

# Report

15 January 2025

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<b>From</b>	Kirsten Crosby	<b>Project No.</b>	12599206
<b>Project Name</b>	Gillieston Public School redevelopment and new public preschool		
<b>Subject</b>	Biodiversity Assessment Report		

## 1. Activity

Gillieston Public School has been identified by the NSW Department of Education (DoE) as requiring redevelopment. The proposed Gillieston Public School redevelopment and new public preschool (the activity) is driven by service need including an increase in expected student enrolments, the removal of a demountable structure and replacement with permanent teaching spaces.

The Gillieston Public School redevelopment and new public preschool comprises the following activities:

- Demolition and removal of existing temporary structures
- Site preparation activities, including demolition, earthworks, tree removal
- Construction of:
  - 32 permanent general learning spaces and 3 support teaching spaces
  - Administration and staff hubs
  - Hall, canteen and library
  - Out of school hours care facility
  - Public preschool (standalone building for 60 places)
  - Covered Outdoor Learning Areas (COLAs)
  - Outdoor play areas, including games courts and yarning circle
  - New at-grade car parking
- The project also includes:
  - Extension of the existing drop-off / pick-up area and new bus bay
  - Realignment of the existing fencing
  - Associated stormwater infrastructure upgrades
  - Associated landscaping
  - Associated pedestrian and road upgrade activities.

## 2. Background

### 2.1 Introduction

This report presents the results of biodiversity investigations undertaken for the proposed Gillieston Public School redevelopment and new public preschool (the subject site). The activity is now being assessed as a Review of Environmental Factors under Part 5 of the EP&A Act. GHD has previously conducted a site visit and prepared a biodiversity constraints assessment for this school (GHD 2023). This report draws on the results of this previous assessment.

The aims of this Biodiversity assessment report are to:

- Describe the existing environment within the site, including vegetation types, fauna habitats and flora and fauna species known or likely to occur.
- Assess the value and conservation significance of native vegetation and habitats in the study area.
- Compile a list of threatened biota previously recorded or predicted to occur in the locality and assess their potential to occur at the site.
- Assess the likely impacts on threatened biota from the proposed activity.
- Recommend mitigation measures to reduce impacts on biodiversity values.
- Provide concluding statements regarding the likely significance of impact of the proposed activity on threatened biota listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and/or *Fisheries Management Act 1995* (FM Act), or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Matters of National Environmental Significance (MNES) including threatened and migratory biota, and the requirement or otherwise for further assessment or approvals at the State or Commonwealth level.

## 2.2 Legislative context

### 2.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act forms the legal and policy platform for assessment and approval in NSW and aims to, inter alia, 'encourage the proper management, assessment and conservation of natural and artificial resources'. Development in NSW is assessed in accordance with the provisions of the EP&A Act and EPA Regulation 2000. Under section 5.5 (1) of the EP&A Act, determining authorities must 'examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity'. The EP&A Act is subject to the provisions of Part 7 of the BC Act and Part 7A of the FM Act. Part 7.3 of the BC Act and section 220ZZ of the FM Act list factors that must be taken into account when determining the significance of potential impacts of a proposed activity on threatened species, populations or ecological communities (or their habitats) listed under the BC Act and/or FM Act.

### 2.2.2 Biodiversity Conservation Act 2016

The BC Act provides legal status for biota of conservation significance in NSW. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act aims, amongst other things, to maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations, and to support conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature.

Part 7.3 of the BC Act lists five factors that must be taken into account when determining the significance of potential impacts of a proposed activity on threatened species, populations or ecological communities (or their habitats) listed under the BC Act. The 'five part test' or 'assessment of significance' is used to assist in the determination of whether a project is 'likely' to impose 'a significant effect' on threatened biota and thus whether a Species Impact Statement (SIS) is required. There is also the option to prepare a Biodiversity Development Assessment Report (BDAR) rather than a SIS, where a significant impact is likely.

This report provides a summary of terrestrial biodiversity values present at the site and an assessment of potential impacts of the proposed activity.

### 2.2.3 Fisheries Management Act 1994

The objectives of the FM Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. It provides for the listing of threatened species, populations and ecological communities, key threatening processes and requirements or otherwise for the preparation of a SIS. One of the objectives of the FM Act is to 'conserve key fish habitats' which includes aquatic habitats that are important to the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. To assist in the protection of key fish habitats, DPI has produced the *Policy and guidelines for fish habitat conservation and management* (DPI, 2013).

This report provides a summary of biodiversity values present at the site and an assessment of potential impacts of the proposed activity.

### 2.2.4 Environmental Protection and Biodiversity Conservation Act 1999

The purpose of the Commonwealth EPBC Act is to ensure that actions likely to cause a significant impact on matters of national environmental significance (MNES) undergo an assessment and approval process. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for the Environment. MNES of potential relevance to this site include threatened species and ecological communities and migratory species.

This report provides a summary of biodiversity values present at the site and an assessment of potential impacts of the proposed activity on MNES.

## 2.3 Significance of environmental impacts

Based on the identification of potential impacts and an assessment of the nature and extent of the impacts of the proposed activity it is determined that all potential impacts can be appropriately mitigated to ensure that there is minimal impact on the locality, community and the environment.

Mitigation measures are discussed in Table 1.

## 2.4 Scope and limitations

*This report: has been prepared by GHD for NSW Department of Education and may only be used and relied on by NSW Department of Education for the purpose agreed between GHD and NSW Department of Education as set out in section 2.1 of this report.*

*GHD otherwise disclaims responsibility to any person other than **NSW Department of Education** arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on information obtained from the site inspection. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points. Investigations undertaken in respect of this report are constrained by the particular site conditions at the time of the survey. As a result, not all relevant site features and conditions may have been identified in this report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 2.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.*

### Accessibility of documents

*If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.*

### 3. Site description

The subject site is identified as 100 Ryans Road and 19 Northview Street, Gillieston Heights, legally described as Lot 5 DP 1162489 and Part Lot 2 DP 1308605. The subject site is located within the Maitland Local Government Area (LGA) and is zoned RU2 Rural Landscape and R1 General Residential zone under the provisions of the Maitland Local Environmental Plan 2011 (MLEP2011).

Existing attributes of the subject site are noted as follows:

- The subject site exhibits an area of approximately 23,385m<sup>2</sup> and is located in the suburb of Gillieston Heights.
- The subject site has a frontage to Ryans Road to the west, Gillieston Road to the north, and Northview Street to the south
- In its existing state, the subject site comprises the existing Gillieston Public School. Existing school buildings are primarily located in the west portion of the subject site with a large area of open space situated in the eastern portion. There are limited permanent structures located on the subject site with thirteen (13) existing demountable classrooms currently occupying the subject site. Permanent buildings consist of the Main Administration Building, Original Brick Cottage, Library and GLS building located in the centre of the subject site; and
- Carparking is provided from Gillieston Road for staff. Pedestrian access is available via this main entrance from Gillieston Road and via a separate pedestrian-only access gate on Northview Street and Ryans Road.

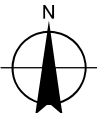
The existing site context is shown in Figure 1 and Figure 2 below.



**LEGEND**

- Subject site
- Lot
- Watercourse

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Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



School Infrastructure NSW  
Gillieston Public School Redevelopment -  
Biodiversity Assessment Report

Project No. 12599206  
Revision No. 0  
Date 23/10/2024

Cadastral map

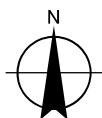
FIGURE 1





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 Metres

Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
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**Biodiversity Assessment Report**

Project No. **12599206**  
 Revision No. **0**  
 Date **23/10/2024**

**Site aerial map**

**FIGURE 2**



### 3.1 Vegetation and flora

GHD conducted a survey at the subject site on 7 December 2022 (refer to GHD 2023, attached as Appendix A to this report). Note that surveys in 2022 did not include assessment of part Lot 213 DP 1186997. The subject site comprises cleared, modified land dominated by exotic grasses with planted native and exotic trees and shrubs and up to seven native trees that may be remnant. The groundlayer on the subject site was dominated by *Cynodon dactylon*, *Ehrharta erecta* and *Plantago lanceolata* with patches of bare earth. The trees on site were mostly planted exotic or non-local native species, with *Grevillea robusta* (Silky Oak) and *Jacaranda mimosifolia* (Jacaranda) the most commonly recorded trees. Local native trees recorded on the subject site were *Corymbia maculata* (Spotted Gum), *Eucalyptus tereticornis* (Forest Red Gum) and *Angophora floribunda* (Rough-barked Apple) (Figure 3). The site does not contain any native midstory vegetation. The entire project site was cleared of most vegetation by 1953, resulting in the loss of any original soil profile and the loss of the native seedbank.

Appendix A of GHD (2023) provides a summary of the threatened biota known or predicted to occur within a 10 km radius of the subject site. No native plant community types (PCTs) are present. There is no suitable habitat for any threatened flora species predicted to occur. The subject site is isolated from areas of native vegetation, with the closest vegetation being a patch of scattered native trees over 50 m away to the south-east. No threatened flora species or threatened ecological communities are present at the subject site or are likely to occur.

### 3.2 Fauna and habitat

GHD (2023) (see Appendix A of this report) provides a summary of the threatened and/or migratory biota known or predicted to occur within a 10 km radius of the subject site. Few of these species are considered likely to occur on the subject site, given the highly modified context of the site. Areas of exotic grasses would not comprise habitat for any threatened species in the locality. The native trees on the site would provide only limited foraging resources to mobile threatened fauna species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*) and microbat species. Given the small number of native trees present (including two *Angophora floribunda*, four *Corymbia maculata* and one *Eucalyptus tereticornis*), the subject site is unlikely to be an important resource for any threatened fauna species.




There is no suitable habitat for any predicted threatened fauna species associated with any of the existing structures (i.e., the demountable buildings) on the subject site, as these buildings would be subject to high frequency of use during daylight hours and are therefore unlikely to be used by microbats for roosting.

The first order drainage line and farm dam may provide habitat for common frog species. No key fish habitat or habitat for threatened aquatic biota are present.






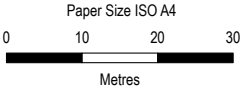


**LEGEND**

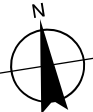
-  Subject site
-  Lot
-  Watercourse

**Tree species**

-  *Angophora floribunda*
-  *Corymbia maculata*
-  *Eucalyptus tereticornis*



Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



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**Biodiversity Assessment Report**

Project No. **12599206**  
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**Native tree species**

**FIGURE 3**



## 4. Impact assessment

The subject site is already cleared of most native vegetation with a ground layer dominated by exotic species and bare earth, planted native and exotic shrubs and trees. Seven native trees are present on the project site which may be remnant.

The subject site did not contain any native PCTs (refer to Appendix A), threatened ecological communities or endangered populations or threatened flora species. The proposed activity may clear at least 13 trees and shrubs within the school grounds and potentially clear all of the trees and shrubs along the southern side of Gillieston Road (19 in total) where it adjoins the school as part of road widening works. The activity would likely remove one possibly remnant *Corymbia maculata* and one possible remnant *Angophora floribunda* as these trees are within the footprints for the communal building and cultural play area.

The seven possibly remnant native trees on the subject site (Figure 3) would provide only limited foraging resources for highly mobile threatened fauna species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*) and microbat species. Given the small number of native trees present (including two *Angophora floribunda*, four *Corymbia maculata* and one *Eucalyptus tereticornis*), the site is unlikely to be an important resource for any threatened fauna species.

## 5. Conclusion and mitigation measures

The activity is unlikely to result in any significant impacts on threatened biota.

The following recommendations will reduce the impact of the activity on the subject site:

Table 1 Mitigation measures

Project stage	Mitigation measures
Construction	Native trees should be retained where possible, as these trees provide a foraging resource for local native fauna.
	Any trees to be removed should be assessed prior to clearing by having an ecologist inspect the trees for birds nests. Trees with occupied nests should be retained until after nesting is completed.
	Any existing trees that are to be retained near areas to be developed should have appropriate tree protection fencing around them.
Design	Locally endemic native species should be considered for any new plantings.

## 6. References

GHD (2023). Biodiversity Constraints Preliminary Report: Gillieston Public School.

# **Appendix A**

## **Biodiversity Constraints Assessment**



# Biodiversity Constraints Preliminary Review Report



**Gillieston Public School**

School Infrastructure NSW

15 March 2023

→ **The Power of Commitment**

<b>School Name:</b>	Gillieston Public School	<b>Company Name:</b>	GHD Pty Ltd
<b>School ID:</b>	1982	<b>Report Status:</b>	Final
<b>School Address:</b>	Cnr Northview St and Ryans Road NSW 2321	<b>Report Date:</b>	15 March 2023
<b>School Region:</b>	Hunter and CC	<b>Contract Number:</b>	DDWO04013-22

<b>Project name</b>		Pre-kindy Feasibility Tranche 1 Environmental Panel - Biodiversity					
<b>Document title</b>		Biodiversity Constraints Preliminary Review Report   Gillieston Public School					
<b>Project number</b>		12599206					
<b>File name</b>		12599206_REP_Gillieston PS Biodiversity Constraints					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	A	R. Goodenough	K. Crosby		E. Ray		15/12/22
S4	0	R. Goodenough	K. Dart		E. Ray		15/03/23

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# 1. Introduction

## 1.1 Purpose of this report

Significant urban growth is occurring in Maitland and in particular Gillieston Heights. Gillieston Public School requires an upgrade in response to current and projected local enrolment demand by demolishing the existing facilities and providing new facilities. School Infrastructure has engaged GHD Pty Ltd (GHD) to provide a Biodiversity Constraints Preliminary Review Report for Gillieston Public School, comprised of Lot 51 DP 1162489, Corner Northview Street and Ryans Road Gillieston Heights, NSW, in the Maitland Local Government Area (LGA) (Figure 1).

The purpose of this Biodiversity Constraints Preliminary Review Report is to:

- confirm the conservation significance of the study area, including the presence of threatened biota listed under the NSW *Biodiversity Conservation Act 2016* (BC Act), NSW *Fisheries Management Act 1994* (FM Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and their habitats
- provide advice regarding the need or otherwise for further assessment, including whether a Biodiversity Development Assessment Report (BDAR) or a BDAR waiver would be required for an SSD application.

## 1.2 Scope and limitations

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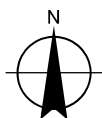
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School Infrastructure NSW  
Gillieston Public School Redevelopment -  
Biodiversity Preliminary Constraints Report

Project No. 12599206  
Revision No. 0  
Date 13/03/2023

**Project Location**

**FIGURE 1**



## 2. Statutory framework

The following section provides a summary of the legislative context for this biodiversity constraints assessment.

### 2.1 Commonwealth legislation

#### 2.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The purpose of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things (DCCEEW, 2021). An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for the Environment.

The EPBC Act identifies MNES as:

- World heritage properties
- National heritage places
- Wetlands of international importance (Ramsar wetlands)
- Threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.

The EPBC Act has been considered in the current assessment through:

- Desktop review to determine the MNES that are predicted to occur within the locality of the subject site and hence could occur, subject to the habitats present
- Opportunistic field survey for threatened biota and migratory species listed under the Act
- Assessment of the potential for impacts on MNES.

Potential impacts of a future development on relevant MNES would need to be subject to assessments of significance pursuant to the EPBC Act Significant Impact Guidelines (DotE 2013). If a significant impact is considered likely, a referral under the EPBC Act must be submitted to the Commonwealth Environment Minister.

### 2.2 NSW legislation

#### 2.2.1 Environmental Planning and Assessment Act 1979

The EPA Act forms the legal and policy platform for proposal assessment and approval in NSW and aims to, inter alia, 'encourage the proper management, assessment and conservation of natural and artificial resources'. Development in NSW is assessed in accordance with the provisions of the EPA Act and EPA Regulation 2000. Under section 5.5 (1) of the EP&A Act, determining authorities must 'examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity'.

In 2017 the State Environmental Planning Policy (Educational Establishments and Child Care Facilities) (SEPP) was introduced with provisions that apply to school State Significant Development (SSD) applications. An amendment was also made to the State and Regional Development SEPP which amended the trigger for school

applications to become a SSD. The Minister for Planning and Homes is the consent authority for SSD applications. SSD applications are assessed via an environmental impact statement (EIS).

## 2.2.2 Biodiversity Conservation Act 2016

The BC Act provides legal status for biota of conservation significance in NSW. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act aims to amongst other things, to maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations, and to support conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature. It provides for:

- The listing of threatened species (including populations) and ecological communities
- The listing of 'Key Threatening Processes' (KTPs)
- A method for assessing the likely impacts on biodiversity values of proposed development and land use change, for calculating measures to offset those impacts and for assessing improvements in biodiversity values
- Establishment of market-based conservation mechanisms through which the biodiversity impacts of development and land use change can be offset at landscape and site scales (see NSW Biodiversity Offset Scheme and Biodiversity Assessment Methodology below).

Part 7 of the BC Act sets out provisions relevant to biodiversity assessment and approvals under the EP&A Act. Specifically, Clause 7.9 applies to an application for development consent under Part 4 of the EP&A Act for SSD. Clause 7.9(2) and (3) set out the following requirements:

(2) Any such application is to be accompanied by a biodiversity development assessment report unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values.

(3) The environmental impact statement that accompanies any such application is to include the biodiversity assessment required by the environmental assessment requirements of the Planning Agency Head under the *Environmental Planning and Assessment Act 1979*.

The BC Act, together with the *Biodiversity Conservation Regulations 2017*, provides a mechanism to address impacts on biodiversity from land clearing associated with development. Under this legislation, there are provisions for a Biodiversity Offsets Scheme (BOS), which includes a framework to avoid, minimise and offset impacts of development on biodiversity.

The Biodiversity Assessment Method (BAM) was established by the (former) New South Wales (NSW) Office of Environment and Heritage (OEH) as a standard method to implement the aims of the BOS and to address the loss of biodiversity and threatened species. The scheme creates a market framework for the conservation of biodiversity values and the offsetting of development impacts. It also provides the mechanisms to offset impacts of development, clearing or biodiversity certification such that there is no loss of biodiversity values.

The BC Act has been considered in this report through:

- Desktop review to identify the threatened biota that have been previously recorded within the locality of the subject site and that could occur subject to the habitats present
- Preliminary field survey to ground-truth vegetation present and its conservation significance, and to assess potential habitat for threatened species listed under the Act
- Identification of biodiversity constraints based on the conservation significance of the species, communities and environments present
- Recommendations regarding whether a BDAR or BDAR waiver would be required for an SSD application.

### 2.2.3 Fisheries Management Act 1994

The objectives of the FM Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. It provides for the listing of threatened species, populations and ecological communities, key threatening processes and requirements or otherwise for the preparation of a species impact statement (SIS). One of the objectives of the FM Act is to 'conserve key fish habitats' which includes aquatic habitats that are important to the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. To assist in the protection of key fish habitats, DPI has produced the Policy and guidelines for fish habitat conservation and management (DPI 2013).

The FM Act has been addressed in this assessment through undertaking:

- A desktop review to determine the threatened species, populations or ecological communities that have been previously recorded within the locality of the proposal and hence could occur in the study area, subject to the habitats present
- Assessment of the potential for impacts on aquatic habitats
- Assessment of the potential for impacts on listed threatened species, populations and ecological communities and the requirement or otherwise for an SIS.

### 2.2.4 Biosecurity Act 2015

The *Biosecurity Act 2015* provides for risk-based management of biosecurity in NSW. It provides a statutory framework to protect the NSW economy, environment and community from the negative impact of pests, diseases and weeds.

The primary object of the Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.

In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

## 3. Methodology

### 3.1 Desktop review

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the BC Act and MNES listed under the EPBC Act that may occur in the study area. Database records pertaining to the study area and locality (i.e. within a 10 km radius of the study area and within the last 20 years) were reviewed, along with relevant reports and mapping, including:

- Department of Planning and Environment (DPE) *NSW BioNet Atlas* database for records of threatened species listed under the BC Act (DPE, 2022a). Accessed on 22/11/2022
- DPE *Threatened biodiversity profile search* online database for threatened ecological communities listed under the BC Act (DPE 2022b)
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) *Protected Matters Online Search Tool* for MNES listed under the EPBC Act and predicted to occur in the locality (DCCEEW, 2022a). Accessed on 22/11/2022
- Aerial photographs and satellite imagery of the study area
- *NSW BioNet Vegetation Classification* (DPE 2022c) to identify plant community types (PCTs) in the study area
- SEED portal for historical aerial photography and additional GIS datasets including soil, topography, geology and drainage (DPE 2022d).

Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was undertaken with reference to the broad habitats in the study area. The likelihood of occurrence assessment was completed following the site inspection and the assessment of habitats present at the study area (see Section 3.2). The results of this assessment informed the biodiversity constraints assessment and are presented in Appendix A.

### 3.2 Field survey

#### 3.2.1 Survey effort

A brief site inspection was undertaken by an accredited BAM assessor. Field survey effort and techniques used for this biodiversity constraints assessment are summarised in Table 1 and described in detail below.

Table 1 Survey effort

Survey round	Date	Survey effort
Preliminary survey	7/12/2022	<ul style="list-style-type: none"><li>• Vegetation assessment</li><li>• Habitat assessment and identification of resources for fauna</li><li>• Opportunistic searches for threatened flora</li><li>• Opportunistic fauna and flora observations throughout the study area</li></ul>

#### 3.2.2 Flora survey

The flora survey involved surveying the site on foot of the vegetation within the study area to assess the species present and vegetation structure, including observation of dominant plant species, vegetation condition, vegetation type and intensity of weed infestation and habitat resources.

Opportunistic searches were conducted for threatened flora species which could potentially occur within the study area given known distributions, previous records in the locality and habitat requirements for each species. Not every area of potential threatened plant habitat within the study area was systematically searched. Given the

duration, extent and timing of the field survey, an appropriate level of targeted threatened flora survey effort, at appropriate seasonal times has not been undertaken for all potentially occurring threatened flora species as part of this assessment. The timing of field surveys (7 December 2022) is ideal for the detection/identification of many flora species, especially cryptic species that require specific conditions to trigger flowering or which flower in different seasons, if present.

The habitat assessment conducted for the study area allowed for identification of habitat resources for cryptic species, in order to make an assessment of their likelihood of occurring within the study area (see Appendix A). As such, the survey was not designed to detect all species, rather to provide an overall assessment of the biodiversity values within the study area in order to determine biodiversity constraints and potential impacts of the proposal, with particular emphasis on threatened biota and their habitats.

Plant identifications were made according to nomenclature in RBGT (2022). All vascular plants (i.e. not mosses, lichens or fungi) observed were recorded on proforma field data sheets. Plant specimens that could not be identified rapidly in the field were collected and subsequently identified using standard botanical texts, PlantNet (RBGT, 2022).

### 3.2.3 Fauna survey

A preliminary fauna survey was undertaken in conjunction with the flora surveys in order to gain an appreciation of habitat values within the study area, with a particular focus on resources of potential relevance for threatened or migratory species known or predicted to occur in the locality. Opportunistic fauna observations were recorded.

Habitat assessments were undertaken throughout the study area, including opportunistic searches for potential shelter, basking, roosting, nesting and/or foraging sites. Specific habitat features and resources such as water bodies, food trees, the density of understorey vegetation, the composition of ground cover, presence of hollow-bearing trees, leaf litter and ground debris were noted.

Indicative habitat criteria for targeted threatened species (i.e. those determined as having the potential to occur within the study area following the desktop review) were identified prior to fieldwork. Habitat criteria were based on information provided in DPE and DCCEEW threatened species profiles, field guides, and the knowledge and experience of GHD field ecologists.

The focus of the preliminary field survey was to identify the presence and quality of habitat for threatened biota and was not intended to provide a comprehensive census of habitat resources. No targeted threatened fauna surveys or detailed, quantitative surveys of habitat resources have been completed to date.

### 3.2.4 Limitations

Given the duration, methodology and timing of the field surveys (one day in early summer) it is likely that many species that occur in the study area (permanently, seasonally or transiently) were not detected during the survey. The desktop assessment provided a list of the threatened biota that are known or predicted to occur in the locality. This list was refined based on the field surveys and habitat assessments to compile a list of those threatened biota that could potentially occur in the study area (including seasonal, transient or cryptic species). The habitat assessment conducted for the study area also allows for identification of habitat resources for such species and an assessment of their likelihood of occurrence in the study area on this basis. As such, the survey was not designed to detect all species, rather to provide an overall assessment of the biodiversity values in the study area in order to inform the constraints assessment.

### 3.2.5 Assessment of likelihood of occurrence

Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the habitats contained within the study area. Identification of potential habitat for threatened and migratory species was based on information provided in the species profiles (DPE 2022b, DCCEEW 2022a), recovery plans and the GHD staff knowledge of species habitat requirements. The likelihood of occurrence assessment was further refined following field surveys. The likelihood of threatened and migratory biota occurring in the study area was assessed based on presence of records from the locality, species distribution and habitat preferences, and the suitability of habitat present. The results of this assessment are



provided in Appendix A. Threatened and migratory biota known or considered likely to occur are discussed further in Section 4.4. Table 2 shows the key used to determine the likelihood of occurrence for threatened biota.

**Table 2**                      *Key to likelihood of occurrence for threatened biota*

<b>Likelihood</b>	<b>Definition</b>
Present	Threatened species, population or community was recorded in the study area.
High	Species, population or community previously recorded within a 10 km radius of the study area and suitable habitat occurs within the study area.
Moderate	Species, population or community previously recorded within a 10 km radius of the study area but only marginally suitable habitat recorded; OR Species, population or community not previously recorded within a 10 km radius of the study area, but the study area is within the species' known distribution and suitable habitat occurs within the study area.
Low	Species, population or community previously recorded within a 10 km radius of the study area but no suitable habitat recorded.
Nil	Species, population or community not previously recorded within a 10 km radius of the study area, suitable habitat not recorded within the study area, and/or the study area is outside the species' known distribution

## 4. Existing environment

### 4.1 Physical environment

The project site is located on the corners of Northview Street and Ryans Road in Gillieston Heights, in Maitland LGA. The school grounds are located in the western portion of Lot 51, with the eastern part of the lot retained as cleared, undeveloped land. The project site is mostly cleared, with numerous buildings, a carpark and scattered trees (Figure 1). The lot is approximately 2.064 ha in size.

The project site is bounded by Gillieston Road to the north, Ryans Road to the west and Northview Street to the south. Beyond the roads, the site is surrounded by cleared pasture to the north and west. To the south there is a single row of houses on the southern side of Northview Street, with cleared land further south. To the east, there is cleared land and some residential development.

The project site is gently sloping down to the north-east and north-west, with the highest point being 28 m AHD in the south-west of the site and the lowest being 23 AHD in the north-western corner of the school, in the western part of the lot where the school is located. The undeveloped part of the project site slopes to the north-east toward a first order watercourse and dam on the eastern boundary of the lot. This water course drains into Swamp Creek to the north-west.

The geology of the project site is mapped as Pmb (Sandstone, siltstone, conglomerate, erratics) which is part of the Branxton Formation in the Maitland Group. The NSW (Mitchell) Landscape of the project site is mapped as Newcastle Coastal Ramp. The Soil Landscape of the project site is mapped as Bolwarra Heights.

The vegetation on the project site is mapped as non-native vegetation on State Vegetation Type Map (Greater Hunter) (Figure 2). Existing native vegetation near the project site is mapped as PCT 3433 Hunter Coast Foothills Spotted Gum – Ironbark Grassy Forest. The original vegetation as mapped on the NSW Pre 1750 State Vegetation Type Map as PCT 3433 Hunter Coast Foothills Spotted Gum – Ironbark Grassy Forest, which is in the Hunter-Macleay Dry Sclerophyll Forests vegetation class and has a Shrub/grass sub-formation.

Historic aerial photographs from several years, including 1953, 1962, 1965, 1976 and 1993, show that the project site has been mostly cleared of native vegetation since at least 1953. In the 1953 aerial the project site contains approximately 7 trees, which appear to have relatively large canopies, indicating they have been on the project site for some years at the time the photograph was taken. These trees may possibly be remnant trees, but it is also possible they were planted when the school was built.

The project site is not mapped as having Biodiversity Values on the Biodiversity Values Map and is not mapped as having important habitat for any threatened or migratory species on the BAM Important Habitat Map.

### 4.2 Vegetation and flora

The vegetation on the site was in a highly managed condition, with closely mown lawns dominated by exotic grass and herb species. The trees on site were mostly planted exotic or non-local native species, with *Grevillea robusta* (Silky Oak) and *Jacaranda mimosifolia* (Jacaranda) the most commonly recorded trees. Local native trees recorded on the site were *Corymbia macaulata* (Spotted Gum), *Eucalyptus tereticornis* (Forest Red Gum) and *Angophora bakeri* (Narrow-leaved Apple). Other planted species recorded included *Callistemon* sp. (bottlebrush), *Banksia integrifolia* (Coast Banksia), *Acmena* sp. (lilly pilly), *Cupaniopsis anacardioides* (Tuckeroo) and *Brachychiton populneus* (Kurrajong). GHD has been advised that although all the trees are within the fenced boundary of the school, a large number of them (along the fence line of Ryans Rd and Gillieston Rd, see Figure 1) are not officially within the school boundary and are instead part of land acquired by council. These trees therefore are not subject to removal as part of the proposed upgrade of the school facilities.

Table 3 Plant Community Type recorded

Cleared and non-native vegetation	
Plant Community Type and ID	n/a
Conservation significance	Not native vegetation. Not significant.
Landscape position and substrate	On gentle slopes

Cleared and non-native vegetation	
Vegetation class	Cleared or non-native vegetation
Vegetation description	Mown lawns containing high proportion of exotic grass and herb species such as <i>Cynodon dactylon</i> , <i>Ehrharta erecta</i> and <i>Plantago lanceolata</i> with patches of bare earth. Some native groundcover species near the base of a <i>Corymbia maculata</i> in the south-western portion of the site including <i>Dichondra repens</i> , <i>Microlaena stipoides</i> and <i>Oxalis perenans</i> . The trees on site were mostly planted exotic or non-local native species, with <i>Grevillea robusta</i> and <i>Jacaranda mimosifolia</i> the most commonly recorded trees. Some local native tree species were recorded on the site, including <i>Corymbia maculata</i> , <i>Eucalyptus tereticornis</i> and <i>Angophora bakeri</i> however some or all of these trees may have been planted, given that there were only seven trees visible on the site in 1953. The local native trees on site are scattered amongst the planted exotic trees and do not constitute any Plant Community Type. None of the trees are a threatened species.
Vegetation condition	Cleared land dominated by exotic species in the groundlayer and canopy with no native midstorey present. Native trees on the site do not meet the definition of any PCT.

## 4.3 Habitat and fauna

Fauna species observed on the site were the native Australian Magpie (*Cracticus tibicen*) and Noisy Myna (*Manorina melanocephala*), and introduced Common Myna (*Acridotheres tristis*). No threatened fauna species were observed on site. One small stick nest was observed in a *Grevillea robusta*, approximately 25 cm across but no evidence of active use was observed. The site contains only limited habitat for native fauna. It is likely to be used only by mobile and generalist native species tolerant of human disturbance, given the number of people on the site during school hours. No hollow bearing trees were observed. This habitat type would not permanently support any resident populations of threatened fauna or contain any resources that are important to maintaining populations of threatened fauna that occur elsewhere.

The site is isolated from areas of native vegetation, with the closest vegetation being a patch of scattered native trees over 50 m away to the south-east. The scattered trees to the south-east are in a grazed paddock with limited fauna resources and are isolated from other trees by at least 200 m to the west.

The first order drainage line and farm dam may provide habitat for common frog species. No key fish habitat or habitat for threatened aquatic biota is present.

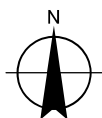
## 4.4 Conservation significance

The project site did not contain any native PCTs or any Threatened Ecological Communities. No endangered populations or species were observed. The native trees on the project site would provide limited foraging resources to mobile threatened fauna species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*) and Swift Parrot (*Lathamus discolor*). Threatened microbat species are also likely to forage across the project site on occasion. Given the small number of native trees present (including two *Angophora bakeri*, four *Corymbia maculata* and one *Eucalyptus tereticornis*), the project site is unlikely to be an important resource for any threatened fauna species.



Paper Size ISO A4  
0 20 40 60 80  
Metres

Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



School Infrastructure NSW  
Gillieston Public School Redevelopment -  
Biodiversity Preliminary Constraints Report

Project No. 12599206  
Revision No. 0  
Date 13/03/2023

**Vegetation**

**FIGURE 2**

## 5. Constraints assessment

The entire project site is considered to have a low biodiversity value due to the lack of intact native vegetation, presence of exotic species and existing development that has occurred. Limited habitat values are associated with planted trees and the small watercourse and farm dam.

Development of the project site could occur subject to appropriate environmental impact assessment under relevant approval processes. Potential impacts in these areas would not require detailed biodiversity survey/assessment nor provision of biodiversity offsets.

Where possible the existing local native tree species on the site should be retained as they provide foraging resource for mobile native fauna. Prior to any clearing of vegetation a brief survey of the project site is recommended to ensure any active birds nests are located and appropriate measures are put in place to minimise harm to any fauna present.



## 6. Recommendations and conclusions

The biodiversity constraints of the site are considered to be low as the habitat on the site is already highly disturbed.

The following recommendations will reduce the impact of any development works on the site:

- Local native trees should be retained where possible, as these trees provide a foraging resource for local native fauna.
- Any removal of trees on the site should be assessed further prior to clearing by having an ecologist inspect the trees for birds nests.
- Any existing trees that are to be retained near areas to be developed should have appropriate tree protection fencing around them.

Development of the site would not require a detailed biodiversity assessment or biodiversity offsets. A BDAR Waiver would be required to accompany an application for SSD.

## 7. References

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Department of Planning and Environment (DPE)(2022a) BioNet Atlas of Wildlife. Accessed at: <https://www.environment.nsw.gov.au/AtlasApp/>

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Department of Planning and Environment (DPE)(2022d). Sharing and Enabling Environmental Data (SEED) Portal. Accessed at: <https://www.seed.nsw.gov.au/>

Gorbert V. & Chesnut W., 1975. Newcastle 1:100 000 Geological Sheet 9132, provisional 1st edition. Geological Survey of New South Wales, Sydney.

Royal Botanic Gardens and Domain Trust (RGBT) (2022). PlantNET - The Plant Information Network System of The Royal Botanic Gardens and Domain Trust, Sydney, Australia. Accessed on 8/12/2022.

# **Appendix A**

**Likelihood of occurrence of threatened  
biota**

Table A.1 Threatened flora likely to occur within 10 km of the study area

Scientific name	Common name	BC Act Status	EPBC Act Status	Records	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Acacia bynoeana</i>	Bynoe's Wattle	E	V	11 records within 10km (DPE, 2022) Species or species habitat known to occur within 10km (DCCEEW, 2022)	Endemic to central eastern NSW, known a limited number of locations, often comprising populations of few plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches. Flowers September to March, and fruit matures in November.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Arthraxon hispidus</i>	Hairy-joint Grass	V	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Scattered locations through SE QLD and northern coast and tablelands of NSW to Kempsey and inland to Glen Innes. Found in or on the edges of rainforest and wet eucalypt forest, often near creeks or swamps. Also recorded in woodland, or around freshwater springs on coastal foreshore dunes, gullies and creek banks and on creek beds in open forests.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid	E	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Occurs from Central Coast NSW to southern Victoria. Mostly coastal but extends inland to Braidwood in southern NSW. In NSW grows in grassy dry sclerophyll woodland on clay loam or sandy soils, and less commonly in heathland on sandy loam soils. Flowers between September and November.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Callistemon linearifolius</i>	Netted Bottle Brush	V		37 records within 10km (DPE, 2022)	Recorded from the Georges to Hawkesbury Rivers in Sydney, and north to Nelson Bay. There is also a recent record from the northern Illawarra. Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers from spring to summer	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Occurs in coastal areas from East Gippsland to southern Queensland. Habitat preferences not well defined. Grows mostly in coastal heathlands, margins of coastal swamps and sedgeland, coastal forest, dry woodland, and lowland forest. Prefers open areas in the	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Records	Habitat description	Likelihood of occurrence	Likelihood of impact
					understorey and is often found in association with Large Tongue Orchid and the Bonnet Orchid. Soils include moist sands, moist to dry clay loam and occasionally in accumulated eucalypt leaves. Flowers November-February.		
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	E	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Occurs from Gerroa (Illawarra) to Brunswick Heads and west to Merriwa in the upper Hunter. Most common near Kempsey. Usually occurs on the edge of dry rainforest or littoral rainforest, but also occurs in Coastal Banksia Scrub, open forest and woodland, and Melaleuca scrub. Soil and geology types are not limiting. Flowering occurs between August and May, with the peak in November.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Dichanthium setosum</i>	Bluegrass	V	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Occurs on the New England Tablelands, North-west Slopes and Plains and the Central-west Slopes. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. Appears to have wide environmental tolerances.	Unlikely: Site is mown regularly and has a long history of disturbance.	Low: Unlikely to occur or be impacted.
<i>Eucalyptus glaucina</i>	Slaty Red Gum	V	V	1 record within 10km (DPE, 2022). Species or species habitat known to occur within 10 km (DCCEEW, 2022)	Locally frequent but very sporadic, in grassy woodland on deep, moderately fertile and well-watered soil; near Casino and from Taree to Broke	Unlikely: No specimens of the species were observed on the site.	Low. Not recorded on site.
<i>Eucalyptus parramattensis subsp. decadens</i>	Earp's Gum	V	V	50 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km	Endemic to the Hunter Region of NSW. Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. Found in dry sclerophyll woodland with dry heath understorey. Also occurs as an emergent in dry or wet heathland. Flowers from November to January.	Unlikely: No specimens of the species were observed on the site.	Low. Not recorded on site.

Scientific name	Common name	BC Act Status	EPBC Act Status	Records	Habitat description	Likelihood of occurrence	Likelihood of impact
				(DCCEEW, 2022)			
<i>Euphrasia arguta</i>		CE	CE	Species or species habitat may occur within 10km (DCCEEW, 2022)	Recently rediscovered near Nundle on the north-western slopes and tablelands, once known from scattered locations between Sydney, Bathurst and Walcha. Known populations occur in eucalypt forest with a mixed grass/shrub understorey, while previous records are described as occurring in open forest, grassy country and river meadows. Dense stands observed in cleared firebreak areas, suggesting it may respond well to disturbance.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Grevillea parviflora</i> <i>subsp. parviflora</i>	Small-flower Grevillea	V	V	20 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Occurs between Moss Vale/Bargo and lower Hunter Valley, with most occurrences in Appin, Wedderburn, Picton and Bargo. Broad habitat range including heath, shrubby woodland and open forest on light clay or sandy soils, and often in disturbed areas such as on the fringes of tracks.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Scattered, disjunct populations in coastal areas from Jervis Bay to Port Macquarie, with most populations in the Gosford-Wyong areas. Grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Unlikely: Site is degraded and unsuitable for the species. No <i>Melaleucas</i> recorded onsite.	Low. Not recorded on site.
<i>Persicaria elatior</i>	Knotweed	V	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Recorded in south-eastern NSW from Ulladulla to the Victorian border. Known from Raymond Terrace and the Grafton area in northern NSW. Normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Unlikely: Site is degraded and unsuitable for the species. No damp habitat onsite where development would occur.	Low: Unlikely to occur or be impacted.
<i>Persoonia hirsuta</i>	Hairy Geebung	E	E	Species or species habitat may occur within 10km	Scattered distribution around Sydney, distributed from Singleton in the north, along the east coast to Hilltop in the south west, Dombarton in the south east and the Blue	Unlikely: Site is degraded and	Low: Unlikely to occur or be impacted.



Scientific name	Common name	BC Act Status	EPBC Act Status	Records	Habitat description	Likelihood of occurrence	Likelihood of impact
				(DCCEEW, 2022)	Mountains to the west. Found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone.	unsuitable for the species.	
<i>Pomaderris brunnea</i>	Rufous Pomaderris	E	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Found in a very limited area around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. Also occurs near Walcha on the New England tablelands. Grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Unlikely: Site is degraded and unsuitable for the species. No suitable moist habitat onsite.	Low: Unlikely to occur or be impacted.
<i>Prasophyllum</i> sp. <i>Wybong</i> (C. Phelps ORG 5269)			CE	Species or species habitat may occur within 10km (DCCEEW, 2022)	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. A perennial orchid, appearing as a single leaf over winter and spring. It flowers in spring and dies back to a dormant tuber over summer and autumn. It's known to occur in open eucalypt woodland and grassland. The NSW Herbarium considers <i>Prasophyllum</i> sp. <i>Wybong</i> (C. Phelps ORG5269) and <i>Prasophyllum petilum</i> to be the same species. This taxonomic recognition will be released in the next Orchidaceae taxonomic update via the Australian Plant Census, which provides a list of currently accepted names. As it stands, the two species are treated as one for NSW regulatory purposes, with the distinction maintained under Commonwealth legislation.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Pterostylis chaetophora</i>		V		1 record within 10km (DPE, 2022)	In NSW it is currently known from 18 scattered locations in a relatively small area between Taree and Kurri Kurri, extending to the south-east towards Tea Gardens and west into the Upper Hunter, with additional records near Denman and Wingen. There are also isolated records from the Sydney region. The species occurs in two conservation reserves, Columbey National Park and Wingen Maid Nature Reserve. The preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Records	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Pterostylis gibbosa</i>	Illawarra Greenhood	E	E	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Known from a small number of populations in the Illawarra, Shoalhaven and Hunter regions. Grows in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by Forest Red Gum, Woollybutt and Melaleuca decora. Near Nowra, the species grows in an open forest of Spotted Gum, Forest Red Gum and Grey Ironbark. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark, Forest Red Gum and Black Cypress Pine.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Rhizanthella slateri</i>	Eastern Underground Orchid	V	E	Species or species habitat may occur within 10km (DCCEEW, 2022)	Currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	CE	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Occurs in coastal districts north from Batemans Bay in New South Wales, to areas inland of Bundaberg in Queensland. Populations typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000 -1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Highly to extremely susceptible to infection by Myrtle Rust.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Rhodomyrtus psidioides</i>	Native Guava	CE	CE	Species or species habitat known to occur within 10km	Occurs from Broken Bay, approximately 90 km north of Sydney, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of	Unlikely: Site is degraded and	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Records	Habitat description	Likelihood of occurrence	Likelihood of impact
				(DCCEEW, 2022)	low elevation and also occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. Extremely susceptible to infection by Myrtle Rust.	unsuitable for the species.	
<i>Rutidosia heterogama</i>	Heath Wrinklewort	V	V	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Recorded from near Cessnock to Kurri Kurri with an outlying occurrence at Howes Valley. On the Central Coast it is located north from Wyong to Newcastle. There are north coast populations between Woolli and Evans Head in Yuraygir and Bundjalung National Parks. It also occurs on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	Unlikely: Site is regularly mown and too degraded. Unsuitable for the species.	Low: Unlikely to occur or be impacted.
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E	V	1 record within 10km (DPE, 2022). Species or species habitat known to occur within 10 km (DCCEEW, 2022)	Occurs in narrow coastal strip from Upper Lansdowne to Conjola State Forest. On the south coast, the species occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast, it occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Unlikely: Site is degraded and unsuitable for the species. No rainforest habitat present.	Low: Unlikely to occur or be impacted.
<i>Tetradlea juncea</i>	Black-eyed Susan	V	V	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. Usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. Also recorded in heathland and moist forest. Majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Records	Habitat description	Likelihood of occurrence	Likelihood of impact
<i>Thesium australe</i>	Austral Toadflax	V	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Occurs in grassland or grassy woodland, and is often found in association with Kangaroo Grass.	Unlikely: Site is degraded and unsuitable for the species.	Low: Unlikely to occur or be impacted.

Notes: E = endangered, CE = critically endangered, V = vulnerable

Table A.2 Threatened fauna likely to occur within 10 km of the study area

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
<b>Birds</b>							
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Widespread but uncommon over south-eastern Australia. Found over most of NSW except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes ( <i>Typha</i> spp.) and spikerushes ( <i>Eleocharis</i> spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. May construct feeding platforms over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.	Possible - Some suitable wetland habitat present within locality. No suitable habitat onsite in location where development would occur. Only possible habitat onsite is in far east of site around dam but this is over 80 m away from existing buildings.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	Species or species habitat known to occur within 10km (DCCEEW, 2022)	In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River, the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Forages nocturnally on mud-flats and in shallow water.	Unlikely - Some suitable wetland habitat present within locality and in proximity to study area. No suitable habitat onsite in location where development would occur. Only possible habitat onsite is in far east of site around dam but this is over 80 m away from existing buildings.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.
<i>Ninox connivens</i>	Barking Owl	V		1 record within 10km (DPE, 2022)	Found throughout continental Australia except for the central arid regions. Occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some	Unlikely - Suitable habitat for roosting and foraging present within locality but only a very small amount of potentially	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					northeast coastal and escarpment forests. Sometimes extends home range into urban areas. Inhabit woodland and open forest, including fragmented remnants and partly cleared farmland. Flexible in its habitat use, hunting can extend in to closed forest and more open areas. Typically roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species.	suitable habitat present within / near study area. This habitat is also isolated from larger contiguous patches of better quality vegetation, no nest trees likely to be present	
<i>Ixobrychus flavicollis</i>	Black Bittern	V		1 record within 10km (DPE, 2022)	Scattered records along the east coast of NSW, with individuals rarely being recorded south of Sydney or inland. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. May occur in flooded grassland, forest, woodland, rainforest and mangroves, where permanent water is present.	Unlikely - Some suitable wetland habitat present within locality and in proximity to study area. No suitable habitat onsite in location where development would occur. Only possible habitat onsite is in far east of site around dam but this is over 80 m away from existing buildings.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.
<i>Falco subniger</i>	Black Falcon	V		1 record within 10km (DPE, 2022)	Widely, but sparsely, distributed in NSW, mostly occurring in inland regions. Occurs in plains, grasslands, foothills, timbered watercourses, wetland environs, crops, and occasionally over towns and cities. Breeding occurs along timbered waterways in inland areas.	Possible - Some suitable habitat present within locality but only a small amount of potentially suitable habitat present in study area. Unlikely to roost or nest in trees present within or near study area, would be restricted	Low: Unlikely to be impacted.



Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
						to foraging within and near study area	
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E		7 records within 10km (DPE, 2022)	Widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland away from breeding areas). Species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the species. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries.	Unlikely - Some suitable wetland habitat present within locality. No suitable habitat onsite in location where development would occur. Only possible habitat onsite is in far east of site around dam but this is over 80 m away from existing buildings.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.
<i>Oxyura australis</i>	Blue-billed Duck	V		29 records within 10km (DPE, 2022)	Widespread in NSW, but most common in the southern Murray-Darling Basin area. Disperses during the breeding season to deep swamps up to 300 km away, and generally seen in coastal areas only during summer or in drier years. Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation.	Unlikely - Some suitable wetland habitat present within locality. No suitable habitat onsite in location where development would occur. Only possible habitat onsite is in far east of site around dam but this is over 80 m away from existing buildings.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.
<i>Irediparra gallinacea</i>	Comb-crested Jacana	V		1 record within 10km (DPE, 2022)	Known to occur mainly in coastal and subcoastal regions along the east coast to the Hunter region, with stragglers recorded in south-eastern NSW. Inhabits permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies,	Unlikely - Some suitable wetland habitat present within locality but none near study area. No suitable habitat onsite in location where development would occur. Only possible	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					or fringing and aquatic vegetation.	habitat onsite is in far east of site around dam but this is over 80 m away from existing buildings.	
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V		2 records within 10km (DPE, 2022)	Occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Unlikely - Some suitable habitat present within locality but study area is isolated from these and contains a very small amount of potentially suitable habitat for the species	Low: Unlikely to occur or be impacted.
<i>Stictonetta naevosa</i>	Freckled Duck	V		17 records within 10km (DPE, 2022)	Found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. Breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. Forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. May also occur as far as coastal NSW and Victoria during	Unlikely - Some suitable wetland habitat present within locality. No suitable habitat onsite in location where development would occur. Only possible habitat onsite is in far east of site around dam but this is over 80 m away from existing buildings.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					such times. 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.		
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	E	Species or species habitat known to occur within 10km (DCCEEW, 2022)	In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer the species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	Unlikely - Some suitable wintering habitat present in locality but very small amount present within and near study area. Study area is isolated from larger contiguous patches of suitable vegetation and is not present on the fringes of any timbered areas.	Low: Unlikely to occur or be impacted.
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V	V	5 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. It inhabits open forest and woodlands of the coast and	Possible - suitable habitat present within locality but limited habitat present within study area. Allocasuarina littoralis was recorded on site however these appear to have been planted and only a	Low: Unlikely to be impacted. Removal of Allocasuarina littoralis should be replaced with the same number of the same species of tree elsewhere on the site to provide foraging resources.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					the Great Dividing Range where stands of sheoak occur. Black Sheoak ( <i>Allocasuarina littoralis</i> ) and Forest Sheoak ( <i>A. torulosa</i> ) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, <i>Allocasuarina diminuta</i> , and <i>A. gymnathera</i> . Belah is also utilised and may be a critical food source for some populations. The species is dependent on large hollow-bearing eucalypts for nest sites.	small number (10) of individuals of this species were present. Study area isolated from larger contiguous patches of native vegetation.	
<i>Falco hypoleucos</i>	Grey Falcon	E	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	Unlikely - Some suitable habitat present within locality, but little present near study area. Study area is isolated from larger contiguous patches of native vegetation such as open woodlands it prefers in coastal areas. Unlikely to utilise wetlands near study area as these are in degraded condition and are isolated from areas of better quality habitat. Unlikely to nest in trees within or near study area	Low: Unlikely to occur or be impacted.
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler	V		74 records within 10km (DPE, 2022)	Occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. Also occurs in woodlands in the Hunter Valley and in several locations on the north coast of	Unlikely - Suitable habitat present within locality, but no suitable areas of open woodlands present near or within study area.	Low: Unlikely to be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					NSW. Inhabits open Box-Gum Woodlands on the slopes, Box-Cypress-pine and open Box Woodlands on alluvial plains and woodlands on fertile soils in coastal regions.	No nests of Grey-crowned Babbler observed. Nest on site was too large for this species.	
<i>Hieraaetus morphnoides</i>	Little Eagle	V		3 records within 10km (DPE, 2022)	Found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Also found in Sheoak or Acacia woodlands and riparian woodlands of inland NSW. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Possible - Some suitable habitat present within locality but only a small amount of highly disturbed habitat present in study area. Unlikely to roost or nest in trees present within or near study area, would be restricted to foraging within and near study area	Low: Unlikely to be impacted.
<i>Glossopsitta pusilla</i>	Little Lorikeet	V		18 records within 10km (DPE, 2022)	Distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year. Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Possible - Some suitable habitat present within locality. May pass through study area en-route to better quality habitat	Low: Unlikely to be impacted.
<i>Anseranas semipalmata</i>	Magpie Goose	V		1 record within 10km (DPE, 2022)	Still relatively common in the Australian northern tropics, but had disappeared from south-east	Possible - Some suitable habitat present within	Low: Unlikely to be impacted. Site is highly disturbed and

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					Australia by 1920 due to drainage and overgrazing of reed swamps used for breeding. Since the 1980s there have been an increasing number of records in central and northern NSW. Vagrants can follow food sources to south-eastern NSW. Inhabits shallow wetlands containing dense rushes or sedges, and nearby dry land used for grazing. Feeds on grasses, bulbs and rhizomes and roosts in tall vegetation within wetland areas. Breeding is occurs predominately in monsoonal areas and is unlikely in SE NSW. Nests are formed in trees over deep water.	locality. Dam on edge of site may provide some foraging habitat.	dam is away from buildings.
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Nomadic species occurring at low densities throughout its range. Most commonly found on the inland slopes of the Great Dividing Range in NSW, where almost all breeding occurs. More likely to be found in the north of its distribution in winter. Inhabits Boree/ Weeping Myall ( <i>Acacia pendula</i> ), Brigalow ( <i>A. harpophylla</i> ) and Box-Gum Woodlands and Box-Ironbark Forests. Specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> .	Unlikely - Some suitable habitat present in locality but no areas of larger contiguous woodland containing mistletoe present within or near study area. Less common to the east of the Great Dividing Range.	Low: Unlikely to occur or be impacted.
<i>Pycnoptilus floccosus</i>	Pilotbird		V	Species or species habitat may occur within 10km (DCCEEW, 2022)	The pilotbird is found from the Wollemi National Park and Blue Mountains National Park in New South Wales through to the Dandenong Ranges, near Melbourne in Victoria. Its natural habitat is temperate wet sclerophyll forests and	Unlikely – No suitable dense temperate wet sclerophyll or rainforest habitat present in locality and none near study area.	Low: Unlikely to occur or be impacted.



Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					occasionally temperate rainforest, where there is dense undergrowth with abundant debris. It is sedentary and common.		
<i>Ninox strenua</i>	Powerful Owl	V		1 record within 10km (DPE, 2022)	Widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Requires large tracts of forest or woodland habitat but can also occur in fragmented landscapes. Breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. Roosts by day in dense vegetation comprising species such as Turpentine, Black She-oak, Blackwood, Rough-barked Apple, Cherry Ballart and a number of eucalypt species.	Unlikely - Suitable habitat for roosting and foraging present within locality but only highly disturbed habitat present within / near study area. This habitat is also isolated from larger contiguous patches of better quality vegetation, no nest trees present.	Low: Unlikely to occur or be impacted.
<i>Erythroriorchis radiatus</i>	Red Goshawk	E	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Formerly, it was at least occasionally reported as far south as Port Stephens. Inhabits open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. Preferred habitats include mixed	Unlikely - Minimal suitable large expanses of contiguous vegetation that is relatively undisturbed and supports habitat for this species present within the locality. No suitable habitat near study area, study area is isolated from any native vegetation and surrounding land is mostly	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	cleared. Outside known current and former distribution.	
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Found in drier coastal woodlands and forests in some years. Only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. Very patchy distribution in NSW, mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa can also contribute important	Unlikely - Minimal suitable large expanses of contiguous vegetation that is relatively undisturbed and supports habitat for this species present within the locality. No suitable habitat near study area, study area is isolated from any native vegetation and surrounding land is mostly cleared. Outside known current distribution, locality not proximate to any known populations.	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					nectar flows at times. Nectar and fruit from the mistletoes <i>Amyema miquelii</i> , <i>A. pendula</i> and <i>A. cambagei</i> are also utilised.		
<i>Petroica boodang</i>	Scarlet Robin	V		2 records within 10km (DPE, 2022)	Occurs from the coast to the inland slopes in NSW. Disperses to the lower valleys and plains of the tablelands and slopes after breeding. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. Found in dry eucalypt forests and woodlands with usually open and grassy understorey with few scattered shrubs. Lives in both mature and regrowth vegetation and occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Abundant logs and fallen timber are important components of its habitat.	Unlikely - Suitable woodland habitat present within locality but vegetation on site is too disturbed to be suitable habitat. Study area is isolated from larger patches of native vegetation suitable for the species.	Low: Unlikely to occur or be impacted.
<i>Chthonicola sagittata</i>	Speckled Warbler	V		7 records within 10km (DPE, 2022)	Patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. Most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. Lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	Unlikely - Suitable woodland habitat present within locality but vegetation on site is too disturbed to be suitable habitat. Study area is isolated from larger patches of native vegetation suitable for the species.	Low: Unlikely to occur or be impacted.

<i>Scientific name</i>	<i>Common name</i>	<i>BC Act Status</i>	<i>EPBC Act Status</i>	<i>Source</i>	<i>Habitat description</i>	<i>Likelihood of occurrence</i>	<i>Likelihood of impact</i>
<i>Circus assimilis</i>	Spotted Harrier	V		2 records within 10km (DPE, 2022)	Occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. Found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Possible - Suitable habitat present within locality, species may forage over wetland areas in proximity to the study area. Unlikely to roost or nest in trees within or near study area.	Low: Unlikely to be impacted.
<i>Lophoictinia isura</i>	Square-tailed Kite	V		3 records within 10km (DPE, 2022)	Ranges along coastal and subcoastal areas from south-western to northern Australia. Scattered records throughout NSW indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests and shows a particular preference for timbered watercourses. Observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland in arid north-western NSW.	Possible - Suitable habitat present within locality, species may forage over wetland areas in proximity to the study area. Unlikely to roost or nest in trees within or near study area as site is highly disturbed.	Low: Unlikely to be impacted.
<i>Lathamus discolor</i>	Swift Parrot	E	CE	6 records within 10km (DPE, 2022). Species or species habitat	Migrates from Tasmania to south-eastern Australia in the autumn and winter months. Mostly occurs on the coast and	Unlikely - Suitable woodland habitat present within locality but only a	Low. The site only provides minimal foraging resources for the species and

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
				known to occur within 10km (DCCEEW, 2022)	south west slopes in NSW. Occurs on the mainland in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Forest Red Gum E. tereticornis, Mugga Ironbark E. sideroxylon, and White Box E. albens.	very minimal amount present within study area. Study area is isolated from larger patches of native vegetation suitable for the species. Corymbia maculate was recorded on the site and would provide a small amount of foraging resource for the species.	is not mapped as important habitat.
<i>Neophema pulchella</i>	Turquoise Parrot	V		1 record within 10km (DPE, 2022)	Extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Typically lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Unlikely - Suitable woodland habitat present within locality but habitat onsite is too degraded. Study area is isolated from larger patches of native vegetation suitable for the species	Low. Unlikely to be impacted.
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		11 records within 10km (DPE, 2022)	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The species inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Unlikely - Suitable woodland habitat present within locality but habitat onsite is too degraded. Study area is isolated from larger patches of native vegetation suitable for the species	Low. Unlikely to occur or be impacted.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V		38 records within 10km (DPE, 2022)	Widespread along the NSW coast, and along all major inland rivers and waterways. Habitats characterised by the presence of	Possible - Suitable habitat present within locality, species may forage	Low. Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat.	over wetland areas in proximity to the study area. Unlikely to roost or nest in trees within or near study area as too disturbed.	
<i>Epthianura albifrons</i>	White-fronted Chat	V		1 record within 10km (DPE, 2022)	Found mostly in temperate to arid climates and very rarely sub-tropical areas. Occurs mostly in the southern half of NSW, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. Typically usually found foraging on bare or grassy ground in wetland areas, singly or in pairs.	Possible - Suitable habitat present within locality. No saltmarsh near study area but nearby wetlands are bordered by open grasslands potentially suitable for foraging	Low. Unlikely to occur or be impacted on the site.
<b>Frogs/reptiles</b>							
<i>Mixophyes iteratus</i>	Giant Barred Frog	E	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Distributed along the coast and ranges from Eumundi in south-east Queensland to Warrimoo in the Blue Mountains. Stronghold in northern NSW, particularly the Coffs Harbour-Dorrigo area. Typically found along freshwater streams with permanent or semi-	Unlikely - Some riparian wet forest habitat present within locality but these patches are isolated from study area with no connectivity	Low. Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					permanent water, generally at lower elevation. Favours moist riparian habitats such as rainforest or wet sclerophyll forest for the deep leaf litter which provides shelter and foraging. Sometimes occur in other riparian habitats with drier forest or degraded riparian remnants, and occasionally around dams.	between. No suitable riparian wet forest habitat present in study area.	
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	2 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. Large populations are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast. Only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes ( <i>Typha</i> spp.) or spikerushes ( <i>Eleocharis</i> spp.). Optimal habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow ( <i>Gambusia holbrooki</i> ), have a grassy area nearby and diurnal sheltering sites available. Also recorded in highly disturbed areas.	Unlikely - Some potentially suitable wetland habitat present in locality but none present within or near study area with required habitat features such as abundant aquatic vegetation and diurnal sheltering sites	Low. Unlikely to occur or be impacted. Site has a long history of clearing and disturbance.
<i>Mixophyes balbus</i>	Stuttering Frog	E	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Occurs along the east coast of Australia from southern Queensland to north-eastern Victoria. Stronghold in the Dorrego region, in north-east NSW. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding	Unlikely - Some riparian wet forest habitat present within locality but these patches are isolated from study area with no connectivity between. No suitable riparian wet	Low. Unlikely to occur or be impacted.



Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Breeds in streams during summer after heavy rain.	forest habitat present in study area	
<i>Delma impar</i>	Striped Legless Lizard	V	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Found mainly in Natural Temperate Grassland but also in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland.	Possible - Some potentially suitable grassland habitat present within locality and within study area near dam. Areas around buildings on site are closely mown regularly and are not suitable habitat.	Low. Unlikely to occur near proposed development or be impacted.
<b>Mammals</b>							
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. It typically shelters or basks during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas.	Unlikely - No suitable habitat featuring rocky outcrops or ridge / cliff lines with caves, ledges and fissures present within the locality or within study area.	Low. Unlikely to occur or be impacted.
<i>Vespadelus trougtoni</i>	Eastern Cave Bat	V		2 records within 10km (DPE, 2022)	Found on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW.	Possible - Some potentially suitable roosting habitat in locality but none present within or	Low. Unlikely to be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. Cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; recorded roosting in disused mine workings. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. Forage over a small area, but are capable of flying 500 m over clear paddocks.	near study area. May forage within and near study area only	
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V		30 records within 10km (DPE, 2022)	Found along the east coast from south Queensland to southern NSW. Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Possible - Suitable habitat present within locality. Unlikely to roost in trees present within study area due to lack of hollows. May forage within and near study area.	Low. Unlikely to be impacted. More suitable foraging habitat offsite in locality.
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V		3 records within 10km (DPE, 2022)	Found on the south-east coast and ranges of Australia, from southern Queensland to Victoria. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Possible - Suitable habitat present within locality. Unlikely to roost in trees present within study area due to lack of hollows. May forage within and near study area.	Low. Unlikely to be impacted. More suitable foraging habitat offsite in locality.
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		8 records within 10km (DPE, 2022)	Found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. Widespread on the New England Tablelands in NSW, however does not occur at altitudes above 500 m. Found in a variety of habitats from woodland through	Possible - Suitable habitat present within locality. Unlikely to roost in trees present within study area due to lack of hollows. May forage within and near study area.	Low. Unlikely to be impacted. More suitable foraging habitat offsite in locality.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					to moist and dry eucalypt forest and rainforest, most commonly found in tall wet forest. Usually roosts in tree hollows but also found in buildings.		
<i>Petauroides volans</i>	Greater Glider		E	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. Prefers taller montane, moist eucalypt forest with relatively old trees and abundant hollows.	Unlikely - Some potentially suitable forest habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	68 records within 10km (DPE, 2022). Roosting known to occur within 10km (DCCEEW, 2022)	Generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. May be found in unusual locations in times of natural resource shortage. Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Possible - Suitable habitat present within locality. May forage in trees present within study area. No roosting camps present within or near study area.	Low: Unlikely to be impacted.
<i>Phascolarctos cinereus</i>	Koala	E	E	3 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests of NSW, with some smaller populations on the plains west of the Great Dividing Range. Inhabits eucalypt woodlands and forests, and feeds on the foliage of more than	Unlikely - Some potentially suitable forest habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					70 eucalypt species and 30 non-eucalypt species, but will select preferred browse species in any one area.		
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V		31 records within 10km (DPE, 2022)	Occurs along the east and north-west coasts of Australia. Uses caves as the primary roosting habitat, but also uses derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops.	Possible - Suitable habitat present within locality. May roost in buildings present within study area and may forage within and near study area.	Low: Unlikely to be impacted. More suitable foraging and roosting habitat present offsite.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	4 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. Generally rare with a very patchy distribution in NSW and scattered records from the New England Tablelands and North West Slopes. Roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin ( <i>Petrochelidon ariel</i> ), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.	Unlikely - Some potentially suitable roosting habitat in locality but this is unlikely to be present within or near study area. Unlikely to forage within and near study area as it is mostly cleared and is isolated from larger patches of woodland / timbered areas that it prefers.	Low: Unlikely to occur or be impacted.
<i>Miniopterus australis</i>	Little Bent-winged Bat	V		27 records within 10km (DPE, 2022)	Occurs along the east coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Prefers 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. Roosts in caves, tunnels, tree hollows, abandoned mines,	Possible - Some potentially suitable roosting habitat in locality but not on site. May on occasion forage under vegetation within study area outside of school hours but would be likely to prefer other locations foremost	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					stormwater drains, culverts, bridges and sometimes buildings during the day. Forages for small insects beneath the canopy of densely vegetated habitats.	as it is mostly cleared and is isolated from larger patches of woodland / timbered areas that it prefers	
<i>Potorous tridactylus</i>	Long-nosed Potoroo	V	V	Species or species habitat may occur within 10km (DCCEEW, 2022)	Generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Unlikely - Some potentially suitable forest habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse		V	2 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Largely restricted to the coast of central and northern NSW, with one inland occurrence near Parkes. Known from Royal National Park (NP), the Kangaroo Valley, Kuringai Chase NP, and Port Stephens to Evans Head near the Queensland border. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. Soil type may be an important indicator of suitability of habitat, with deeper top soils and softer substrates being preferred for digging burrows.	Unlikely - Some potentially suitable forest, woodland and heathland habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.
<i>Notamacropus parma</i>	Parma Wallaby	V	V	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	The species once occurred in north-eastern NSW from the Queensland boarder to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and	Unlikely - Some potentially suitable forest habitat present within locality but none near study area	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino. Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest.		
<i>Myotis macropus</i>	Southern Myotis	V		4 records within 10km (DPE, 2022)	Mainly coastal but may occur inland along large river systems. Usually associated with permanent waterways at low elevations in flat/undulating country, usually in vegetated areas. Forages over streams and watercourses feeding on fish and insects from the water surface. Roosts in a variety of habitats including caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage, typically in close proximity to water.	Possible - Suitable habitat present within locality. No roosting habitat present within study area as buildings are regularly used and no hollows in trees. May forage within and near study area.	Low: Unlikely to occur or be impacted.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	2 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEW, 2022)	Found in eastern NSW, the species has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Uses hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Known to traverse their home ranges along densely vegetated creeklines.	Unlikely - Some potentially suitable forest habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.

<i>Scientific name</i>	<i>Common name</i>	<i>BC Act Status</i>	<i>EPBC Act Status</i>	<i>Source</i>	<i>Habitat description</i>	<i>Likelihood of occurrence</i>	<i>Likelihood of impact</i>
<i>Petaurus norfolcensis</i>	Squirrel Glider	V		27 records within 10km (DPE, 2022)	Widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Require abundant tree hollows for refuge and nest sites.	Unlikely - Some potentially suitable forest habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.
<i>Petaurus australis</i>	Yellow-bellied Glider	V	V	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Vegetation preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Den, often in family groups, in hollows of large trees.	Unlikely - Some potentially suitable forest habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V		1 record within 10km (DPE, 2022)	Wide-ranging species found across northern and eastern Australia. Rare visitor of south-western NSW in late summer and autumn. Scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. It forages in most habitats across its very	Possible - Suitable habitat present within locality. No roosting habitat present within study area as buildings are regularly used and no hollows in trees. May forage within and near study area.	Low: Unlikely to be impacted.



<i>Scientific name</i>	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					wide range, with and without trees.		

Notes: E = endangered, CE = critically endangered, V = vulnerable

**Table A.3**      *Migratory biota likely to occur within 10 km of the study area*

<b>Scientific name</b>	<b>Common name</b>	<b>BC Act Status</b>	<b>EPBC Act Status</b>	<b>Source</b>	<b>Habitat description</b>	<b>Likelihood of occurrence</b>	<b>Likelihood of impact</b>
<i>Limosa lapponica</i>	Bar-tailed Godwit		C,J,K, Bonn	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Recorded in the coastal areas of all Australian states. Widespread along the east and south-east coasts of NSW, including the offshore islands. Few inland records from NSW. Inhabit estuarine mudflats, beaches and mangroves. Common in coastal areas around Australia. Social birds, often seen in large flocks and in the company of other waders.	Unlikely - Some suitable mudflat habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.
<i>Monarcha melanopsis</i>	Black-faced Monarch		Bonn	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found along the coast of eastern Australia, becoming less common further south. Occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberralt. Found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	Unlikely - Some suitable wet forest habitat present within locality but none near study area.	Low: Unlikely to occur or be impacted.
<i>Hydroprogne caspia</i>	Caspian Tern		J	3 records within 10km (DPE, 2022)	Found in coastal and inland areas. In NSW, widespread east of the divide, mainly in coastal regions as well as the Riverina and Western regions, with occasional records elsewhere. Breeding has been recorded in the Menindee Lakes. Mostly found in sheltered coastal embayments, preferring areas with sandy or muddy margins. Usually forages in open wetlands, including lakes and rivers.	Low - Some suitable wetland habitat present within locality but not onsite. Dam on edge of site is too small.	Low: Unlikely to occur or be impacted.

<i>Scientific name</i>	<i>Common name</i>	<i>BC Act Status</i>	<i>EPBC Act Status</i>	<i>Source</i>	<i>Habitat description</i>	<i>Likelihood of occurrence</i>	<i>Likelihood of impact</i>
<i>Tringa nebularia</i>	Common Greenshank		C,J,K, Bonn	1 record within 10km (DPE, 2022). Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Common throughout Australia in the summer. In NSW, the species has been recorded in most coastal regions. It is widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions. Found both on the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	Unlikely. Most of site is too dry. Dam onsite is small and unlikely to provide suitable habitat. Some suitable wetland habitat present within locality.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.
<i>Actitis hypoleucos</i>	Common Sandpiper		C,J,K, Bonn	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Does not breed in Australia. When in Australia it is found on all coastlines and in inland areas, but is concentrated in the north and west with important areas in WA, the NT and Qld. Utilises a wide range of coastal and inland wetlands with varying salinity levels.	Unlikely - Some suitable wetland habitat present within locality but not onsite.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE, C,J,K, Bonn	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Distributed around most of the Australian coastline. Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. Breeds in Siberia and migrates to Australia for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April. Generally occupies littoral and estuarine	Unlikely - Some suitable wetland habitat present within locality but not onsite.	Low. Unlikely to regularly occur in developed portion of site. Unlikely to be impacted.

<i>Scientific name</i>	<i>Common name</i>	<i>BC Act Status</i>	<i>EPBC Act Status</i>	<i>Source</i>	<i>Habitat description</i>	<i>Likelihood of occurrence</i>	<i>Likelihood of impact</i>
					habitats, and is mainly found in intertidal mudflats of sheltered coasts in NSW. Also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. 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.		
<i>Numenius madagascariensis</i>	Eastern Curlew	E	CE, C,J,K, Bonn	Species or species habitat may occur within 10km (DCCEEW, 2022)	Occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. Generally occupies coastal lakes, inlets, bays and estuarine habitats, and is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts in NSW. Rarely seen inland.	Unlikely - No suitable habitat present within locality or near study area.	Low. Unlikely to occur in developed portion of site. Unlikely to be impacted.
<i>Pandion cristatus</i>	Eastern Osprey	V	Bonn	3 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found right around the Australian coast line, except for Victoria and Tasmania. Common around the northern coast, especially on rocky shorelines, islands and reefs. Uncommon to rare or absent from closely settled parts of south-eastern Australia. Rare records from inland areas. Favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Breeds in NSW from July to September. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Unlikely. No suitable habitat present onsite or nearby.	Low: Unlikely to occur or be impacted.

<i>Scientific name</i>	<i>Common name</i>	<i>BC Act Status</i>	<i>EPBC Act Status</i>	<i>Source</i>	<i>Habitat description</i>	<i>Likelihood of occurrence</i>	<i>Likelihood of impact</i>
<i>Apus pacificus</i>	Fork-tailed Swift		C,J,K	1 record within 10km (DPE, 2022). Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. Mostly occur over inland plains but sometimes above foothills or in coastal areas. Mostly found over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. Also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. Sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. Also found over settled areas, including towns, urban areas and cities.	Possible - May fly over study area.	Low: Unlikely to be impacted, better quality habitat offsite.
<i>Charadrius leschenaultii</i>	Greater Sand Plover		V, C,J,K, Bonn	Species or species habitat may occur within 10km (DCCEEW, 2022)	Breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries. The species is almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or	Unlikely – No suitable mudflat or estuarine habitat present within locality or near study area.	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					muddy beaches or estuaries with large intertidal mudflats or sandbanks.		
<i>Pluvialis squatarola</i>	Grey Plover		C,J,K	1 record within 10km (DPE, 2022)	Breeds around the Arctic regions and migrates to the southern hemisphere, being a regular summer migrant to Australia, mostly to the west and south coasts. Almost entirely coastal, being found mainly on marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats for feeding, sandy beaches for roosting, and also on rocky coasts.	Unlikely – No suitable mudflat or estuarine habitat present within locality or near study area.	Low: Unlikely to occur or be impacted.
<i>Gallinago hardwickii</i>	Latham's Snipe		J,K, Bonn	39 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Non-breeding migrant to the south east of Australia. Breeds in Japan and on the east Asian mainland. Seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. Found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. Also uses crops and pasture.	Possible - No suitable wetland habitat present within locality or study area but pasture grasses present near dam.	Low: Unlikely to be impacted.
<i>Tringa stagnatilis</i>	Marsh Sandpiper		C,J,K, Bonn	1 record within 10km (DPE, 2022)	Found on coastal and inland wetlands throughout Australia. It is recorded in all regions of NSW but especially the central and south coasts and (inland) on the western slopes of Great Divide and western plains. The Hunter River Estuary and the Macquarie Marshes are internationally important sites for this species. The species lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons,	Unlikely – No suitable wetland habitat present within locality.	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. It is a summer migrant to Australia, from about August to April.		
<i>Limosa lapponica baueri</i>	Nunivak Bar-tailed Godwit		V	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria. The bar-tailed godwit is a regular migrant to Christmas Island, Norfolk Island, Lord Howe Island. During the non-breeding period, the distribution of bar-tailed godwit (western Alaskan) is predominately New Zealand, northern and eastern Australia. In Australia, <i>L. l. baueri</i> mainly occur along the north and east coasts.	Unlikely – No suitable habitat present within locality and in proximity to study area.	Low: Unlikely to occur or be impacted.
<i>Cuculus optatus</i>	Oriental Cuckoo		C,J,K	2 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	This species migrates to northern and eastern Australia in the warmer months. Occurs south to the Shoalhaven area. Occurs in a range of habitats, including monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides and mangroves.	Possible - Inhabits a wide range of habitats, suitable habitat present within locality. May pass through study area en-route to better quality habitat.	Low: Unlikely to occur or be impacted.
<i>Calidris melanotos</i>	Pectoral Sandpiper		J,K, Bonn	Species or species habitat known to occur	Widespread but scattered records across NSW, east of the divide and in the Riverina and	Unlikely – No suitable habitat present within	Low: Unlikely to occur or be impacted.

Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
				within 10km (DCCEEW, 2022)	Lower Western regions. Breeds in the northern hemisphere. In Australasia, prefers shallow fresh to saline wetlands and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Usually in coastal or near-coastal habitats, and prefers wetlands with open mudflats and low emergent or fringing vegetation such as grass or samphire.	locality or on site.	
<i>Rhipidura rufifrons</i>	Rufous Fantail		Bonn	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found along NSW coast and ranges. Inhabits rainforest, dense wet forests, swamp woodlands and mangroves. During migration, it may be found in more open habitats or urban areas.	Unlikely - No suitable habitat present within locality. May pass through study area en-route to better quality habitat.	Low: Unlikely to occur or be impacted.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher		Bonn	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found along the east coast of Australia from far northern Queensland to Tasmania. Uncommonly seen species, especially in the far south of its range, where it is a summer breeding migrant. Inhabits heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Unlikely - No suitable habitat present within locality. May pass through study area en-route to better quality habitat.	Low: Unlikely to occur or be impacted.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper		C,J,K, Bonn	3 records within 10km (DPE, 2022). Species or species habitat known to occur	Spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are	Unlikely – No suitable habitat present within site.	Low: Unlikely to occur or be impacted.



Scientific name	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
				within 10km (DCCEEW, 2022)	widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. Breeds in northern Siberia.		
<i>Symposiachrus trivirgatus</i>	Spectacled Monarch		Bonn	Species or species habitat known to occur within 10km (DCCEEW, 2022)	Found in coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales. It is much less common in the south. Prefers thick understorey in rainforest, wet gullies and waterside vegetation as well as mangroves.	Unlikely - Some suitable wet forest habitat present within locality but none near study area. Not well known in southern parts of its range.	Low: Unlikely to occur or be impacted.
<i>Hirundapus caudacutus</i>	White-throated Needletail		V,C,J,K	8 records within 10km (DPE, 2022). Species or species habitat known to occur within 10km (DCCEEW, 2022)	Migrates to eastern Australia from October to April. Almost exclusively aerial and most often seen before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. Occurs over most types of habitat, but mostly recorded above wooded areas, including open forest and rainforest. May also fly between trees or in clearings, below the canopy. Recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows.	Unlikely, no suitable habitat onsite. May fly over study area.	Low: Unlikely to occur or be impacted.
<i>Motacilla flava</i>	Yellow Wagtail		C,J,K	Species or species habitat likely to occur within 10km (DCCEEW, 2022)	Occurs within Australia in open country habitat with disturbed ground and some water. Recorded in short grass and bare ground, swamp margins, sewage ponds, saltmarshes,	Possible - Some suitable habitat present within locality. May pass through study area en-	Low: Unlikely to be impacted.



<i>Scientific name</i>	Common name	BC Act Status	EPBC Act Status	Source	Habitat description	Likelihood of occurrence	Likelihood of impact
					playing fields, airfields, ploughed land and town lawns. Breeds in temperate Europe and Asia.	route to better quality habitat.	

Notes: E = endangered, CE = critically endangered, V = vulnerable, C = Migratory under the China-Australia migratory bird agreement, J = Migratory under the Japan-Australia migratory bird agreement, K = Migratory under the Korea-Australia migratory bird agreement.

# **Appendix B**

**Site photographs**

Table 5      *Site photographs*

Photograph	Description
	<p>Trees on project site (viewed from southern boundary)</p>
	<p>Trees near southern boundary of project site</p>

Photograph	Description
	<p>Trees on western boundary of project site</p>



Photograph	Description
	<p>Trees on north-western corner of project site including <i>Eucalyptus tereticornis</i></p>

Photograph	Description
	<p>Trees on western boundary of project site including <i>Corymbia maculata</i>.</p>



Photograph	Description
	<p>Trees on northern boundary of project site including <i>Grevillea robusta</i>.</p>
	<p>Trees on edge of playground</p>



Photograph	Description
	<p>Nest in <i>Grevillea robusta</i></p>



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