soils derived from the Permian sedimentary bedrock found on the valley floors and on lower hillslopes and low ridges.	Low. Not recorded in study area.	Low	No
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community		-	E	L	The ecological community occurs in sub-tropical, sub-humid and temperate climatic zones from Curtis Island, north of Gladstone, in Queensland to Bermagui in southern New South Wales. The ecological community occurs in coastal catchments, mostly at elevations of less than 20 m above sea-level (ASL) that are typically found within 30 km of the coast. However, this distance varies by catchment	Low. Not recorded in study area.	Low	No
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland		-	E	L	The ecological community is associated with forested palustrine wetlands, or swamp forests, found in the temperate to subtropical coastal valleys of Australia's east coast, and occurs between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of New South Wales.	Low. Not recorded in study area.	Low	No
Lowland Rainforest of Subtropical Australia		-	CE	L	The ecological community primarily occurs from Maryborough in Queensland to the Clarence River (near Grafton) in New South Wales (NSW). The ecological community also includes isolated areas between the Clarence River and Hunter River such as the Bellinger and Hastings valleys. The ecological community occurs in the following Interim Biogeographic Regionalisation for Australia Version 6.1 (IBRA) Bioregions: South Eastern Queensland Bioregion and NSW North Coast Bioregion. The ecological community occurs on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on enriched rhyolitic soils and basaltically enriched	Low. Not recorded in study area.	Low	No

				metasediments. Lowland Rainforest mostly occurs in areas <300 m above sea level. Aspect can result in the ecological community being found at >300 m altitude on north-facing slopes, but typically 300 m defines the extent of the lowlands. In addition, Lowland Rainforest typically occurs in areas with high annual rainfall (>1300 mm).			
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	-	CE	L	The River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria is found in the South East Corner (SEC) and Sydney Basin (SYB) IBRA bioregions. This encompasses the area from around Sale on the south-east coast of Victoria to around Raymond Terrace, just north of Newcastle on the New South Wales east coast.	Low. Not recorded in study area.	Low	No
Subtropical and Temperate Coastal Saltmarsh	-	V	L	This EEC occurs within a relatively narrow margin of the Australian coastline, within the subtropical and temperate climatic zones south of the South-east Queensland IBRA bioregion boundary at 23° 37' latitude along the east coast and south of (and including) Shark Bay at 26° on the west coast. It is typically restricted to the upper intertidal environment, occurring in areas within the astronomical tidal limit, often between the elevation of the mean high tide and the mean spring tide. Associated sediments generally consist of poorly-sorted anoxic sandy silts and clays, and may have salinity levels that are much higher than seawater due to evaporation.	Low. Not recorded in study area.	Low	No
Subtropical eucalypt floodplain forest and woodland of the New South Wales Coast and South East Queensland bioregions	E	E	L	Largely restricted to coastal sands on the Umina, Woy Woy and Ettalong Sandplain, a beach ridge system within the Gosford local government area. Including ecotonal areas, less than 10% (being less than 10 hectares) of the community's estimated original cover of about 80 hectares remains. This comprises four main remnants at Umina, while a few smaller remnant patches and scattered trees around Pearl Beach and Patonga and elsewhere on the 'Peninsula' indicate its former distribution. Occurs on sandy soils (iron podzols) of the Woy Woy Soil Landscape which are distinguished from the humus podsols generally associated with foothill talus slopes further away from the coast on which *Angophora costata* predominates.	Low. Not recorded in study area.	Low	No

Flora								
Angophora inopina	Charmhaven Apple	-	V	-	Endemic to the Central Coast region of NSW. Is lignotuberous, allowing vegetative growth to occur following disturbance. However, such vegetative reproduction may suppress the production of fruits/seeds, necessary for the recruitment of new individuals to a population, and the time between such disturbance and the onset of sexual reproduction is not known. Occurs most frequently in four main vegetation communities: (i) *Eucalyptus haemastoma–Corymbia gummifera–Angophora inopina* woodland/forest; (ii) *Hakea teretifolia–Banksia oblongifolia* wet heath; (iii) *Eucalyptus resinifera–Melaleuca sieberi–Angophora inopin*a sedge woodland; (iv) *Eucalyptus capitellata–Corymbia gummifera–Angophora inopina* woodland/forest.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. The species is unlikely to occur within the study area and therefore no further assessment is required.	Low	No
Arthraxon hispidus	Hairy-joint Grass	-	V	-	Occurs over a wide area in south-east Queensland, and on the northern tablelands and north coast of NSW, but is never common. Moisture and shade-loving grass, found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the study area and therefore no further assessment is required.	Low	No
Asperula asthenes	Trailing Woodruff	-	V	K	The trailing woodruff occurs only in NSW. It is found in scattered locations from Bulahdelah north to near Kempsey, with several records from the Port Stephens/Wallis Lakes area. Occurs in damp sites, often along river banks.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs	-	V	-	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Callistemon linearifolius	Netted Bottle Brush	V	-	252	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of	Low. 270 number of individuals are listed in OEH Bionet records within	Low	No

					NSW. Recorded in 2000 at Coalcliff in the northern Illawarra. Grows in dry sclerophyll forest on the coast and adjacent ranges.	a 10 km radius of the Study area boundary, however, all the records, barring two, are in an area 9-10km from the site which consists of more intact vegetation at Black Hill. There is no appropriate habitat present within the Study area given the high level of modification and disturbance.		
Commersonia prostrata	Dwarf Kerrawang	-	E	K	Dwarf Kerrawang occurs on the Southern Highlands and Southern Tablelands, a larger population in the Thirlmere Lakes area and on the North Coast. Occurs on sandy, sometimes peaty soils in a wide variety of habitats. Associated native species may include *Imperata cylindrica, Empodisma minus* and *Leptospermum continentale.*	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Cryptostylis hunteriana	Leafless Tongue-orchid	-	V	L	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid *(C. subulata*) and the Tartan Tongue Orchid (*C. erecta*).	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Cynanchum elegans	White-flowered Wax Plant	E	E	2	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The species has been recorded as far west as Merriwa in the upper Hunter River valley. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest.	Low. Two individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 7 km south-west. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No

Dichanthium setosum	Bluegrass	-	V	L	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched).	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Dillwynia tenuifolia		E	-	1	Dillwynia tenuifolia has its core distribution in the Cumberland Plain from Windsor and Penrith east to Dean Park near Colebee. In western Sydney, may be locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. At Yengo, is reported to occur in disturbed escarpment woodland on Narrabeen sandstone.	Low. One individual is listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 10 km west. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Diuris praecox	Newcastle Doubletail	V	V	L	The Rough Doubletail is known from between Bateau Bay and Smiths Lake. Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Eucalyptus camaldulensis	*Eucalyptus camaldulensis* population in the Hunter catchment	E	-	2	The population of River Red Gum in the Hunter is unique in NSW being the only one to occur in a coastal catchment. It is disjunct and at the limit of range of the species, it may be genetically distinct, and is of conservation significance as the community dominant in distinct riparian and floodplain vegetation types.	Low. One individual is listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 10 km west. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is	Low	No

					The Hunter population occurs from the west at Bylong, south of Merriwa, to the east at Hinton, on the bank of the Hunter River, in the Port Stephens local government area. It has been recorded in the local government areas of Lithgow, Maitland, Mid-Western Regional, Muswellbrook, Port Stephens, Singleton and Upper Hunter.	unlikely to occur within the Study area and therefore no further assessment is required.		
Eucalyptus camfieldii	Camfield's Stringybark	V	V	K	Restricted distribution in a narrow band with the most northerly records in the Raymond Terrace area south to Waterfall. Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park. Occurs mostly in small scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas. Associated species frequently include stunted species of *E. oblonga* Narrow-leaved Stringybark, *E. capitellata* Brown Stringybark and *E. haemastoma* Scribbly Gum.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Eucalyptus glaucina	Slaty Red Gum	-	V	-	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Eucalyptus parramattensis subsp. decadens	Earp's Gum, Earp's Dirty Gum	-	V	1	There are two separate meta-populations *of E. parramattensis subsp. decadens*. The Kurri Kurri meta-population is bordered by Cessnock—Kurri Kurri in the north and Mulbring—Abedare in the south. Large aggregations of the subspecies are located in the Tomalpin area. The Tomago Sandbeds meta-population is bounded by Salt Ash and Tanilba Bay in the north and Williamtown and Tomago in the south. Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with	Low. A OEH Bionet record indicates the presence of this species within a 10 km radius of the Study area boundary approx. 4.5 km south. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No

					dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.			
Euphrasia arguta		-	CE	-	The current known populations are located in the Nundle State Forest in eucalypt forest with a mixed grass and shrub understorey (D Binns pers. comm. February 2009). This area is located at the junction of the New England Tableland, NSW North Coast, and Nandewar Bioregions. here are no known occurrences of *Euphrasia arguta* in a conservation reserve. The majority of *E. arguta* plants are located in Nundle State Forest. A small part of the largest population of *E. arguta* is located on private land that is adjacent to the State Forest. The land is currently used for rough grazing by sheep or cattle.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	2	Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. In Sydney it has been recorded from Shale Sandstone Transition Forest and in the Hunter in Kurri Sand Swamp Woodland. however, other communities occupied include *Corymbia maculata* - *Angophora costata* open forest in the Dooralong area, in Sydney Sandstone Ridgetop Woodland at Wedderburn and in Cooks River / Castlereagh Ironbark Forest at Kemps Creek.	Low. One individual is listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 4.5 km south. No associated vegetation community present within the Study area. Although *Grevillea robusta* was observed on the site, *G. parviflora* is unlikely to occur within the Study area due to the heavy modification of the vegetation and therefore no further assessment is required.	Low	No
Melaleuca biconvexa	Biconvex Paperbark	-	V	-	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Maundia triglochinoides		V	-	4	The Maundia triglochinoides is restricted to coastal NSW and extending into southern Queensland. The current southern limit is Wyong; former sites around Sydney are	Low. 500 individual are listed in OEH Bionet records within a 10 km radius of the Study area boundary.	Low	No

					now extinct. Grows in swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients. Associated with wetland species e.g. Triglochin procerum.	No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Persicaria elatior	Knotweed, Tall Knotweed	-	V	-	In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). The species also occurs in Queensland. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. While the site possesses areas with depressions that contained water at the time of site inspections, no Persicaria species were observed within the site. Owing to the lack of OEH records and associated vegetation. No further assessment is needed.	Low	No
Pomaderris brunnea	Rufous Pomaderris, Brown Pomaderris	-	V	-	Brown Pomaderris is found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. The species has been found in association with Eucalyptus amplifolia, Angophora floribunda, Acacia parramattensis, Bursaria spinosa and Kunzea ambigua.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Prasophyllum sp. Wybong (C.Phelps ORG 5269)	a leek-orchid	-	CE	-	*Prasophyllum sp. Wybong* (C. Phelps ORG 5269) is a terrestrial orchid known from seven populations in open eucalypt woodland and grassland in New South Wales. The species' area of occupancy is estimated to be 1.5 km2 with an estimated population size based on surveys in 2006 of 460 mature individuals	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No

Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	-	E	-	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). It is apparently extinct in western Sydney which is the area where it was first collected (1803). All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by Forest Red Gum *Eucalyptus tereticornis*, Woollybutt *E. longifolia* and White Feather Honey-myrtle *Melaleuca decora*. Near Nowra, the species grows in an open forest of Spotted Gum *Corymbia maculata*, Forest Red Gum and Grey Ironbark *E. paniculata*. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark E*. crebra*, Forest Red Gum and Black Cypress Pine *Callitris endlicheri*. The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place). As with many other greenhoods, male fungus gnats are believed to be the pollinator. The Illawarra Greenhood can survive occasional burning and grazing because of its capacity to reshoot from an underground tuber.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. Although there are some associated canopy species located within the Study area, it lacks the associated vegetation formation and is subjected to sustained disturbance. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Rhizanthella slateri	Eastern Underground Orchid	-	E	-	The Eastern Underground Orchid occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Rhodamnia rubescens	Scrub Turpentine	CE	CE	2	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present	Low	No

					regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Rhodomyrtus psidioides	Native Guava	-	CE	L	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Rutidosis heterogama	Heath Wrinklewort	-	V	L	On the Central Coast it is located north from Wyong to Newcastle. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Syzygium paniculatum	Magenta Lilly Pilly	E	V	K	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Tetratheca juncea	Black-eyed Susan	V	V	1	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover.	Low. Two individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 10 km south-west. No associated vegetation community present within the Study area. There	Low	No

					However, it has also been recorded in heathland and moist forest. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. While some studies show the species has a preference for cooler southerly aspects, it has been found on slopes with a variety of aspects. It generally prefers well-drained sites below 200m elevation and annual rainfall between 1000 - 1200mm. The preferred substrates are sandy skeletal soil on sandstone, sandy-loam soils, low nutrients; and clayey soil from conglomerates, pH neutral.	is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Thesium australe	Austral Toadflax, Toadflax	-	V	-	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Zannichellia palustris		E	-	19	A submerged aquatic plant. In NSW, known from the lower Hunter and in Sydney Olympic Park. Grows in fresh or slightly saline stationary or slowly flowing water. Flowers during warmer months. NSW populations behave as annuals, dying back completely every summer.	Low. No individuals listed in the OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Birds								
Anseranas semipalmata	Magpie Goose	V	-	63	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	Low. 937 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 6-10 km south of the Study area. No associated vegetation community present within the Study area. There is no appropriate foraging or nesting	Low	No

						habitat present within the Study area.		
Anthochaera phrygia	Regent Honeyeater	CE	CE	K	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Range is between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	1	The Dusky Woodswallow is a woodland dependant bird. It is found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests. Common habitat requirements are an open understorey with sparse eucalypt saplings, acacias and other shrubs, including heath. The ground cover may consist of grasses, sedges or open ground, often with coarse woody debris. Birds are also often observed in farm land, road sides and golf courses, usually at the edges of forest or woodland or wind breaks with dead timber.	Low. One individual is listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 4 km south-west. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Botaurus poiciloptilus	Australasian Bittern	-	E	32	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha spp*.) and spikerushes (*Eleocharis spp*.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	Low. 25 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 7.5-10 km south of the Study area. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study	Low	No

						area and therefore no further assessment is required.		
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	1	The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	Low. Eight individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 10 km west. No associated vegetation community present within the Study area. No appropriate habitat hollow bearing trees were observed within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	7	The Glossy Black-Cockatoo is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuaraina diminuta*, *and A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah *(Casuarina cristata).* Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	Low. Nine individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although Casuarina species are present within the Study area, there are only three individuals, which are unlikely to sustain this species. Additionally, there is no appropriate nesting habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No

Chthonicola sagittata	Speckled Warbler	V	-	2	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	Low. Two individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Circus assimilis	Spotted Harrier	V	-	23	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Low. 13 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Daphoenositta chrysoptera	Varied Sittella	V	-	33	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low. 73 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	171	In Australia, Black-necked Storks are widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland, well away from breeding areas). In NSW, the species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Floodplain wetlands (swamps, billabongs,	Low. 198 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. Although the floodplain of the Hunter River abuts the south-west	Low	No

					watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish).	boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Epthianura albifrons	White-fronted Chat	V	-	574	The distribution of the White-fronted Chat extends across the southern half of Australia, from the southernmost areas of Queensland to southern Tasmania and across to Western Australia as far north as Carnarvon (Barrett et al. 2003). Found mostly in temperate to arid climates and very rarely seen in sub-tropical areas, the White-fronted Chat occupies foothills and lowlands below 1000 m above sea level (North 1904; Higgins et al. 2001; Barrett et al. 2003). In New South Wales the White-fronted Chat occurs mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state (Higgins et al. 2001). Along the coastline, White-fronted Chats are found predominantly in saltmarsh vegetation although they are also observed in open grasslands and sometimes in low shrubs bordering wetland areas. These birds are unlikely to fly over urbanised areas.	Low. 1923 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 6-10 km south of the Study area. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Erythrotriorchis radiatus	Red Goshawk	-	V	-	The Red Goshawk occurs from the north-west to north-east coast of Australia. The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. In NSW favoured habitat is mixed subtropical rainforest and Melaleuca forest along coastal rivers, often in rugged terrain.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Falco hypoleucos	Grey Falcon	-	V	-	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated	Low	No

					restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	vegetation community present within the Study area. Although the Hunter River and its associated floodplain area is within proximity of the south-west site boundary, it significantly lacks a vegetated riparian corridor, therefore, the species is unlikely to occur within the Study area and no further assessment is required.		
Falco subniger	Black Falcon	V	-	14	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres. Populations are likely to occur in most substantial reserve of flat, open habitats in the arid and semi-arid zones, particularly those with riparian habitats. The Black Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded (eucalypt dominated) watercourses; it also uses agricultural land with scattered remnant trees. The Falcon is often associated with streams or wetlands, visiting them in search of prey. It uses standing dead trees as lookout posts.	Low. 11 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 7-10 km south of the Study area. No associated vegetation community present within the Study area. Although the Hunter River and its associated floodplain area is within proximity of the south-west site boundary, it significantly lacks a vegetated riparian corridor, therefore, the species is unlikely to occur within the Study area and no further assessment is required.	Low	No
Gallinago hardwickii	Latham's Snipe	-	-	102	Latham's Snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia. The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. The structure and composition of the vegetation that occurs around these wetlands is not	Low. 318 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No

					important in determining the suitability of habitat (Naarding 1983).			
Gelochelidon nilotica	Gull-billed Tern	-	C	6	Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean.	Low. 29 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 7-10 km south of the Study area. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Glareola maldivarum	Oriental Pratincole	-	-	6	Within Australia the Oriental Pratincole is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in Western Australia, the Top End of the Northern Territory, and parts of the Gulf of Carpentaria. It is also widespread but scattered inland, mostly north of 20° S. There are occasional records in southern Australia, at sparsely scattered sites, with records in all states, including an unconfirmed report in Tasmania. The species has also been recorded on various outlying islands, including Lord Howe Island, and, in the Indian Ocean, Christmas Island and Cocos-Keeling Islands	Low. 5 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Glossopsitta pusilla	Little Lorikeet	V	-	21	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open Eucalyptus Forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	Moderate.166 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Suitable foraging and breeding habitat on Study area is limited due to low number of canopy species and no hollows. Species was not observed during site assessment however due to the generalist and mobile nature of the species further assessment required.	Moderate	Yes
Grantiella picta	Painted Honeyeater	-	V	L	The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great	Low. No OEH Bionet records exist within a 10 km radius of the Study	Low	No

					Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.		
Haematopus longirostris	Pied Oystercatcher	E	-	7	The Pied Oystercatcher is distributed around the entire Australian coastline, with only small population across the NSW coast. Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.	Low. 10 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	473	The White-bellied Sea-Eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea and sewage ponds). Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land.	Moderate. 347 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No records within the site however, within the territorial range of several records along the river to the west. One record is recorded on the northwest boundary of the site. The riparian area 6-10 km south of site would represent more suitable habitat, while nesting habitat within the site is limited and foraging habitat is absent due to the lack of open water. Stick nests were not observed during the site assessment. The species is unlikely to nest within the Study area and no further assessment is required.	Moderate	No
Hieraaetus morphnoides	Little Eagle	V	-	14	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior	Moderate. 7 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No records within the site however, within the territorial range the records to the south. Suitable	Moderate	No

					NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter	habitat for nesting is limited and foraging habitat is absent due to the lack of open water. Stick nests were not observed during the site assessment. The species is unlikely to nest within the Study area and no further assessment is required.		
Hydroprogne caspia	Caspian Tern	-	-	130	Within Australia, the Caspian Tern has a widespread occurrence and can be found in both coastal and inland habitat (Higgins & Davies 1996). Widespread east of the Great Divide, mainly in coastal regions, and also in the Riverina and Lower and Upper Western Regions, with occasional records elsewhere	Low. 187 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Irediparra gallinacea	Comb-crested Jacana	V	-	2	The Comb-crested Jacana occurs on freshwater wetlands in northern and eastern Australia, mainly in coastal and subcoastal regions, from Cape York to the Hunter region. Inhabit permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies, or fringing and aquatic vegetation.	Low. Four individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Lathamus discolor	Swift Parrot	E	CE	3	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta,* Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. Return to some foraging sites on a cyclic basis depending on food availability. Following winter	Moderate. 80 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Study area is not mapped on the OEH Important area mapping for the species. A single favoured feed tree species *Eucalyptus robusta* is present within the site. The site may serve as foraging habitat for the species; however due to the size of potential foraging habitat this is unlikely. There is no other appropriate habitat present within the Study area, therefore no further assessment is required.	Moderate	No

					they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *Eucalyptus globulus*.			
Lophoictinia isura	Square-tailed Kite	V	-	6	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland.	Low. Two individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	2	The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially *Eucalyptus sideroxylon* (Mugga Ironbark), *E. albens* (White Box), *E. microcarpa* (Inland Grey Box), *E. melliodora* (Yellow Box), *E. blakelyi* (Blakely's Red Gum) and *E. tereticornis* (Forest Red Gum). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees	Low. No individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Some *E. tereticornis* was present on the site, however, the canopy is too highly fragmented to provide suitable habitat. There is no other appropriate habitat present within the Study area, therefore no further assessment is required.	Low	No
Neophema pulchella	Turquoise Parrot	V	-	3	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Low. Eight individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate	Low	No

						habitat present within the Study area.		
Ninox strenua	Powerful Owl	V	-	6	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the eastern side of the Great Dividing Range, from south-eastern Queensland to Victoria. The Powerful Owl is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. Needs old growth trees to nest.	Low. Three individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Some older remnant trees present within the Study area, however, lack of intact bushland within the surrounding area There is no suitable breeding habitat (large hollows) on Study area.	Low	No
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	65	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states and rarely inland. The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	Low. 369 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Oxyura australis	Blue-billed Duck	V	-	4	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached.	Low. 11 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Pachyptila turtur subantarctica	Fairy Prion (southern)	-	V	K	Fairy Prions (including other subspecies) are often beachcast on the south-eastern coast of Australia (including the entirety of NSW coastline), and are commonly seen offshore over the continental shelf and over pelagic waters. The southern subspecies of the	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no	Low	No

					Fairy Prion is a marine bird, found mostly in temperate and subantarctic seas.	appropriate habitat present within the Study area.		
Pandion cristatus	Eastern Osprey	V	-	43	Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs, with a few records from inland NSW. Favour coastal areas, especially the mouths of large rivers, lagoons and lakes.	Low. 21 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the hunter river occurs to the south-west of the site boundary, there is no associated vegetation community present within the Study area that would be utilised by this species. There is no appropriate habitat present within the Study area.	Low	No
Petroica boodang	Scarlet Robin	V	-	1	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.	Low. Six individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Petroica phoenicea	Flame Robin	V	-	-	The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to	Low. One individual listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community	Low	No

					the inland slopes and plains. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herb fields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas.	present within the Study area. There is no appropriate habitat present within the Study area.		
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	74	The eastern subspecies (temporalis occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	Low. 189 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Ptilinopus magnificus	Wompoo Fruit-Dove	V	-	1	Occurs along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula. It is rare south of Coffs Harbour. Three subspecies are recognised, with the most southerly in NSW and south-eastern Queensland. It used to occur in the Illawarra, though there are no recent records. Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests.	Low. No individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Ptilinopus regina	Rose-crowned Fruit-Dove	V	-	1	Coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Vagrants are occasionally found further south to Victoria. Rose-crowned Fruit-doves occur	Low. No individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary.	Low	No

					mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful.	No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.		
Ptilinopus superbus	Superb Fruit-Dove	V	-	1	The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic.	Low. No individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Pycnoptilus floccosus	Pilotbird	-	V	-	Pilotbirds are endemic to south-east Australia. Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the Australian Capital Territory, and in the Snowy Mountains in New South Wales and north-east Victoria, where Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Rostratula australis	Australian Painted Snipe	-	E	10	Most records of the Australian Painted Snipe are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	Low. 21 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Sterna hirundo	Common Tern	-	-	33	The Common Tern is mainly coastal when not breeding and found in offshore waters, ocean beaches, estuaries and large lakes. Common Terns are occasionally seen in freshwater swamps, floodwaters, sewage farms and brackish and saline lakes.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no	Low	No

						appropriate habitat present within the Study area.		
Sternula albifrons	Little Tern	E	-	20	Little Tern is found on the north, east and south-east Australian coasts. In NSW, it arrives from September to November, occurring mainly north of Sydney. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months. Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.	Low. 75 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Sternula nereis nereis	Australian Fairy Tern	-	V	L	Within Australia, the Fairy Tern occurs along the coasts of Victoria, Tasmania, South Australia and Western Australia; occurring as far north as the Dampier Archipelago near Karratha. The subspecies has been known from New South Wales (NSW) in the past, but it is unknown if it persists there.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Stictonetta naevosa	Freckled Duck	V	-	6	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	Low. 19 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Tyto longimembris	Eastern Grass Owl	V	-	9	Eastern Grass Owls have been recorded occasionally in all mainland states of Australia but are most common in northern and north-eastern Australia. In NSW they are more likely to be resident in the north-east. Eastern Grass	Low. Four individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation	Low	No

					Owl numbers can fluctuate greatly, increasing especially during rodent plagues. Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains.	community present within the Study area. There is no appropriate habitat present within the Study area.		
Tyto novaehollandiae	Masked Owl	V	-	4	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Low. Three OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no suitable breeding habitat (large hollows) on Study area. The species was not observed during nocturnal surveys.	Low	No
Mammals								
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	-	V	K	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Dasyurus maculatus	Spotted-tailed Quoll	V	E	3	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.	Low. three individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary approx. 5 km north. No associated vegetation community present within the Study area. No appropriate habitat hollow bearing trees were observed within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	18	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with	Low. OEH Bionet records associated with this species indicate	Low	No

					trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	is presence within a 10 km radius of the Study area boundary. The site is highly fragmented and lacks potential breeding habitat (structures, culverts, caves). Species unlikely to occur on site. No further assessment is required.		
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	143	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	Low. 432 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary, primarily 6-10 km to the west and south. The site is highly fragmented and lacks potential breeding habitat (structures, culverts, caves). Species unlikely to occur on site. No further assessment is required.	Low	No
Miniopterus australis	Little Bent-winged Bat	V	-	72	East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Low. 134 OEH Bionet records exist within a 10 km radius of the Study area boundary, primarily 4-10 km to the south along riparian areas. The site is highly fragmented and lacks potential breeding habitat (structures, culverts, caves). Species unlikely to occur on site. No further assessment is required.	Low	No
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	46	Large Bent-winged Bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Low. 5 OEH Bionet records exist within a 10 km radius of the Study area boundary, primarily 6-10 km to the west and south. The site is highly fragmented and lacks potential breeding habitat (structures, culverts, caves). Species unlikely to occur on site. No further assessment is required.	Low	No

Myotis macropus	Southern Myotis	V	-	48	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 – 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Low. 94 OEH Bionet records exist within a 10 km radius of the Study area boundary, primarily 6-10 km to the west and south. The site is highly fragmented and lacks potential breeding habitat (structures, culverts, caves). Species unlikely to occur on site. No further assessment is required.	Low	No
Notamacropus parma	Parma Wallaby	-	V	-	The species once occurred in north-eastern NSW from the Queensland boarder to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino. Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. During the day they shelter in dense cover.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	1	Overall, the distribution of the Corben's Long-eared Bat coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, Buloke *Allocasuarina luehmannii* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Low. No individuals listed in the OEH Bionet records within a 10 km radius of the Study area boundary. The record was located an urban area 3.5 km north of the Study area. Associated species are limited within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Petauroides volans	Greater Glider	-	E	L	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Roosts in tree hollows and is more common in areas abundant in tree hollows.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No

Petaurus australis australis	Yellow-bellied Glider (south-eastern)	-	V	L	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No
Petaurus norfolcensis	Squirrel Glider	V	-	22	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	Low. 22 OEH Bionet records exist within a 10 km radius of the Study area boundary, primarily in a wooded area 8 km west. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. No further assessment required.	Low	No
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	7	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Females are territorial over a 20-40 ha range. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.	Low. seven individuals listed in the OEH Bionet records within a 10 km radius of the Study area boundary. The records were located an semi-wooded area 8.5 km North of the Study area. Associated species are limited within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Phascolarctos cinereus	Koala	E	E	1018	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests.	Low. 976 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records are historical and likely represent sightings prior to the development of the woodlands north of the Study area. Limited associated vegetation present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	Yes

Potorous tridactylus	Long-nosed Potoroo	V	V	K	The long-nosed potoroo is found on the south-eastern coast of Australia, from Queensland to eastern Victoria and Tasmania, including some of the Bass Strait islands. There are geographically isolated populations in western Victoria. In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Pseudomys novaehollandiae	New Holland Mouse	-	V	1	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, NSW and Queensland. The species is now largely restricted to the coast of central and northern NSW, with one inland occurrence near Parkes. The New Holland Mouse has been found from coastal areas and up to 100 km inland on sandstone country. The species has been recorded from sea level up to around 900 m above sea level. Soil type may be an important indicator of suitability of habitat for the New Holland Mouse, with deeper top soils and softer substrates being preferred for digging burrows (Wilson & Laidlaw 2003). In Victoria, the species has been recorded on deep siliceous podsols, sandy clay, loamy sands, sand dunes and coastal dunes. Due to the largely granivorous diet of the species, sites where the New Holland Mouse is found are often high in floristic diversity, especially leguminous perennials. The mouse is known to inhabit open heathland, open woodland with a heathland understorey and vegetated sand dunes.	Low. One individual listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	101	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Moderate. 142 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No roosting camps present on site, however, the closest *P. poliocephalus* breeding camp is 3 km north of the site within Raymond Terrace. Foraging habitat is marginal due to the size of the	Moderate	Yes

						suitable vegetation present on site. Species was not observed during site assessment however due to the generalist and mobile nature of the species further assessment required.		
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	10	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Low. Two individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Despite the generalist and mobile nature of the species, suitable habitat is marginal on site, with poor foraging habitat due to the modified fragmented vegetation. Moreover, breeding habitat in the form of hollows is absent, with any rabbit warrens unlikely to be utilised given the heavy disturbance that the site experiences in the form or mowing.	Low	No
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	33	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m. Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 – 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.	Low. Only one individual is listed in OEH Bionet records within a 10 km radius of the Study area boundary. However, there is no suitable habitat on Study area. Species was not observed during nocturnal surveys. Species unlikely to occur on site. No further assessment required.	Low	No
Vespadelus troughtoni	Eastern Cave Bat	V	-	1	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to	Low. No individuals listed in OEH Bionet records within a 10 km radius	Low	No

					Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally found along cliff-lines in wet eucalypt forest and rainforest.	of the Study area boundary. No associated vegetation community present within the Study area. The site is highly fragmented and lacks potential breeding habitat (structures, culverts, caves). The species is unlikely to occur on site. No further assessment is required.		
Amphibians								
Litoria aurea	Green and Golden Bell Frog	-	V	9565	The Green and Golden Bell Frog main populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp*.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Low. 13,143 OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area. No further assessment is required.	Low	No
Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	-	V	-	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. It is the only Mixophyes species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney, and Dorrigo being the stronghold.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area.	Low	No
Uperoleia mahonyi	Mahony's Toadlet	-	E	K	Mahony's Toadlet is endemic to the mid-north coast of New South Wales (NSW) and to date has been found between Kangy Angy and Seal Rocks. Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Known records are associated with shallow	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area.	Low	No

					ephemeral/semi-permanent water bodies with limited flow of water.			
Listed Migratory Species								
Migratory Terrestrial Birds								
Cuculus optatus	Oriental Cuckoo, Horsfield's Cuckoo	-	-	6	This species migrates to the north and east coasts of Australia during the non-breeding season over winter. Mainly inhabiting forests, the Oriental cuckoo occurs in mixed, deciduous and coniferous forest. It is present at all levels of the forest canopy, and can be found at a range of elevations, occasionally being recorded in mountains as high up as 1,100 metres.	Low. Five OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area.	Low	No
Hirundapus caudacutus	White-throated Needletail	-	V	10	The White-throated Needletail is widespread in across the coast of eastern and south-eastern Australia, and Tasmania. White-throated Needletails only occur as vagrants in the Northern Territory and in Western Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable (Cramp 1985), but there are, nevertheless, certain preferences exhibited by the species. They are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.	Low. 207 OEH Bionet records exist within a 10 km radius of the Study area boundary. There is limited appropriate roosting habitat present within the Study area. The species is unlikely to occur on site. No further assessment is required	Low	No
Monarcha melanopsis	Black-faced Monarch	-	-	K	The Black-faced Monarch is widespread in eastern Australia. In Queensland, it is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts (occasionally including offshore islands) and the eastern slopes of the Great Divide, to the New South Wales border. In New South Wales and the Australian Capital Territory, the species occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberra. The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest,	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area.	Low	No

					dry (monsoon) rainforest and (occasionally) cool temperate rainforest.			
Motacilla flava	Yellow Wagtail	-	-	32	Occurs throughout Australia. Can be found in a range of land uses including pastures, wetlands, shrublands, grasslands and man made environments. The yellow wagtail typically forages in damp grassland and on relatively bare open ground at edges of rivers, lakes and wetlands, but also feeds in dry grassland and in fields of cereal crops.	Moderate. 42 OEH Bionet records exist within a 10 km radius of the Study area boundary. Although no open bodies or water are present within the Study area, the Hunter River and its associated floodplain abut the south-west boundary. Additionally, the site is dominated by managed lawns so further assessment is required.	Moderate	Yes
Myiagra cyanoleuca	Satin Flycatcher	-	-	K	The Satin Flycatcher is widespread in eastern Australia and vagrant to New Zealand (Blakers et al. 1984; Coates 1990a). In Queensland, it is widespread but scattered in the east, being recorded on passage on a few islands in the western Torres Strait. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests than the Leaden Flycatcher*, Myiagra rebecula*, often occurring in gullies. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area.	Low	No
Rhipidura rufifrons	Rufous Fantail	-	-	K	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia. In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (Eucalyptus microcorys), Mountain Grey Gum (E. cypellocarpa), Narrow-leaved Peppermint (*E. radiata*), Mountain Ash (*E. regnans*), Alpine Ash (E. delegatensis), Blackbutt *(E. pilularis*) or Red Mahogany (*E. resinifera*); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests; for example near Bega in south-east NSW, where they are recorded in temperate Lilly Pilly (*Acmena smithi*) rainforest, with Grey Myrtle (*Backhousia myrtifolia*),	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area.	Low	No

					Sassafras (*Doryphora sassafras*) and Sweet Pittosporum (*Pittosporum undulatum*) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including Spotted Gum (*Eucalyptus maculata*), Yellow Box (*E. melliodora*), ironbarks or stringybarks, often with a shrubby or heath understorey. They are also recorded from parks and gardens when on passage. In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of Paperbarks (Melaleuca spp.) (Higgins et al. 2006).			
Symposiachrus trivirgatus	Spectacled Monarch	-	-	K	This species occurs around the coast of NSW. The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area There is no appropriate habitat present within the Study area.	Low	No
Migratory Wetland Birds								
Actitis hypoleucos	Common Sandpiper	-	-	18	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	Low. 13 OEH Bionet records exist within a 10 km radius of the Study area boundary, primarily in a wooded area 8 km west. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required. No further assessment required.	Low	No
Arenaria interpres	Ruddy Turnstone	-	-	6	The Ruddy Turnstone is widespread within Australia during its non-breeding period of the year. It is mainly found on coastal regions with exposed rock coast lines or	Low. Two OEH Bionet records exist within a 10 km radius of the Study area boundary. . Although the floodplain of the Hunter River abuts	Low	No

					coral reefs. This species arrives in east Australia from September.	the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Calidris acuminata	Sharp-tailed Sandpiper	-	-	463	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs.	Low. 92,330 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 6-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Calidris canutus	Red Knot, Knot	-	E	131	The Red Knot is common in all the main suitable habitats around the coast of Australia. They mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They move south, mostly along coasts, with some inland	Low. 1644 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 6-10 km south of the Study area. Although the floodplain of the Hunter River	Low	No

					records from September–November and arrive in south-west Australia from September.	abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Calidris ferruginea	Curlew Sandpiper	-	CE	1016	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one year old birds remain in Australia rather than migrating north. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	Low. 1382 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 6-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Calidris melanotos	Pectoral Sandpiper	-	-	19	the Pectoral Sandpiper is widespread but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	Low. 11 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 8.5-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study	Low	No

						area and therefore no further assessment is required.		
Calidris ruficollis	Red-necked Stint	-	-	321	It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable. In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in salt flats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation.	Low. 1937 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 8.5-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Calidris subminuta	Long-toed Stint	-	-	1	The Long-toed Stint is irregular with widely scattered records in NSW. The species has been recorded at the estuary of the Richmond River, Kooragang Island, Pitts Town Lagoon, McGrath's Hill, Bushell's Lagoon, the Hawkesbury River, Shell Point, Botany Bay, Parkes, Fivebough Swamp, Tullakool Saltworks, Dareton, Mortanally Billabong, Wentworth and Cobar. They prefer shallow freshwater or brackish wetlands. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire.	Low. No individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Calidris tenuirostris	Great Knot	-	CE	2	The Great Knot has been recorded in Narooma, Tullakool, Armidale, Gilgandra and Griffith. Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches	Low. No individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west	Low	No

					with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although juveniles may not arrive until October-November.	boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Charadrius bicinctus	Double-banded Plover	-	-	K	The Double-banded Plover can be found in both coastal and inland areas. During the non-breeding season, it is common in eastern and southern Australia, mainly between the Tropic of Capricorn and western Eyre Peninsula. The Double-banded Plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. The species is sometimes associated with coastal lagoons, inland saltlakes and saltworks.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	-	V	L	In Australia, the Greater Sand Plover occurs in coastal areas in all states. n the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs.	Low. No individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. . Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Charadrius mongolus	Lesser Sand Plover, Mongolian Plover	-	E	31	The Lesser Sand Plover breeds in central and north eastern Asia, migrating further south for winter. Occurs almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms. Roosts during high tide on sandy beaches, spits and rocky	Low. Nine individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate	Low	No

					shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge.	habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Charadrius veredus	Oriental Plover	-	-	5	The Oriental Plover is a non-breeding visitor to Australia, where the species occurs in both coastal and inland areas. Immediately after arriving Australia, Oriental Plovers spend a few weeks in coastal habitats before dispersing further inland. Thereafter they usually inhabiting grasslands. The species arrives in Australia in early to mid-September, and leave between February and April, with most having left by the end of March.	Low. 30 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Chlidonias leucopterus	White-winged Black Tern	-	-	17	The species is a non-breeding migrant to Australia, where it is widespread and common along south-western, northern and central-eastern coasts, with only scattered records of small numbers along the coasts elsewhere in southern Australia. In NSW, the species is widespread east of the Great Divide, mainly south to about Wollongong, but with scattered records further south along the coast and on inland wetlands west of the Great Divide, for example Lake Cowal, Narran Lake and as far west as the Menindee Lakes	Low. 164 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Limicola falcinellus	Broad-billed Sandpiper	-	-	7	Broad-billed Sandpiper breeds in northern Siberia before migrating southwards in winter to Australia. In NSW, the main site for the species is the Hunter River estuary, with birds occasionally reaching the Shoalhaven estuary. There are few records for inland NSW. Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. Occasionally, individuals may be recorded in	Low. Two individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns	Low	No

					sewage farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches.	experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Limosa lapponica	Bar-tailed Godwit	-	-	756	The Bar-tailed Godwit has been recorded in the coastal areas of all Australian states. The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas.	Low. 1149 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Limosa limosa	Black-tailed Godwit	-	-	291	The Black-tailed Godwit is found in all states and territories of Australia, however, it prefers coastal regions and the largest populations are found on the north coast between Darwin and Weipa. In Australia the Black-tailed Godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. The use of habitat often depends on the stage of the tide. It is also found in shallow and sparsely vegetated, near-coastal, wetlands; such as saltmarsh, salt flats, river pools, swamps, lagoons and floodplains. There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms and saltworks.	Low. 603 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	-	CE	22	Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states and rarely inland. The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock	Low. 16 OEH Bionet records exist within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed	Low	No

					platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Numenius minutus	Little curlew, Little Whimbrel	-	-	L	Little Curlews generally spend the non-breeding season in northern Australia from Port Hedland in Western Australia to the Queensland coast (Minton 2002 pers. comm.). There are records of the species from inland Australia, and widespread but scattered records on the east coast. The species has also been recorded on Lord Howe Island, Cocos-Keeling Island and Christmas Island.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Numenius phaeopus	Whimbrel	-	-	89	The Whimbrel is a regular migrant to Australia and New Zealand, with a primarily coastal distribution. There are also scattered inland records of Whimbrels in all regions. It is found in all states but is more common in the north. The Whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used salt flats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms and salt fields. There are a small number of inland records from saline lakes and canegrass swamps.	Low. 152 OEH Bionet records exist within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Pandion haliaetus	Osprey	-	-	K	The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island. Eastern Ospreys occur in littoral and coastal	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland	Low	No

					habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging.	birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Philomachus pugnax	Ruff (Reeve)	-	-	6	In Australia the Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and flood lands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks. They are sometimes found on wetlands surrounded by dense vegetation including grass, sedges, saltmarsh and reeds. They have been observed on sand spits and other sandy habitats including shingles. The Ruff forages on exposed mudflats, in shallow water and occasionally on dry mud. They have been observed foraging in dry waterside plants and in swampy areas next to aeration tanks in sewage farms. They prefer to roost amongst shorter vegetation Most NSW records come from the Sydney region.	Low. Four individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Pluvialis fulva	Pacific Golden Plover	-	-	415	Within Australia, the Pacific Golden Plover is widespread in coastal regions, though there are also a number of inland records, sometimes far inland and usually along major river systems, especially the Murray and Darling Rivers and their tributaries. Most occur along the east coast. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats	Low. 908 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 6-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Pluvialis squatarola	Grey Plover	-	-	4	The Grey Plover has been recorded in all states, where it is found along the coasts. In non-breeding grounds in	Low. A single OEH Bionet records exist within a 10 km radius of the	Low	No

					Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes.	Study area boundary. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Thalasseus bergii	Greater Crested Tern	-	-	44	Crested Tern is a costal bird which can be found along the coast of all Australia and breeds off of islands on the coast of Australia. If forages out at sea and in shallow waters of lagoons, coral reefs, estuaries, bays and harbours, along sandy, rocky or muddy shores.	Low. 24 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 6-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Tringa brevipes	Grey-tailed Tattler	-	-	76	In NSW the Grey-tailed Tattler is distributed along most of the coast from the Queensland border, south to Tilba Lake. It is more heavily distributed along coastal regions north of Sydney. It is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. The Grey-tailed Tattler arrives in Australia mostly in August, however, they sometimes appear south of the breeding range as early as July.	Low. Of the OEH Bionet records existing for this species, most occur before 2002, with 32 individuals being listed within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 6.5-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this	Low	No

						species is unlikely to occur within the Study area and therefore no further assessment is required.		
Tringa glareola	Wood Sandpiper	-	-	10	There are records of this species east of the Great Divide, from Stratheden and Casino, south to Nowra and elsewhere, mostly from the Riverina, but also from the Upper and Lower Western Regions. The Wood Sandpiper inhabits well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. The species arrives in Australia from August.	Low. 25 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 6-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Tringa nebularia	Common Greenshank, Greenshank	-	-	639	The Common Greenshank does not breed in Australia, however, the species occurs in all types of wetlands across Australia. The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	Low. Of the OEH Bionet records existing for this species, half occur before 2002, with 1555 individuals being listed within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 6.5-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Tringa stagnatilis	Marsh Sandpiper, Little Greenshank	-	-	594	The Marsh Sandpiper is found on coastal and inland wetlands throughout Australia. The species is widespread in coastal Queensland, but few records exist north of Cooktown. It is recorded in all regions of NSW but especially the central and south coasts and (inland) on	Low. Of the OEH Bionet records existing for this species, half occur before 2002, with 3400 individuals being listed within a 10 km radius of the Study area boundary. Most of	Low	No

					the western slopes of Great Divide and western plains. The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	these records occur in the riparian area 6.5-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.		
Xenus cinereus	Terek Sandpiper	-	-	230	The Terek Sandpiper is a rare migrant to the eastern and southern Australian coasts, being most common in northern Australia. The two main sites for the species in NSW are the Richmond River estuary and the Hunter River estuary. The latter has been identified as nationally and internationally important for the species. In Australia, has been recorded on coastal mudflats, lagoons, creeks and estuaries. Favours mudbanks and sandbanks located near mangroves, but may also be observed on rocky pools and reefs, and occasionally up to 10 km inland around brackish pools. Generally roosts communally amongst mangroves or dead trees, often with related wader species.	Low. Of the OEH Bionet records existing for this species, most occur before 2002, with 79 individuals being listed within a 10 km radius of the Study area boundary. Most of these records occur in the riparian and wetland area 8-10 km south of the Study area. Although the floodplain of the Hunter River abuts the south-west boundary of the Study area, the site itself offers little to no appropriate habitat for wetland birds aside from when the managed lawns experience flooding. Therefore, this species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Listed Migratory Species								
Birds								
Anous stolidus	Common Noddy	-	-	L	In Australia, the Common Noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast. The species is also rarely encountered off the coast of the Northern Territory, where only one breeding location with about 100-130 birds is known.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study	Low	No

						area and therefore no further assessment is required.		
Apus pacificus	Fork-tailed Swift	-	-	3	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. The Fork-tailed Swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines.	Low. 30 individuals are listed in OEH Bionet records within a 10 km radius of the Study area boundary. Most of these records occur in the riparian area 8-10 km south of the Study area. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Andenna grisea	Sooty Shearwater	-	-	L	The Sooty Shearwater breeds on islands off NSW and Tasmania. Birds nest in burrows or rock crevices on coastal slopes, ridges and cliff tops, in herb fields, tussock grassland or forest. The Sooty Shearwater is gregarious, forming large flocks of up to 500 000 birds, or 'millions' when foraging or undertaking movements; although, these flocks may include other species of shearwaters.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Ardenna pacifica	Wedge-tailed Shearwater	-	-	1	The Wedge-tailed Shearwater breeds on the east and west coasts of Australia and on off-shore islands. The Wedge-tailed Shearwater breeds colonially and is rarely seen alone during this period. Small flocks are formed at the start of the breeding season and birds often gather in large flocks (up to 600 have been recorded in one flock) in areas where food is concentrated.	Low. No individuals listed in OEH Bionet records within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Calonectris leucomelas	Streaked Shearwater	-	-	K	The Streaked Shearwater is a non-breeding migrant to Australia's northern and eastern coasts. This marine	Low. No OEH Bionet records exist within a 10 km radius of the Study	Low	No

					species can be found over both pelagic and inshore waters.	area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Diomedea antipodensis	Antipodean Albatross	-	V	L	The Antipodean Albatross is endemic to New Zealand, however forages widely in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman Sea, notably off the coast of NSW. The Antipodean Albatross is marine, pelagic and aerial. It nests in open patchy vegetation, such as among tussock grassland or shrubs on ridges, slopes and plateaus.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Diomedea antipodensis gibsoni	Gibson's Albatross	-	V	L	In Australian territory, Gibson's Albatross has been recorded foraging between Coffs Harbour, NSW, and Wilson's Promontory, Victoria. There are no breeding colonies of Gibson's Albatross in Australian territory. Gibson's Albatross is marine, pelagic and aerial, flying within 15 m of the sea surface.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Diomedea epomophora	Southern Royal Albatross	-	V	L	Southern Royal Albatross is moderately common throughout the year in offshore waters of southern Australia, mostly off southeastern NSW, Victoria and Tasmania. The Southern Royal Albatross is marine and pelagic. It occurs in subantarctic, subtropical and occasionally Antarctic waters.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Diomedea exulans	Wandering Albatross	-	V	L	The Wandering Albatross breeds on Macquarie Island and feeds off of the Australian coast in the Southern Ocean. The Wandering Albatross is marine, pelagic and	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated	Low	No

					aerial. It occurs where water surface temperatures range from -2° to 24°C .	vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Diomedea sanfordi	Northern Royal Albatross	-	E	L	The Northern Royal Albatross feeds regularly in Tasmanian and South Australian waters, and less frequently in NSW waters. The Northern Royal Albatross is marine, pelagic and aerial. Its habitat includes subantarctic, subtropical, and occasionally Antarctic waters.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Fregata ariel	Lesser Frigatebird, Least Frigatebird	-	-	K	The Lesser Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Fregata minor	Great Frigatebird, Greater Frigatebird	-	-	1	The Great Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes and occasionally on bare ground.	Low. No individuals listed in the OEH Bionet records within a 10 km radius of the Study area boundary. The record of this species occurs in the riparian area 7.5 km south-west of the Study area, This habitat is not present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel	-	E	-	The Southern Giant Petrel has a circumpolar pelagic range from Antarctica to approximately 20° S and is a common visitor off the coast of NSW. Over summer, the species nests in small colonies amongst open vegetation	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present	Low	No

					on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory.	within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Macronectes halli	Northern Giant Petrel	-	V	L	The Northern Giant-Petrel has a circumpolar pelagic distribution, usually between 40-64ºS in open oceans. Their range extends into subtropical waters (to 28ºS) in winter and early spring, and they are a common visitor in NSW waters, predominantly along the south-east coast during winter and autumn. Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Phaethon lepturus	White-tailed Tropicbird	-	-	M	In Australia, the White-tailed Tropicbird (Indian Ocean) breeds in the Cocos-Keeling Islands, and at Ashmore Reef (on West, Middle and East Islands) and Rowley Shoals off the northern coast of Western Australia. Over the past few years, birds have been sighted with increased frequency on West Island and Home Island (also in the main atoll) in the Cocos-Keeling Islands. However, there have been no recent breeding records. The White-tailed Tropicbird (Indian Ocean) ranges widely over the oceans surrounding its breeding locations	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Thalassarche bulleri	Buller's Albatross, Pacific Albatross	-	V	M	Buller's Albatross breed in New Zealand (Snares, Solander and Chatham Islands), but are regular visitors to Australian waters. They are frequently seen off the coast from Coffs Harbour, south to Tasmania and west to Eyre Peninsula. Buller's Albatross are marine and pelagic, inhabiting subtropical and subantarctic waters of the southern Pacific Ocean.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Thalassarche bulleri platei	Northern Buller's Albatross, Pacific Albatross	-	V	-	The Pacific Albatross is a non-breeding visitor to Australian waters. Foraging birds are mostly limited to the Pacific Ocean and the Tasman Sea, although birds do reach the east coast of the Australian mainland.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no	Low	No

						appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Thalassarche cauta	Shy Albatross	-	E	L	Shy Albatrosses appear to occur over all Australian coastal waters below 25° S. Breeding occurs on Albatross Island, Bass Strait, and Mewstone and Pedra Branca, off southern Tasmania. The Shy Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current off South America.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Thalassarche eremita	Chatham Albatross	-	E	L	Breeding for the Chatham Albatross is restricted to Pyramid Rock, Chatham Islands, off the coast of New Zealand (Gales 1998). The principal foraging range for this species is in coastal waters off eastern and southern New Zealand, and Tasmania. The Chatham Albatross is a marine species. It occurs in subantarctic and subtropical waters reaching the tropics in the cool Humboldt Current off South America.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross	-	V	M	The Campbell Albatross is a non-breeding visitor to Australian waters. Non-breeding birds are most commonly seen foraging over the oceanic continental slopes off Tasmania, Victoria and New South Wales. The Campbell Albatross is a marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Thalassarche melanophris	Black-browed Albatross	-	V	L	During the breeding season, the Black-browed Albatross is restricted to islands in the subantarctic and Antarctic region, and can be found along the coast of Australia during the non-breeding season. The Black-browed Albatross is a marine species that inhabits Antarctic,	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within	Low	No

					subantarctic and temperate waters and occasionally enters the tropics.	the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.		
Thalassarche salvini	Salvin's Albatross	-	V	L	Salvin's Albatross is a non-breeding visitor to Australian waters. Salvin's Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current, off South America.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No
Thalassarche steadi	White-capped Albatross	-	V	K	This species breeds on a number of islands in New Zealand waters. Virtually the entire population nests in the Auckland Islands, comprising between 75,000 and 117,000 breeding pairs. A small number of pairs nest on Bollons Island in the Antipodes Islands and occasionally on The Forty-Fours in the Chatham Islands. After breeding most birds remain in Australasian waters with some adults migrating across the Indian Ocean to seas off South Africa and Namibia. In NSW waters it is probably frequently overlooked due to the difficulties of separating it from the Shy Albatross. However, it appears to be a regular visitor principally occurring between March and December Mostly observed in inshore and offshore waters over the continental shelf and less frequently in pelagic waters off the shelf break. May occasionally enter larger bays.	Low. No OEH Bionet records exist within a 10 km radius of the Study area boundary. No associated vegetation community present within the Study area. There is no appropriate habitat present within the Study area. The species is unlikely to occur within the Study area and therefore no further assessment is required.	Low	No

Key:

V = Vulnerable M = Migratory A= Marine
E = Endangered CE = Critically Endangered P=Protected

K = Known where there are confirmed records, specimens or otherwise verified sightings in any CMA subregion overlapping the search area

P = Predicted where there is high expectation by relevant experts that a species is likely to be present in any CMA subregion overlapping the search area, based on known presence of suitable habitat and distribution with adjoining subregions

1 – NSW BioNet Atlas, Office of Environment and Heritage (Accessed 03-11-2022).
2 – Commonwealth Protected Matters Search Tool, Department of the Environment (Accessed 03-11-2022)

5.3 Other Legislative Considerations

5.3.1 Key Threatening Processes

A Key Threatening Process (KTP) is defined in the BC Act as a process that "adversely affects threatened species or ecological communities, or it could cause species or ecological communities that are not threatened to become threatened." They are listed under Schedule 4 of the BC Act and may adversely affect threatened species, populations or ecological communities or could cause species, populations or ecological communities that are not threatened to become threatened.

Three (3) KTP's have the potential to operate on site and require consideration under the site proposal:

1. Anthropogenic Climate Change

2. Infection of native plants by *Phytophthora cinnamomi*

3. Clearing of native vegetation

Anthropogenic Climate Change

Modification of the environment by humans is considered to contribute to Climate Change and as a result has been listed as a Key Threatening Process. Land use change and construction processes which will occur as a result of the Project are actions that can contribute to greenhouse gas emissions. This may indirectly impact upon known or potentially occurring threatened species as most species depend on climate for their distribution.

The proposal seeks to remove up to 4.217 ha of vegetation within the Study area, of which 0.1 ha constitutes native vegetation, which is represented by a few remnant canopy trees and several planted native canopy trees. On this basis it is unlikely to make a significant contribution to local climate such that alterations resulting in impacts on locally occurring threatened species, populations or ecological communities would occur.

Infection of native plants by Phytophthora cinnamomi.

The soil born pathogen *Phytophthora cinnamomi* spreads in plant roots and has been known to infect a number of native plants. There was no evidence observed of *P. cinnamomi* impact on site during the survey period. Control measures should be enforced during site works to ensure infected materials are not introduced to the site (refer to **Section 6**). On the condition that such management measures are adhered to, it is unlikely that the proposal will contribute to this KTP.

Clearing of native vegetation

The KTP final determination lists nine factors that have the potential to impact to species distribution or result in extinction. These factors are:

- destruction of habitat resulting in loss of local populations or individual species;
- fragmentation;
- expansion of dryland salinity;
- riparian zone degradation;
- increased greenhouse gas emissions;
- increased habitat for invasive species;
- loss of leaf litter layer;
- loss or disruption of ecological function; and
- changes to soil biota.

Although the proposal seeks to remove 0.1 ha of native vegetation, most of the site consists of existing infrastructure associated with the high school including administrative buildings, classrooms, recreational areas, parking lots, and managed fields such as recreational lawns or pastures. Therefore, the removal of vegetation due to the proposed development is unlikely to contribute further to the loss of populations or individuals resulting in extinction.

No new points of fragmentation or connectivity will result from the proposal.

The proposal will have a minor impact on increasing greenhouse gas emissions and a minor loss on leaf litter layer due to the loss of vegetation within the site.

The proposal will not increase habitat for invasive species as the proposal involves the clearing and/or management of all vegetation. To limit further invasion as a result of the proposal it is recommended that mitigation measures be implemented such as ongoing weed management and monitoring (refer to **Section 6**). On the condition that such management measures are adhered to, it is unlikely that the proposal will contribute to this KTP.

The proposal will have a minor impact on ecological function and soil biota of an already disturbed patch of exotic vegetation.

5.3.2 SEPP (Biodiversity and Conservation) 2021

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* commenced on 1 March 2022 and combines 11 separate SEPPs into one consolidated document. SEPP (Biodiversity and Conservation) 2021 replaces and repeals those consolidated SEPPs, which includes amongst others, both the SEPP (Koala Habitat protection) 2020 and SEPP (Koala Habitat protection) 2021. The Biodiversity and Conservation SEPP 2021 provides the existing provisions as separate chapters.

The principles of the Biodiversity and Conservation SEPP 2021 are unchanged from the previous Koala SEPP 2020 and 2021 and aim to:

- Encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.
- Help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process.
- Provide a process for councils to strategically manage koala habitat through the development of koala plans of management.

The Biodiversity and Conservation SEPP 2021 reflects the policy framework of previous Koala SEPP 2020 (Chapter 3) and 2021 (Chapter 4) for Local Government Areas (LGA) in NSW. At this stage:

- In nine of these LGAs – Metropolitan Sydney (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA – **Chapter 4** of the Biodiversity and Conservation SEPP 2021 applies to **all zones**.
- In all other identified LGAs, **Chapter 3** of the Biodiversity and Conservation SEPP 2021 **applies** to land zoned RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry.

The SEPP applies in accordance with *Part 4.2 Clause 4.8 – Development assessment process – approved koala plan of management for land.*

(1) This section applies to land to which this Chapter applies and to which an approved koala plan of management applies.
(2) The council's determination of the development application must be consistent with the approved koala plan of management that applies to the land.

Port Stephens Council Comprehensive Plan of Management

Port Stephens Council has a gazetted Local Plan of Management, namely the *Port Stephens Council Comprehensive Koala Plan of Management (CKPoM).*

With regard to the proposed development area a CKPoM assessment has been produced (refer to **Appendix 6)**.

The development footprint is located within the established perimeter, therefore, given that the site accounts for only Mainly Cleared land (as per the PSC Koala Habitat Planning Map), and no habitat linking areas present it is expected that the proposal will not impact significantly impact Koala populations within the local area (refer to **Figure 4** for impacted feed trees).

HUNTER RIVER HIGH SCHOOL,
HEATHERBRAE

FIGURE 4:
KOALA FEED TREES

Legend

- Site Boundary
- Cadastral Boundary
- Koala Feed Tree (Retained)
- Koala Feed Tree (Removed)

N
W E
S

0 25 50 75 100

Metres

1:1650

MJD Environmental

Aerial: Nearmap (2022) | Data: MJD Environmental, NSW Spatial Services (2022) | Datum/Projection: GDA94 / MGA zone 56 | Date: 12/04/2023 | Version: 2 | HS & Irrawang HS\QGZ\HRHS | This plan should not be relied upon for critical design dimension.

HUNTER RIVER HIGH SCHOOL, HEATHERBRAE

FIGURE 5: PROPOSED KOALA FEED TREE PLANTINGS

Legend

- Site Boundary
- Cadastral Boundary
- Offset Tree Planting (Indicative)

N

W E

S

0 25 50 75 100

Metres

1:1650

MJD Environmental

Aerial: Nearmap (2022) | Data: MJD Environmental, NSW Spatial Services, Terras (2022) | Datum/Projection: GDA94 / MGA zone 56 | Date: 20/04/2023 | Version: 3 | HS & Irrawang HS\QGZ\HRHS | This plan should not be relied upon for critical design dimension.

5.3.3 Port Stephens Local Environmental Plan 2013

Under Part 7 Additional local provisions, the Port Stephens Local Environmental Plan (PSLEP) clause 7.9 stipulates assessments regarding wetlands, with the objective of clause 7.9 to ensure that wetlands are preserved and protected from impacts of development. As such the clause applies to land identified as 'wetland' on the PSLEP Wetlands Map, which the subject land is, therefore the clause applies.

Assessment as per the clause is as follows:

Subclause 3 states that before determining a development application the consent authority must consider -

a) *whether or not the development is likely to have significant adverse impacts on the following;*
    i. *The condition and significance of the existing native fauna and flora on the land,*
    ii. *The provision and quality of habitats on the land for indigenous and migratory species,*
    iii. *The surface and groundwater characteristics of the land, including water quality, natural water flows and salinity, and*
b) *Any appropriate measures proposed to avoid, minimise, or mitigate impacts of the development.*

As per this BAR, subclause 3. a)i. and a)ii. are addressed, with no significant impacts to native flora and fauna determined, nor impacts to listed migratory species (as per the review in Section 5.3.4 and Appendix 5).

As the mapped wetland occurs within the far north-western portion of the subject land it is not anticipated to be significantly impacted by the proposed works as the proposed works occur predominately within the eastern portion. As no earth works or vegetation clearance is expected within the mapped wetland it is not anticipated that the groundwater characterises will be altered, as listed within subclause 3. a)iii.

The proposal is occurring in an existing school site which is highly modified, with Native Remnant Canopy avoided where possible, therefore adhering to a principle of an avoidance, minimisation and mitigation across the proposal.

As per subclause 4, which states that development consent must not be granted to development on land to which clause 7.9 applies unless the consent authority is satisfied that

a) *The development is designed, sited and will be managed to avoid any significant adverse environmental impact, or*
b) *If that impact cannot be reasonably avoided – the development is designed, sited and will be managed to minimise that impact, or*
c) *If that impact cannot be minimised – the development will be managed to mitigate that impact.*

Subclause 4 is addressed by the detailed design of the proposal which ensures impacts to biodiversity are avoided where possible, with minimal impacts included within the subject land, especially the northern portion (refer to **Appendix 1** Plan of Proposal).

5.3.4 Commonwealth EPBC Act

The Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) Test determines whether an action is likely to have a significant impact on a Matter of National Environmental Significance (MNES). Subsequently, it informs whether a proposed development requires the submission of a referral to the Australian Government Department of the Environment for a decision by the Australian Government Environment Mister on whether assessment and approval is required under the EPBC Act.

An EPBC Act Protected Matters Search (accessed 03-11-2022) was undertaken to generate a list of those MNES from within 10 km of the site. An assessment of those MNES relevant to biodiversity has been undertaken in accordance with EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DoE, 2013 – refer to **Appendix 5**). The Matters of National Environmental Significance protected under national environment law include:

- Listed threatened species and communities;
- Listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- World heritage properties;
- National heritage places;
- The Great Barrier Reef Marine Park;
- Nuclear actions; and
- A water resource, in relation to coal seam gas development and large coal mining development.

Listed Threatened Species and Communities

A total of 103 threatened species and 7 threatened ecological communities were listed under the EPBC Act as having been recorded on the protected matters search. A likelihood of occurrence assessment for these MNES has been completed in **Section 5.2**.

The likelihood of occurrence assessment found the following species listed under the EPBC Act to have a moderate likelihood of occurrence within the site, and potential impacts;

- *Pteropus poliocephalus* - Grey-headed Flying-fox (V)
- *Motacilla flava* – Yellow Wagtail (Migratory)

The EPBC Act Test of Significance concluded that the proposal is unlikely to significantly impact the listed species (See **Appendix 5**).

No Threatened Ecological Communities listed under the EPBC Act have been recorded within the site or have been identified within any areas that have potential to be affected by indirect impacts.

Listed Migratory Species

The protected matters search nominated 38 migratory species or species habitat that may occur with the 10 km site buffer search area. The assessment contained in **Section 5.2** concluded that one migratory species may occupy and utilise the Study area (*Motacilla flava*) which is addressed in **Appendix 5**. Although other migratory species may occupy and utilise various habitats throughout the site and locality, no habitat on site is critical to their survival. Therefore, it is unlikely that the proposal over the site will impact migratory species.

Wetlands of International Significance (declared Ramsar wetlands):

The site is listed as occurring within the feature area of a declared Ramsar Site - Hunter Estuary Wetlands.

This wetland is located within 4.7 km to the northeast from the study area and Ramsar supports 112 species of waterbirds and 45 species of migratory birds listed under international agreements, including the great egret (*Ardea alba*), cattle egret (*Ardea ibis*), terns (*Sterna* spp.), glossy ibis (*Plegadis falcinellus*) and white-breasted sea-eagle (*Haliaeetus leucogaster*). The Hunter Estuary wetlands also provide refuge for waterbirds such as ducks and herons during periods of inland drought. The Hunter Estuary Wetland Ramsar site regularly supports 1% of the population of the eastern curlew (*Numenius madagascariensis*) and the red-necked avocet (*Recurvirostra novaehollandiae*),

The site assessment confirms that the Study area does not contain any habitat nor landform features to be a part of this declared Wetlands.

Commonwealth Marine Areas:

The site is not part of any Commonwealth Marine Areas.

World Heritage Properties:

The site is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The site is not a National Heritage area and is not in close proximity to any such area.

Great Barrier Reef Marine Parks:

The site is not part of or within close proximity to any Great Barrier Reef Marine Park.

Nuclear Actions:

The proposal over the site is not and does not form part of a Nuclear action.

Water Resources in relation to Coal Mining and CSG:

The proposal over the site is related to land development and as such is not or does not for part of a coal mining and/or CSG proposal.

Summary

In summary the proposed action is unlikely to have an impact to MNES considered under this report, and as such Commonwealth referral under the EPBC Act is not required.

6 Recommendations

The following recommendations have been generated with due consideration of the proposed footprint for the proposed school infrastructure upgrade project at Lot 1 DP 120189, Lot 1 DP 540114 & Lot 1 DP 579025, Hunter River High School, Heatherbrae, NSW

General Mitigation Measures for the Construction Phase

The following mitigation measures have been provided for implementation to ensure best practice environmental management throughout the construction phase, including appropriate location and management of construction materials:

- Demarcate Study area boundary with visible flicker tape of temporary fencing to ensure no impacts occur to retained vegetation adjacent to the site;
- Implement Tree Protection Zones surrounding trees located along the boundary of the Study area;
- All contractors will be specifically advised of the designated work area. The following activities are not to occur outside of designated work areas to minimise environmental impacts:
    - Storage and mixing of materials;
    - Liquid disposal;
    - Machinery repairs and/or refuelling;
    - Combustion of any material; and
    - Any filling or excavation including trenching, topsoil skimming and/or surface excavation.
- All construction vehicles/machinery are to use the designated access from main roads. Speeds will be limited to reduce the potential of fauna strike and to reduce dust generation;
- Plant and machinery would be cleaned of any foreign soil and seed prior to being transported to the site to prevent the potential spread of weeds and *Phytophthora cinnamomi*;
- If machinery is transported from an area of confirmed infection of *Phytophthora cinnamomi* to the site, stringent wash down must be completed before leaving the area, removing all soil and vegetative material from cabins, trays, and under carriages;
- All liquids (fuel, oil, cleaning agents, etc.) will be stored appropriately and disposed of at suitably licensed facilities. Spill management procedures will be implemented as required;
- Rubbish will be collected and removed from the site.

Erosion and Sedimentation Control

Erosion and sediment control measures shall be implemented in accordance with the approved Sediment and Erosion control plan to be prepared prior to commencement of civil works on site. In general, erosion and sediment control measures include:

- Identification of potential erosion areas;
- Installation and maintenance of flow, erosion, sediment and nutrient control within the site during construction ahead of pavement and kerb establishment;
- Separation of ‘dirty’ construction water from the ‘clean’ natural overland flow water;
- Coordinated work practices aimed at minimising land disturbance;
- Minimise vegetation disturbance to surrounding retained vegetation; and
- Routine site inspections of drains, channels, sediment control structures and water quality.

Weed Control

- Control the establishment of weeds on the development site which could spread into adjacent native vegetation or affect watercourses.

7 Conclusion

MJD Environmental has been engaged by engaged by APP Corporation Pty Ltd on behalf of School Infrastructure NSW to prepare a Biodiversity Assessment Report to accompany a Development Application for a proposed school infrastructure upgrade project on Lot 1 DP 120189, Lot 1 DP 540114 & Lot 1 DP 579025, at 36 Elkin Avenue Hunter River High School, Heatherbrae, NSW

This report has been prepared to support:

a) A development application for the construction of a Construction of gymnasium (Block Y), consisting of a basketball court, equipment storage, canteen kitchen, staff room, first aid room and change room amenities, construction of hardstand civic space north of the gymnasium, construction of full-size rugby field, the construction of new carpark consisting of sixty-five (65) parking spaces (including 6 accessible parking spaces) and the construction and connection of a reticulated sewer pipe.
b) A Part 5 Activity Approval, development permitted without consent, for the construction of a new administration building, student learning hub and provision of essential services.
c) A Part 5 Activity Approval, development permitted without consent, for the construction of a new linking road and kiss and drop bay between Adelaide Street and Elkin Avenue.

The objective of the assessment was also to examine the likelihood of the proposal having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Biodiversity Conservation Act 2016* (BC Act). This assessment recognises the relevant requirements of the *EP&A Act 1979* as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*. Preliminary assessment was also made with regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An appraisal of the site to determine the appropriate assessment pathway under the BC Act determined the proposal on site does not trigger a Biodiversity Offset Scheme (BOS) entry threshold and on this basis an assessment of significance is required including application of the 5-part test.

The ecological field assessment found the maximum associated impacts to comprise of:

- 0.092 ha of Native Remnant Canopy
- 0.008 ha of Native Planted Canopy
- 1.021 ha of Endemic & Exotic Planted Canopy
- 3.096 ha of Managed Lawn - Exotic dominated

Note, the maximum associated impacts include all removed and potentially retained trees within the impact boundary. As such, the impact of the current design will be lower should the trees noted within the arborist report be retained.

No threatened flora or fauna species listed under the BC Act 2016 and EPBC Act 1999 were recorded on Study area.

No hollow bearing trees were detected at the time of the site assessment. Significant trees on site have been further assessed in the Comprehensive Koala Plan of Management in **Appendix 6**.

An assessment of significance determined the proposal is unlikely to have a significant impact to threatened species, populations or ecological communities assessed.

Recommendations have been provided to mitigate potential impacts arising from the construction phase of the proposal.

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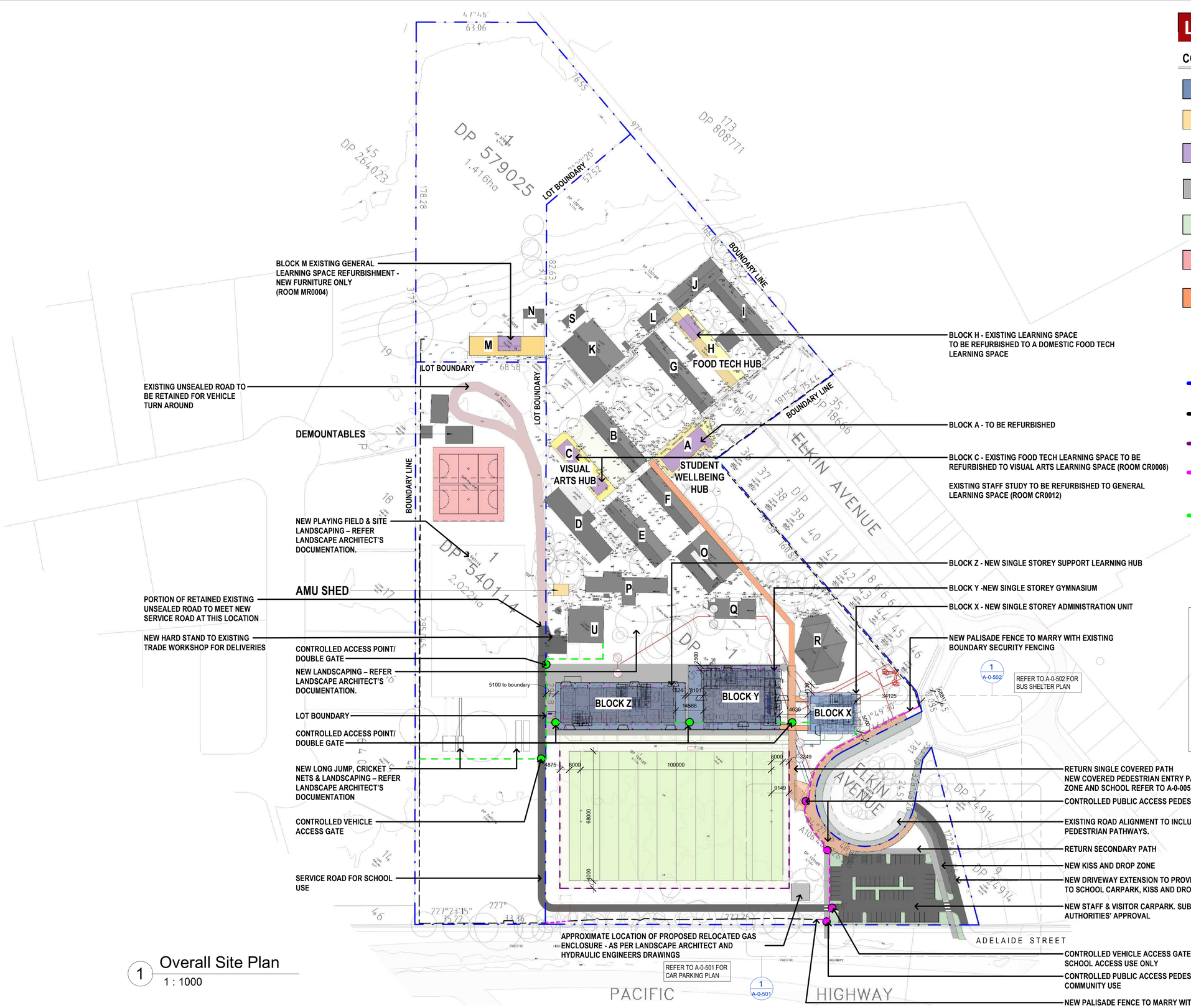
Appendix 1 Plan of Proposal



1 Overall Site Plan
1 : 1000

LEGEND

CONSTRUCTION LEGEND:

- NEW CONSTRUCTIONS
- EXISTING BUILDING BLOCKS FOR REFURBISHMENT
- SCOPE OF AREAS WITHIN EXISTING BLOCKS TO BE REFURBISHED
- EXISTING BUILDINGS OUT OF SCOPE
- EXISTING ACTIVE PLAY
- EXISTING HARDSTAND PLAY
- NEW COVERED WALKAWAY
- EXISTING TREES AS PER LANDSCAPE ARCHITECT
- PROPERTY BOUNDARY LINE
- EXISTING PALISADE FENCING
- PROPOSED LOW HEIGHT FENCE – 1000mm MIN.
- PROPOSED PALISADE SECURITY FENCING TO MATCH EXISTING (EXTERIOR SECURITY BOUNDARY FENCING)
- PROPOSED PALISADE SECURITY FENCING (INTERNAL SCHOOL ACCESS CONTROL)
- PROPOSED SECURITY ACCESS GATES TO BOUNDARY FENCING (EXTERIOR SECURITY)
- PROPOSED CONTROLLED ACCESS GATES TO INTERNAL SCHOOL ACCESS FENCING

NOTE:
REFER SSU DRAFT SECURITY DESIGN FOR SITE & BUILDING SECURITY & ACCESS REQUIREMENTS, AS WELL AS GATE TYPES, AUTOMATION & ELECTRONIC ACCESS & MONITORING REQUIREMENTS.

REFER TO A-0-005 TYPICAL COVERED WALKWAY FOR GENERAL CONSTRUCTION DETAILS

REFER TO LANDSCAPE ARCHITECT DOCUMENTATION AND ARBORIST REPORT FOR EXISTING TREES TO BE RETAINED, REMOVED AND NEW PLANTING DETAILS

REFER TO HYDRAULIC ENGINEER'S DOCUMENTATION FOR PROPOSED NEW SEWER LOCATION. EFFECTED AND DISTRUBED AREA TO BE MADE GOOD WHERE WORKS PASS THROUGH EXISTING SCHOOL SITE.

EJE ARCHITECTURE
ACN 002 912 843 | **ABN** 82 644 949 849
Nominated Architect - Bernard Collins | NSW Architects Registration No: 4438
P +61 2 4929 2353 | **F** +61 2 4926 3069 | **E** mail@eje.com.au | **W** www.eje.com.au
A 412 KING STREET, NEWCASTLE, NSW 2300

0 25mm 100mm 150mm ON ORIGINAL A1

NSW GOVERNMENT

REV	DATE	COMMENTS	DRN	CHKD	VRFD
F	29/07/2022	100% Schematic Design Issue	MJD	HN	
G	03/08/2022	Revised 100% Schematic Design Issue	MJD	HN	
H	05/08/2022	Revised 100% Schematic Design Issue	MJD	HN	
J	09/08/2022	Revised 100% Schematic Design Issue	MJD	HN	
K	25/08/2022	Final Schematic Design Issue	MJD	HN	
L	25/01/2023	Revised Carparking & Access Road For Review	MJD	HN	
M	07/03/2023	REQUESTED DESIGN CHANGES ISSUE	MJD	HN	
N	17/03/2023	REVISED DESIGN FOR COORDINATION	MJD	HN	
P	22/03/2023	REVISED BUS BAYS FOR COORDINATION	MJD	HN	
Q	11/04/2023	FINAL ISSUE FOR COORDINATION	MJD	HN	
R	18/04/2023	SCHEMATIC DESIGN ISSUE FOR TENDER	MJD	HN	

PROJECT : **Hunter River High School Upgrade**
CLIENT : **School Infrastructure NSW**
SITE : **36 Elkin Ave, Heatherbrae, 2324**
DRAWING : **Overall Site Plan**

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

Autodesk Docs://Hunter River High School/HRHS-EJE-ZZ-ZZ-M3-A-0001.rvt

PROJECT No :	DRAWN :	DATE :	SCALES :
14276	MJD	18/04/2023	As indicated@ A1 1 : 2000@ A3

PHASE :	BUILDING ID:	Level No:	DRAWING No :	REV :
DA	000	000	A-0-001	R

EJE architecture

Appendix 2 Flora Species List

Flora		
Family	**Scientific Name**	**Common Name**
Araucariaceae	*Araucaria heterophylla*	Norfolk Pine
Asteraceae	*Arctotheca calendula**	capeweed
	*Cirsium vulgare**	spear thistle
	*Gamochaeta americana**	Cudweed
	*Senecio madagascariensis**	Fireweed
	*Soliva sessilis**	Bindi weed
Bignoniaceae	*Jacaranda mimosifolia**	Jacaranda
Caryophyllaceae	*Stellaria media**	chickweed
Casuarinaceae	*Casuarina cunninghamiana*	River She-oak
	Casuarina glauca	Swamp She-oak
Convolvulaceae	*Dichondra repens*	Kidney Weed
Lauraceae	*Cinnamomum camphora**	Camphor laurel
Malvaceae	*Modiola caroliniana**	Red-flowered Mallow
Myrtaceae	*Angophora costata*	Sydney Red Gum
	Callistemon viminalis	Weeping Bottlebrush
	Corymbia maculata	Spotted Gum
	Eucalyptus microcorys	Tallowwood
	Eucalyptus robusta	Swamp Mahogany
	Eucalyptus saligna	Sydney Blue Gum
	Eucalyptus scoparia	Wallangarra white gum
	Eucalyptus tereticornis	Forest Red Gum
	Lophostemon confertus	Brushbox
	Syzygium australe	Lilly Pilly
Pinaceae	*Pinus canariensis**	Canary Island Pine
Plantaginaceae	*Plantago lanceolata**	Plantain
Poaceae	*Bromus catharticus**	Prairie Grass
	*Ehrharta erecta**	Panic Veldtgrass
	*Festuca arundinacea**	Tall Fescue
	*Lolium perenne**	Perennial Ryegrass
	*Poa annua**	Winter Grass
Primulaceae	*Lysimachia arvensis**	Scarlet Pimpernel
Proteaceae	*Grevillea robusta*	Silky Oak
	Xylomelum pyriforme	Woody Pear
Solanaceae	*Solanum nigrum**	Black-berry Nightshade

*exotic species

Appendix 3 Fauna Species List

Fauna List	
Birds	
Acridotheres tristis	Common Myna
Columba livia	Rock Dove
Eolophus roseicapilla	Galah
Falco cenchroides	Nankeen Kestrel
Grallina cyanoleuca	Magpie-lark
Gymnorhina tibicen	Australian Magpie
Malurus cyaneus	Superb Fairywren
Manorina melanocephala	Noisy Miner
Ocyphaps lophotes	Crested Pigeon
Pelecanus conspicillatus	Australian Pelican
Platycercus eximius	Eastern Rosella
Psephotus haematonotus	Red-rumped Parrot
Rhipidura leucophrys	Willie Wagtail
Threskiornis moluccus	Australian White Ibis
Trichoglossus haematodus	Rainbow Lorikeet
Vanellus miles	Masked Lapwing
Mammals	
Oryctolagus cuniculus	Rabbit

Appendix 4 Test of Significance (5-part Test)

Section 7.3 of the BC Act lists five factors that must be taken into account in the determination of whether proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats' (threatened biota) listed under the BC Act. The '5-part test' is used to determine whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats and thus whether the Biodiversity Offset Scheme will apply to the proposed development in which case a Biodiversity Development Assessment will be required.

The significance of the impacts on those threatened entities which have been recorded in the site or are likely to occur or utilise habitat to be potentially impacted by the proposal (see **Table 3**) have been assessed. The following threatened species and ecological community have been considered:

Flora

No threatened flora was identified within the Study area.

Fauna

- *Glossopsitta pusilla* - Little Lorikeet (V)
- *Pteropus poliocephalus* - Grey-headed Flying-fox (V)

Endangered Ecological Communities

No endangered ecological communities were identified on the Study area

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.

Glossopsitta pusilla - Little Lorikeet (V)

No individuals of this species were detected during field survey. 21 OEH Bionet records exists within a 10 km radius of the Study area, with the closest record (2020) occurring approximately 4km south-west. This species is associated with Swamp Mahogany - Paperbark Forest (MU 37) that was predicted to be on the Study area (PCT 4004), however, given the highly modified condition of the vegetation within the Study area only five canopy trees could be associated with this vegetation class. Therefore, given the limited abundance of foraging and nesting canopy trees it is expected that the impacts of the proposed development are unlikely to have an adverse effect on the life cycle of the species.

Pteropus poliocephalus - Grey-headed Flying-fox (V)

No individuals of this species were detected during field survey, the closest *P. poliocephalus* breeding camp is 3 km north of the site within the suburb Raymond Terrace. 21 OEH Bionet records exists within a 10 km radius of the Study area, with the closest record (2020) occurring approximately 5.5km south-west. This species is associated with Swamp Mahogany - Paperbark Forest (MU 37) that was predicted to be on the Study area (PCT 3080 and PCT 4004), however, the abundance of the associated canopy species is highly limited. Although fruit trees may be present within the surrounding urban landscape, roosting trees are limited within the Study area, and therefore this species is likely to occupy more suitable habitat outside of the Study area. As such, given the limited abundance of foraging and nesting canopy trees it is expected that the impacts of the proposed development are unlikely to have an adverse effect on the life cycle of the species.

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.

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.

No Threatened Ecological Community has been recorded within the Study area.

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;

The proposal will remove no more than 0.1 ha of native vegetation that occurs in a disturbed state and 1.0 ha of endemic and exotic planted canopy vegetation and 3.07 ha if managed lawn that are exotic dominated.

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

No threatened species habitat was confirmed present within the Study area. The proposal seeks to remove native canopy vegetation that occurs in an isolated patch that offers no connectivity to the broader landscape. The proposal will create no new points of fragmentation or disrupt connectivity within the broader landscape.

d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value

No declared areas of outstanding biodiversity value occur within the site or within 10 km of the locality.

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

A Key Threatening Process (KTP) is listed under Schedule 4 of the BC Act. KTPs considered relevant to the proposal is described in **Section 5.3.1**. This assessment concluded that the proposal was unlikely to trigger KTPs currently not operating on site and/or not significantly contribute to or increase the activity of a KTP operating on the site.

Appendix 5 EPBC Act Test of Significance

EPBC Listed Vulnerable Species

***Pteropus poliocephalus* (Grey-headed Flying-Fox)**	**Vulnerable**
Significant Impact Guideline	Assessment
Lead to a long-term decrease in the size of an important population of a species	As per the National Recovery Plan, the Grey-headed Flying-fox is considered to be a single, mobile population with individuals distributed across Qld, NSW, Vic, SA, Tas, and the ACT. As such individuals occurring within proximity to the Study Area are identified as an important population. Although, the Study Area is identified as occurring within a Priority Management Area for this species, this area represents poor roosting habitat and marginal forging habitat. As such, important populations are not likely to occur within the study area.
Reduce the area of occupancy of an important population	No, see above.
Fragment an existing important population into two or more populations	No, the proposal will not substantially increase the overall fragmentation of habitat for the species.
Adversely affect habitat critical to the survival of a species	No, habitat within the Study Area is not considered critical to the survival of the species. In the Study Area, the canopy is comprised primarily of non-native canopy species, with few canopy tree species that provide suitable foraging habitat for the species (e.g. *E. tereticornis, E. robusta*, and *C. maculata*), with remainder of the Study Area highly disturbed.
Disrupt the breeding cycle of an important population	No. The removal of 0.1 ha of marginal habitat for the species will not disrupt the breeding cycle of the species. In addition, there are no breeding roosts within the Study Area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. The proposal will impact 0.1 ha of marginal habitat; therefore the proposal will not modify, destroy, remove, isolate, or decrease habitat to the extent that the species is likely to decline at a regional scale.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	HTE are present within the subject land, and therefore the proposal may spread these weeds or contribute to the establishment of new weeds via movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. However, environmental safeguards for the management of biosecurity risks should be implemented to reduce these risks to a low level.
Interfere with the recovery of the species.	As per the National Recovery Plan for this species, the proposed development will not exacerbate the threats this species currently faces. The proposal is unlikely to impact the species recovery at a regional population scale.
Conclusion	Non-significant impact.

EPBC Listed Migratory Species

Motacilla flava **(Yellow Wagtail)**	**Migratory**
Significant Impact Guideline	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	As per the referral guideline, the Study Area is identified as important habitat represent non-breeding habitat (i.e. mostly well-watered open grasslands). However, this area is likely poorly utilised given the high coverage of exotic plants, as well as, high foot and vehicle traffic associated with the functioning of the high school, and therefore, modifications associated with the proposal will not substantially contribute to the loss of important habitat for this migratory species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	HTE are present within the subject land, and therefore the proposal may spread these weeds or contribute to the establishment of new weeds via movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. However, environmental safeguards for the management of biosecurity risks should be implemented to reduce these risks to a low level.
Seriously disrupt the lifecycle (Breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	No. the proposal will impact 0.1 ha of marginal habitat and will not seriously disrupt an ecologically significant proportion of this species population (10,000 individuals).
Conclusion	Non-significant impact.

Appendix 6 Port Stephens Council Comprehensive Koala Plan of Management (CKPoM)

Port Stephens Council Comprehensive Koala Plan of Management (CKPoM)

Performance Criteria for Development Applications

An assessment has been made against the provisions of Appendix 4 of the Port Stephens Council (PSC) CKPoM. Assessment against performance criteria (a – h) of Appendix 4 is required under the Port Stephens Council Local Environmental Plan.

The Performance Criteria apply to all developments proposed on sites that contain or are adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers, or Habitat Linking Areas. The Performance Criteria are as follows:

Proposed Development (other than agricultural activities):

a) Minimise the removal or degradation of native vegetation within Preferred Koala Habitat or Habitat Buffers;

The proposed development is not located within Preferred Koala habitat as mapped by PSC. The Study area is encompassed within a predominantly cleared area and is subsequently mapped as Mainly Cleared, with no associated Habitat Buffers.

b) Maximise retention and minimise degradation of native vegetation within Supplementary Koala Habitat and Habitat Linking Areas;

The proposed development is not located within Supplementary Koala habitat as mapped by PSC. The Study area is encompassed within a predominantly cleared area and is subsequently mapped as Mainly Cleared, with no associated Habitat Linking Areas.

c) Minimise the removal of any individuals of preferred koala food trees, wherever they occur on a development site. In the Port Stephens LGA these tree species are Swamp Mahogany (*Eucalyptus robusta*), Parramatta Red Gum (*Eucalyptus parramattensis*), and Forest Red Gum (*Eucalyptus tereticornis*), and hybrids of any of these species. An additional list of tree species that may be important to koalas based on anecdotal evidence is included in Appendix 8

The site contains one individual of *Eucalyptus robusta* (Swamp Mahogany) and three individuals of *Eucalyptus tereticornis* (Forest Red Gum), which are listed as being preferentially utilised by koalas within the Port Stephens LGA (Section 2 CKPoM, 2002). In reference to the additional tree species that may be important to koalas (Appendix 8 CKPoM, 2002), *Casuarina glauca* (Swamp She-oak), *Eucalyptus microcorys* (Tallowwood), and *Eucalyptus saligna* (Sydney Blue Gum) are present within the Study area.

As per the current design of the proposal, two *E. robusta*, and six *E. microcorys* will be impacted by the proposed development. Due to the existing layout of the pre-existing infrastructure, the development footprint cannot be adjusted in such a way to avoid all Preferred Koala Feed Trees and the additional tree species.

Overall, the disturbance history and the corresponding classification of Mainly Cleared Land indicates that the Study area represents minimal habitat for koalas. Utilisation of the food trees present is likely to be limited given the high use and traffic within the site, its proximity to the Pacific Highway, and the open floodplains to the west of the site. Moreover, movement of koalas into the study area is likely to limited due to the fencing around the parameter of the site.

Supplementary habitat that is more likely to be utilised by koalas within proximity to the study area include areas further to the east and south, across the Pacific Highway. These areas will not be impacted by the proposed development.

d) Make provision, where appropriate, for restoration or rehabilitation of areas identified as Koala Habitat including Habitat Buffers and Habitat Linking Areas over Mainly Cleared Land. In instances where Council approves the removal of koala habitat (in accordance with dot points 1-4 of the above waive clause), and where circumstances permit, this is to include measures which result in a "net gain" of koala habitat on the site and/or adjacent land;

The proposed development will upgrade and add infrastructure to the Hunter River High School, which has pre-existing infrastructure and is in an area of Mainly Cleared Land. Little remnant is associated with the vegetation found within the Study area, however, it will be recommended that Landscape plantings be conducive with Koala Habitat Feed Trees throughout the Site, and that replacement Koala Feed Trees be planted in line with the Port Stephens Council Tree Technical Specification and in consultation with PSC.

Port Stephens Council Tree Technical Specification – Replacement Plantings – Koala Habitat

The Port Stephens Council Tree Technical Specification (PSCTTS) have been developed with particular reference to the *Port Stephens Council Local Environment Plan 2013*, the *Port Stephens Council Development Control Plan 2014*, the *Local Government Act 1993*, *Trees (Disputes between Neighbours) Act 2006* and the *Threatened Species Conservation Act 2005* (subsequently repealed).

Prior to the issue of an Occupation Certificate any koala food trees removed as a result of the development Councils requires Koala tree to be replaced according to the ratio detailed in the PSCTTS (refer to **Table 1** below), or, at Council's discretion the applicant may conduct enhancement works which improve the integrity and viability of koala food trees, habitat and movement corridors on the site.

Table 1 PSC Replacement Koala Feed Tree Planting Ratios (from PSCTTS)

Koala food tree size class (dbh)	Replacement Ratio (loss:gain)
<100 mm	**1:6**
100-300 mm	**1:8**
>300 mm	**1:10**

Koala Feed Trees found on site are as follows:

- 2 x *Eucalyptus robusta* (Swamp Mahogany)
- 6 x *Eucalyptus microcorys* (Tallowwood)

Refer to **Figure 4** for Koala Feed Tree Map.

All listed Koala Feed Trees will be removed at Stage 1 of the development, as such compensatory planting is required in accordance with the PSCTTS per the loss: gain replacement ratio. The total number of replacement trees have been detailed below (refer to **Table 5**).

Table 2 Replacement Koala Feed Tree Planting Requirements

Koala Food Tree Size Class (dbh)	Trees Removed	Replacement Trees Required
<100 mm	-	-
100-300 mm	-	-
>300 mm	**8**	**80**
Total	**8**	**80**

All compensatory plantings shall be:

- Of the same species as the trees that are removed;
- Sourced from local provenance seed stock;
- Planted as tubestock to afford improved establishment based on location and soil condition;
- Planted in a cluster and, where feasible, in the vicinity of any retained food trees;
- Protected, nurtured and maintained until the trees have reached a mature size of 5 metres – at the cost of the applicant; and
- Any replacement trees that die before maturity must be replaced by the applicant and at their cost.

Note: Replacement ratios are higher than 1:1 because of the time lag before the ecological benefits of compensatory plantings are realised. However, based on the advice from a PSC Natural Systems Environmental Planner, an opportunity exists to reduce the offset planting number in exchange for the planting advanced trees at a 1:1 ratio (i.e. planting seven replacement trees), with advanced trees having a minimum pot size of 45 litres and being taller than 1.2m at the time of planting. Moreover, we advise that the plantings not necessarily be the same species as the trees that are removed given the limited capacity for the site to support koalas. Instead, we advise that the additional plantings demonstrate a level of consideration to local biodiversity more likely to interact with the site, such as assisting highly mobile species (e.g. Grey-headed Flying Fox and Swift Parrot).

e) Make provision for long term management and protection of koala habitat including both existing and restored habitat;

Ongoing maintenance in line with the current operation of the high school will aid in maintenance of the planting. Furthermore, high-quality Preferred Koala Habitat is found within C1 national park lands to the south and east of the site and will not be impacted upon by this proposal.

f) Not compromise the potential for safe movement of koalas across the site. This should include maximising tree retention generally and minimising the likelihood that the proposal would result in the creation of barriers to koala movement, such as would be imposed by certain types of fencing. The preferred option for minimising restrictions to safe koala movement is that there be no fencing (of a sort that would preclude koalas) associated with dog free developments within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas. Suitable fencing for such areas could include:

***i)* Fences where the bottom of the fence is a minimum of 200 mm above ground level that would allow koalas to move underneath;**

***ii)* Fences that facilitate easy climbing by koalas; for example, sturdy chain mesh fences, or solid style fences with timber posts on both sides at regular intervals of approximately 20m; or**

***iii)* Open post and rail or post and wire (definitely not barbed wire on the bottom strand).**

Pre-existing security fencing is present around the perimeter of the Study Area, limiting Koala movement into the site, with the current proposal not expected to remove the fence. Additionally, the development footprint is located within the established perimeter, therefore, given that the site accounts for only Mainly Cleared land (as per the PSC Koala Habitat Planning Map), and no habitat linking areas present it is expected that the proposal will not impact the safe movement of Koalas within the local area.

g) Be restricted to identified envelopes which contain all buildings and infrastructure and fire fuel reduction zone. Generally, there will be no clearing on the site outside these envelopes. In the case of applications for subdivision, such envelopes should be registered as a restriction on the title, pursuant to the Conveyancing Act 1919; and

The proposed development will involve vegetation clearing only as required to encompass the development footprint. No additional clearing will occur following the establishment of this development and compensatory landscape plantings will be recommended within the high school to meet the Replacement Planting requirements associated with the Port Stephens Council Tree Technical Specification and in consultation with PSC.

h) Include measures to effectively minimise the threat posed to koalas by dogs, motor vehicles and swimming pools by adopting the following minimum standards.

i) The development must include measures that effectively abate the threat posed to koalas by dogs through prohibitions or restrictions on dog ownership. Restrictions on title may be appropriate.

Dogs are not permitted off-leash within the high school.

ii) The development must include measures that effectively minimise the threat posed to koalas from traffic by restricting motor vehicle speeds, where appropriate, to 40 kph or less.

The Study area is situated within the established high school where vehicle access is restricted by security gates, with driving speeds within the school grounds limited for safety. Machinery / equipment associated with ground maintenance are also present on the Study area, however, these vehicles generally have a low maximum speed limit and won't pose a threat to koalas.

iii) The development must reduce the risk of koala mortality by drowning in backyard swimming pools.

This development will not include any backyard swimming pools or permanent water sources. Furthermore, any residential properties abutting the site will require fencing.

Koala Impacts Assessment Summary

The proposal would require the removal of vegetation which is classed as Mainly Cleared koala habitat (as per the PSC Koala Habitat Planning Map), but includes the removal of eight feed trees, primarily in the form of additional tree species that may be important to koalas (Appendix 8 CKPoM, 2002).

The design of the proposal has been tailored to minimise removal of koala preferred feed trees, and as such the proposal is considered to be consistent with criteria in the PSC CKPoM on the condition that the recommendations outlined Section 6 of the BAR are followed. This includes:

- An appropriate number (8) of compensatory planting of *E. microcorys,* and *E. robusta* in appropriate locations within the study area, such as areas lacking canopy trees or with minimal canopy connectivity (see **Appendix Figure 1**).

HUNTER RIVER HIGH SCHOOL, HEATHERBRAE

APPENDIX FIGURE 1: PROPOSED KOALA FEED TREE PLANTINGS

Legend

- Site Boundary
- Cadastral Boundary
- Offset Tree Planting (Indicative)

N
W E
S

0 25 50 75 100

Metres

1:1650

MJD Environmental

Aerial: Nearmap (2022) | Data: MJD Environmental, NSW Spatial Services, Terras (2022) | Datum/Projection: GDA94 / MGA zone 56 | Date: 20/04/2023 | Version: 3 | HS & Irrawang HS\QGZ\HRHS | This plan should not be relied upon for critical design dimension.