JWA PTY LTD
Ecological Consultants
ABN 56 066 448 879

REVIEW OF ENVIRONMENTAL FACTORS

Halstead Drive Reconstruction, Casino (Stages 2 & 3)

A Report Prepared for
Burchills Engineering Solutions

SEPTEMBER 2023

JWA Pty Ltd
PO Box 650, Jimboomba QLD 44280
p 07 3219 9436 • **e** brisbane@jwaec.com.au

www.jwaec.com.au

DOCUMENT CONTROL

Document

Title	Review of Environmental Factors - Halstead Drive Reconstruction, Casino (Stages 2 & 3)
Job Number	N23004
File Reference	2023 CLIENTS\N23004_Halstead Drive, Casino - REF (Stages 2 & 3)\REF
Version and Date	RW2 28/09/23
Client	Burchills Engineering Solutions

Revision History (office use only)

Issue	Version	Draft/ Final	Date Sent	Distributed To	No. Copies	Media	Delivery Method
1	RW1	DRAFT	26/09/23	JWA	1	Word	Email
1	RW1	DRAFT	26/09/23	Client	1	PDF	Email
2	RW2	FINAL	28/09/23	Client	1	PDF	Email

Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	26/09/23	Grant Brearley	GB	Adam McArthur	AM
RW2	28/09/23	Grant Brearley	GB	Adam McArthur	AM

Reviewed by: Development Assessment Panel Signed:  (Andy Edwards) Dated: 14/11/23

TABLE OF CONTENTS

ABBREVIATIONS

Abbreviation	Description
AHIMS	Aboriginal Heritage Information Management System
AOBV	Area of Outstanding Biodiversity Value
ASIRF	Aboriginal Site Impact Recording Form
ASRF	Aboriginal Site Recording Form
BAM	Biodiversity Assessment Method
BC Act	*NSW Biodiversity Conservation Act 2016*
BCR	*Biodiversity Conservation Regulation 2017*
BOS	Biodiversity Offset Scheme
DAWE	Department of Agriculture, Water and the Environment
DCP	Development Control Plan
DoPIE	NSW Department of Planning, Industry and Environment
DotE	Department of the Environment
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
FM Act	*Fisheries Management Act 1994*
HE Act	*Heritage Act 1977*
Km	Kilometre
LEP	Local Environmental Plan
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013*
MNES	Matters of National Environmental Significance
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	Office of Environment and Heritage
PKFT	Preferred Koala Food Tree
PMST	Protected Matters Search Tool
QLD	Queensland
REF	Review of Environmental Factors
RVC	Richmond Valley Council
RVDCP	Richmond Valley Development Control Plan
RVLEP	Richmond Valley Local Environmental Plan
SEPP	State Environmental Protection Policy
SIS	Species Impact Statement
TEC	Threatened Ecological Community
TPZ	Tree Protection Zone

1 INTRODUCTION

1.1 Background

JWA Pty Ltd have been engaged by Burchills Engineering Solutions and on behalf of Richmond Valley Council (RVC) to complete a Review of Environmental Factors (REF) to accompany an application for the reconstruction of Halstead Drive, Casino.

It is understood that Halstead Drive suffered severe damage during the 2022 (February / March) flood. The project will be carried out in three (3) stages, of which this REF relates specifically to Stage 2 (Geotechnical testing, survey and design) and Stage 3 (reconstruction of Halstead Drive). Stage 1 has now been completed, which involved the removal and disposal of all damaged concrete and materials to restore the access track.

1.2 Subject site and environmental context

1.2.1 *Introduction*

The subject site comprises the damaged Halstead Drive, which is a non-gazetted road that runs along the bank of the Richmond River from Webb Park (on River Street), under the Centre Street bridge, to an end point approximately 120 m to the west of the bridge.

The area whereby works are required will be subject to geotechnical testing and the reconstruction of Halstead Drive. A recent aerial photograph showing the alignment of the proposed works is provided in **FIGURE 1**.

Due to the damage caused by the floods, and apart from emerging groundcovers that are predominately exotic species, almost all native vegetation was removed from the alignment and remaining adjacent vegetation was sparse or in poor condition (**APPENDIX 1**). Stage 1 has now been complete (**APPENDIX 2**)

1.3 The proposed works

The reconstruction of Halstead Drive in Casino is required due to severe damage during the 2022 (February / March) flood (**APPENDIX 1**). The overall project will be carried out in the following three (3) stages:

- Stage 1 (COMPLETE) – Remove and dispose of all concrete and restore the access track (**APPENDIX 2**).
- Stage 2 – Geotechnical testing, survey, and design.
- Stage 3 – Reconstruct Halstead Drive.

This REF relates specifically to Stage 2 and 3. A summary of the proposed methodology is provided below[1].

[1] Information provided by the relevant contractor

1.3.1 *Stage 2 - Methodology for geotechnical testing in support of the reconstruction of Halstead Drive, Casino*

This methodology outlines the procedures for conducting geotechnical testing as part of the environmental assessment for the reconstruction of Halstead Drive in Casino. The purpose of this investigation is to assess the geotechnical conditions of the project area, which is essential for informed decision-making and minimizing environmental impacts.

1.3.1.1 Site assessment and objectives

In the initial phase, a review of all project documents, including previous REF, road concepts and geological maps, will be conducted to understand the project scope and potential environmental implications. The objectives of the geotechnical investigation will be defined, including soil classification, determination of bearing capacity, assessment of slope stability, and identification of potential environmental hazards. Specific locations along Halstead Drive where drilling and testing will occur will be identified, taking into consideration potential environmental sensitivities.

To minimize environmental impact, a thorough site visit will be undertaken to assess surface conditions, geological features, and any visible signs of subsurface issues, such as erosion or potential impacts on local ecosystems. Potential drilling locations will be marked based on the preliminary site assessment, taking into consideration environmental protection measures.

1.3.1.2 Equipment preparation and environmental safety precautions

Environmental protection is a priority, and as such, the 4x4 ute-mounted drill rig will be ensured to be in proper working order and regularly maintained to minimize potential environmental leaks or spills. Verification will be conducted regarding the availability and functionality of all necessary drilling tools, soil sampling equipment, and safety gear to prevent environmental harm.

An environmental safety plan for drilling operations will be developed and implemented by the Contractor, encompassing protocols for handling drilling fluids, spill containment, protection of nearby water bodies, and emergency response procedures. All personnel involved in the operation will be trained in environmental safety protocols and equipped with appropriate personal protective equipment.

1.3.1.3 Drilling operations and sampling

Drilling methods that minimize environmental disruption, such as auger drilling or core drilling, will be selected. Boreholes will be drilled at predetermined locations to avoid asset disturbance, with careful logging of the depth, soil type, and any encountered obstacles or potential environmental impacts. Soil samples will be collected at specified intervals while employing best practices to prevent contamination of the environment.

The collected data will be analyzed to evaluate potential environmental impacts, such as contamination risks or disturbance to ecosystems. A comprehensive report will be prepared, including drilling logs, environmental test results, and recommendations for road design based on the soil classification and criteria. Based on the findings, recommendations will also be provided to minimize the project's impact on the environment including measures for erosion control.

Throughout the project, strict adherence to local environmental regulations, REF/permit requirements, and environmental protection guidelines will be ensured. Detailed records of all field and laboratory testing, equipment calibration, and environmental conditions will be maintained throughout the project.

1.3.2 *Stage 3 - Methodology for the reconstruction of Halstead Drive, Casino*

This is a broad outline of the methodology for the reconstruction of Halstead Drive in Casino. The primary objective is to ensure the successful reconstruction of Halstead Drive while considering various aspects related to the project.

1.3.2.1 Site assessment and objectives

The initial phase involves reviewing all relevant project documents, including previous road design, geological maps, and engineering reports and the final endorsed detailed design. The objectives of the reconstruction project will be precisely defined, focusing on road design, traffic management, and any potential environmental or community impacts. Specific locations along Halstead Drive requiring reconstruction will be identified.

To gain a comprehensive understanding of site conditions, a thorough site visit during the tender period will be conducted to assess current site conditions, drainage, and any visible issues that need attention during reconstruction. Particular attention will be given to factors affecting road safety, such as existing surrounding road geometries and intersections.

1.3.2.2 Equipment preparation and safety precautions

Safety remains a priority throughout the project. All construction equipment, vehicles, and tools will be thoroughly inspected and maintained to ensure safe operation during reconstruction. Safety protocols will be developed and implemented to protect both workers and the public, with an emphasis on traffic management and ensuring safe access for pedestrians and vehicles.

Construction methods and procedures will be carefully selected to minimize disruption to the environment, traffic and local community. Detailed construction plans and schedules will be developed to coordinate various activities, including excavation, pavement construction, signage installation, and any necessary utility relocations.

1.3.2.3 Environmental considerations & reporting

While this methodology primarily focuses on road reconstruction, environmental protection will be prioritized. All construction activities will adhere to environmental regulations and guidelines. Measures will be in place to prevent soil erosion and manage construction runoff, and appropriate disposal of construction waste and materials will be ensured.

Comprehensive records will be maintained throughout the reconstruction project. These records will include project schedules, safety records, construction plans, inspection reports, and any changes or modifications made during the construction process. This documentation will be vital for project reporting and compliance purposes.

FIGURE 1 ALIGNMENT OF THE PROPOSED RECONSTRUCTION OF HALSTEAD DRIVE

2 DATABASE SEARCHES

2.1 Introduction

Database searches were completed to highlight any potential state or commonwealth conservation significant vegetation communities, threatened flora and fauna, and ecologically sensitive areas on the subject site.

2.2 Methods

2.2.1 *Commonwealth database searches*

The Protected Matters Search Tool (PMST) was used to generate a list of the following Matters of National Environmental Significance (MNES) protected under the Commonwealth EPBC Act that may occur within 10 km of the subject site:

- World heritage and national heritage areas;
- Wetlands of international significance (Ramsar wetlands);
- Threatened ecological communities (TECs);
- Threatened species; and
- Migratory species.

The PMST database incorporates information from a range of sources, including government agencies, research, and community organisations. It should be noted that there are limitations on the accuracy of some matters reported by the PMST. Database records of threatened and migratory species are based on their current known distribution and do not necessarily correlate to an actual observation. As a result, these records are an indicator of potential presence only and do not consider if suitable vegetation, geology, soil, climate, or habitat types are present to support the occurrence of a species or community.

2.2.2 *State database searches*

The NSW BioNet online database is based on collated biodiversity data acquired by the NSW Government through a range of sources including specimen collections, research and monitoring programs, and community wildlife groups. A BioNet database search was used to generate a list of threatened flora and fauna species listed under the NSW BC Act that may occur within 10 km of the subject site.

2.3 Results

2.3.1 *World or National Heritage Properties*

No World or National heritage properties listed under the EPBC Act occur on or within 10 km of the subject site.

2.3.2 *Wetlands of International Significance (Ramsar Wetlands)*

No wetlands of international significance (Ramsar wetlands) occur on or within 10 km of the subject site.

2.3.3 *Threatened Ecological Communities (TECs)*

Database searches using the Commonwealth PMST revealed that six (6) TECs listed under the EPBC Act may occur within 10 km of the subject site:

- Coastal Swamp oak (*Casuarina glauca*) forest of NSW and south east QLD ecological community - Endangered;
- Coastal swamp sclerophyll forest of NSW and south east QLD – Endangered;
- Dunn's white gum (*Eucalyptus dunnii*) moist forest in north east NSW and south east QLD - Endangered;
- Grey box-grey gum wet forest of subtropical eastern Australia – Endangered;
- Lowland rainforest of subtropical Australia – Critically Endangered;
- Subtropical eucalypt floodplain forest and woodland of the NSW north coast and south east QLD bioregions – Endangered.

2.3.4 *Threatened flora species*

Threatened flora species detected in the database searches are listed in **TABLE 1**. The conservation status of each species listed in **TABLE 1** is shown in accordance with the EPBC Act and BC Act.

TABLE 1
THREATENED FLORA SPECIES THAT MAY OCCUR WITHIN 10 KM OF THE SUBJECT SITE

Scientific Name	Common Name	BC Act^	EPBC Act#
Archidendron hendersonii	White lace flower	V	
Arthraxon hispidus	Hairy-joint grass		V
Bosistoa transversa	Three-leaved bosistoa		V
Bulbophyllum globuliforme	Miniature moss-orchid	V	V
Clematis fawcettii	Stream clematis	V	V
Corchorus cunninghamii	Native jute	E	E
Desmodium acanthocladum	Thorny pea	V	V
Dichanthium setosum	Bluegrass	V	V
Endiandra floydii	Floyd's walnut	E	E
Eucalyptus glaucina	Slaty Red Gum	V	V
Floydia praealta	Ball nut	V	V
Gossia fragrantissima	Sweet myrtle	E	E
Grevillea hilliana	White yiel yiel	E	
Macadamia integrifolia	Macadamia Nut		V
Macadamia tetraphylla	Rough-shelled Bush Nut	V	V
Myrsine richmondensis	Purple-leaf muttonwood	E	E
Melalueca irbyana	Weeping paperbark	E	

Scientific Name	Common Name	BC Act^	EPBC Act#
Owenia cepiodora	Onionwood	V	V
Paspalidium grandispiculatum		V	V
Persicaria elatior	Knotweed	V	V
Rhodamnia rubescens	Scrub Turpentine	CE	CE
Rhodomyrtus psidioides	Native Guava	CE	CE
Rotala tripartita		E	
Sophora fraseri	Brush sophora	V	V
Syzygium hodginsoniae	Smooth-barked rose apple		V
Thesium australe	Austral Toadflax	V	V
Tylophora woollsii	Cryptic Forest Twiner	E	E

^ *NSW Biodiversity Conservation Act 2016 (BC Act)*

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act)

CE - Critically Endangered, E – Endangered and V - Vulnerable

2.3.5 *Threatened fauna species*

Threatened fauna species detected in the database searches are listed in **TABLE 2**. The conservation status of each species listed in **TABLE 2** is shown in accordance with the EPBC Act and BC Act.

TABLE 2
THREATENED FAUNA SPECIES THAT MAY OCCUR WITHIN 10 KM OF THE SUBJECT SITE

Scientific Name	Common Name	BC Act^	EPBC Act#
Amphibians			
Mixophyes fleayi	Fleay's frog	E	E
Mixophyes iteratus	Giant barred frog	E	V
Birds			
Anseranas semipalmata	Magpie goose	V	
Anthochaera phrygia	Regent Honeyeater	CE	CE
Botaurus poiciloptilus	Australasian bittern		E
Calidris ferruginea	Curlew sandpiper	E	CE
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V
Carterornis leucotis	White-eared monarch	V	
Climacteris picumnus victoriae	Brown treecreeper	V	V
Coracina lineata	Barred Cuckoo-shrike	V	
Cyclopsitta diophthalma coxeni	Coxen's Fig-Parrot	CE	E
Dasyornis brachypterus	Eastern bristlebird		E
Ephippiorhynchus asiaticus	Black-necked Stork	E	
Erythrotriorchis radiatus	Red Goshawk	CE	V
Falco hypoleucos	Grey Falcon	V	V
Grantiella picta	Painted Honeyeater	V	V
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	
Hirundapus caudacutus	White-throated Needletail		V
Irediparra gallinacea	Comb-crested jacana	V	
Ixobrychus flavicollis	Black bittern	V	
Lathamus discolor	Swift Parrot	E	CE
Limosa limosa	Black-tailed godwit	V	

Scientific Name	Common Name	BC Act^	EPBC Act#
Melanodryas cucullata cucullata	South-eastern hooded robin		E
Numenius madagascariensis	Eastern curlew		CE
Oxyura australis	Blue-billed duck	V	
Pandion cristatus	Eastern Osprey	V	
Rostratula australis	Australian painted snipe	E	E
Stagonopleura guttata	Diamond Firetail		V
Stictonetta naevosa	Freckled duck	V	
Turnix maculosus	Red-backed button-quail	V	
Turnix melanogaster	Black-breasted Button-quail	CE	V
Tyto longimembris	Eastern Grass Owl	V	
Insects/Invertebrates			
Argynnis hyperbius inconstans	Australian Fritillary		CE
Mammals			
Chalinolobus dwyeri	Large-eared Pied Bat	V	V
Dasyurus maculatus	Spotted-tailed Quoll	V	E
Macropus dorsalis	Black-striped wallaby	E	
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	
Miniopterus australis	Little Bent-winged Bat	V	
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	
Notamacropus parma	Parma Wallaby	V	V
Nyctophilus bifax	Eastern long-eared bat	V	
Petauroides volans	Greater Glider	E	E
Petaurus australis	Yellow-bellied Glider	V	V
Petaurus norfolcensis	Squirrel Glider	V	
Petrogale penicillata	Brush-tailed rock-wallaby		V
Phascogale tapoatafa	Brush-tailed Phascogale	V	
Phascolarctos cinereus	Koala	E	E
Potorous tridactylus tridactylus	Long-nosed Potoroo		V
Pseudomys novaehollandiae	New Holland Mouse		V
Pteropus poliocephalus	Grey-headed Flying-fox	V	V
Scoteanax rueppellii	Greater Broad-nosed Bat	V	
Thylogale stigmatica	Red-legged pademelon	V	
Reptiles			
Cacophis harriettae	White-crowned snake	V	
Coeranoscincus reticulatus	Three-toed Snake-tooth Skink	V	V

^ *NSW Biodiversity Conservation Act 2016 (BC Act)*

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act)

CE - Critically Endangered, E – Endangered and V - Vulnerable

2.3.5.1 Migratory Species

Migratory species identified in database searches are listed in **TABLE 3.**

TABLE 3
COMMONWEALTH LISTED MIGRATORY SPECIES THAT MAY OCCUR WITHIN 10 KM OF THE SUBJECT SITE

Scientific Name	Common Name	Status#
Actitis hypoleucos	Common sandpiper	M

Scientific Name	Common Name	Status#
Apus pacificus	Fork-tailed swift	M
Calidris acuminata	Sharp-tailed sandpiper	M
Calidris ferruginea	Curlew sandpiper	M, CE
Calidris melanotos	Pectoral sandpiper	M
Cuculus optatus	Oriental Cuckoo	M
Gallinago hardwickii	Latham's snipe	M
Hirundapus caudacutus	White-throated Needletail	M, V
Monarcha melanopsis	Black-faced Monarch	M
Motacilla flava	Yellow Wagtail	M
Myiagra cyanoleuca	Satin Flycatcher	M
Numenius madagascariensis	Eastern curlew	M, CE
Pandion haliaetus	Osprey	M
Rhipidura rufifrons	Rufous Fantail	M
Symposiachrus trivirgatus	Spectacled Monarch	M
Tringa nebularia	Common greenshank	
# Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act) CE - Critically Endangered, E – Endangered, V – Vulnerable and M – Migratory		

3 STATUTORY CONSIDERATIONS

3.1 Introduction

This section includes an assessment of the likely impacts of the proposed development with regards to relevant Commonwealth, State, and local legislation. Mitigation / management measures proposed to minimise and mitigate any impacts on the biodiversity and habitat values of the subject site have also been detailed where applicable. Assessment of compliance with relevant legislative requirements is also provided where relevant.

3.2 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

3.2.1 *Declared world heritage areas*

There are no declared World Heritage areas located on or near the subject site.

3.2.2 *Background*

The EPBC Act provides a mechanism for assessing the environmental impact of activities and development on Matters of National Environmental Significance (MNES). A person must not, without an approval under the EPBC Act, take an action that has or will have, or is likely to have, a significant impact on any of the following MNES:

- world heritage properties or national heritage places.
- declared Ramsar wetlands.
- listed threatened species or ecological community.
- listed migratory species.
- Commonwealth marine area or Commonwealth land.

The Act also prohibits the taking, without an approval under the EPBC Act, of:

- a nuclear action; and
- an action in a Commonwealth marine area or on Commonwealth land that has or will have, or is likely to have, a significant impact on the environment.

MNES in NSW include:

- declared World Heritage areas.
- declared Ramsar wetlands.
- listed threatened species (Schedule 1 and 2 of the *Commonwealth Endangered Species Protection Act 1992*).
- listed ecological communities.
- listed migratory species (JAMBA and CAMBA).

An action includes a project, development, undertaking or an activity or series of activities. An action does not require approval if it is a lawful continuation of a use of land, sea or seabed that was occurring before the commencement of the EPBC Act. An enlargement, expansion or intensification of a use is not a continuation of a use.

A Commonwealth assessment will be required for proposed activities on the subject site if they affect a MNES. The Commonwealth Department of the Environment has prepared EPBC Act Policy Statements, including the *Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (DotE 2013), which provides a self-assessment process to assist in determining whether an action should be referred to the Commonwealth for a decision on whether assessment and approval is required.

Where a project or action is believed to potentially cause a significant impact on a MNES, it is to be referred to the Australian Government Department of Agriculture, Water and the Environment (DAWE) for assessment as to whether the action is a 'controlled action' requiring Commonwealth approval for the proposed action. The proposed development has been considered against the Principal Significant Impact Guidelines for each of the MNES identified on the subject site. This assessment is provided in the following sections.

3.2.3 *Declared Ramsar wetlands*

There are no declared Ramsar wetlands located on or near the subject site.

3.2.4 *Threatened Ecological Communities (TECs)*

No TECs identified in **SECTION 2.3.3** are present within or directly adjacent to subject site.

3.2.5 *Commonwealth listed threatened flora and fauna species*

3.2.5.1 Significant impact criteria

An action is likely to have a significant impact on a critically endangered, endangered, or vulnerable species if it results in the following:

- a long-term decrease in the size of a population;
- reduction in the area of occupancy of the species;
- fragments an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupts the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduces disease that may cause the species to decline; or
- interferes with the recovery of the species.

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to a geographically distinct regional population, or collection of local populations, or a population, or collection of local populations that occur within a particular bioregion.

An 'invasive species' is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources, or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.

The suitability of the habitats on the subject site for EPBC Act listed threatened fauna species identified in **TABLES 1-3** were assessed to determine those species could potentially occur (**APPENDIX 3**). A summary of this assessment is provided below.

3.2.5.2 Applicability to the subject site

Flora

No threatened flora species listed under schedules of the EPBC Act were recorded in the subject site / proposed works areas. Further, no suitable habitat was observed that could support any of the threatened flora species listed **TABLE 1**.

Amphibians

There have been no records of the Fleay's frog (*Mixophyes fleayi*) or Giant barred frog (*Mixophyes iteratus)* from within 10 km of the subject site in the NSW BioNet online database. Both species are typically found in areas of intact rainforest / wet sclerophyll forest with leaf litter for shelter. No suitable habitat is available in the subject site for these species and no impact is considered likely (**APPENDIX 3** refers).

Birds

Taking a conservative approach and given the proximity of the Richmond River, it cannot be conclusively ruled out that the following wide-ranging species may aerially traverse the area from time-to-time. Notwithstanding, the subject site provides no suitable forage, nesting, or roosting habitat to be of value to these species.

- Grey falcon (*Falco hypoleucos*);
- Red goshawk (*Erythrotriorchis radiatus*);
- White-throated needletail (*Hirundapus caudacutus*).

Suitable forage habitat / trees for the Glossy-black cockatoo (*Calyptorhynchus lathami lathami*) and Painted honeyeater (*Grantiella picta*) were observed along the Richmond River. It is therefore considered possible that individuals would traverse the area while foraging; however, no suitable habitat is available or will be impacted within the subject site / works area.

Although some threatened bird species are considered possible occupants of nearby areas, no suitable habitat is available in the subject site to support an important population or indeed any individual. See **APPENDIX 3** for detailed habitat suitability assessments. As a result, it can be confidently concluded that no threatened bird species listed under the EPBC Act will be significantly affected by Stage 2 or 3 of the proposed works.

Invertebrates
The subject site does not contain suitable habitat (including the larval food plant *Viola betonicifolia*) to support the Australian fritillary (*Argynnis hyperbius inconstans)*. See **APPENDIX 3** for detailed habitat suitability assessments.

Mammals
The subject site contain no suitable roosting or forage habitat for threatened Large-eared pied bat (*Chalinolobus dwyeri*) or hollow-bearing trees for the Greater glider (*Petauroides Volans*).

Suitable vegetation types are also absent from the area to consider any potential impact to the following terrestrial species by the proposed works:

- Brush-tailed rock-wallaby (*Petrogale penicillata*);
- Long-nosed potoroo (*Potorous tridactylus tridactylus*);
- New Holland mouse (*Pseudomys novaehollandiae*);
- Spotted-tailed quoll (*Dasyurus maculatus*);

Given the presence of Preferred Koala Food Trees (PKFTs) and suitable flowering and fruiting trees along the Richmond River, the Grey-headed flying fox (*Pteropus poliocephalus*) and koala (*Phascolartctos cinereus*) are expected to occupy / utilise habitat in the area. Notwithstanding this, no suitable vegetation for these species is located within the subject site to consider any direct impacts to individuals or their habitat.

Given a complete absence of suitable habitat across the subject site, it can be confidently concluded that no threatened mammal species listed under the EPBC Act will be significantly affected by Stage 2 or 3 of the proposed works (**APPENDIX 3**).

Reptiles
There is no suitable habitat available in the subject site / works areas to consider the presence of, and therefore any impact to, the Three-toed snake-tooth skink (*Coeranoscincus reticulatus*) (**APPENDIX 3** refers).

3.2.5.3 Summary

No suitable habitat is available in the subject site to consider that a significant impact will occur to threatened species or their habitats due to Stage 2 or 3 of the proposed works. This will be further abated by integrating the relevant safeguards and mitigation measures discussed in **SECTION 5**.

Overall, the proposed works will (i) not have an impact on flora or fauna species threatened under the EPBC Act, (ii) is not a new development, and (iii) will result in the reconstruction of an existing asset following flood damage in 2022.

Conversely, it is expected that the overall proposed works will ultimately yield a positive outcome by way of the completed clean-up of damaged concrete from within the Richmond River during Stage 1 (**APPENDIX 1 & 2**), and stabilisation of banks and surrounding vegetation due to the reconstruction of the existing Halstead Road.

3.2.6 *Listed migratory species*

3.2.6.1 Significant impact criteria

An action will require approval if the action has, will have, or is likely to have a significant impact on a listed migratory species. Note that some migratory species are also listed as threatened species. The significant impact criteria below are relevant to migratory species that are not threatened.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles); or
- alter hydrological cycles, destroy, or isolate an area of important habitat for a migratory species; or
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An area of 'important habitat' for a migratory species is:

- habitat used by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at life-cycle stages; and/or
- habitat utilized by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, the definition of what an 'ecologically significant proportion' of the population is varies with the species (each circumstance needs to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness, and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

The term 'population' in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one (1) or more national jurisdictional boundaries including Australia.

3.2.6.2 Applicability to the subject site

Taking a conservative approach and given the proximity of the Richmond River, it cannot be conclusively ruled out that the following migratory species may aerially traverse the subject site from time-to-time and/or utilise available habitat in the Richmond River. Notwithstanding, the subject site provides no suitable forage, nesting, or roosting habitat to be of value to these species.

- Fork-tailed swift (*Apus pacificus*);
- White-bellied sea-eagle (*Haliaeetus leucogaster*)
- White-throated needletail (*Hirundapus caudacutus*); and
- Osprey (*Pandion haliaetus*).
- Common greenshank (*Tringa nebularia*);
- Latham's snipe (*Gallinago hardwickii)*.

Given the absence of habitat, the proposed works is unlikely to impact habitat critical or any migratory bird species listed in **TABLE 3**.

3.2.7 *Requirement for Commonwealth Referral*

No suitable habitat is available in the subject site / works area to support an important population of any of the flora / fauna species listed as threatened under the EPBC Act. As a result, it can be confidently concluded that no MNES will be significantly affected by Stage 2 or 3 of the proposed works and no Commonwealth approval is considered necessary.

3.3 Biodiversity Conservation Act 2016 (BC Act)

3.3.1 *Background*

The NSW BC Act commenced on the 25th August 2017. The BC Act, together with the *Biodiversity Conservation Regulation 2017* (BCR), outlines the framework for addressing impacts on biodiversity from development and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS) (addressed in **SECTION 3.3.2** below).

The BOS creates a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant impact on biodiversity. It also establishes biodiversity stewardship agreements, which are voluntary in-perpetuity agreements entered into by landholders, to secure offset sites.

There are five key steps to participating in the BOS for developers or landholders ('proponents') who want to undertake development or clearing.

- Step 1 – The proponent determines whether the BOS applies.
- Step 2 – An accredited assessor applies the Biodiversity Assessment Method (BAM) and offsetting rules to the activity.
- Step 3 – The consent authority assesses the application and determines whether to approve or refuse the application.
- Step 4 – The consent authority determines the application and sets the offset obligation.
- Step 5 – The proponent satisfies its credit obligation and can begin the approved activity.

Step 1 of this process has been completed (in the following sections) as part of this REF to determine if the BOS applies to the proposed works. Additional steps (if required) will be completed separately, and in addition, to this REF.

3.3.2 *Biodiversity Offsets Scheme (BOS)*

3.3.2.1 Background

The BOS applies to:

1. local development assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP & A Act) that triggers the BOS threshold or is likely to significantly affect threatened species based on the test of significance in section 7.3 of the BC Act;
2. state significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning and Environment (DoPE) and the Chief Executive of OEH determine that the project is not likely to have a significant impact;
3. biodiversity certification proposals;
4. clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the BOS threshold and does not require development consent;
5. clearing of native vegetation that requires approval by the Native Vegetation Panel under the LLS Act; and
6. activities assessed and determined under Part 5 of the EP & A Act (generally, proposals by government entities), if proponents choose to 'opt in' to the BOS.

Point 6 above may apply to the proposed development.

3.3.2.2 The BOS Threshold

The BOS Threshold is a test used to determine when is necessary to engage an accredited assessor to apply the BAM to assess the impacts of a proposal.

It is used for local developments (development applications submitted to councils) and clearing that does not require development consent in urban areas and areas zoned for environmental conservation i.e. under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP).

The BCR sets out threshold levels for when the BOS will be triggered. The threshold has two elements:

1. whether the amount of native vegetation being cleared exceeds a threshold area set out below; and
2. whether the impacts occur on an area mapped on the Biodiversity Values map (BV Map) published by the Minister for the Environment.

If clearing and other impacts exceeds either trigger, the BOS applies to the proposed development including biodiversity impacts prescribed by clause 6.1 of the BCR.

Area Clearing Threshold

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP) as shown in **TABLE 4** below.

The area threshold applies to all proposed native vegetation clearing associated with a proposal, regardless of whether this clearing is across multiple lots. In the case of a subdivision, the proposed clearing must include all future clearing likely to be required for the intended use of the land after it is subdivided.

TABLE 4
BOS AREA CLEARING THRESHOLD

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

The proposed works will not result in the removal of any native vegetation. Entry into the BOS is therefore not triggered by the area clearing threshold.

Biodiversity Values Map (BV Map) Threshold

The BV Map identifies land with high biodiversity value, as defined by clause 7.3(3) of the BCR. The BOS applies to all clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BCR on land identified on the map.

The subject site is mapped as containing areas of high biodiversity value on the BV Map (i.e., associated with the Richmond River) (**FIGURE 2**). Notwithstanding this, no native vegetation will be cleared for Stage 2 or 3 of the proposed works and therefore entry into the BOS is not triggered.

FIGURE 2 BIODIVERSITY VALUES MAPPED ALONG THE RICHMOND RIVER (PURPLE)

3.3.2.3 Applicability to the subject site

With consideration of the above, further assessment under the BOS is not considered necessary for the proposed works.

3.3.3 *State listed threatened flora and fauna species*

3.3.3.1 Test of significance

The test of significance is set out in section 7.3 of the BC Act and is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

In determining the nature and magnitude of an impact, it is important to consider matters such as:

- Pre-construction, construction and occupation/maintenance phases;

- All on-site and offsite impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones;
- All direct and indirect impacts;
- The frequency and duration of each known or likely impact/action;
- The total impact which can be attributed to that action over the entire geographic area affected, and over time;
- The sensitivity of the receiving environment; and
- The degree of confidence with which the impacts of the action are known and understood.

Recovery and threat abatement plans, priorities action statements and threatened species profiles may provide further guidance on whether an action/activity is likely to be significant.

Application of the precautionary principle requires that a lack of scientific certainty about the potential impacts of an action does not itself justify a decision that the action is not likely to have a significant impact. If information is not available to conclusively determine that there will not be a significant impact on a threatened species, population or ecological community, or its habitat, then it should be assumed that a significant impact is likely.

If the activity is likely to have a significant impact or will be carried out in a declared Area of Outstanding Biodiversity Value (AOBV), the proponent must either apply the BOS or prepare a species impact statement (SIS).

An AOBV in NSW is considered as one of the following:

- Gould's Petrel – critical habitat declaration
- Little penguin population in Sydney's North Harbour – critical habitat declaration
- Mitchell's Rainforest Snail in Stotts Island Nature Reserve – critical habitat declaration
- Wollemi Pine – critical habitat declaration

The suitability of the habitats on the subject site for BC Act listed threatened fauna species identified in **TABLES 1 & 2** were assessed to determine those species could potentially occur (**APPENDIX 3**). A summary of this assessment is provided below.

3.3.3.2 Applicability to the subject site

Flora

No threatened flora species listed under schedules of the BC Act were recorded in the subject site / works area. Further, no suitable habitat was observed that could support any of the threatened flora species listed **TABLE 1**.

Amphibians

No suitable habitat is available in the subject site / works area to support the Fleay's frog or Giant barred frog (**APPENDIX 3** refers). As a result, no impact is considered likely.

Birds

It cannot be conclusively ruled out that the White-bellied sea-eagle (*Haliaeetus leucogaster*) or the Osprey (*Pandion cristatus*) may aerially traverse the area from time-to-time while foraging along the Richmond River. Regardless, the subject site / works area provides no suitable forage, nesting, or roosting habitat to be of value to these species.

Taking a conservative approach, the following threatened species listed under the BC Act have all been recorded within 10 km of the subject site and may potentially utilise resources within the Richmond River catchment from time-to-time. Despite this, no suitable habitat is available in the subject site to support an important population or indeed any individual.

- Black bittern (*Ixobrychus flavicollis*);
- Black-necked stork (*Ephippiorhynchus asiaticus*);
- Blue-billed duck (*Oxyura australis*);
- Comb-crested jacana (*Irediparra gallinacean*); and
- Freckled duck (*Strictonetta naevosa*).

As a result, it can be confidently concluded that no threatened bird species listed under the BC Act will be significantly affected by Stage 2 or 3 of the proposed works. See **APPENDIX 3** for detailed habitat suitability assessments.

Mammals

The subject site / works area contains no suitable roosting or forage habitat for threatened microchiropteran bat species or hollow-bearing trees for the Brush-tailed phascogale (*Phascogale* tapoatafa), Squirrel glider (*Petaurus norfolcensis*), or Yellow-bellied glider (*Petaurus australis*).

Suitable vegetation types are also absent from the area to consider any potential impact to the following terrestrial species (excluding those addressed under **SECTION 3.2.5.2**) by the proposed works:

- Black-striped wallaby (*Macropus dorsalis*);
- Parma wallaby (*Notamacropus parma*);
- Red-legged pademelon (*Thylogale stigmatica*); and
- Spotted-tailed quoll (*Dasyurus maculatus*).

As discussed in **SECTION 3.2.5.2**, the Grey-headed flying fox and koala are expected to occupy / utilise habitat in the area. Notwithstanding this, no suitable vegetation for these species is located within the subject site to consider any direct impacts to individuals or their habitat.

Given a complete absence of suitable habitat across the subject site / works area, it can be confidently concluded that no threatened mammal species listed under the BC Act will be significantly affected by Stage 2 or 3 of the proposed works.

Reptiles
There is no suitable habitat available in the subject site / works area to consider the presence of, and therefore any impact to, the White-crowned snake (*Cacophis harriettae*) (**APPENDIX 3** refers).

3.3.3.3 Summary

No suitable habitat is available in the subject site to consider that a significant impact will occur to threatened species or their habitats due to Stage 2 or 3 of the proposed works. This will be further abated by integrating the relevant safeguards and mitigation measures discussed in **SECTION 5**.

Overall, the proposed works will (i) not have an impact on flora or fauna species threatened under the BC Act, (ii) is not a new development, and (iii) will result in the reconstruction of an existing asset following flood damage in 2022.

Conversely, it is expected that the overall proposed works will ultimately yield a positive outcome by way of the completed clean-up of damaged concrete from within the Richmond River during Stage 1 (**APPENDIX 1 & 2**), and stabilisation of banks and surrounding vegetation due to the reconstruction of the existing Halstead Road.

3.3.4 *Key threatening processes*

3.3.4.1 Background

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes (KTP) have been listed in Schedule 4 of the *BC Act (2016)*.

Key Threatening Processes (Schedule 4):

- Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (Manorima melanocephala)
- Alteration of habitat following **subsidence due to longwall mining**
- **Alteration to the natural flow regimes** of rivers, streams, floodplains & wetlands
- Anthropogenic Climate Change
- **Bushrock Removal**
- **Clearing of native vegetation**
- Competition and grazing by the **feral European rabbit (***Oryctolagus cuniculus***)**

- Competition and habitat degradation by feral goats (*Capra hircus*)
- Competition from **feral honeybees (***Apis mellifera***)**
- Death or injury to marine species following capture in **shark control programs on ocean beaches**
- Entanglement in, or ingestion of **anthropogenic debris in marine and estuarine environments**
- Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners
- Habitat degradation and loss by feral horses
- Herbivory and environmental degradation caused by **feral deer**
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition
- Importation of **Red Imported Fire Ants** (*Solenopsis invicta*)
- Infection by **Psittacine Circoviral (beak & feather) Disease** affecting endangered psittacine species and populations
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis
- Infection of native plants by *Phytophthora cinnamomi*
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae
- Introduction of the Large Earth Bumblebee (*Bombus terrestris*)
- Invasion and establishment of **exotic vines and scramblers**
- Invasion and establishment of Scotch Broom (*Cytisus scoparius*)
- Invasion and establishment of the **Cane Toad** (*Bufo marinus*)
- Invasion, establishment and spread of (Lantana camara)
- Invasion of native plant communities by African Olive (*Olea europaea* subsp. *cuspidata*)
- Invasion of native plant communities by *Chrysanthemoides monilifera*
- Invasion of native plant communities by **exotic perennial grasses**
- Invasion of the **yellow crazy ant** (*Anoplolepis gracilipes*)
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants
- Loss of hollow-bearing trees
- Loss and degradation (or both) of **sites used for hill-topping by butterflies**
- Predation and hybridisation by Feral Dogs (*Canis lupus familiaris*)
- Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)

- Predation by the **European Red Fox (***Vulpes vulpes***)**
- Predation by the **Feral Cat (*Felis catus*)**
- Predation by the **Ship Rat (***Rattus rattus***) on Lord Howe Island**
- Predation, habitat degradation, competition and disease transmission by **Feral Pigs** (*Sus scrofa*)
- Removal of **dead wood and dead trees.**

3.3.4.2 Applicability to the subject site

It is not considered that the proposed works will contribute significantly to any of the above listed KTP. This is particular the case with the implementation of the environmental safeguards and mitigation measures discussed in **SECTION 5**.

3.4 State Environmental Planning Policies (SEPPs)

3.4.1 *Introduction*

This section provides a discussion on the relevant statutory and policy implications of the proposed development which require an environmental assessment under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

3.4.1 *Resilience and Hazards SEPP*

3.4.1.1 Background

The *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) came into effect on the 1st March 2022.

Chapter 2 – Coastal Management of the Resilience and Hazards SEPP contains planning provisions for land use planning within the coastal zone consistent with the Coastal Management Act 2016. Chapter 2 – Coastal Management gives effect to the objectives of the Coastal Management Act 2016 from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone.

Part 2.1, Clause 2.4 of Chapter 2 – Coastal Management defines the following four (4) coastal management areas through detailed mapping and specifies assessment criteria that are tailored for each coastal management area:

- Coastal wetlands and littoral rainforests area - defined as areas with particular hydrological and ecological characteristics;
- Coastal vulnerability area - defined as the area affected by any one of seven coastal hazards;
- Coastal environment area - defined as the coastal waters of the state/ estuaries/ coastal lakes and foreshores including beaches/ dunes/ headlands and rock platforms as well as surrounding land; and

- Coastal use area - defined as land adjacent to the coast/ where development is or may be carried out.

Councils and other consent authorities must apply these criteria when assessing proposals for development that fall within one or more of the mapped areas.

3.4.1.2 Applicability to the subject site

The subject site / works area does not contain any mapped coastal values under the Resilience and Hazards SEPP.

3.4.2 *Biodiversity and Conservation SEPP 2021 - Vegetation in Non-Rural Areas*

3.4.2.1 Background

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) commenced on 1st March 2022. Chapter 2 - Vegetation in Non-Rural Areas of the Biodiversity and Conservation SEPP works together with the *Biodiversity Conservation Act 2016* and the *Local Land Services Amendment Act 2016* to create a framework for the regulation of clearing of native vegetation in NSW.

Chapter 2 - Vegetation in Non-Rural Areas aims to ensure the biodiversity offset scheme (established under the Land Management and Biodiversity reforms) will apply to all clearing of native vegetation that exceeds the offset thresholds in urban areas and environmental conservation zones that does not require development consent.

Chapter 2 - Vegetation in Non-Rural Areas applies to:

a) Land within the following local government areas: Bayside, City of Blacktown, Burwood, Camden, City of Campbelltown, Canterbury-Bankstown, Canada Bay, Cumberland, City of Fairfield, Georges River, City of Hawkesbury, Hornsby, Hunter's Hill, Georges River, Inner West, Ku-ring-gai, Lane Cove, City of Liverpool, Mosman, Newcastle, North Sydney, Northern Beaches, City of Parramatta, City of Penrith, City of Randwick, City of Ryde, Strathfield, Sutherland Shire, City of Sydney, The Hills Shire, Waverley, City of Willoughby, Woollahra.

b) Land within the following zones under an environmental planning instrument: Zone RU5 Village, Zone R1 General Residential, Zone R2 Low Density Residential, Zone R3 Medium Density Residential, Zone R4 High Density Residential, Zone R5 Large Lot Residential, Zone B1 Neighbourhood Centre, Zone B2 Local Centre, Zone B3 Commercial Core, Zone B4 Mixed Use, Zone B5 Business Development, Zone B6 Enterprise Corridor, Zone B7 Business Park, Zone B8 Metropolitan Centre, Zone IN1 General Industrial, Zone IN2 Light Industrial, Zone IN3 Heavy Industrial, Zone IN4 Working Waterfront, Zone SP1 Special Activities, Zone SP2 Infrastructure, Zone SP3 Tourist, Zone RE1 Public Recreation, Zone RE2 Private Recreation, Zone E2 Environmental Conservation, Zone E3 Environmental Management, Zone E4 Environmental Living or Zone W3 Working Waterways.

3.4.2.2 Applicability to the subject site

The Vegetation SEPP applies to the subject site; however, no native vegetation will require clearing for Stage 2 or 3 of the proposed works.

3.4.3 *Biodiversity and Conservation SEPP 2021 - Koala Habitat Protection 2021*

3.4.3.1 Background

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) commenced on 1st March 2022. Chapter 4 - Koala Habitat Protection 2021 of the Biodiversity and Conservation SEPP contains the land-use planning and assessment framework for koala habitat within Metropolitan Sydney and the Central Coast and applies to all zones except RU1, RU2 and RU3 in the short term.

The aim of Chapter 4 - Koala Habitat Protection 2021 is to "*encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline*".

Chapter 4 - Koala Habitat Protection 2021 applies to all zones in the following nine (9) LGAs – Metropolitan Sydney LGAs (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA. In all other identified LGAs, the provisions of Chapter 4 - Koala Habitat Protection 2021 do not apply to land zoned RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry.

3.4.3.2 Applicability to the subject site

The subject site is located within a relevant LGA (i.e., Richmond Valley) and KMA (i.e., North Coast) as outlined in Schedule 2 of the Biodiversity and Conservation SEPP. The subject site is also zoned as the following under the Richmond Valley LEP 2012:

- Area 1: C2 – Environmental Conservation and W1 – Natural Waterways.

Chapter 4 – Koala habitat protection 2021 therefore applies.

Notwithstanding this, to confirm if development controls apply, assessment has been undertaken to determine whether the proposed works is likely to have any impact on koalas or koala habitat as per the requirements of Part 4.2 of Chapter 4 - Koala Habitat Protection 2021.

Part 4.1, Clause 4.2 of Chapter 4 - Koala Habitat Protection 2021 of the Biodiversity and Conservation SEPP defines koala habitat and core koala habitat as:

> ***"Koala habitat** means koala habitat however described in a plan of management under this Policy or a former Koala SEPP and includes core koala habitat."*
>
> ***"Core koala habitat** means –*
>
> *a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas*

are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or

b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years."

It is noted that the term **highly suitable habitat** is not defined within the Biodiversity and Conservation SEPP. However, a factsheet issued by the NSW Government provides the following definition:

> *"**Highly suitable habitat** is where 15% or greater of the total number of trees within any Plant Community Type are the regionally relevant species of those listed in Schedule 2 of the SEPP."*

It is also noted that Part 3.1, Clause 3.2 of Chapter 3 - Koala Habitat Protection 2020 of the Biodiversity and Conservation SEPP "potential koala habitat" is defined as follows:

> *"**Potential koala habitat** means areas of native vegetation where trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component."*

The subject site contains no native vegetation that is considered to be core koala habitat for the purposes of the Chapter 4 - Koala Habitat Protection 2021 of the Biodiversity and Conservation SEPP.

3.5 'Additional' relevant environmental NSW legislation

3.5.1 *National Parks and Wildlife Act 1974 (NPW Act)*

3.5.1.1 Introduction

The NPW Act consolidates and amends the law relating to the establishment, preservation and management of national parks, historic sites and certain other areas and the protection of certain Aboriginal objects; to repeal the *Wild Flowers and Native Plants Protection Act 1927*, the *Fauna Protection Act 1948*, the *National Parks and Wildlife Act 1967* and certain other enactments; to amend the *Local Government Act 1919* and certain other Acts in certain respects; and for purposes connected therewith.

In addition to environmental / ecological features associated with biodiversity and ecosystem processes (addresses in other areas of this REF), the NPW Act provides the basis for the legal protection and management of Aboriginal sites within NSW.

Part 6, Division 1 and 2 of the NPW Act provide statutory protection for any physical/material evidence of Aboriginal occupation of NSW and places of cultural significance to the Aboriginal community. The key principles of the Act in relation to Aboriginal heritage are the prevention of unnecessary or unwarranted destruction of Aboriginal objects, and the active protection and conservation of objects which are of high cultural significance. It is an offence to knowingly disturb an Aboriginal object, irrespective of its nature or significance.

3.5.1.2 Applicability to the subject site

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken on 19th April 2023 and identified no Aboriginal Sites or Places registered in association with the subject site areas. Further detail on relevant management considerations provided in **SECTION 5.9**.

3.5.2 *Fisheries Management Act 1994 (FM Act)*

3.5.2.1 Introduction

The NSW FM Act aims 'to conserve, develop and share the fishery resources of the state for the benefit of present and future generations and, in particular to:

(a) conserve fish stocks and key fish habitats, and

(b) conserve threatened species, populations and ecological communities of fish and marine vegetation, and

(c) promote ecologically sustainable development, including the conservation of biological diversity,

and, consistently with those objects:

(d) promote viable commercial fishing and aquaculture industries, and

(e) promote quality recreational fishing opportunities, and

(f) appropriately share fisheries resources between the users of those resources, and

(g) provide social and economic benefits for the wider community of NSW.

(h) to recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing.

3.5.2.2 Applicability to the subject site

The Richmond River is mapped as containing the following under the FM Act:

- Freshwater fish community – status = good (**FIGURE 3**); and
- Key fish habitat – Northern Rivers (**FIGURE 4**).

FIGURE 3 FRESHWATER FISH COMMUNITY MAPPING UNDER THE *FISHERIES MANAGEMENT ACT 1994* ALONG THE RICHMOND RIVER (GREEN)

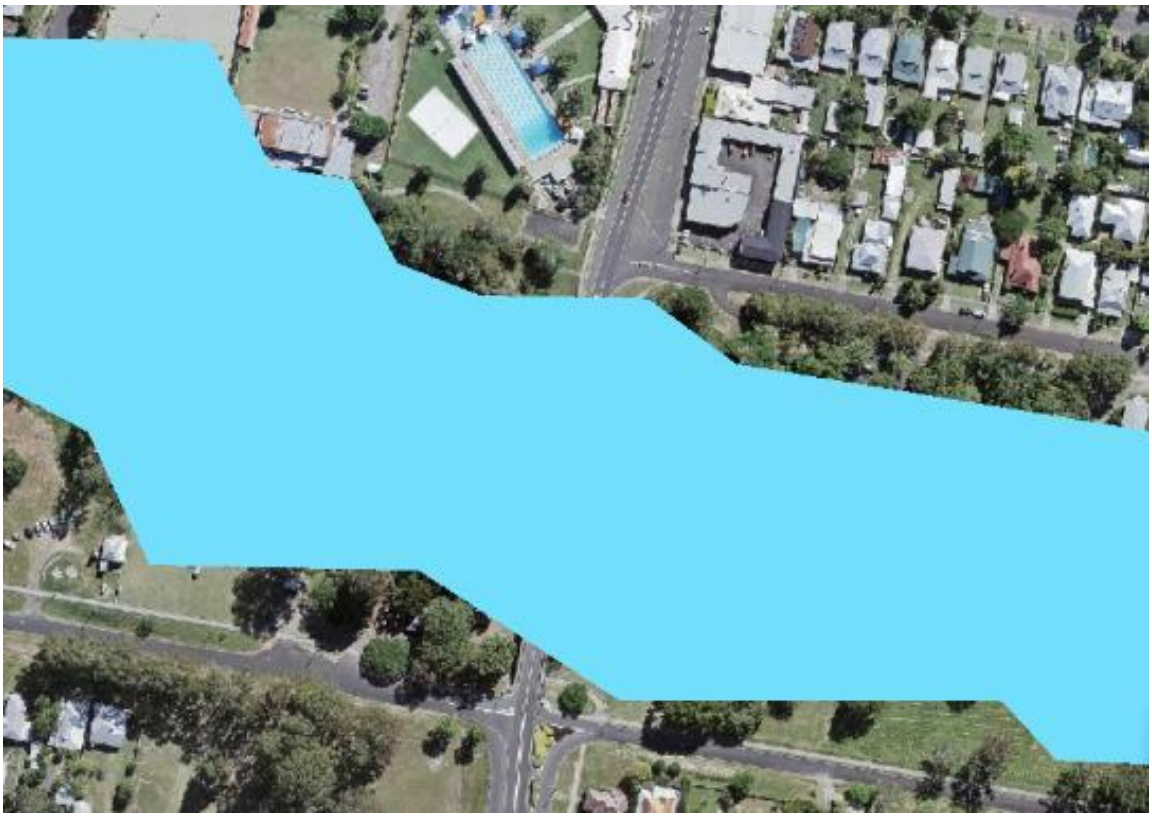

FIGURE 4 KEY FISH HABITAT MAPPING UNDER THE *FISHERIES MANAGEMENT ACT 1994* ALONG THE RICHMOND RIVER (BLUE)

The proposed works will occur within an area mapped as Key Fish Habitat under the FM Act. Despite this, all proposed works will occur outside of aquatic habitat areas to prevent any impacts to ecosystem function, fish, or marine vegetation.

The now completed clean-up of damaged concrete and materials (i.e., Stage 1; **APPENDIX 2**), and reconstruction of Halstead Drive, will improve the water quality and flow, and bank stability of this section of the Richmond River. By association, these works will enhance aquatic habitats and fish passage. Appropriate environmental safeguards will be implemented (e.g., silt fencing, water barriers etc.) to ensure no indirect impacts to the aquatic values of the Richmond River occur.

A *Part 7 Fisheries Management Act* permit has been submitted to the Department of Primary Industries for assessment and approval of the proposed works (**SECTION 2.5.2** refers).

3.5.3 *Heritage Act 1977 (HE Act)*

3.5.3.1 Introduction

The *Heritage Act 1977* (HE Act) provides for the conservation of items of environmental heritage in NSW. The HE Act defines heritage as items or places that are of state and/or local heritage significance and include: places, buildings, works, relics, moveable objects and precincts. As part of NSW heritage protection and management the HE Act maintains a register including an inventory and list to protect items including (i) Aboriginal place, (ii) State Heritage Register, (iii) Interim Heritage order, and (iv) LEP.

3.5.3.2 Applicability to the subject site

A search of the State Heritage Inventory[2] was undertaken resulting in the item in **PLATE 1** being located within proximity of the subject site:

- Cultural feature – Platypus sculptures / carvings on the bed of the Richmond River beneath, and west of, Irving Bridge (Centre Street).

[2] https://www.hms.heritage.nsw.gov.au/App/Item/SearchHeritageItems?_ga=2.73410962.1480961755.1639350082-1679604799.1601431558

PLATE 1 – PLATYPUS SCULPTURES / CARVINGS ON THE RICHMOND RIVER BED TO THE WEST OF THE IRVING BRIDGE. PHOTO SOURCE:
https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=2850325

This item is outside of the proposed works area and will not be impacted.

3.6 Richmond Valley Local Environmental Plan (2012) (RVLEP 2012)

3.6.1 *Introduction*

The RVLEP 2012 currently applies to land in the Richmond Valley LGA and commenced on 21st April 2012. Among other things, the CHLEP is subject to the provisions of any SEPP that prevails over as provided by section 3.28 of the *Environmental Planning and Assessment Act 1979* (EP & A Act).

3.6.2 *Zoning*

3.6.2.1 Background

The proposed works is located within the RVLGA, in an area covered by the RVLEP 2012. The subject site is zoned as **C2 – Environmental Conservation** and **W1 – Natural Waterways** (**FIGURE 6**).

FIGURE 6 Richmond Valley Local Environmental Plan zoning

3.6.2.2 C2 – Environmental Conservation

The objectives of the C2 zone are:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

Stages 2 and 3 of the proposed works are considered to be consistent with this zone as it will restore and stabilise areas whereby the environmental values have been diminished by severe damage caused by flooding (**APPENDIX 1**), and re-establish an existing asset (i.e. Halstead Drive).

3.6.2.3 W1 – Natural Waterways

The objectives of the W1 zone are:

- To protect the ecological and scenic values of natural waterways.
- To prevent development that would have an adverse effect on the natural values of waterways in this zone.
- To provide for sustainable fishing industries and recreational fishing.

Assessment of the potential impacts of Stage 2 & 3 of the proposed works on the Richmond River is provided in **SECTION 3.5.2** under the FM Act. Notwithstanding this, Stage 2 & 3 of

the proposed works is consistent with this zone as it will improve the ecological and scenic values of the Richmond River that have been diminished due to flooding (**PLATES 1-10** refer).

3.7 Richmond Valley Development Control Plan 2021 (RVDCP)

3.7.1 *Introduction*

The RVDCP has been prepared in accordance with *Section 3.43 of the* EP&A Act and in accordance with *Part 3 of the Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). The aims of the RVDCP are to:

(1) provide detailed provisions with respect to development to achieve the purpose of the RVLEP 2012;

(2) outline requirements for development which meets community expectations and addresses key environmental planning issues relevant to the LGA;

(3) repeal all pre-existing DCPs as they apply within the local government area of Richmond Valley Council.

Part H – Natural Resources and Hazards of the DCP requires further consideration for Stage 2 & 3 of the proposed works.

Part H relates to natural hazards and natural resources and sensitivities provided for within the RVLEP 2012. It provides more detailed information to assist applicants address the requirements contained within the RVLEP 2012 in the preparation of the development application. Part H comprises the following three (3) Chapters:

- *Part H-1 Flood Planning*
- *Part H-2 Acid Sulfate Soils*
- *Part H-3 Natural Resources.*

3.7.2 *Part H-1 – Flood Planning*

Evidenced by the recent damage, the subject site is clearly located within a flood prone zone. Given that Halstead Drive is a non-gazetted road, it is highly unlikely that its reconstruction in the flood zone will *"increase the risk to life and lower the health, social, and psychological trauma associated with flooding, and greatly reduce property damage".*

Notwithstanding the above, and as per H-1.4 of the DCP, the proposed works is considered to represent 'Other Development' whereby *"a combination of design, flood level and freeboard will be used to determine the suitability of development through consultation of the Risk Plans".*

3.7.3 *Part H-2 – Acid Sulfate Soils*

The subject site is not shown on the Acid Sulfate Soils Map, and therefore assessment is not required against Clause 6.1 of the RVLEP 2012.

3.7.4 *Part H-3 – Natural Resources*

3.7.4.1 Background

RVLEP contains the following clauses relating to management of natural resources:

- *clause 6.6 Terrestrial biodiversity*
- *clause 6.7 Landslide risk*
- *clause 6.8 Riparian land and watercourses*
- *clause 6.9 Drinking water catchments*
- *clause 6.10 Wetlands*

Based on interrogation of the relevant RVLEP 2012 Natural Resource Sensitivities (NRS) mapping, the following clauses as part of Part H-3 relate to Stage 2 & 3 of the proposed works:

3.7.4.2 H-4.3 Terrestrial Biodiversity (Clause 6.6. of the RVLEP 2012)

Introduction

(1) The objective of this clause is to maintain terrestrial biodiversity by—

(a) protecting native fauna and flora, and

(b) protecting the ecological processes necessary for their continued existence, and

(c) encouraging the conservation and recovery of native fauna and flora and their habitats.

(2) This clause applies to land identified as "Biodiversity" on the Terrestrial Biodiversity Map.

Under the RVLEP, the proposed works will occur within an area mapped as Biodiversity on the Terrestrial Biodiversity Map (Sheet BIO_006) (**FIGURES 7A & 7B**).

FIGURE 7A BIODIVERSITY AREAS (GREEN) MAPPED OVER AREA 1 OF THE SUBJECT SITE AS PER THE TERRESTRIAL BIODIVERSITY MAP UNDER THE RVLEP 2012.

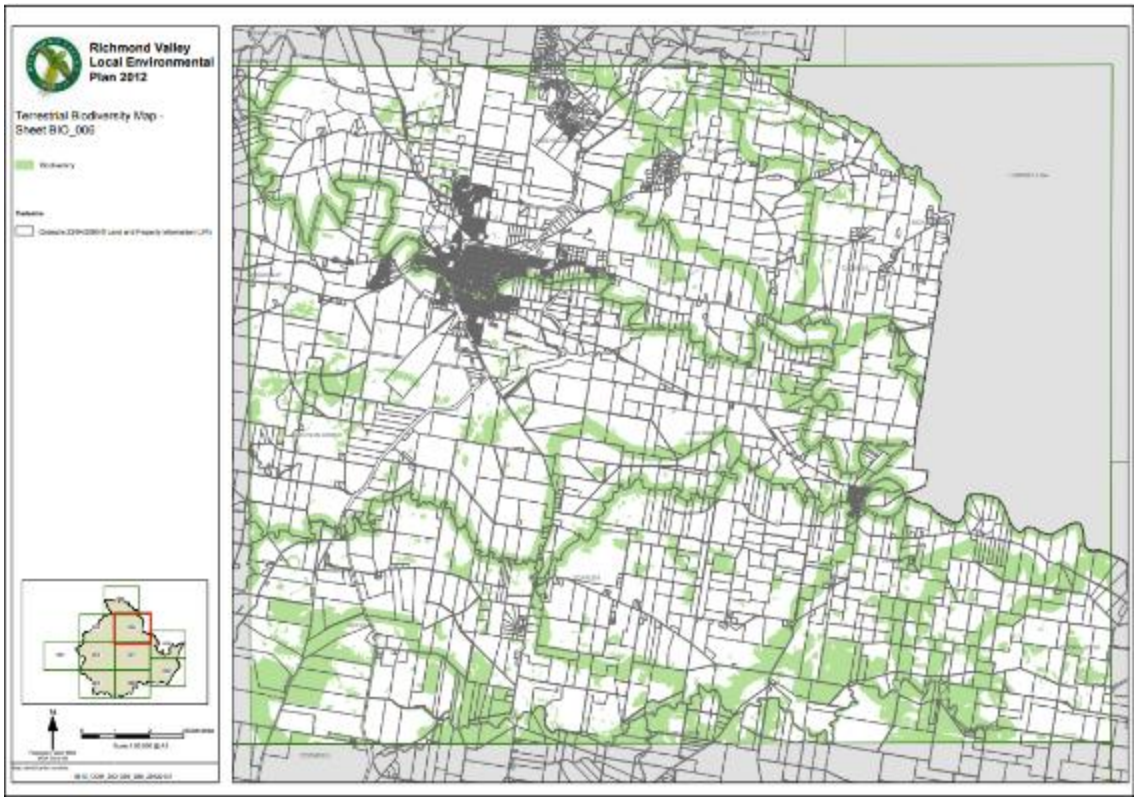

FIGURE 7B TERRESTRIAL BIODIVERSITY MAP (SHEET BIO_006) UNDER THE RVLEP 2012. SOURCE:
https://eplanningdlprod.blob.core.windows.net/pdfmaps/6610_COM_BIO_006_080_20120131.pdf

To determine whether the proposed works will impact the objectives of this clause, the following assessment applies as per the RVLEP 2012:

Clause	**Assessment**
(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider— (a) whether the development— (i) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and (ii) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and (iii) has any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and (iv) is likely to have any adverse impact on the habitat elements providing connectivity on the land, and (b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	The subject site has been severely damaged by floods that has almost entirely removed native vegetation from the proposed works area and directly adjacent. The proposed Stage 2 and 3 works will not directly impact on any vegetation that could be considered important for biodiversity, nor will any impacts occur to any environmental feature more than already exists. Appropriate environmental safeguards will be implemented (e.g., silt fencing, water barriers etc.) to ensure no indirect impacts to the Richmond River occur during construction. The completed clean-up of damaged concrete and materials, and the reconstruction of the existing Halstead Drive will improve the ecological function and condition of the Richmond River and provide opportunities for re-establishment of native vegetation along the stabilised banks.
(4) Development consent must not be granted for development on land to which this clause 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 by adopting feasible alternatives—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.	No impacts are expected to occur for Stage 2 or 3 due to the current condition of the subject site (see response above). The proposed works are limited to the original alignment of Halstead Drive; however, these works are considered essential to improve the condition of the area, re-stablished safe use, and re-stabilise damaged areas.

Applicability to the subject site

The proposed works will occur within an area mapped as Biodiversity under the RVLEP 2012. Given the highly disturbed condition of the area due to flooding damage, and with the implementation appropriate environmental safeguards, Stage 2 & 3 of the proposed works will not impact or negate any of the objectives set out for this Clause under the RVLEP 2012. Conversely, the completed clean-up of damaged concrete and materials during Stage 1 (**APPENDIX 2**), and the reconstruction of the exiting Halstead Drive, will improve the ecological function and condition of the Richmond River and provide opportunities for re-establishment of native vegetation along re-stabilised banks.

3.7.4.3 H-4.5 Riparian Land and Watercourses (Clause 6.8 of the RVLEP 2012)

Introduction

(1) The objective of this clause is to protect and maintain the following—

(a) water quality within watercourses,

(b) the stability of the bed and banks of watercourses,

(c) aquatic and riparian habitats,

(d) *ecological processes within watercourses and riparian areas.*

(2) This clause applies to land identified as "Key Fish Habitat" on the Riparian Land and Waterways Map.

Under the RVLEP 2012, the proposed works will occur within an area mapped as Key Fish Habitat on the Wetlands Map – Riparian Land and Waterways Map (Sheet_CL1_006) (**FIGURES 8A & 8B**).

FIGURE 8A KEY FISH HABITAT (BLUE) MAPPED OVER AREA 1 OF THE SUBJECT SITE AS PER THE WETLAND MAP UNDER THE RVLEP 2012.

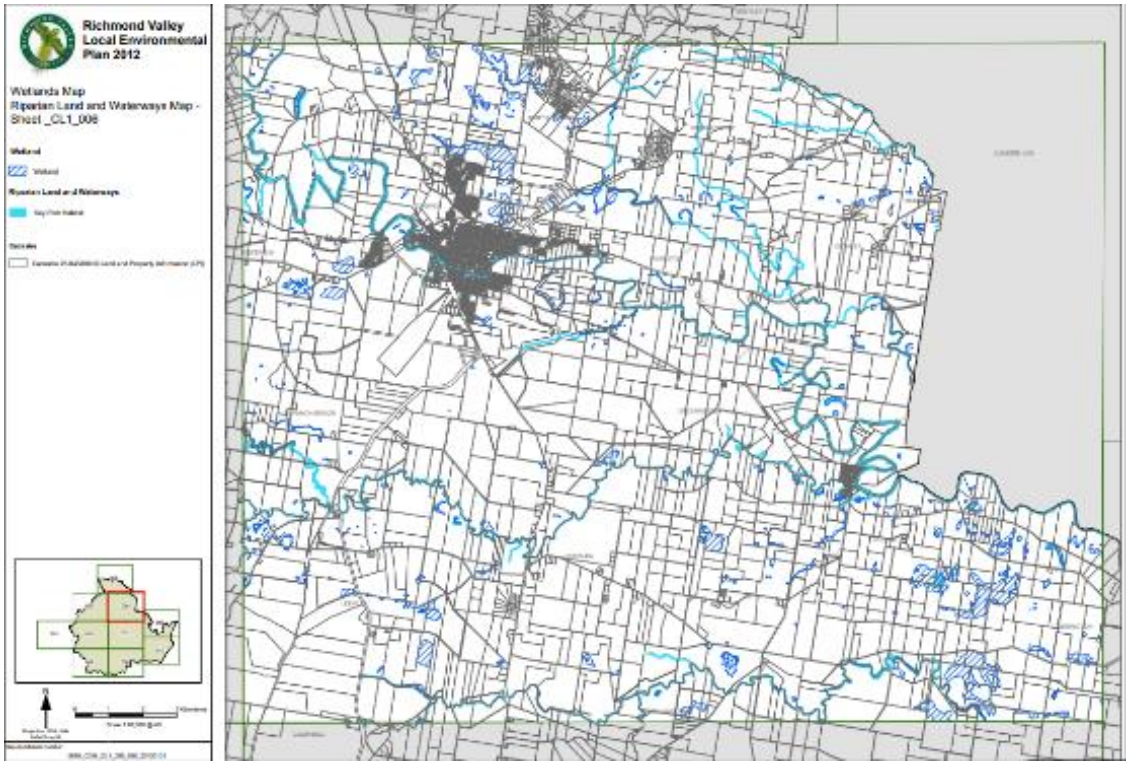

FIGURE 8B WETLANDS MAP RIPARIAN LAND AND WATERWAYS MAP (SHEET_CL1_006) UNDER THE RVLEP 2012[3]

[3] https://eplanningdlprod.blob.core.windows.net/pdfmaps/6610_COM_CL1_006_080_20120131.pdf

To determine whether the proposed works will impact the objectives of this clause, the following assessment applies as per the RVLEP:

Clause	**Assessment**
(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider— (a) whether or not the development is likely to have any adverse impact on the following— (i) the water quality and flows within the watercourse, (ii) aquatic and riparian species, habitats and ecosystems of the watercourse, (iii) the stability of the bed and banks of the watercourse, (iv) the free passage of fish and other aquatic organisms within or along the watercourse, (v) any future rehabilitation of the watercourse and its riparian areas, and (b) whether or not the development is likely to increase water extraction from the watercourse, and (c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	The completed clean-up of damaged concrete and materials during Stage 1, and reconstruction of Halstead Drive will help to improve the water quality and flow, and bank stability of this section of the Richmond River. By association, these remediation works will enhance aquatic habitats and fish passage. Appropriate environmental safeguards will be implemented (e.g., silt fencing, water barriers etc.) to ensure no indirect impacts to the Richmond River occur during construction.
(4) Development consent must not be granted for development on land to which this clause 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 avoided by adopting feasible alternatives—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.	No impacts are expected to occur for Stage 2 or 3 due to the current condition of the subject site (see responses above). In addition, the reconstruction of Halstead Drive will not result in long-term impacts that exceed those that were already in place prior to the flood damage.

Applicability to the subject site

The proposed works will occur within an area mapped as Key Fish Habitat under the RVLEP 2012. Given the current highly disturbed condition of the area due to flooding, and with

the implementation appropriate environmental safeguards, Stage 2 & 3 of the proposed works will not impact or negate any of the objectives set out for this Clause under the RVLEP 2012. Conversely, the completed clean-up of damaged concrete and materials during Stage 1 (**APPENDIX 2**), and the reconstruction of the exiting Halstead Drive will help to improve the water quality and flow, and bank stability of this section of the Richmond River. By association, these remediation works will enhance aquatic habitats and fish passage.

Note: A *Part 7 Fisheries Management Act* permit has been submitted to the Department of Primary Industries for assessment and approval of the proposed works (**SECTION 3.5.2** refers).

4 EXISTING ENVIRONMENT AND IMPACT ASSESSMENT

4.1 Introduction

The potential impacts of the proposed Stage 2 and 3 works on relevant environmental factors have been considered and assessed below.

4.2 Ecology

4.2.1 *Native vegetation*

Due to the damage caused by the floods, and apart from emerging groundcovers that are predominately exotic species, almost all native vegetation has been removed. As a result, the proposed works in this area will not remove native vegetation. Safeguards and mitigation measures have been discussed in **SECTION 5.3.2** regarding potential impacts on adjacent trees / vegetation.

Weeds may be introduced during works in materials or by vehicles in the subject site. Notwithstanding this, the implementation of environmental safeguards and mitigation measures will negate any risk of this occurring (**SECTION 4.3.4** refers).

4.2.2 *Flora*

There is no suitable habitat available to support threatened flora in the subject site. It can be confidently concluded that no threatened flora will be significantly affected by Stage 1 of the proposed works.

Due to the damage caused by the floods, and apart from emerging groundcovers that are predominately exotic species, almost all native vegetation has been removed from the alignment. Remaining adjacent vegetation is sparse or in poor condition but will be demarcated and fenced to ensure maximum protection during the proposed works.

4.2.3 *Fauna*

The proposed works will not result in the loss of habitat for native fauna and given the reconstruction of Halstead Drive will require a systematic approach, the risk of endangering native fauna or creating barriers to movement is very low.

4.2.4 *Impacts*

With consideration of the current disturbed condition of the subject site due to flooding, and the paucity of vegetation and environmental features, it can be confidently concluded from an ecological / environmental perspective that there will not be a significant impact on any threatened species, population, or community. Impacts are further minimised by the implementation of environmental safeguards and mitigation measures (**SECTION 5**).

Overall, the proposed works will (i) not have an impact on flora or fauna, (ii) is not a new development, and (iii) will result in the reconstruction of an existing asset following flood damage in 2022.

Conversely, it is expected that the overall proposed works will ultimately yield a positive outcome by way of the completed clean-up of damaged concrete from within the Richmond River during Stage 1 (**APPENDIX 1 & 2**), and stabilisation of banks and surrounding vegetation due to the reconstruction of the existing Halstead Drive.

4.3 Bushfire hazard

The subject site occurs wither within or adjacent to 'Category 2' bushfire prone land and 'buffer' areas (**FIGURES 9**).

The subject site is void of any mature vegetation and the proposed works involves (among other things) the use of construction materials that are not conducive to an increased bushfire risk. These include (as examples): concrete, gravel, asphalt, road pavements and surfacing.

With the above considered, the proposed works will not increase bushfire risk in any way.

FIGURE 9 BUSHFIRE PRONE LAND SHOWING CATEGORY 2 (YELLOW) AND BUFFER (RED) ZONES MAPPED OVER THE SUBJECT SITE.

4.4 Soil and water

4.4.1 *Acid sulphate soils*

The subject site is not mapped on the Acid Sulfate Soils Map, and therefore potential risk is negligible.

4.4.2 *Erosion and sediment control*

Erosion of sediment from the work site and surrounding area may pose a risk to the receiving environment if appropriate measures are not implemented. Therefore, strict adherence to best management practices will be required to ensure the surrounds are not adversely affected.

The following will apply (as a minimum) to works in the subject site:

- *To minimise run off into the Richmond River, a silt fence should be installed for the length of the works area on the river side. The silt fence should comprise timber stakes and green silt fence, and orange flagging and bollards should also be used to flag off the river area.*
- *During times when machinery is required near the water, Ecospill Silt curtain booms (or similar) with one (1) meter skirts should be installed to control any sediment and/or accidental spills from entering the water.*
- *Water barriers should be installed along the length of the works area prior to and during reconstruction.*

In addition to the above measures (if required), to ensure the works are undertaken with the least environmental impacts, erosion and sedimentation controls will follow the International Erosion Control Associations *Best Practice Erosion and Sediment Control* document and Council / industry best practices.

4.4.3 *Stormwater*

Stormwater pipes existing within the alignment will be reconstructed to ensure no ongoing impacts.

4.4.4 *Flood assessment*

Evidenced by the recent damage, the subject site is clearly located within a flood prone zone. As a result, the reconstruction of Halstead Drive will require additional design considerations in relation to flood risk.

4.5 Noise and air

4.5.1 *Noise*

Noise from the Proposal would be typical of that associated with industrial scale construction work and would result from the use of plant and machinery, work vehicles, earthworks, and infrastructure installation associated with the redevelopment.

The nearest residential dwellings are located approximately 60 m away from the works area. Given the scale, location, and methodology of the proposed works, it is unlikely that it would result in any persistent highly noise-affected level to any nearby residents.

Despite this, it is possible certain noisy works/plant could exceed this level depending on the activity, proximity, and equipment used.

4.5.2 *Air*

The subject site areas are largely open and as such are considered to have good air quality in its current state. During the proposed works there is the potential for the generation of airborne dust emissions from ground disturbance, windblown construction materials and from construction machinery use.

Air pollutants created will consist of exhaust emissions from trucks and machinery and dust from construction activities. Despite this, such emissions would occur only intermittently and are unlikely to significantly affect air quality. It is expected that the successful Contractor would prepare and submit a dust suppression plan to Council for approval prior to works.

4.6 Heritage

4.6.1 *Non-aboriginal heritage*

Searches were conducted of the Australian Heritage Council database (which includes the World Heritage List, the National Heritage List, the Commonwealth Heritage list and the Register of the National Estate), the State Heritage Inventory and the Coffs Harbour LEP heritage listings. The subject site does not contain or is not near any heritage item listed on any of these registers. The subject site is highly disturbed by way of flood damage and/or existing cleared and managed areas. It is therefore considered unlikely that any items of European Heritage would be found in the subject site.

4.6.2 *Aboriginal heritage*

An AHIMS search was undertaken on 19th April 2023 and identified no Aboriginal Sites or Places registered in association with the subject site. Given the disturbed and/or anthropogenic management of each area, it is considered a low likelihood for cultural material. Despite this, and as a matter of caution, relevant safeguards and mitigation measures have been provided in **SECTION 5.9** to ensure that any unlikely discovers are managed suitably.

5 ENVIRONMENTAL SAFEGUARDS AND MITIGATION MEASURES

5.1 Introduction

The following safeguards/mitigation measures would be implemented to ensure minimal environmental impact.

5.2 General measures

All relevant safeguards detailed in this REF should be implemented and complied with throughout all stages of the proposed works.

All construction staff and site personnel would be made aware of their environmental responsibilities and safeguard measures from the REF to minimise environmental impacts.

An onsite meeting would be held with each relevant contractor, construction staff, site personnel and project staff before the commencement of works/activities, including site establishment. The purpose of the meeting is to discuss the environmental safeguards that are required to be implemented for the relevant phase of works. The meeting would also include relevant environmental awareness and toolbox talks.

Relevant environmental aspects to be considered for environmental awareness/toolbox include the limit of works, environmentally sensitive areas (Richmond River), pollution prevention, construction methodology and hazards. The toolbox should also address who is responsible for various components; as an example: inspection and maintenance of sedimentation, erosion and water controls and safeguards along the Richmond River.

Environmental awareness/toolbox talks would commence early in the program and continue as new personnel/contractors are engaged.

5.3 Management of vegetation

5.3.1 *Background*

Given that no established native vegetation is proposed for removal (i.e. no direct impacts), this section discusses specific management strategies for mitigating and/or minimising any potential indirect impacts on vegetation that may be adjacent to the subject site.

5.3.2 *Vegetation protection guidelines (if required)*

No potential impacts to native vegetation are anticipated; however, all activities adjacent to any native tree are to be carried out in such a manner as to minimise any damage to native trees. During the proposed works, any trees that are identified as having a potential to be impacted will be demarcated and fenced prior to construction works in the vicinity. Tree protection fences (if necessary) shall be installed under the supervision of a qualified

ecologist or arborist, and in accordance with the Australian Standard AS 4970-2009 (Protection of trees on development sites).

Trees that have the potential to be impacted by the proposed works will be managed in accordance with the following tree protection guidelines. These procedures will ensure that trees adjacent to the subject site will survive construction works and will remain in a healthy condition. The procedures will also ensure that any activity taking place within the drip line of any retained tree will not significantly impact on the survival of the tree.

The following procedures are to be followed to protect retained vegetation (where applicable):

1. *Identifying a Tree Protection Zone (TPZ)*: All trees deemed a potential to be impacted upon by development works will be marked prior to construction works. The size and shape of a particular protection zone will vary according to individual tree species. The TPZ will remain in place until project completion.
2. *Establishing the TPZ*: The following measures will be taken to protect the tree:
    - Fencing – Temporary fencing consisting of high visibility webbing and star pickets will be installed at the edge of works line prior to construction works. Temporary fencing will remain in place until all works within or immediately adjacent to the retained vegetation have been completed.
    - Trunk protection – 1.8 m high palings strapped to the trunk.
    - Mulching – 100 mm of composted mulch cover over the ground within the TPZ to retain soil moisture and encourage microbial activity.
    - Irrigation – natural moisture levels should be maintained.
    - Drainage – the natural drainage patterns around the root zone should not be altered.
    - Signage – as follows:
        - Tree Protection zone
        - No vehicle movement
        - No storage of building materials
        - No washing of equipment
        - Contact name and number for enquires.

5.3.3 *Stockpile locations*

No storage or stockpiling should occur on the banks of the Richmond River.

5.3.4 *Weed management protocols*

The following weed species management protocols are to be followed:

1. Soil disturbance within areas adjacent to the proposed works shall be kept to a minimum to avoid weed recruitment.
2. Machinery operations are to ensure that propagative material from cleared weeds does not spread across the subject site areas. The earthworks machinery must not introduce weed material to the site or spread such material throughout the subject site.

5.4 Management of fauna

Given the absence of suitable fauna habitat in the subject site, specific management strategies for mitigating and/or minimising the potential impacts on fauna during Stages 2 and 3 are considered unnecessary.

5.5 Soils

To prevent soil erosion and sedimentation during the proposed works, the following mitigation measures should be implemented:

- Land disturbance will be limited to that necessary for implementation of the works.
- Erosion and sedimentation controls will be implemented prior to the commencement of works to capture any sediment passing entering the Richmond River.
- These controls will be kept functional to the end of the works until they are removed.

5.6 Water quality

In addition to the management of soils, the following mitigation measures should be implemented in order to prevent adverse impacts to water quality in the Richmond River:

- Fuels, lubricants or other compounds will be located in suitably bunded areas within/adjacent to the site compound.
- Fuels and other liquids will be stored in small quantities.
- Cleaning of tools and equipment will occur at a suitable wash-down bay or away from hardstand areas.
- No cleaning of tools or equipment will occur within any drainage line, creek or river.
- All equipment will be maintained in good working order and operated according to manufacturer's specifications.

5.7 Noise

The proposed works will be undertaken in accordance with the following EPA recommended standard construction hours in order to avoid and minimise any potential adverse impacts relating to noise:

- Monday to Friday 7:00 am to 6:00 pm
- Saturday 8:00 am to 1:00 pm
- No work on Sundays or public holidays.

Appropriate noise and vibration management measures should be documented in a Construction Environmental Management Plan (CEMP) and implemented to minimise the impact and ensure residents are informed of the works.

5.8 Air quality

Due the temporary duration of the works the level of potential impact is not considered significant and can be managed or minimised through implementation of common safeguards and management measures. It is expected that the successful Contractor would prepare and submit a dust suppression plan to Council for approval prior to works.

5.9 Heritage

In the event artefact material is encountered during earthworks, all works must cease immediately in the vicinity of the find and the following 'Procedure for unexpected discovery of an Aboriginal object' is to be followed:

- STOP WORK, notify all on site crew, isolate and protect the find area and inform Council to organise confirmation that the object is an artefact.

If the above confirms the object is of cultural origin an Archaeologist is to be engaged to undertake the following:

- Recording and reporting of objects salvaged, with relevant site officers;
- Preparation of a 'Harm to Aboriginal Objects Report (Harm Report)' on completion of all earthworks;
- Reburial of the salvaged material adjacent to the previously buried capsule in the riparian corridor;
- Preparation and lodgement of revised Aboriginal Site Impact Recording Form (ASIRF) and Aboriginal Site Recording Form (ASRF);
- Harm Report to be sent by Registered mail to the stakeholders;
- Email copy of the Harm Report, ASIRF and ASRF to Heritage NSW; and
- Lodgement of the Harm Report, ASIRF and ASRF with AHIMS.

6 SUMMARY AND CONCLUSIONS

JWA Pty Ltd have been engaged by Burchills Engineering Solutions and on behalf of Richmond Valley Council (RVC) to complete a Review of Environmental Factors (REF) to accompany an application for the reconstruction of Halstead Drive, Casino.

It is understood that Halstead Drive suffered severe damage during the 2022 (February / March) flood. The project will be carried out in three (3) stages, of which this REF relates specifically to Stage 2 (Geotechnical testing, survey and design) and Stage 3 (reconstruction of Halstead Drive). Stage 1 has now been completed, which involved the removal and disposal of all damaged concrete and materials to restore the access track.

The subject site comprises the damaged Halstead Drive, which is a non-gazetted road that runs along the bank of the Richmond River. This area will be subject to geotechnical testing and the reconstruction of Halstead Drive. Due to the damage caused by the floods, and apart from emerging groundcovers that are predominately exotic species, almost all native vegetation was removed from the alignment.

A review of the statutory considerations for the proposed works determined that no suitable habitat is available in the subject site to support an important population of any of the flora / fauna species listed as threatened under the EPBC Act or BC Act. As a result, and with the implementation of environmental safeguards and mitigation as well as specific construction methods, it can be confidently concluded from an ecological / environmental perspective that there is unlikely to be a significant impact to any threatened species. Accordingly, a Commonwealth approval and a BC Act Species Impact Statement are not considered necessary.

The subject site is mapped as containing areas of high biodiversity value on the Biodiversity Values Map (i.e., associated with the Richmond River; however, no native vegetation will be cleared for Stage 2 or 3 of the proposed works and therefore entry into the BOS is not triggered.

Assessment of the relevant SEPPs, identified the following:

- The subject site areas do not contain any mapped coastal values under the Resilience and Hazards SEPP.
- The Vegetation SEPP applies to the subject site; however, no native vegetation will require clearing for the proposed works.
- The subject site areas do not contain vegetation that is considered to be potential / core koala habitat for the purposes of Chapter 4 - Koala Habitat Protection 2021 of the Biodiversity and Conservation SEPP

Assessment was undertaken for the following additional relevant state legislation:

- *National Parks and Wildlife Act 1974* (NPW Act)

An Aboriginal Heritage Information Management System search was undertaken on 19th April 2023 and identified no Aboriginal Sites or Places registered in association with the subject site areas. As a matter of caution, ongoing care and monitoring is recommended for cultural heritage safeguards, with stop-work actions and liaison with relevant contacts required if artefact material is encountered.

- *Fisheries Management Act 1994 (FM Act)*

The subject site / works area is mapped as Key Fish Habitat under the FM Act. Despite this, all proposed works will occur outside of aquatic habitat areas to prevent any impacts to ecosystem function, fish, or marine vegetation.

The completed clean-up of damaged concrete and materials during Stage 1, and the reconstruction of the exiting Halstead Drive, will improve the ecological function and condition of the Richmond River and provide opportunities for re-establishment of native vegetation along re-stabilised banks. By association, these remediation works will enhance aquatic habitats and fish passage. Appropriate environmental safeguards will be implemented (e.g., silt fencing, water barriers etc.) to ensure no indirect impacts to the aquatic values of the Richmond River occur. A *Part 7 Fisheries Management Act* permit has been submitted for assessment.

- *Heritage Act 1997 (HE Act)*

A search of the State Heritage Inventory identified a platypus sculptures / carvings on the bed of the Richmond River. This item is outside of the proposed works area and will not be impacted.

The proposed works is located within the RVLGA, in an area covered by the RVLEP 2012.The subject site is zoned as (i) C2 – Environmental conservation and (ii) W1 – Natural waterways. The proposed works is consistent with the objectives of each zone in the relevant areas, and in some instances will enhance the values of those zones by way of cleanup and reconstruction of Halstead Drive that will improve the ecological and scenic values of the that have been diminished due to flooding.

Under the RVDCP, the proposed works will occur within an area mapped as Biodiversity and Key Fish Habitat under the RVLEP 2012. Given the current highly disturbed condition of the area due to flooding, and with the implementation appropriate environmental safeguards, Stage 2 and 3 will not impact or negate any of the objectives set out under the RVLEP 2012. Conversely, the completed clean-up of damaged concrete and materials during Stage 1, and reconstruction of the existing Halstead Drive, will improve the ecological function and condition of the Richmond River, including water quality and flow and bank stability. By association, these remediation works will enhance aquatic / terrestrial habitats and fish passage.

The proposed works will not remove native vegetation; however, safeguards and mitigation measures have been provided (if required) to minimise any potential impacts on vegetation / trees that may be adjacent to the subject site. These include (among other things), identification, demarcation and fencing in accordance with Australian Standards. Weeds

may be introduced during works in materials or by vehicles in each of the subject site areas. Notwithstanding this, the implementation of environmental safeguards and mitigation measures will negate any risk of this occurring.

Soil and water disturbance will require management and safeguards by way of best practise sediment and erosion controls, and correct storage and maintenance of (as examples) fuel, liquids, and equipment / tools. It is considered unlikely that the proposed works would result in persistent noise or air pollution to impact nearby residents as it will be undertaken in accordance with EPA recommended standard construction hours.

In addition, the level of air pollution can be easily managed or minimised through implementation of common safeguards and management. It is also expected that the successful Contractor would prepare and submit a dust suppression plan to Council for approval prior to works. Appropriate air noise and vibration management measures should be documented in a Construction Environmental Management Plan and implemented to minimise the impact and ensure residents are informed of the works.

This REF concludes with confidence the proposed works will not have a significant negative impact to ecological / environmental values. This will be further abated by integrating the relevant safeguards and mitigation measures. Overall, the proposed works will (i) not have an impact on flora or fauna species or their habitat listed under the EPBC Act or BC Act, (ii) is not a new development, and (iii) will result in the reconstruction of an existing asset following flood damage in 2022.

Conversely, it is expected that the overall proposed works will ultimately yield a positive outcome by way of the completed clean-up of damaged concrete from within the Richmond River during Stage 1, and stabilisation of banks and surrounding vegetation due to the re-establishment of the existing Halstead Road during Stages 2 and 3.

APPENDIX 1 – PRE-STAGE 1 WORKS

PLATES 1-10 show the damage caused by the 2022 flood event and the poor environmental condition prior to Stage 1 of the proposed works.

PLATE 1

PLATE 2

PLATE 3

PLATE 4

PLATE 5

PLATE 6

PLATE 7

PLATE 8

PLATE 9

PLATE 10

APPENDIX 2 – POST-STAGE 1 WORKS

PLATES 11-15 show the current condition of the Halstead Drive alignment following the cleanup and restoration during Stage 1 of the proposed works.

PLATE 11

PLATE 12

PLATE 13

PLATE 14

PLATE 15

APPENDIX 3 - HABITAT SUITABILITY ASSESSMENTS

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Mixophyes fleayi	Fleay's frog	E	E	Fleay's frog is associated with montane rainforest (Corben & Ingram 1987) and open forest communities adjoining rainforest (Hines 2001, pers. comm.). The species occurs along stream habitats from first to third order streams (i.e. small streams close to their origin through to permanent streams with grades of 1 in 50) and is not found in ponds or ephemeral pools. Adults may be found in leaf litter and along watercourses in rainforest and adjoining wet sclerophyll forests (Hines & SEQTFRT 2002).	There are no records of the Fleay's frog from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Mixophyes iteratus	Giant barred frog	E	V	Giant barred frogs are found along freshwater streams with permanent or semi-permanent water, generally (but not always) at lower elevation. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. However, giant barred frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams.	There are no records of the Giant barred frog from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Birds						
Actitis hypoleucos	Common sandpiper		M	This 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. This species 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. This species generally forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves (Dept. Environment 2012).	There are no records of the Common sandpiper from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Anseranas semipalmata	Magpie goose	V		A waterbird that is mainly found in shallow wetlands, where the depth of water is less than 1 m and dense reeds and rushes are present.	There are eight (8) records of the Magpie goose from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Anthochaera phrygia	Regent honeyeater	CE	CE	The Regent honeyeater is found from Dalby in QLD, south to Bendigo in Victoria, especially along the ranges and the western slopes. Its	There are no records of the Regent honeyeater from within 10 km of the subject site from the NSW BioNet online database.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				distribution is extremely patchy with only a small number of known breeding sites. The estimated total population is between 350 and 400 mature individuals. Potential habitat for this species includes dry eucalypt woodland and open forest, rural and urban areas with mature eucalypts. It favours ironbark-box associations, mugga ironbark (*Eucalyptus sideroxylon*), white box (*E. albens*), and yellow box (E. *melliodora*). Other habitat includes swamp mahogany (*E. robusta*), spotted gum (*Corymbia maculata*), or river she-oak (*Casuarina cunninghamiana*) with associated needle-leaf mistletoe (*Amyema cambagei*). This species generally prefers wetter, more fertile sites that are reliable nectar producers (both in timing and quantity), such as creek flats, river valleys and lower slopes (OEH 2014).	No suitable habitat observed on the subject site.	
Apus pacificus	Fork-tailed swift		M	This is a primarily aerial species, usually occurring above dry or open habitats, but also occasionally above rainforest and wet sclerophyll forests. They have been recorded above settled areas such as farmlands, towns, and cities.	There are no records of the Fork-tailed swift from within 10 km of the subject site from the NSW BioNet online database. This species may forage above the subject site.	**Possible**
Botaurus poiciloptilus	Australasian bittern		**E**	The Australasian bittern is widespread but uncommon in south-west and south-east Australia, generally preferring freshwater	There are no records of the Australasian bittern within 10 km of the subject site from the NSW BioNet online database.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				habitats with tall, dense vegetation with bulrushes and spike rushes.	No suitable habitat observed on the subject site.	
Calidris acuminata	Sharp-tailed sandpiper		M	The Sharp-tailed Sandpiper prefers the grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Its breeding habitat in Siberia is the peat-hummock and lichen tundra of the high Arctic.	There are no records of the Sharpe-tailed sandpiper within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Calidris ferruginea	Curlew sandpiper		M, CE	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	There is one (1) record of the Curlew sandpiper within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Calidris melanotos	Pectoral sandpiper		M	Small, migratory wader that prefers shallow fresh to saline wetlands. This species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains, and artificial wetlands.	There are no records of the Pectoral sandpiper within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Calyptorhynchus lathami lathami	Glossy black cockatoo	V	V	This species is associated with woodland or open sclerophyll forests with populations of	There are two (2) records of the Glossy-black cockatoo from within 10 km of the	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				Allocasuarina, which comprise its exclusive diet. They require large old trees with hollows for nesting.	subject site from the NSW BioNet online database. Very limited suitable forage habitat was noted adjacent to the subject site; however, potentially suitable nesting habitat by way of nest hollows is absent.	
Carterornis leucotis	White-eared monarch	V		In NSW, White-eared monarchs occur in rainforest, especially drier types, such as littoral rainforest, as well as wet and dry sclerophyll forests, swamp forest and regrowth forest.	There is one (1) record of the White-eared monarch from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Climacteris picumnus victoriae	Brown treecreeper	V		Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range. This species mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. It is also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. Fallen timber is an important habitat component for foraging. The Brown treecreeper has been recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	There is one (1) record of the Brown treecreeper from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				Hollows in standing dead or live trees and tree stumps are essential for nesting.		
Coracina lineata	Barred cuckoo-shrike	V		Found in rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses. They are usually seen in pairs or small flocks foraging among foliage of trees for insects and fruit. They are active birds, frequently moving from tree to tree.	There is one (1) record of the Barred cuckoo-shrike from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Cuculus optatus	Oriental cuckoo		M	This species is found in monsoon forests, the edges of rainforests, treed paddocks, mangroves, roadsides, and river flats (Pizzey and Knight 1999).	There are no records of the Oriental cuckoo within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Cyclopsitta diophthalma coxeni	Coxen's fig parrot	CE	E	Usually recorded from drier rainforests and adjacent wetter eucalypt forest but rarely seen due to its small size and cryptic habits. Also found in the wetter lowland rainforests that are now largely cleared in New South Wales.	There are no records of the Coxen's fig parrot within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Dasyornis brachypterus	Eastern bristlebird		E	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern New South Wales the habitat occurs in open forest with dense tussocky grass understorey and sparse	There are no records of the Eastern bristlebird within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				mid-storey near rainforest ecotone; all of these vegetation types are fire prone.		
Ephippiorhynchus asiaticus	Black-necked stork	E		Floodplain wetlands (swamps, billabongs, 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.	There are 98 records of the Black-necked stork from within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, the Black-necked stork is likely to occupy habitat in nearby areas; however, is unlikely to utilise habitat available on the subject site.	**Possible**
Erythrotriorchis radiatus	Red goshawk	CE	V	This species occupies open forests and woodlands along rivers and wetlands and rainforest fringes. In NSW favoured habitat includes *Melaleuca* forest along coastal rivers (Debus 1991, 1993).	There are no records of the Red goshawk from within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, it cannot be conclusively ruled out that the Red goshawk may traverse the area infrequently. Notwithstanding, this species in unlikely to utilise habitat available on the subject site.	**Possible**
Falco hypoleucos	Grey falcon	E	V	This species is associated with arid or semi-arid environments, where it can be found in shrublands, grasslands, watercourses, and wetlands.	There are no records of the Grey falcon within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, it cannot be conclusively ruled out that the Grey falcon may traverse the area infrequently. Notwithstanding, this species	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
					in unlikely to utilise habitat available on the subject site.	
Gallinago hardwickii	Latham's snipe		M	This species generally occupies flooded meadows, seasonal or semi-permanent swamps, or open waters bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. Dense fringing vegetation is preferred by this species, but it has been recorded in waterlogged paddocks.	There are no records of the Latham's snipe within 10 km of the subject site from the NSW BioNet online database. Despite an absence of records, the presence of the Richmond River means it cannot be conclusively ruled out that the Latham's snipe occurs in the area from time-to-time. Notwithstanding, no suitable vegetation is available in the subject site.	**Possible**
Grantiella picta	Painted honeyeater		V	The Painted honeyeater is found in dry open forests and woodlands and is strongly associated with mistletoe. It may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation. It has been seen in urban parks and gardens where large eucalypts are available.	There are no records of the Painted honeyeater from within 10 km of the subject site from the NSW BioNet online database. Despite an absence of records, the presence of the Richmond River means it cannot be conclusively ruled out that the Painted honeyeater occurs in the area from time-to-time. Notwithstanding, no suitable vegetation is available in the subject site.	**Possible**
Haliaeetus leucogaster	White-bellied sea-eagle	V	M	This species has a large distribution range, and is found in association with coasts, large rivers and estuaries and prefers to nest in large trees adjacent watercourses.	There is one (1) record of the White-bellied sea-eagle from within 10 km of the subject site from the NSW BioNet online database.	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
					This species is likely to aerially traverse the subject site while foraging along the Richmond River.	
Hirundapus caudacutus	White-throated needletail		V, M	This species is recorded in all coastal regions of QLD and NSW and almost always forages aerially. Most often, the species is recorded 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.	There are no records of the White-throated needletail from within 10 km of the subject site from the NSW BioNet online database. This species may forage above the subject site.	**Possible**
Irediparra gallinacea	Comb-crested jacana	V		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.	There are 12 records of the Comb-crested jacana from within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, it cannot be conclusively ruled out that the Comb-crested jacana occurs in the area from time-to-time. Notwithstanding, this species in unlikely to utilise habitat available on the subject site.	**Possible**
Ixobrychus flavicollis	Black bittern	V		Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest, and mangroves.	There is one (1) record of the Black bittern from within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, it cannot be conclusively ruled out that the Black bittern occurs in the area from time-	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
					to-time. Notwithstanding, this species in unlikely to utilise habitat available on the subject site.	
Lathamus discolor	Swift parrot	E	CE	The swift parrot migrates from its Tasmanian breeding grounds to overwinter in the box-ironbark forests and woodlands of Victoria, NSW, and southern QLD.	There are no records of the Swift parrot within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Limosa limosa	Black-tailed godwit	V		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, saltflats, river pools, swamps, lagoons and floodplains.	There is one (1) record of the Black-tailed godwit 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Melanodryas cucullata cucullata	South-eastern hooded robin		E	This species prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. It requires structurally diverse habitats featuring mature eucalypts, saplings, some	There are no records of the South-eastern hooded robin 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				small shrubs and a ground layer of moderately tall native grasses.		
Monarcha melanopsis	Black-faced monarch		M	This species 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, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. During winter or migration, this species also occurs in marginal habitats such as 20-30 years old regrowth rainforest, nearby open eucalypt forest (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as dry sclerophyll forests and woodlands, often with a patchy understorey.	There are no records of the Black-faced monarch from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Motacilla flava	Yellow wagtail		M	Inhabits open country near water, such as wet meadows. It nests in tussocks.	There are no records of the Yellow wagtail within 10 km of the subject site from the NSW BioNet online database. No suitable habitat has been observed on the subject site.	**Unlikely**
Myiagra cyanoleuca	Satin flycatcher		M	This species occurs in heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occurs in coastal	There are no records of the Satin flycatcher from within 10 km of the subject site from the NSW BioNet online database.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				forests, woodlands, mangroves and drier woodland and open forests.	This species has not been recorded on the subject site during previous or recent targeted surveys. Although considered less likely, it cannot be conclusively ruled out that the Satin flycatcher utilises marginal habitat on the subject site during migration.	
Numenius madagascariensis	Eastern curlew		CE	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	There are no records of the Eastern curlew within 10 km of the subject site from the NSW BioNet online database. No suitable habitat has been observed on the subject site.	**Unlikely**
Oxyura australis	Blue-billed duck	V		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. They usually nest solitarily in Cumbungi over deep water between September and February. They will also nest in trampled vegetation in	There are six (6) records of the Blue-billed duck within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, it cannot be conclusively ruled out that the Blue-billed duck occurs in the area from time-to-time. Notwithstanding, this species in unlikely to utilise habitat available on the subject site.	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed.		
Pandion cristatus	Eastern osprey	V	M	This species is found in littoral and coastal habitats, occasionally following large watercourses inland. It requires extensive open areas of water for foraging.	There is one (1) rcord of the Eastern osprey from within 10 km of the subject site from the NSW BioNet online database. This species is likely to aerially traverse the subject site while foraging along the Richmond River.	**Possible**
Rhipidura rufifrons	Rufous fantail		M	In east and south-east Australia, the Rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallowwood (*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*), Sassafras (*Doryphora sassafras*) and Sweet pittosporum (*Pittosporum undulatum*) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When	There are no records of the Rufous fantail from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat has been observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				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. 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 *Melaleuca* spp.		
Rostratula australis	Australian painted snipe	E	E	This species inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps, and clay pans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum Muehlenbeckia or canegrass or sometimes tea-tree (Melaleuca). Breeding habitat requirements appear to be specific and includes shallow wetlands with areas of bare wet mud, with both upper and canopy cover nearby. Nest records are predominately from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense	There are four (4) records of the Australian painted snipe from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat has been observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				low cover and sometimes some tall dense cover.		
Stagonopleura guttata	Diamond Firetail	V		The Diamond firetail is typically found in grassy eucalypt woodlands (including Box-Gum woodlands and Snow Gum Eucalyptus pauciflora woodlands), and is often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. It also occurs in open forest, mallee, natural temperate grassland, and in secondary grassland derived from other communities. Nests are built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting.	There are no records of the Diamond firetail from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat has been observed on the subject site.	**Unlikely**
Stictonetta naevosa	Freckled duck	V		The Freckled duck prefers 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. They generally rest in dense cover during the day, usually in deep water.	There are 12 records of the Freckled duck within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, it cannot be conclusively ruled out that the Freckled duck occurs in the area from time-to-time. Notwithstanding, this species in unlikely to utilise habitat available on the subject site.	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Symposiachrus trivirgatus	Spectacled monarch		M	The Spectacled monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	There are no records of the Spectacled monarch from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat has been observed on the subject site.	**Unlikely**
Tringa nebularia	Common greenshank		M	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. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. It was once recorded with Black-winged Stilts (*Himantopus himantopus*) in pasture, but	There are no records of the Common greenshank from within 10 km of the subject site from the NSW BioNet online database. Given the presence of the Richmond River, it cannot be conclusively ruled out that the Common greenshank occurs in the area from time-to-time. Notwithstanding, this species in unlikely to utilise habitat available on the subject site.	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				are generally not found in dry grassland (Higgins & Davies 1996).		
Turnix maculosus	Red-backed button-quail	V		The red-backed button-quail prefers sites near water, including grasslands and sedgelands near creeks, heaths, swamps, springs, and wetlands. They usually breed in dense grass near water, and nests are made in a shallow depression sparsely lined with grass and ground litter. The species has been observed associated with the following grasses (in various vegetation formations): speargrass Heteropogon, Blady Grass Imperata cylindrica, Triodia, Sorghum, and Buffel Grass Cenchrus ciliaris.	There are two (2) records of the Red-backed button quail within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Turnix melanogaster	Black-breasted button quail	CE	V	This species is restricted to areas mostly with 770-1200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, Araucarian microphyll vine forest and Araucarian notophyll vine forest. This species may also be found in low, dense acacia thickets and in littoral areas, in vegetation behind sand dunes. An extensive dense leaf-litter layer is required for foraging and possibly also roosting. Fallen logs and a dense, heterogeneously distributed shrub layers are also considered to be important habitat characteristics for shelter and breeding.	There are no records of the Black-breasted button quail within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Tyto longimembris	Eastern grass owl	V		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. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy vegetative growth.	There is one (1) record of the Eastern grass owl from within 10 km of the subject site from the NSW BioNet online database. Potentially suitable habitat is available on the subject site (i.e., vegetation communities 9-10).	**Unlikely**
Invertebrates						
Argynnis hyperbius inconstans	Australian fritillary	**E**	CE	Restricted to open, swampy, coastal areas where the larval food plant, *Viola betonicifolia*, grows as a small, ground herb in association with *Lomandra longifolia* (long leaved matrush) and grasses, especially the grass *Imperata cylindrica* (blady grass).	There are no records of the Australian fritillary within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Mammals						
Chalinolobus dwyeri	Large-eared pied bat	V	V	This species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors that are used for foraging. Almost all records have been found within several kilometres of cliff lines or rocky terrain. Roosting has also been observed in disused mine shafts, caves, overhangs, and disused fairy martin (*Hirundo ariel*) nests. The structure of primary nursery roosts appears to	There are no records of the Large-eared pied bat within 10 km of the subject site from the NSW BioNet online database. No suitable roosting or forage habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				be very specific, *i.e.* arch caves with dome roofs (that need to be deep enough to allow juvenile bats to learn to fly safely inside) and with indentations in the roof (presumably to allow the capture of heat). These physical characteristics are very uncommon in the landscape and therefore a limiting factor to the species distribution.		
Dasyurus maculatus	Spotted-tail quoll	V	E	This species is recorded from a wide range of habitats, including montane rainforests, sclerophyll forests (*e.g.* open, closed, wet), coastal heathlands, sub-alpine woodlands, and riparian forests. It prefers mature wet forests that have not been logged and require large areas of relatively intact forest for foraging. Preferred den sites include hollow logs, caves, or rocky outcrops for daytime shelter.	There are no records of the Spotted-tailed quoll from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Macropus dorsalis	Black-striped wallaby	**E**		Preferred habitat is characterised by dense woody or shrubby vegetation within three metres of the ground. This dense vegetation must occur near a more open, grassy area to provide suitable feeding habitat. On the north coast, this species is closely associated with dry rainforest but also occur in moist eucalypt forest with a rainforest understorey or a dense shrub layer.	There are two (2) records of the Black-striped wallaby from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	**V**		Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	There are eight (8) records of the Eastern Coastal Free-tailed Bat from within 10 km of the subject site from the NSW BioNet online database. No suitable roosting or forage habitat observed on the subject site.	**Unlikely**
Miniopterus australis	Little Bent-winged Bat	**V**		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. Roosting occurs in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings.	There are four (4) records of the Little bent-winged bat from within 10 km of the subject site from the NSW BioNet online database. This species may traverse the area while foraging; however, the subject site contains no habitat to be of importance.	**Unlikely**
Miniopterus orianae oceanensis	Large Bent-winged Bat	**V**		Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings, and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the treetops.	There is one (1) record of the Large bent-winged Bat from within 10 km of the subject site from the NSW BioNet online database. No suitable roosting or forage habitat observed on the subject site.	**Unlikely**
Notamacropus parma	Parma Wallaby	**V**		Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. During the day they shelter in dense cover.	There are no records of the Parma wallaby within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Nyctophilus bifax	Eastern long-eared bat	V		Lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured. Roosts in tree hollows, the hanging foliage of palms, in dense clumps of foliage of rainforest trees, under bark and in shallow depressions on trunks and branches, among epiphytes, in the roots of strangler figs, among dead fronds of tree ferns and less often in buildings.	There is one (1) record of the Eastern long-eared bat from within 10 km of the subject site from the NSW BioNet online database. No suitable roosting or forage habitat observed on the subject site.	**Unlikely**
Petauroides volans	Greater glider	E	E	This species is found in eucalypt forests and woodlands. It prefers forests with a good diversity of eucalypt species to provide consistent forage opportunities year-round, and is found in the greatest abundance in tall, montane, moist old growth forests.	There are no records of the Greater glider within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Petaurus australis	Yellow-bellied glider	V		Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	There are no records of the Yellow-bellied glider within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Petaurus norfolcensis	Squirrel glider	V		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	There is one (1) record of the Squirrel glider within 10 km of the subject site from the NSW BioNet online database.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	No suitable habitat observed on the subject site.	
Petrogale penicillata	Brush-tailed rock-wallaby		V	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.	There are no records of the Brush-tailed rock-wallaby within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Phascogale tapoatafa	Brush-tailed phascogale	V		Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Within their home range individuals require multiple, large hollow bearing trees (DBH >80 cm) in which to nest.	There are two (2) records of the Brush-tailed phascogale within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Phascolarctos cinereus	Koala	E	E	This species inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities where suitable food trees are present. The koala is a leaf-eating specialist that feeds primarily during dawn, dusk, or night. Its diet is restricted mainly to foliage of a small selection of preferred *Eucalyptus* spp; however, it may also consume foliage of related genera, including *Corymbia* spp., *Angophora* spp., *Melaleuca* spp., and *Lophostemon* spp.	There are 28 records of the Koala from within 10 km of the subject site from the NSW BioNet online database. Suitable habitat was observed along the upper banks of the Richmond River.	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Potorous tridactylus tridactylus	Long-nosed potoroo	**V**	V	This species inhabits coastal heath and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an important habitat feature, and may consist of grasstrees, sedges, ferns, or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	There are no records of the Long-nosed potoroo within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Pseudomys novaehollandiae	New Holland mouse		V	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	There are no records of the New Holland mouse within 10 km of the subject site from the NSW BioNet online database. No suitable habitat observed on the subject site.	**Unlikely**
Pteropus poliocephalus	Grey-headed flying-fox	V	V	This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. This species feeds on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia*, and fruits of rainforest trees and vines. It also feeds on commercial fruit crops and on introduced tree species in urban areas. The grey-headed flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are generally located within 20 km of a regular food source and are typically located near water, such as lakes, rivers, or the coast. Roost vegetation includes	There are 324 records of the Grey-headed flying-fox from within 10 km of the subject site from the NSW BioNet online database. Suitable forage habitat by way of flowering or fruiting trees is available along the Richmond River. As a result, the Grey-headed flying-fox is likely to traverse the area while foraging; however, the subject site provides no suitable vegetation.	**Possible**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
				rainforest patches, stands of *Melaleuca*, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas. The species can maintain fidelity to roost sites for extended periods, although new sites have been colonized.	
Scoteanax rueppellii	Greater broad-nosed bat	V		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. This species predominately roosts in tree hollows; however, has been recorded using buildings.	There is one (1) record of the Greater broad-nosed bat from within 10 km of the subject site from the NSW BioNet online database. No suitable roosting or forage habitat observed on the subject site.	**Unlikely**
Thylogale stigmatica	Red-legged pademelon	V		Inhabits forest with a dense understorey and ground cover, including rainforest, moist eucalypt forest and vine scrub.	There is one (1) record of the Red-legged pademelon from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat was observed on the subject site.	**Unlikely**
Reptiles						
Cacophis harriettae	White-crowned snake	V		Favours low to mid-elevation dry eucalypt forest and woodland, particularly areas with a varied and well-developed litter layer, where their prey of small lizards may be more abundant. Also occasionally found in moist eucalypt forest and coastal heathland.	There is one (1) record of the RWhite-crowned snake from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat was observed on the subject site.	**Unlikely**

Scientific name	Common name	BC Act*	EPBC Act#	Habitat assessment[1]	Records and Suitable Habitat	Likelihood of occurrence
Amphibians						
Coeranoscincus reticulatus	Three-toed snake-tooth skink	V	V	This species inhabits rainforest and occasionally moist eucalypt forest, on loamy or sandy soils. This species feeds on earthworms and beetle grubs and is found in leaf litter, often immediately adjacent to fallen tree trunks.	There are no records of the Three-toed snake-tooth skink from within 10 km of the subject site from the NSW BioNet online database. No suitable habitat was observed on the subject site.	**Unlikely**

* *NSW Biodiversity Conservation Act 2016* (BC Act)

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act)

CE – Critically Endangered, E – Endangered, V – Vulnerable, M – Migratory (marine, terrestrial or listed)

() listed but not found in site database search.

[1] Sources (including specific literature references) from:

- DAWE (2022) *Species Profile and Threats Database*. Department of Agriculture, Water and the Environment (DAWE). Australian Government. Available at http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.
- DES (2022). *Species Profile Search*. Department of Environment and Science (DES), Queensland Government.
- DoPIE (2022). *Threatened biodiversity profile search*. Office of Environment and Heritage, Department of Planning, Industry and Environment (DoPIE), New South Wales Government.