



Biodiversity Assessment Report

**Greater Sydney Rockfall Stabilisation Program –
Broughtons Pass Weir**

Water NSW

05 September 2023

→ **The Power of Commitment**



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Executive Summary

GHD Pty Ltd (GHD) has been engaged by WaterNSW to prepare this Biodiversity Assessment Report (BAR) for an embankment located at the Broughton Pass Zone Substation (identified by WaterNSW as Site 001), located at Appin, NSW. The stabilisation of the embankment is proposed as a part of WaterNSW's proposed Greater Sydney Rockfall Stabilisation Program (the proposal). The stabilisation works are required in order to reduce the risk of infrastructure damage and personnel injury and has been prompted in response to a number of rockfalls at WaterNSW dam sites over the last few years.

The aims of this BAR report are to:

- Describe the existing environment within the proposal site
- Determine the presence of any threatened fauna within areas that may be impacted by the proposal
- Assess the likely impacts on the above threatened biota resulting from the proposed works
- Recommend mitigation measures to reduce impacts on biodiversity values
- Provide concluding statements regarding the likely significance of impact of the proposed works on threatened biota listed under the BC Act and/or Matters of National Environmental Significance (MNES) including threatened and migratory biota listed under the EPBC Act, and the requirement or otherwise for further assessment or approvals at the State or Federal level.

The assessment included a desktop study to identify threatened flora and fauna species, populations and ecological communities (threatened biota) listed under the *Biodiversity and Conservation Act 2016* (BC Act), *Fisheries Management Act 1994* (FM Act), and *Environment Protection and Biodiversity Conservation Act 1997* (EPBC Act), that would be expected to occur in the locality. This was based on previous records, known distribution ranges, and habitat present. Field surveys were also completed which focussed on the identification of vegetation types, the presence and extent of threatened ecological communities within the proposal site and an assessment of the value of habitats present for threatened biota. Survey effort included ground-truthing of vegetation mapping, surveys for threatened flora species that could potentially occur, general fauna survey and habitat assessment including identifying potential shelter, basking, roosting, nesting and/or foraging sites and microbat surveys.

The results of the survey identified 36 flora species from 24 families within the proposal site, comprising 24 native and 11 exotic species and vegetation is most aligned with Plant Community Type (PCT) 3616 - Sydney Hinterland Grey Gum Transition Forest. It is noted that while most of the proposal site was inaccessible by foot, most of the vegetated areas could be seen from pathways below and above inaccessible areas. Photographs collected during previous assessments were also used to identify plant species on site that could not be accessed. Habitat features included canopy trees, fallen timber, leaf litter and cavities in rocks/rock overhangs.

No threatened ecological communities (TECs) listed under the BC Act or EPBC Act were recorded in the proposal site. No threatened flora species were recorded during surveys although 34 threatened flora species listed under the BC Act and EPBC Act are known to occur or are projected to occur within 10 km of the proposal site. These species were assessed in a likelihood of occurrence assessment, with it determined that none had a 'high' likelihood of occurrence. No microbat species recorded under the BC Act were identified.

The proposal site contains at least six Koala Use Tree species listed in SEPP (Biodiversity and Conservation) 2021- Koala Habitat Protection for the Wollondilly LGA. Results of the desktop study, 523 sightings of the Koala were reported in the locality, with the closest being approximately 120 m west of the proposal site. No evidence of the presence of Koalas was observed during the site inspections (e.g. scat or scratch marks on smooth-barked trees) but it is noted that most of the trees that are likely to require removal were inaccessible and so the presence of marks on these trees is unknown. Notwithstanding, given the steep slope and topography of the construction area, it is considered unlikely that koalas would occur regularly.

Based on the results of this BAR, impacts resulting from the proposal have been avoided wherever practical through design and selection of remediation techniques that minimise impacts on biodiversity matters. Notwithstanding, the proposal would result in the following impacts to threatened biota listed under the BC Act:

- Removal of up to 16 native trees, of which, six species are identified as Koala use trees.

An assessment of the likely significance of impacts of the proposal on the Koala have been prepared pursuant to Section 7.3 of the BC Act. The proposal is unlikely to have a significant impact on the Koala provided that mitigation measures described in Section 6 are implemented.

As the proposal is unlikely to result in a significant impact on any threatened biota listed under the BC Act, the proposal will not trigger the Biodiversity Offsets Scheme (BOS). Therefore, assessment and biodiversity offsets under the Biodiversity Assessment Methodology (BAM), via a Biodiversity Development Assessment Report (BDAR) or Species Impact Statement (SIS), are not required.

The proposal is unlikely to result in a significant impact on threatened biota or migratory species listed under the EPBC Act and Referral of the proposal to the Australian Minister for the Environment is therefore not considered necessary.

Although no threatened flora and fauna was reported on the proposal site, it is likely that they utilise the proposal site on occasion. Therefore, a stop works procedure should be implemented in the event that threatened flora or fauna are observed at the proposal site during works. Additionally, the mitigation measures provided in Section 6.2 should be implemented to mitigate damage to flora, fauna and the surrounding environment (such as the adjacent Cataract River) during works.

Contents

1.	Introduction	1
1.1	Background	1
1.2	Previous studies	1
1.3	Proposal description	1
1.4	Terms and definitions	2
1.5	Purpose of this report	2
1.6	Scope and limitations	2
2.	Legislative context	2
2.1	NSW State legislation	2
2.1.1	Environmental Planning and Assessment Act 1979	2
2.1.2	Biodiversity Conservation Act 2016	3
2.1.3	Fisheries Management Act 1994	3
2.1.4	Biosecurity Act 2015	4
2.2	State Environmental Planning Policies (SEPP)	4
2.2.1	SEPP (Biodiversity and Conservation) 2021 - Chapter 4 Koala habitat protection 2021	4
2.3	Commonwealth legislation	4
2.3.1	Environment Protection and Biodiversity Conservation Act 1999	4
3.	Methods	6
3.1	Desktop assessment	6
3.2	Field survey	6
3.2.1	Terrestrial fauna survey	6
3.2.2	Survey conditions	7
3.2.3	Survey limitations	7
4.	Site information	9
4.1	Site description	9
4.2	Geology and soils	10
4.3	Hydrology	10
4.4	Flora and vegetation communities	10
4.4.1	Priority weeds	11
4.5	Fauna and fauna habitat	11
4.6	Conservation significance	12
4.6.1	Threatened ecological communities	12
4.6.2	Threatened flora species and populations	12
4.6.3	Threatened fauna species	12
4.6.3.1	Chapter 4 – SEPP (Biodiversity and Conservation) 2021	12
4.6.4	Migratory fauna species	13
5.	Impact assessment	15
5.1	Avoidance of impacts	15
5.2	Direct impacts	15
5.2.1	Remediation methodology	15
5.2.2	Removal of vegetation and threatened flora	15
5.2.3	Removal of fauna habitats	15

5.2.4	Fauna injury and mortality	16
5.2.5	Aquatic impacts	16
5.3	Indirect impacts	16
5.3.1	Habitat fragmentation	16
5.3.2	Weed invasion and edge effects	16
5.3.3	Soil and water pollution	16
5.3.4	Introduction of pests and pathogens	17
5.3.5	Noise and vibration	17
5.4	Cumulative impacts	17
5.5	Key threatening processes	17
5.6	Likely significance of impacts on threatened biota and migratory species	18
5.6.1	Threatened flora species	18
5.6.2	Threatened fauna species	18
5.6.2.1	Koala	18
5.6.2.2	Cave-dwelling and hollow-dependent fauna	19
5.6.3	Migratory species	19
5.6.4	Summary of impacts	19
6.	Mitigation	20
6.1	Avoiding and minimising impacts	20
6.2	Mitigating impacts	20
7.	Conclusion	23
8.	References	24

Table index

Table 3.1.	Confidence ratings applied to calls	7
Table 3.2	Daily weather data over the survey period	7
Table 4.1	Proposal site particulars	9
Table 4.2	Summary of number of calls for each species and species group	12
Table 5.1	Key threatening processes of relevance to the proposal	17
Table B.1	Likelihood of occurrence	33
Table C.1	Flora species list	70
Table D.1	5 part test - Phascolarctos cinereus	72

Figure index

Figure 4.1	Site features	14
Figure A.1	Remediation design plans - overview	27
Figure A.2	Remediation design plans – part 1 of 3	28
Figure A.3	Remediation design plans – 2 of 3	29
Figure A.4	Remediation design plans – 3 of 3	30

Appendices

Appendix A	Remediation design plans (taken from Appendix G of GHD, 2022)
Appendix B	Desktop results and likelihood of occurrence table
Appendix C	Flora species list
Appendix D	Assessment of Significance

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1. Introduction

1.1 Background

GHD Pty Ltd (GHD) has been engaged by WaterNSW to prepare this Biodiversity Assessment Report (BAR) for an embankment located at the Broughton Pass Zone Substation (identified by WaterNSW as Site 001), located at Appin, NSW (refer to Figure 4.1). The stabilisation of the embankment is proposed as a part of WaterNSW's proposed Greater Sydney Rockfall Stabilisation Program. The stabilisation works are required in order to reduce the risk of infrastructure damage and personnel injury and has been prompted in response to a number of rockfalls at WaterNSW dam sites over the last few years.

WaterNSW has indicated that the proposal would be assessed under Division 24 s. 2.159 (2)(b) of *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TISEPP), and as such, is development permitted without consent that would be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). WaterNSW would be the consent authority.

1.2 Previous studies

GHD previously prepared the following report relevant to this assessment:

- *Greater Sydney Rockfall Stabilisation Project, Detailed Design Report* (12519708-27928 – Revision 1) dated January 2022 (GHD, 2022)

GHD was previously engaged by WaterNSW to carry out slope remediation design for a number of dam sites across the greater Sydney Area. The assessment was required to support WaterNSW's legislative requirements with regards to biodiversity for the proposed Greater Sydney Rockfall Stabilisation Program. The dam sites, which includes the proposal site, had been prioritised by WaterNSW for treatment on the basis of risk assessment carried out in previous studies. GHD (2022) provided a scope of work and specifications for the remediation of the risk sites.

GHD (2022) employed a risk-based approach to assess and develop the rockfall mitigation, which included adopting the pragmatic 'ALARP' principle ("As Low As Reasonably Practicable") because reduction of risk to higher levels was often not viable. This resulted in proposed risk management techniques/methods that are varied and minimal in design, and also require little to no ongoing maintenance. Hence, the disturbance to the surrounding environment, both during and following remediation, is expected to be minimal.

The GHD (2022) remediation design plans¹ for the proposal site have been provided in Appendix A and are summarised in Section 1.3 below.

1.3 Proposal description

With reference to GHD (2022), the proposed works include a mix of methods, including scaling and grooming, tree lopping/removal of vegetation and pinned rock fall mesh in localised areas across the proposal site (see Section 3) as follows:

- General rock scaling and devegetation across an approximate area of 2710 m² – completed using hand tools via a crane or rope. It is noted that the vegetation will include the removal of up to 16 trees and one fallen stag. The removal of understory vegetation is minimal. The removal of loose rock (scaling) from one rock overhang is proposed. This location is identified in GHD (2022) as Hazard B25, is located approximately 6 m above the main access track, is up to 1.5 m in length as shown on Figure 4.1
- Approximately 30 m² of targeted rock removal and scaling using a jack hammer
- The installation of 31 rock bolts using rotary or rotary percussion equipment. No equipment using drilling fluids is permitted
- The installation of 45 m² of Geobruigg T35 Rock Fall Barrier; and
- The installation of 152 m² of rock fall mesh

¹ *Greater Sydney Rockfall Stabilisation, Slope stabilization treatment Broughton Pass 0 The proposal site* - drawings prepared by GHD for WaterNSW, Ref. 12519708-B001 dated 17 January 2020 (GHD, 2020)

1.4 Terms and definitions

The following definitions have been used in this report:

- The **'proposal'** or **'proposed works'** refers to the proposed stabilisation remediation works, briefly discussed in Section 1.1, and as shown in the design plans
- **'proposal site'** refers to Site 001 as defined by WaterNSW
- The **'remediation area'** refers to those areas directly impacted by the proposed works. This comprises the individual proposed remediation locations, as well as access routes required to complete the proposed works
- The **'locality'** is the area within a 10 km radius of the proposal site.

1.5 Purpose of this report

The aims of this BAR report are to:

- Describe the existing environment within the proposal site
- Determine the presence of any threatened fauna within areas that may be impacted by the proposal
- Assess the likely impacts on the above threatened biota resulting from the proposed works
- Recommend mitigation measures to reduce impacts on biodiversity values
- Provide concluding statements regarding the likely significance of impact of the proposed works on threatened biota listed under the BC Act and/or Matters of National Environmental Significance (MNES) including threatened and migratory biota listed under the EPBC Act, and the requirement or otherwise for further assessment or approvals at the State or Federal level.

1.6 Scope and limitations

This report: has been prepared by GHD for Water NSW and may only be used and relied on by Water NSW for the purpose agreed between GHD and Water NSW as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Water NSW 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 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) 1.4 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.

2. Legislative context

2.1 NSW State legislation

2.1.1 Environmental Planning and Assessment Act 1979

The EP&A Act forms the legal and policy platform for proposal assessment and approval in NSW and aims to, amongst other things, 'encourage the proper management, development and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and the *Environmental Planning and Assessment Regulation 2000*.

The proposed works, as an activity that is permissible without consent, is to be determined under Part 5 of the Act and WaterNSW is the 'determining authority' for the purposes of the Act.

The EP&A Act is subject to the provisions of Part 7 of the BC Act and Part 7A of the *Fisheries Management Act 1994* (FM Act). Part 7.3 of the *Biodiversity Conservation Act 2016* (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 the FM Act.

2.1.2 Biodiversity Conservation Act 2016

The BC Act provides legal status for biota of conservation significance in NSW. The BC Act aims to, amongst other things, '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'. It provides for the listing of threatened species and communities, establishes a framework to avoid, minimise and offset the impacts of proposed development (the Biodiversity Offsets Scheme, BOS), and establishes a scientific method for assessing the likely impacts on biodiversity values and calculating measures to offset those impacts (the Biodiversity Assessment Method, BAM). As this proposal is being assessed under Part 5 of the EP&A Act, assessment in accordance with the BAM is not required unless there is likely to be a significant impact on threatened biota.

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 proposal is 'likely' to impose 'a significant effect' on threatened biota and thus whether a species impact statement (SIS) is required. Under the BC Act, there is also the option to prepare a Biodiversity Development Assessment Report (BDAR) rather than an SIS, where a significant impact is likely. Assessments of significance have been prepared for threatened biota that would be impacted or are likely to be impacted by the proposal and are provided in Appendix D.

All field surveys for this assessment were carried out under a Section 132C scientific licence (SL100146) issued under the BC Act.

The BC Act has been addressed in this assessment through:

- A desktop assessment to determine the threatened species, populations or ecological communities that have been previously recorded within the locality and hence could occur subject to the habitats present
- Field surveys for listed threatened species, populations and ecological communities
- Assessment of the potential for threatened species (or their habitat) to occur and be impacted
- Assessment of potential impacts on listed threatened species, populations and ecological communities
- Assessment of the likely significance of impacts and requirement or otherwise for a species impact statement (SIS) or biodiversity development assessment report (BDAR)
- Identification of suitable impact mitigation and environmental management measures.

2.1.3 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).

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

- A desktop assessment to determine the threatened species, populations or ecological communities that have been previously recorded within the locality of the proposal and hence could occur subject to the habitats present

- Assessment of potential impacts on aquatic habitats, including identification of key threatening processes of relevance to the proposal, impacts on key fish habitat and fish passage
- Assessment of the potential for impacts on listed threatened species, populations and ecological communities and the requirement or otherwise for an SIS
- Identification of suitable impact mitigation and environmental management measures to avoid or mitigate impacts on the aquatic environment.

2.1.4 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.

2.2 State Environmental Planning Policies (SEPP)

2.2.1 SEPP (Biodiversity and Conservation) 2021 - Chapter 4 Koala habitat protection 2021

Chapter 4 (Koala Habitat Protection 2021) of State Environmental Planning Policy (Biodiversity and Conservation) 2021 aims to encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for Koalas (*Phascolarctos cinereus*) to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline'.

Part 4.1 of Chapter 4 identifies Local Government Areas (LGAs) to which this SEPP 44 applies. Wollondilly Shire Council Local Government Area is listed in Chapter 4 as having the potential to contain Potential Koala Habitat and/or Core Koala Habitat:

- Potential Koala Habitat are areas of native vegetation where the trees of the types listed constitute at least 15 per cent of the total number of trees in the upper or lower strata of the tree component
- Core Koala Habitat is an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

Potential impacts on the Koala have been considered in this report given the species' is listed as Endangered under both the BC Act and the EPBC Act, and is discussed in Section 4.5.4

2.3 Commonwealth legislation

2.3.1 Environment Protection and Biodiversity Conservation Act 1999

The purpose of the EPBC Act is to ensure that actions likely to cause a significant impact on MNES or the environment of Commonwealth land undergo an assessment and approval process. Under the EPBC Act, an action includes a proposal, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. An action that 'has, will have or is likely to have a significant impact on a MNES or a significant impact to the environment of Commonwealth land is deemed to be a 'controlled action' and may not be conducted without prior approval from the Australian 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
- 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 addressed in this assessment through:

- Desktop review to determine the threatened and/or migratory species or threatened ecological communities that have been previously recorded within the locality and hence could occur within the proposal site, subject to the habitats present
- Desktop review of any other additional MNES e.g. Ramsar sites or World Heritage Areas that are present in the locality and that may be impacted by the proposal
- Targeted field surveys for threatened biota listed under the Act
- Identification of suitable impact mitigation and environmental management measures for threatened biota, where required
- Assessment of potential impacts on MNES and any potential requirement for a referral or being a controlled action.

3. Methods

3.1 Desktop assessment

A desktop review was undertaken to identify threatened flora and fauna species, populations and ecological communities (threatened biota) listed under the BC Act, FM Act, and EPBC Act, that would be expected to occur in the locality. This was based on previous records, known distribution ranges, and habitat present. The resources and databases that were reviewed prior to conducting field investigations included:

- NSW Department of Planning and Environment (DPE) BioNet Atlas for records of threatened species listed under the BC Act and EPBC Act which have been recorded within the locality (DPE, 2023a)
- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool for MNES listed under the EPBC Act which may occur in the locality (DCCEEW, 2023a)
- NSW Department of Primary Industry (DPI) Fisheries Spatial Data Portal (DPI, 2023a) to assess threatened freshwater species and key fish habitat (KFH) distribution maps within the locality
- NSW threatened species profiles (DPE, 2023b) for descriptions of threatened species and ecological communities listed under the BC Act
- Commonwealth Species Profile and Threats Database (DCCEEW, 2023b) for descriptions of threatened species listed under the EPBC Act
- NSW State Vegetation Type Mapping (DPE, 2023c) to determine the mapped plant community types (PCTs) present within the proposal site
- NSW BioNet Vegetation Classification (DPE, 2023d)
- NSW WeedWise (DPI, 2023b) to identify declared priority weeds in the Greater Sydney Local Land Services region
- MetroMap aerial imagery.

The results of desktop searches are provided in Appendix B.

A review of photographs used to build photogrammetry models of the slopes for GHD (2022) was completed to provide an initial assessment of the existing environment, including site conditions, vegetation type, floristic composition and habitat suitability for threatened biota.

3.2 Field survey

A field survey was undertaken by a GHD ecologist on 28 April 2023. The field surveys focussed on the identification of vegetation types, the presence and extent of threatened ecological communities within the proposal site and an assessment of the value of habitats present for threatened biota. Survey effort included the following:

- Ground-truthing of vegetation mapping
- Random meander surveys for threatened flora species that could potentially occur within the proposal site given known distributions, previous records in the locality and habitat requirements for each species according to the methods of Cropper (1993)
- General fauna survey and habitat assessment including identifying 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 also noted
- Additionally, microbat surveys at the rock overhang (HazardB25) for a period of 11 days (i.e. 23 June to 4 July 2023) were completed (see section 3.2.1 for more detail).

3.2.1 Terrestrial fauna survey

Microbat ultrasonic echolocation call recordings (Anabat surveys) were undertaken using one Anabat Express Zero Crossing detector over 11 nights (23 June to 4 July 2023) at the location of the rock overhang identified as Hazard B25 (see Figure 4.1).

The *Bat calls of NSW: Region based guide to the echolocation calls of microchiropteran bats* (Pennay *et al.* 2004) was used to assist call analysis. Call identification was also assisted by consulting distribution information for potential species (Pennay *et al.* 2011; Churchill 2008; Van Dyck *et al.* 2013) and records from BioNet (June 2023). No reference calls were collected during the survey.

A call (pass) was defined as a sequence of three or more consecutive pulses of similar frequency and shape. Calls with less than three defined consecutive pulses of similar frequency and shape were not unambiguously identified to a species but were used as part of the activity count for the survey area. Due to variability in the quality of calls and the difficulty in distinguishing some species the identification of each call was assigned a confidence rating (see Mills *et al.* 1996 & Duffy *et al.* 2000 for similar process) as summarised in Table 3.1. Due to the absence of reference calls from the proposal site, high level of variability within a bat call and overlap in call characteristics between some species, a conservative approach was taken when analysing calls. Species nomenclature follows Armstrong *et al.* 2022.

Table 3.1. Confidence ratings applied to calls

Identification	Description
D - Definite	Species identification not in doubt.
PR - Probable	Call most likely to represent a particular species, but there exists a low probability of confusion with species of similar call type or call lacks sufficient detail.
SG - Species Group	Call made by one of two or more species. Call characteristics overlap making it too difficult to distinguish between species for e.g. <i>Chalinolobus gouldii</i> / <i>Ozimops</i> sp.

See Section 4.6.3 for results.

3.2.2 Survey conditions

Surveys were conducted in early winter. Weather conditions were generally cool in the mornings with warm days and regular rain. Temperatures ranged between 1.0°C and 20.2°C, with precipitation ranging between 0.2 mm and 4.8 mm over five (non-consecutive) days. Temperature and rain details for the nearest weather station No. 068257 (Campbelltown) are provided in Table 3.2 (BoM, 2023).

Table 3.2 Daily weather data over the survey period

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
23 June 2023	6.2	18.5	4.8
24 June 2023	4.1	20.0	0
25 June 2023	1.0	20.2	0
26 June 2023	9.4	18.0	0
27 June 2023	4.4	17.4	0
28 June 2023	9.2	10.9	2.8
29 June 2023	3.2	15.0	2.4
30 June 2023	6.8	17.7	0.2
1 July 2023	2.2	18.6	0
2 July 2023	3.1	18.6	0
3 July 2023	4.4	19.0	0
4 July 2023	10.3	14.1	2.6

3.2.3 Survey limitations

The proposal site comprises steep rocky terrain susceptible to landslide with some areas inaccessible by foot for the survey. Given the nature of the proposal site, surveys were rapid, focussing on accessible areas and areas of

potential impact. Areas that could not be assessed on foot were photographed using an unmanned aerial vehicle (UAV) to obtain high resolution images for later assessment.

Given the short duration and timing of the field survey it is likely that some species that use the proposal site (permanently, seasonally or transiently) were not detected during the survey as it was conducted outside optimal survey periods for some threatened flora and fauna. Some flora species only flower after fire or are annual, ephemeral or cryptic species. Some fauna species are also highly mobile and transient in their use of resources, some fauna species are cryptic in their habits, and some frogs call at other times of year. Thus, the survey was designed to provide an overall indication of ecological value within the proposal site which was supplemented by information gathered during the desktop reviews.

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4. Site information

The proposal site is located in Appin, approximately 65 km southwest of the Sydney central business district (CBD) and approximately 24 km northwest of the Wollongong CBD. Further information about the proposal site is given in Table 4.1 below. The proposal site is shown in Figure 4.1.

Table 4.1 Proposal site particulars

Parameters	Description
Locality	Located at the Broughton Pass Substation, along Wilton Road, Appin, NSW Lot 10, Deposited Plan 1085929
Local government area	Wollondilly Shire
Local Environment Plan	Wollondilly Local Environmental Plan (LEP) 2011
Land zoning	SP2 Infrastructure (Water Supply System)
Elevation (Australian Height Datum)	Between 130 and 170 metres (m)
Interim Biogeographic Regionalisation for Australia (IBRA) 7 region / subregion	Sydney Basin / Cumberland
NSW WeedWise Local Land Services Area	Greater Sydney

4.1 Site description

The proposal site is located at the Broughton Pass Substation on a steep south-west facing slope adjacent to the Cataract River. The site was described in detail in the report *Greater Sydney Rockfall Stabilisation Project, Detailed Design Report* (GHD, 2022) as outlined below:

The proposal site is located on the right abutment slopes of the reservoir, extending upstream and just downstream of the weir. The proposal site covers the area above the weir infrastructure (approximately 0.25 ha) and comprises a lower sandstone cutting approximately 100 m long and approximately 2 m to 8 m high. The overall height of the slope is approximately 43 m. This cutting is overlain by steep and vegetated natural slopes interspersed with rock steps up to 4 m high.

Several old 'drystone' walls up to about 3 m high of varying condition are located at various heights across the natural slopes. The walls all comprise loosely stacked makeshift rock walls with some exhibiting recent collapsed sections. The original purpose of the walls is unclear, however based on our observations it is speculated they may have been formed along former construction tracks.

A number of service pipelines descend down the slope, originating from WaterNSW buildings at the crest and connect to various infrastructure at the toe. The function of these is not known.

The irregular height rock face along the toe of the slope is generally near-vertical with some excavated terraces and natural overhangs along the crest. The cutting comprises locally weathered seams and fractured rock masses immediately adjacent to access walkway and stairs (which is pedestrian access only for maintenance personnel).

Based on site observations there is evidence of past rockfall history across the length of the site. Rockfalls appear to have originated a number of different locations including the lower rock face / cutting, as well as from the overlying slope via surficial boulder hazards and partial collapses of some existing drystone walls. Refer to Plate 1 for an aerial view of proposal site.



Plate 1 Aerial view of Broughtons Pass Weir – The proposal site

4.2 Geology and soils

Based on the Wollongong-Port Hacking 1:100,000 Geology Sheet, geology at the proposal site comprises Hawkesbury Sandstone which is described as medium to coarse-grained quartz sandstone with very minor shale and laminite lenses.

The Wollongong-Port Hacking 1:100,000 Soils Landscape Sheet maps colluvial soils of the Hawkesbury Landscape at the proposal site. These soils are characterised by shallow soils comprised mostly of quartz sand and loose rock and are associated with rocky outcrops along steep and rugged slopes and ridges of the Woronora Plateau. They are considered to have an extreme erosion hazard with mass movement (rock fall), high permeability and very low fertility to be major limitations. Deep sands are noted along benches and fractures with some loams are associated with localised shale lenses.

4.3 Hydrology

The closest watercourse is the Cataract River, which is located immediately adjacent to the proposal site, at the base of the substation. The Cataract River is a perennial river that flows in a general northerly direction to its confluence with the Nepean River, approximately 4.4 km northwest.

4.4 Flora and vegetation communities

A total of 36 flora species from 24 families were recorded within the proposal site, comprising 24 native and 11 exotic species. The Myrtaceae (six species, all native), Poaceae (four species, two native) and Asteraceae (three species, no native), were the most diverse families recorded. A full list of flora species recorded within the site is provided in Appendix C.

Based on NSW state vegetation type mapping (SVTM), the Plant Community Type (PCT) mapped at the proposal site is PCT are mapped as present at the proposal site:

- PCT: 3615 – Sydney Hinterland Dry Sclerophyll Forests

- PCT: 3616 - Sydney Hinterland Grey Gum Transition Forest

Plant community assemblage and structure was ground-truthed within the proposal site and compared to the descriptions of the mapped PCTs (Department of Planning and the Environment, 2023d).

Based on this, the vegetation in the proposal site is most aligned with PCT: 3616 - Sydney Hinterland Grey Gum Transition Forest with dominant canopy species comprising *Eucalyptus punctata* (Grey Gum), *Corymbia gummifera* (Red Bloodwood), *Angophora bakeri* (Narrow-leaved Apple), *Allocasuarina littoralis* (Black She-oak) and *Eucalyptus oblonga* (Narrow-leaved Stringybark). The vegetation was in good condition, complete with mid-storey and understory vegetation including *Dodonaea triquetra* (Hop Bush), *Ceratopetalum gummiferum* (NSW Christmas Bush), *Leptospermum trinervium* (Slender Tea-tree) and *Elaeocarpus reticulatus* (Blueberry Ash). While some exotic forbs and grasses were observed along the pathways, they were not abundant enough to classify the proposal site into different vegetation zones.

It is noted that while most of the proposal site was inaccessible by foot, most of the vegetated areas could be seen from pathways below and above inaccessible areas. Photographs collected for GHD (2022) were also used to identify plant species on site that could not be accessed.

4.4.1 Priority weeds

Priority weeds listed under the *Biosecurity Act 2015* are those plants with restrictions on their trade and movement and have the potential to negatively impact the NSW environment, economy and community.

A total of 11 exotic flora was recorded in the proposal site, of which two, Blackberry (*Rubus* sp. agg.) and Bridal Creeper (*Asparagus asparagoides*) are also listed as Weeds of National Significance (WoNS). WoNS are especially noxious and have greater importance placed on their control and eradication.

4.5 Fauna and fauna habitat

Habitat resources across the proposal site included:

- Canopy trees, sap, nectar, fruits and leaves as well as foraging substrate, and some fruiting and flowering small trees and shrubs
- Fallen timber and leaf litter
- Cavities in rock overhangs.

Intact vegetation was suitable habitat for threatened insectivorous bats including the Large-eared Pied Bat, which is listed as Vulnerable under the BC Act and EPBC Act, and the Southern Myotis (*Myotis macropus*), Large Bent-winged Bat (*Miniopterus orianae oceanensis*), the Eastern Coastal Freetail Bat (*Micronomus norfolkensis*), and Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), which are listed as Vulnerable under the BC Act. The cave-roosting Large-eared Pied Bat and Large Bent-winged Bat may roost in crevices and voids in sandstone outcrops, such as the one observed at Hazard B25 (see Figure 4.1).

While no trees with hollows were observed, given the access limitations, it's possible that small hollows, such as those suitable for small woodland birds, arboreal mammals and microbats, are present.

The woodland on the rock wall and in adjoining areas contains habitat resources for threatened birds including the:

- Swift Parrot (*Lathamus discolor*) (listed as Endangered in the BC Act and Critically Endangered under the EPBC Act)
- Gang-gang Cockatoo (*Callocephalon fimbriatum*) (listed as Vulnerable under the BC Act and Endangered under the EPBC Act)
- South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*) which is listed as Vulnerable under the BC Act and EPBC Act
- Scarlet Robin (*Petroica boodang*), Varied Sittella (*Daphoenositta chrysoptera*), Little Lorikeet (*Glossopitta pusilla*) and Dusky Woodswallow (*Artamus cyanopterus cyanopterus*), which are all listed as Vulnerable under the BC Act.

The woodland vegetation may also provide habitat for the Koala (*Phascolarctos cinereus*), which has been reported in NSW BioNet within 120 m west of the proposal site. The Koala is listed as Endangered under the BC Act and EPBC Act, with favoured food tree species recorded in the proposal site. No evidence of the presence of koalas (e.g. scats or scratch marks on trees) were observed.

4.6 Conservation significance

4.6.1 Threatened ecological communities

No threatened ecological communities (TECs) listed under the BC Act or EPBC Act were recorded in the proposal site.

4.6.2 Threatened flora species and populations

No threatened flora species were recorded during surveys although 34 threatened flora species listed under the BC Act and EPBC Act are known to occur or are projected to occur within 10 km of the proposal site. These species were assessed in a likelihood of occurrence assessment, with it determined that none had a 'high' likelihood of occurrence (Appendix B).

4.6.3 Threatened fauna species

Table 4.2 presents a summary of the data for the survey period as a result of the bat call analysis. Bat calls were recorded for 5 of the 11 survey nights between 23 June and 4 July 2023. Few files were recorded each night and three nights failed to record any recognisable data (e.g. bat or other ultrasonic data such as insect noise). Less than 5% of the files recorded contained bat files of some description. Most files contained miscellaneous ultrasound including insect noise as the recorded was set to continuous mode (day and night).

No species were positively (Definite) identified of the 20 or so species that are known to occur from the locality of the proposal site. No *Biodiversity Conservation Act 2016* listed species was recorded. As many as three other species may also have been recorded, but poor data quality and/or interspecific call similarities precluded reliable identification of additional species.

Table 4.2 Summary of number of calls for each species and species group

Species	24/6/23	27/6/23	28/6/23	3/7/23	4/7/23
<i>Chalinolobus gouldii</i>					PR
<i>Chalinolobus morio</i>	PR				
<i>C. gouldii</i> / <i>Ozimops ridei</i>					SG
<i>M. oriana oceanensis</i> / <i>Vespadelus sp</i>			SG		
Other bat calls	Y	Y	Y	Y	Y
Number of species per night	0	0	0	0	0

Table Notes:

Total number of species recorded for each night/site is based on definite (D) identification only. Total number of D species for each night includes one *Nyctophilus* species where recorded. See Table 3.1 for confidence rating e.g. D or Pr

ce, e, v - species listed under the *NSW Biodiversity Conservation Act 2016*.

CE, E, VU – species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Other bat calls – files with one or more non-consecutive pulses from possible one or more species

4.6.3.1 Chapter 4 – SEPP (Biodiversity and Conservation) 2021

The proposal site contains at least six Koala Use Tree species listed in SEPP (Biodiversity and Conservation) 2021- Koala Habitat Protection for the Wollondilly LGA, being *Allocasuarina littoralis* (Black She-oak), *Angophora costata* (Smooth-barked Apple), *Eucalyptus agglomerata* (Blue-leaved Stringybark), *Eucalyptus oblonga* (Narrow-leaved Stringybark), *Eucalyptus punctata* (Grey Gum), and *Eucalyptus resinifera* (Red Mahogany).

Based on DPE (2023a) records, 523 sightings of the Koala were reported in the locality, with the closest being approximately 120 m west of the proposal site. No evidence of the presence of Koalas was observed during the site inspections (e.g. scat or scratch marks on smooth-barked trees) but it is noted that most of the trees that are likely to require removal were inaccessible and so the presence of marks on these trees is unknown.

Given that there are no previous sightings of the Koala in the near vicinity of the proposal site, the steep slope and topography of the construction area, it is considered unlikely that koalas would occur regularly. Notwithstanding this, an assessment of significance pursuant to Section 7.3 of the BC Act was completed (Appendix D).

4.6.4 Migratory fauna species

No migratory species were recorded during field surveys. There is potential for a number of migratory woodland bird species to forage on occasion within the proposal site, during their migration to breeding habitats elsewhere.

Important habitat for migratory birds is defined in the significance criteria for listed migratory species (DoE 2013) as follows:

- Habitat utilised by a migratory species occasionally or periodically within the region that supports an ecologically significant proportion of the population of the species
- Habitat that is of critical importance to the species at particular life-cycle stages
- Habitat utilised by a migratory species which is at the limit of the species range
- Habitat within an area where the species is declining.

Habitat in the proposal site is unlikely to be important habitat for migratory species as it would not support an ecologically significant proportion of the population, is not critical to the lifecycle of these species and is not at the limit of these species' range. While these species may occur on occasion, they would not rely on the habitats present for their survival in the locality.



Figure 4.1 Site features

5. Impact assessment

5.1 Avoidance of impacts

There has been an ongoing and lengthy process of impact avoidance undertaken by WaterNSW and their contractors, in order to minimise impacts on biodiversity values as a result of the proposal. As stated in Section 1.3 a minimalistic remediation approach has been adopted, where the aims are to do the least amount of work (and thus disturbance) to stabilise the rock face at the proposal site.

5.2 Direct impacts

5.2.1 Remediation methodology

As stated in Section 1.3, remediation works will consist of:

- General rock scaling and revegetation across an approximate area of 2710 m² – completed using hand tools via a crane or rope. It is noted that the vegetation will include the removal of up to 16 trees and one fallen stag. The removal of understory vegetation is minimal. The removal of loose rock (scaling) from one rock overhang is proposed. This location is identified in GHD (2020) as Hazard B25 and is shown on Figure 4.1
- Approximately 30 m² of targeted rock removal and scaling using a jack hammer
- The installation of 31 rock bolts using rotary or rotary percussion equipment. No equipment using drilling fluids is permitted
- The installation of 45 m² of Geobrugg T35 Rock Fall Barrier; and
- The installation of 152 m² of rock fall mesh

No additional laydown areas are proposed at the proposal site as appropriate laydown areas are already present.

5.2.2 Removal of vegetation and threatened flora

Based on a review of the GHD (2020), most vegetation clearing comprises the removal of up to 16 trees native trees of varying height (plus one fallen stag) over the approximate area of 2710 m² area. The removal of shrubs and understorey appears to be minimal; being limited to the removal of only the vegetation that is required to complete the stabilisation works, as opposed to broad-scale stripping of the entire rock face.

Although no threatened flora was identified on site, for the reasons stipulated in Section 3.2.3, it is possible that they are present and at risk of disturbance or damage due to the works. Therefore care should be taken so as to not inadvertently damage flora unnecessarily.

5.2.3 Removal of fauna habitats

Up to 16 trees plus one fallen stag may be removed as a part of remediation works, which includes the potential removal of up to five feed and use trees for the Koala. The vegetation removal would remove habitat resources for native fauna including shelter, food and foraging substrate. Despite this, impacts associated with loss and modification of fauna habitat would be minor and localised and are unlikely to remove a significant proportion of the habitat resources that are relied upon by local fauna populations, including the Koala.

No hollows were observed during field work, however, due to access restrictions, not all trees could be thoroughly inspected. Based on the age of the trees present, none are expected to have hollows suitable for forest owls or cockatoos, however it is possible that small hollows (5 cm diameter) suitable for small woodland birds, arboreal mammals and microbats, are present.

Based on a review of the remediation design plans, the removal of some unstable potential microbat habitat is proposed. This includes the small sandstone overhang identified as Hazard B25 where microbats were previously recorded. Although the Anabat survey was completed outside of the roosting period for *Chalinolobus dwyeri* (i.e.

October to March), given the low activity surrounding the overhang and miscellaneous ultrasound recorded at the site, it is considered unlikely that *Chalinolobus dwyeri* would roost at this location. No other threatened microbat species were recorded during the Anabat surveys. Notwithstanding, some species may roost on occasion outside the breeding season (see Section 5.6.2).

5.2.4 Fauna injury and mortality

There is potential for injury or mortality of native fauna where native vegetation and rocky habitat is to be cleared or disturbed. Species most at risk of injury and mortality include small terrestrial species that may be sheltering in leaf litter.

The clearing of hollow-bearing trees could result in the injury or mortality of roosting or denning species, such as microbats, arboreal mammals and birds. The proposal may result in the removal of hollow-bearing trees or stags that were not identified during the field surveys. Mortality of less mobile individuals, such as nestlings may also occur if nests are present in vegetation to be removed.

The proposal may cause temporary displacement of more mobile fauna, such as birds, given noise and other disturbance during remediation. Birds are relatively mobile and so most individuals would be able to avoid vegetation clearing (which is minimal) or remediation operations.

Environmental safeguards including pre-clearing surveys, fauna rescue and relocation protocols, are proposed in Section 6.2 to minimise the risk of mortality of fauna as a result of clearing.

5.2.5 Aquatic impacts

Given that the proposal site is adjacent to the Cataract River, it is possible that there would be impacts to aquatic biota, such as sediment laden runoff, wind-blow sediment and soil and soil erosion, resulting from the remediation works. Environmental safeguards including sediment control during works, are proposed in Section 6.2 to minimise the risk of impacts to the aquatic environment resulting from the clearing of vegetation.

5.3 Indirect impacts

5.3.1 Habitat fragmentation

Given that the site is less than 1 ha in size, and the remediation works are localised to small areas, the proposed works will not contribute to the fragmenting of habitat. The works would take place in an area already subject to historical disturbance, along a narrow, linear strip of highly unstable vegetation adjacent to dam operations and a picnic area. The proposal would not result in the creation of any barriers to movement for native species or pollinators, beyond those that already exist.

5.3.2 Weed invasion and edge effects

'Edge effects' refers to increased noise and light or erosion and sedimentation at the interface of intact vegetation and cleared areas. Edge effects may result in impacts such as changes to vegetation type and structure, increased growth of exotic plants, increased predation of native fauna or avoidance of habitat by native fauna.

There is the potential for additional impacts on native vegetation in the proposal site through dispersal of weed propagules on vehicles or equipment and through disturbance of vegetation and surface soil, which may provide increased opportunities for recruitment of new weed species.

Environmental safeguards, including weed control and minimising impacts on native vegetation are proposed in Section 6.2 to minimise the spread of weeds and edge effects.

5.3.3 Soil and water pollution

Given that the proposed remediation works will be completed using hand tools and on foot (or via rope), it is considered there is a relatively low risk of impacts associated with dust generation or erosion and sedimentation due to the limited surface disturbance areas at the proposal site.

5.3.4 Introduction of pests and pathogens

The proposal would not involve the transport of any animals or any other activities that are likely to directly contribute to the introduction of pest fauna species.

Remediation activities have the potential to introduce or spread pathogens such as Phytophthora (*Phytophthora 17innamomic*) and Myrtle Rust (*Uredo rangeli*) throughout the proposal site through vegetation disturbance and increased visitation. Phytophthora and Myrtle Rust may result in the dieback or modification of native vegetation and damage to fauna habitats.

Environmental safeguards, including industry standard protocols for hygiene on construction sites are proposed in Section 6.2 to minimise the potential for introduced pathogens.

5.3.5 Noise and vibration

Given that the remediation works are to be completed using portable hand tools, noise and vibration resulting from the remediation works is expected to be minimal, but still may affect roosting and breeding bats. Any species present would be habituated to some degree of noise and light disturbance from the existing dam infrastructure and regular operations.

Remediation works would occur during daylight hours and impacts associated with increased light or light spill are unlikely.

5.4 Cumulative impacts

With reference to NSW Planning Portal (DPE 2023e), 43 major projects are reported for the Wollondilly LGA. All of these projects relate to AGL's Camden Gas Project. None of the projects are located within 5 km, additionally, all projects are expected to be decommissioned in 2023 (AGL, 2023).

Based on the above, there are no cumulative impacts to biota expected to result from these works and the surrounding area.

5.5 Key threatening processes

A key threatening process (KTP) is a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community. KTPs are listed under the BC Act, FM Act and EPBC Act. Some KTPs are listed under more than one Act. KTPs of relevance to the proposal are discussed in Table 5.1. Mitigation measures to limit the impacts of these KTPs are discussed in Section 6.2.

Table 5.1 Key threatening processes of relevance to the proposal

KTP	Status	Comment
Clearing of native vegetation	BC Act; EPBC Act	Clearing of native vegetation refers to the removal of one or more strata within a stand of native vegetation. There are numerous impacts as a result of clearing native vegetation, including: destruction of habitat causing a loss of biological diversity; fragmentation of populations; riparian zone degradation; disturbed habitat which may permit the establishment and spread of exotic species; and loss of leaf litter, removing habitat for a wide variety of vertebrates and invertebrates (DPIE, 2021d). The proposal would result in the clearing of up 16 trees and one fallen stag.
Loss of hollow-bearing trees	BC Act	Tree hollows are cavities formed in the trunk or branches of a living or dead tree. Hollows are usually more characteristic of older, mature to over mature trees. Hollows occur primarily in old eucalypts trees and are uncommon in many other native and introduced species. The presence, abundance and size of hollows is positively correlated with tree trunk diameter, which is an index of age. As such, large old hollow-bearing trees are relatively more valuable to hollow-using fauna than younger hollow-bearing trees. The latter are important as a future resource. While no medium or large hollows were observed, it is possible that small hollows suitable for microbat habitat are present in some of the trees proposed to be removed. The implementation of fauna management measures would minimise potential impacts on fauna as a result of the removal of any hollow-bearing trees (see Section 6.2).

KTP	Status	Comment
Removal of dead wood and dead trees	BC Act	Fallen timber and hollow-bearing stags provide important habitat for a range of native species and are important to ecosystem health. The proposal may result in the removal of fallen timber during remediation. The implementation of fauna management measures would minimise potential impacts on fauna as a result of removal of dead wood and stag trees (see Section 6.2).
Invasion of plant communities by perennial exotic grasses	BC Act	Exotic perennial grasses of concern include <i>Hyparrhenia hirta</i> , <i>Cortaderia</i> spp., <i>Sporobolus fertilis</i> , <i>Nassella neesiana</i> , <i>Nassella trichotoma</i> and <i>Eragrostis curvula</i> . There is evidence that these perennial grass species have significant adverse impacts on biodiversity, including increases to fuel loads that result in changes to fire regimes that can alter the structure of native vegetation communities and lead to local extinctions of some native species (DPIE, 2021d). While none of the above grasses were observed on site, it is possible that they may be introduced to site during remediation works. Weed management procedures would be implemented to prevent any further spread of weeds as a result of the proposal (see Section 6.2).
Invasion and establishment of exotic vines and scramblers	BC Act	Exotic vines can have a significant effect on biodiversity, through smothering native vegetation and seedlings, and preventing natural recruitment, particularly in riparian areas. While no relevant exotic vines or scramblers were observed on site, it is possible that they may be introduced to site during remediation works. Weed management procedures would be implemented to the introduction of weeds such weeds as a result of the proposal (see Section 6.2).
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	BC Act	Remediation activities have the potential to introduce Myrtle Rust to the proposal site. The fungus infects leaves of susceptible plants producing spore-filled lesions on young actively growing leaves, shoots, flower buds and fruits. Leaves may become buckled or twisted and may die as a result of infection. Infection on highly susceptible plants may result in plant death. Implementation of hygiene protocols would minimise the risk of introduction or spread of this pathogen (see Section 6.2).
Infection of native plants by <i>Phytophthora cinnamomi</i>	BC Act; EPBC Act	<i>Phytophthora cinnamomi</i> is a soil borne pathogen that occurs in warm, moist conditions. Infected species may show a range of symptoms, and some plants may be killed and lead to areas of dieback. The proposal has the potential to introduce or spread this pathogen throughout the proposal site, through the transport and movement of workers and equipment during remediation works. Implementation of hygiene protocols would minimise the risk of introduction or spread of this pathogen (see Section 6.2).

5.6 Likely significance of impacts on threatened biota and migratory species

5.6.1 Threatened flora species

No threatened flora species were recorded at the proposal site.

5.6.2 Threatened fauna species

5.6.2.1 Koala

The proposal will remove up to 16 trees, including feed and use trees for the Koala.

An assessment of significance pursuant to Section 7.3 of the BC Act (5 part test) has been prepared for impacts on this species (Appendix D). The outcome of the assessment is that the proposal would be unlikely to have a significant impact, given:

- The proposal site comprises generally unsuitable habitat for the species, given that it is located along a steep escarpment that would be difficult for the Koala to traverse
- There are extensive areas of suitable habitat in adjoining areas and the broader locality
- The small area of potential habitat within the proposal site is highly unlikely to be important to the long-term survival the species

- Mitigation measures to minimise direct and indirect impacts, including avoiding removal of feed trees where possible, would be included in the CEMP (see Section 6.2).

5.6.2.2 Cave-dwelling and hollow-dependent fauna

No threatened microbats were recorded during the Anabat survey, with only minimal activity recorded for other non-threatened species. Given that microbat activity has been recorded, there is a prevalence of suitable adjacent cave habitat, and that up to 16 trees are to be removed as a part of works, it is possible that microbats may utilise any caves and/or tree hollows for roosting. Trees on the proposal site may also be used by microbats for foraging.

While the proposal site may be utilised by microbats for roosting or foraging, there is no evidence to show that the proposal site constitutes critical habitat for any threatened microbat species. Given the minimal microbat activity recorded at the proposal site and the prevalence of suitable adjacent habitat, it is considered that there is a lack of likely impacts to threatened microbats at the proposal site. No assessments of significance have been prepared for microbats.

Mitigation measures to minimise direct and indirect impacts, including avoiding removal of hollows, or relocation of hollows where possible, will be included in the CEMP (see Section 6.2).

5.6.3 Migratory species

Given the prevalence of adjacent habitat and the minimal amount of habitat to be removed by the proposal, it is considered that there is a lack of likely impacts to potential migratory species. Therefore, no assessments of significance have been prepared for any migratory species.

5.6.4 Summary of impacts

The proposal would result in the removal of vegetation that is considered to be potential habitat for the Koala, which is a threatened species listed under the BC Act and EPBC Act.

An Assessment of significance pursuant to Section 7.3 of the BC Act (5 part test) for the Koala indicates that to the proposal is unlikely to result in a significant impact on the Koala. The findings of the 5 part test have been considered with reference to the EPBC Act *MNES Significant Impact Guidelines 1.1* (DEWHA 2013), and the proposal is unlikely to result in a significant impact on the Koala under the EPBC Act.

6. Mitigation

6.1 Avoiding and minimising impacts

The overall proposal site location is constrained by the steep slope and unstable, rocky terrain, making it difficult to access to the site by any other means other than by foot or by rope. This has resulted in remediation works that are minimal in nature, thereby minimising impacts to threatened flora and fauna at the proposal site.

6.2 Mitigating impacts

The environmental safeguards outlined in Table 6.2 would be implemented to address the potential impacts of the proposal on biodiversity values. A Construction Environmental Management Plan (CEMP) would be prepared, that would identify the specific measures to be implemented during the 'Pre-remediation' and 'remediation' stages of the proposal and would include work methods, contingencies, roles and responsibilities.

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Table 6.2 Environmental safeguards

Issue	Safeguard	Timing	Responsibility
Environmental management	A CEMP will be prepared, including the specific mitigation/management measures and sub-plans listed below along with work methods, contingencies, roles and responsibilities. The mitigation/management measures included in the CEMP and sub-plans would be implemented during pre-remediation and remediation stages.	Pre-remediation	Remediation contractor
Worker inductions	Ensure all workers are provided with an environmental induction prior to starting construction activities on site. This would include information on the ecological values of the site and protection measures to be implemented to protect biodiversity during construction.	Pre-remediation	Remediation contractor
Erosion and sediment	Erosion and sediment control plans would be established prior to the commencement of construction. Controls would be managed and maintained in accordance with the CEMP to ensure their ongoing functionality. Erosion and sediment control controls would be regularly inspected, particularly following rainfall events, to ensure their ongoing functionality. All stockpiled material should be stored in bunded areas and kept away from waterways to avoid sediment or contaminants entering waterways.	Pre-remediation / remediation	Remediation contractor
Dust	Specific measures will be incorporated into the CEMP to minimise the generation of dust and associated impacts on natural environments during remediation works.	Pre-remediation / remediation	Remediation contractor
Contaminants	Specific measures will be incorporated into the CEMP to minimise the potential for chemical spills and associated impacts on natural environments during remediation works Spill kits would be made available to construction vehicles. A management protocol for accidental spills would be put in place.	Pre-remediation / remediation	Remediation contractor
Protection of native flora	To reduce the potential for adverse impacts on native flora, efforts should be made to minimise vegetation clearance and disturbance, including impacts to canopy trees as far as possible. Where possible, limit clearing to trimming rather than the removal of whole plants.	Pre-remediation / remediation	Remediation contractor. Site environmental officer
Rock scaling, hollow-bearing tree and hollow-log management	Given that pre-clearance surveys are considered to be unpracticable due to the steep terrain and limited access; and given that the timing of works cannot be informed by fauna habits, such as microbat breeding or torpor seasons, to manage potential harm to threatened fauna during works, a Stop-works procedure should be implemented to manage any threatened fauna encountered during works. Where possible and when safe to do so, trees to be removed should be inspected by the project Arborist prior to the removal of the tree for the presence of fauna. If signs of fauna are present, such as nests and hollows, these should be inspected prior to the removal of the tree. In the event that fauna is observed in hollows during works, then the Stop-works procedure discussed above should be implemented. Where possible, following or during clearing operations, salvaged hollows are to be relocated in an adjacent vegetated area See the Animal handling/ethics/capture section below for any fauna encountered during works	Pre-work/during works	Remediation contractor. Site environmental officer

Issue	Safeguard	Timing	Responsibility
Animal handling/ethics/capture	<p>Animals that require handling must not be approached or handled unless in an emergency (e.g. when there are both no authorised persons present and where the failure to immediately intervene would place the animal at significant risk). In such an emergency, the site manager may obtain over the phone instructions from the project ecologist to ameliorate the situation. A wildlife rescue organisation (e.g. WIRES) should be made aware of operations in case any injured fauna are found.</p> <p>All animals encountered will be treated humanely, ethically, and in accordance with relevant codes under the NSW <i>Prevention of Cruelty to Animals Act 1979</i>, including:</p> <ul style="list-style-type: none"> – Australian code of practice for the care of animals for scientific purposes (NHMRC, 2013) <p>Animal ethics considerations and protocols outlined in this document.</p>	Pre-work/during works	Remediation contractor. Site environmental officer
Protection of native fauna	If native fauna is encountered on site, stop work and allow the fauna to move away un-harassed. A local wildlife rescue service or the ecologist responsible for pre-clearing surveys should be engaged to assist with fauna removal and rescue if fauna fails to move away on its own.	Pre-remediation / remediation	Remediation contractor
Protection of threatened species not listed in this BAR	If any threatened species (flora or fauna) not listed in this BAR is discovered during the works, stop work immediately and notify the WaterNSW Environmental Representative and a qualified Ecologist. Work will only recommence once the impact on the species has been assessed and appropriate control measures provided.	Pre-remediation / remediation	Remediation contractor / Site environmental officer/Ecologist
Pathogen management	<p>Manage plant and animal disease and pathogens such as Phytophthora, Myrtle Rust and Chytrid fungus. General mitigation measures would include:</p> <ul style="list-style-type: none"> – exclusion zones around retained areas of native vegetation – ‘clean on entry, clean on exit’ policy – provision of machine and footwear washdown stations for all equipment and personnel working in areas of native vegetation. <p>Protocols to prevent introduction or spread of Phytophthora, Myrtle Rust and Chytrid fungus should be implemented following OEH Hygiene protocol for the control of disease in frogs (DPIE, 2020).</p> <p>Working under the assumption that the area where works are to be undertaken in is free of the disease and therefore needs to be protected against infection, and that the activity to be undertaken has the potential to introduce the disease (Hornsby Shire Council, 2014).</p>	Remediation	Remediation contractor

7. Conclusion

Based on the results of this BAR, impacts resulting from the proposal have been avoided wherever practical through design and selection of remediation techniques that minimise impacts on biodiversity matters. Notwithstanding, the proposal would result in the following impacts to threatened biota listed under the BC Act:

- Removal of up to 16 native trees, of which, six species are identified as Koala use trees.

An assessment of the likely significance of impacts of the proposal on the Koala have been prepared pursuant to Section 7.3 of the BC Act. The proposal is unlikely to have a significant impact on the Koala provided that mitigation measures described in Section 6 are implemented.

As the proposal is unlikely to result in a significant impact on any threatened biota listed under the BC Act, the proposal will not trigger the Biodiversity Offsets Scheme (BOS). Therefore, assessment and biodiversity offsets under the Biodiversity Assessment Methodology (BAM), via a Biodiversity Development Assessment Report (BDAR) or Species Impact Statement (SIS), are not required.

The proposal is unlikely to result in a significant impact on threatened biota or migratory species listed under the EPBC Act and Referral of the proposal to the Australian Minister for the Environment is therefore not considered necessary.

Although no threatened flora and fauna was reported on the proposal site, it is likely that they utilise the proposal site on occasion. Therefore, a stop works procedure should be implemented in the event that threatened flora or fauna are observed at the proposal site during works. Additionally, the mitigation measures provided in Section 6.2 should be implemented to mitigate damage to flora, fauna and the surrounding environment (such as the adjacent Cataract River) during works.

8. References

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Appendix A

**Remediation design plans (taken from
Appendix G of GHD, 2022)**

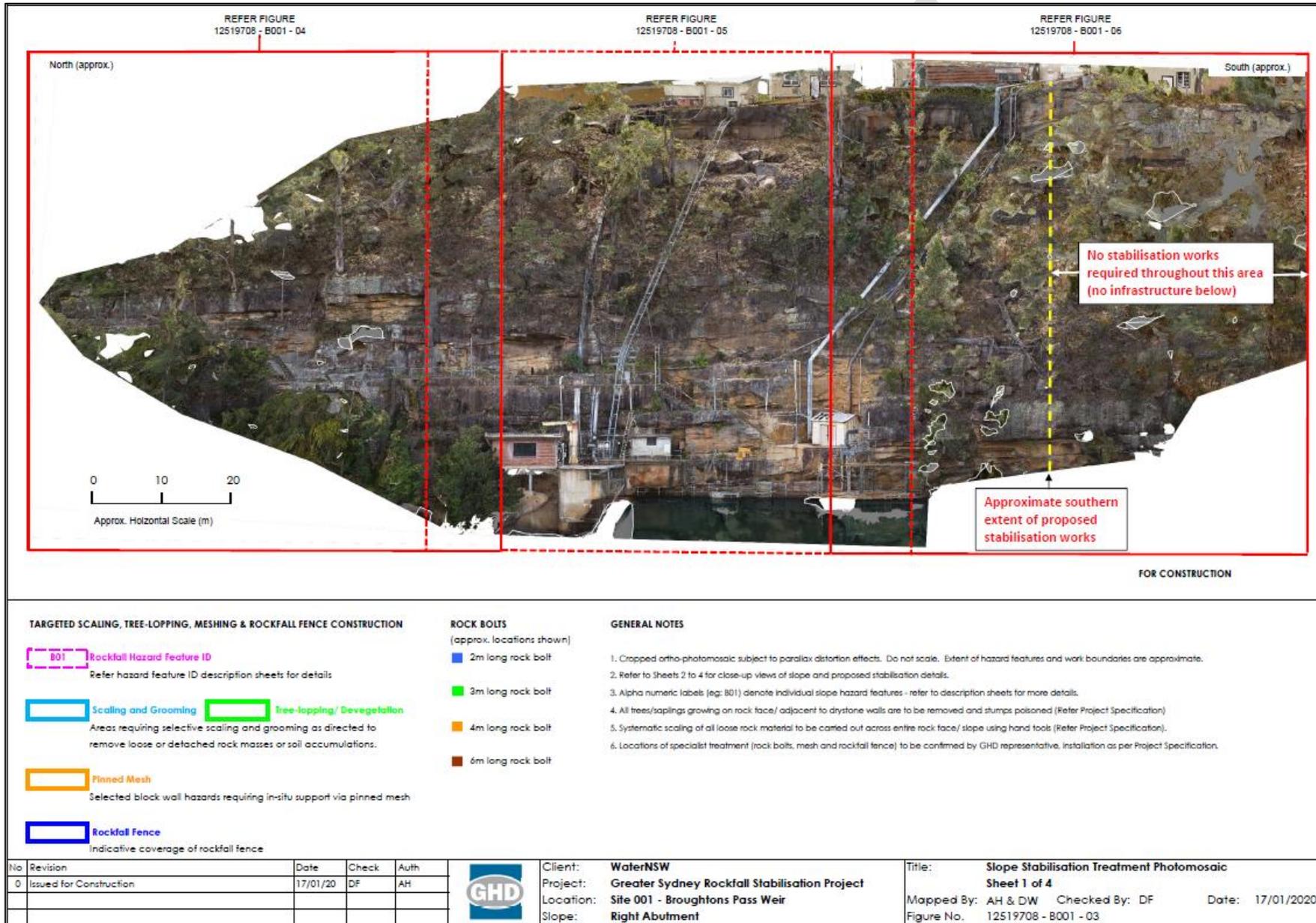


Figure A.1 Remediation design plans - overview

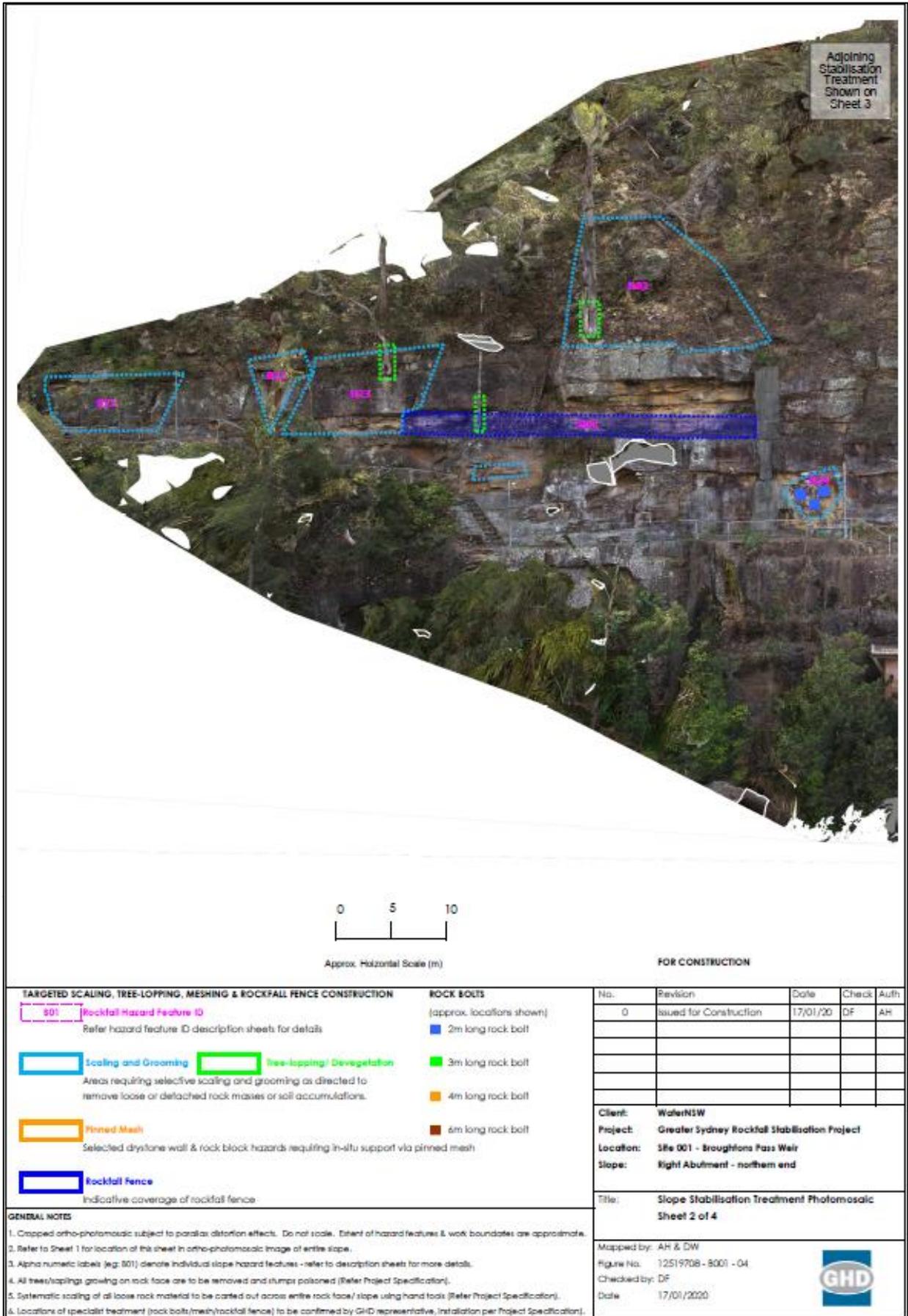


Figure A.2 Remediation design plans – part 1 of 3

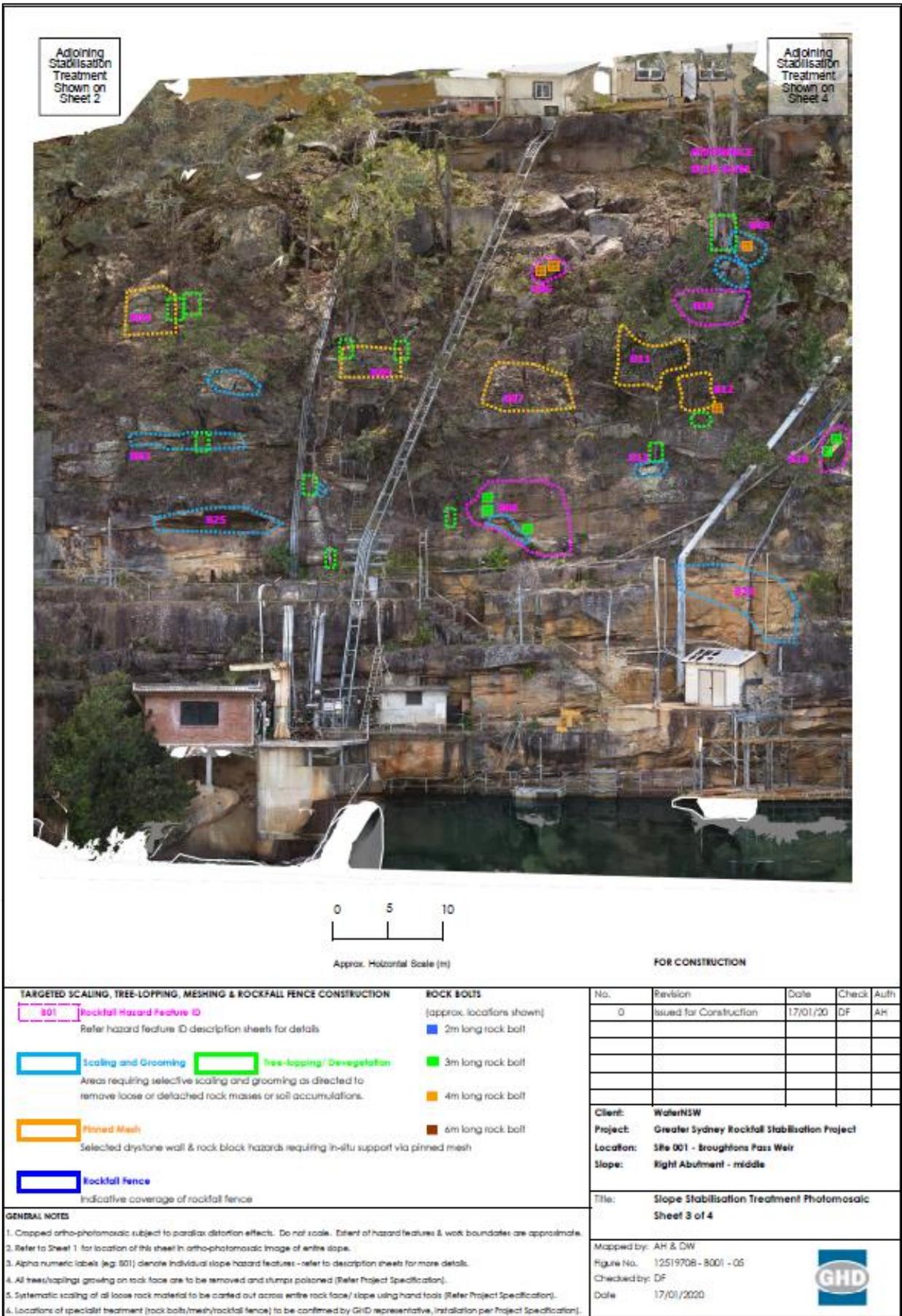
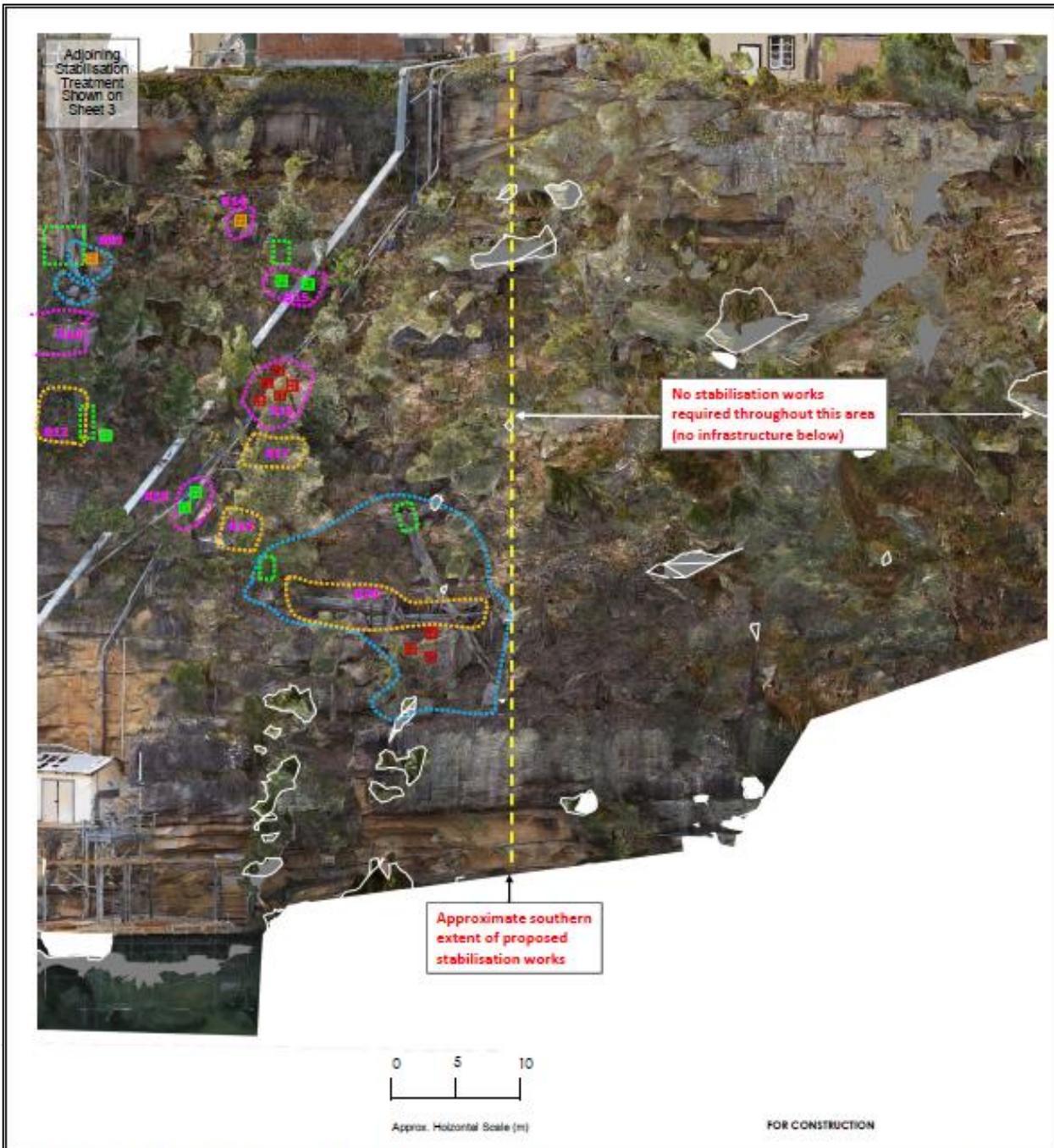


Figure A.3 Remediation design plans – 2 of 3



TARGETED SCALING, TREE-LOPPING, MESHING & ROCKFALL FENCE CONSTRUCTION		ROCK BOLTS		No.	Revision	Date	Check	Auth
801	Rockfall Hazard Feature ID Refer hazard feature ID description sheets for details	■	(approx. locations shown) 2m long rock bolt	0	issued for Construction	17/01/20	DF	AH
 	Scaling and Grooming	■	3m long rock bolt					
 	Tree-logging/ Devegetation Areas requiring selective scaling and grooming as directed to remove loose or detached rock masses or soil accumulations.	■	4m long rock bolt					
 	Pinned Mesh Selected drystone wall & rock block hazards requiring in-situ support via pinned mesh	■	6m long rock bolt					
 	Rockfall Fence Indicative coverage of rockfall fence							
GENERAL NOTES				Client: WaterNSW				
1. Cropped ortho-photomosaic subject to parallax distortion effects. Do not scale. Extent of hazard features & work boundaries are approximate.				Project: Greater Sydney Rockfall Stabilisation Project				
2. Refer to Sheet 1 for location of this sheet in ortho-photomosaic image of entire slope.				Location: Site 001 - Broughtons Pass Weir				
3. Alpha numeric labels (e.g. 801) denote individual slope hazard features - refer to description sheets for more details.				Slope: Right Abutment - southern end				
4. All trees/loppings growing on rock face are to be removed and stumps poisoned (Refer Project Specification).				Title: Slope Stabilisation Treatment Photomosaic Sheet 4 of 4				
5. Systematic scaling of all loose rock material to be carried out across entire rock face/ slope using hand tools (Refer Project Specification).				Mapped by: AH & DW				
6. Locations of specialist treatment (rock bolts/mesh/rockfall fence) to be confirmed by GHD representative. Installation per Project Specification.				Figure No. 12519708 - 8001 - 06				
				Checked by: DF				
				Date 17/01/2020				

Figure A.4 Remediation design plans – 3 of 3

Appendix B

**Desktop results and likelihood of
occurrence table**

Table B.1 Likelihood of occurrence

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
Bird	<i>Actitis hypoleucos</i>	Common Sandpiper	NL	M	EPBC PMST	Found in Australia during non-breeding season, 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.	Low - No suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	EPBC PMST	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. 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. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark <i>Eucalyptus eugenioides</i> and other Stringybark species, and Broad-leaved Ironbark <i>E. fibrosa</i> can also contribute important 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.	Low - Limited key Eucalypt species present on site and no records in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
Bird	<i>Aphelocephala leucopsis</i>	Southern Whiteface	NL	V	EPBC PMST	Occur across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range. Lives in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Forages almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover.	Low - Habitat on site is outside known distribution. No records in the locality	Low - unlikely to occur
Bird	<i>Apus pacificus</i>	Fork-tailed Swift	NL	M	Bionet (1 Record) and EPBC PMST	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.	Low - No suitable habitat on site and only one record in the locality	Low - unlikely to occur
Bird	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	EPBC PMST	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	Low - No suitable habitat on site and no records in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						snails. May construct feeding platforms over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.		
Bird	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	NL	CE	EPBC PMST	Most of the population migrates to Australia during non-breeding season, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	Low - No suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	EPBC PMST	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. Migrates to Australia for the non-breeding period, arriving between August and November, and departing between March and mid-April. Generally occupies littoral and estuarine 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.	Low - No suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Calidris melanotos</i>	Pectoral Sandpiper	NL	M	EPBC PMST	Widespread but scattered records across NSW, east of the divide and in the Riverina and Lower Western regions. Prefers shallow fresh to saline wetlands and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains	Low - No suitable habitat on site and no records in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						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.		
Bird	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	E	Bionet (9 Records) and EPBC PMST	Distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes in NSW. Occurs regularly in the ACT. It 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.	Moderate - Suitable habitat within locality and site with 9 records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	V	V	Bionet (25 Records) and EPBC PMST	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. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of Sheoak occur. Black Sheoak and Forest Sheoak are important foods. Inland populations feed on a wide range of Sheoaks, including Drooping Sheoak, and <i>Allocasuarina 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.	Moderate - Suitable habitat on site and locality with 25 records in the locality	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
Bird	<i>Chthonicola sagittata</i>	Speckled Warbler	V	NL	Bionet (1 Record)	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.	Moderate - Suitable habitat on site and locality with 25 records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	V	Bionet (3 Records) and EPBC PMST	The western boundary of the species range runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Often found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. Also found in mallee and River Red Gum Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. Usually not found in woodlands with a dense shrub layer. Fallen timber is an important habitat component for foraging. Also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	Moderate - Suitable habitat on site and locality with 25 records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Cuculus optatus</i>	Oriental Cuckoo	NL	M	EPBC PMST	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	Low - No suitable habitat on site and no records in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides and mangroves.		
Bird	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	NL	Bionet (20 Records) and EPBC PMST	Sedentary species, 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. Found in eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Moderate - Suitable woodland habitat present within locality and the proposal site. 20 records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Dasyornis brachypterus</i>	Eastern Bristlebird	E	E	EPBC PMST	Occurs in three disjunct areas, in southern Queensland/northern NSW, the Illawarra Region and in the vicinity of the NSW/Victorian border. Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. Habitat in northern NSW occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone. The age of habitat since fires (fire-age) is of paramount importance to this species. The Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years. Habitat in northern NSW requires frequent fires to maintain habitat condition and suitability. The northern fire regimes is between 3-6 years and of variable intensity depending on the habitat condition.	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Erythrotriorchis radiatus</i>	Red Goshawk	CE	E	EPBC PMST	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	Low - Although suitable habitat is present in the locality and the proposal site, there are no records in	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						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 subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	the locality	
Bird	<i>Falco hypoleucos</i>	Grey Falcon	E	V	EPBC PMST	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.	Low - Potentially suitable woodland habitat present within locality but minimal amount occurs in the proposal site. Would only occur as an occasional vagrant, if it were to occur. No records in the locality.	Low - unlikely to occur
Bird	<i>Falco subniger</i>	Black Falcon	V	M	Bionet (1 Record)	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 in land areas.	Moderate - Suitable habitat on site and locality with 1 record in the locality	Low - removal of broadly suitable habitat
Bird	<i>Gallinago hardwickii</i>	Latham's Snipe	NL	M	EPBC PMST	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.	Low - Potentially suitable habitat present within locality but minimal amount occurs in the proposal site. No records in the locality.	Low - unlikely to occur
Bird	<i>Dasyornis brachypterus</i>	Eastern Bristlebird	E	E	EPBC PMST	Occurs in three disjunct areas, in southern Queensland/northern NSW, the Illawarra Region and in the vicinity of the	Low - Limited suitable habitat on site and no records	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						NSW/Victorian border. Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. Habitat in northern NSW occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone. The age of habitat since fires (fire-age) is of paramount importance to this species. The Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years. Habitat in northern NSW requires frequent fires to maintain habitat condition and suitability. The northern fire regimes is between 3-6 years and of variable intensity depending on the habitat condition.	in the locality	
Bird	<i>Glossopsitta pusilla</i>	Little Lorikeet	V	NL	Bionet (52 Records)	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.	Moderate - Suitable woodland habitat within locality and the proposal site but species would likely only be an occasional visitor to the proposal site. 52 records in the locality.	Low - removal of broadly suitable habitat
Bird	<i>Grantiella picta</i>	Painted Honeyeater	V	V	EPBC PMST	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	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						(<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> .		
Bird	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	M	Bionet (2 Records)	Widespread along the NSW coast, and along all major inland rivers and waterways. Habitats characterised by the presence of 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.	Moderate - Suitable habitat on site and locality with 2 records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Hieraaetus morphnoides</i>	Little Eagle	V	NL	Bionet (5 Records)	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.	Moderate - Suitable woodland habitat within locality and the proposal site but species would likely only be an occasional visitor to the proposal site. 5 records in the locality.	Low - removal of broadly suitable habitat
Bird	<i>Hirundapus caudacutus</i>	White-throated Needletail	NL	V	Bionet (4 Records) and EPBC PMST	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	Moderate - Suitable habitat on site and locality with 4 records in the locality	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows.		
Bird	<i>Glossopsitta pusilla</i>	Little Lorikeet	V	NL	Bionet (52 Records)	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.	Moderate - Suitable woodland habitat within locality and the proposal site but species would likely only be an occasional visitor to the proposal site. 52 records in the locality.	Low - removal of broadly suitable habitat
Bird	<i>Lathamus discolor</i>	Swift Parrot	E	CE	Bionet (2 Records) and EPBC PMST	Migrates from Tasmania to south-eastern Australia in the autumn and winter months. Mostly occurs on the coast and 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, Spotted Gum, Red Bloodwood, Forest Red Gum, Mugga Ironbark, and White Box.	Moderate - Suitable woodland habitat present within locality and the proposal site but with only 2 records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Lophoictinia isura</i>	Square-tailed Kite	V	NL	Bionet (6 Records)	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	Moderate - Suitable woodland habitat within locality and the proposal site but species would likely only be an occasional visitor to the proposal site. A total of 6 records in	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						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.	the locality	
Bird	<i>Melanodryas cucullata cucullata</i>	South-eastern Hooded Robin	V	E	EPBC PMST	Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies <i>picata</i> . Prefers lightly wooded country, usually open eucalypt woodland, Acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	NL	Bionet (1 Record)	Widespread in NSW, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. Recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, but very rare in the latter. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark, White Box, Inland Grey Box, Yellow Box, Blakely's Red Gum and Forest Red Gum. Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.	Low - Limited suitable habitat on site and only 1 record in the locality	Low - unlikely to occur
Bird	<i>Monarcha melanopsis</i>	Black-faced Monarch	NL	M	EPBC PMST	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	Moderate - Suitable woodland habitat present within locality and the	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						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.	proposal site but with no records in the locality	
Bird	<i>Motacilla flava</i>	Yellow Wagtail	NL	M	EPBC PMST	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, playing fields, airfields, ploughed land and town lawns. Breeds in temperate Europe and Asia.	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	NL	M	EPBC PMST	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.	Moderate - Suitable woodland habitat present within locality and the proposal site but with no records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Neophema chrysostoma</i>	Blue-winged Parrot	NL	V	EPBC PMST	During the non-breeding period, from autumn to early spring, birds are recorded in western NSW, with some reaching south-eastern NSW, particularly on the southern migration. Inhabits a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. Tends to favour grasslands and grassy woodlands, often found near wetlands both near the coast and in semi-arid zones. Sometimes seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs.	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Neophema</i>	Turquoise Parrot	V	NL	Bionet (1	Extends from southern Queensland through	Moderate - Suitable	Low - removal of

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
	<i>pulchella</i>				Record)	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.	woodland habitat present within locality and the proposal site but with 1 record in the locality	broadly suitable habitat
Bird	<i>Ninox connivens</i>	Barking Owl	V	NL	Bionet (1 Record)	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 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.	Low - Limited suitable habitat on site and only 1 record in the locality	Low - removal of broadly suitable habitat
Bird	<i>Ninox strenua</i>	Powerful Owl	V	NL	Bionet (14 Records)	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.	Moderate - Suitable woodland habitat present within locality and the proposal site and 14 records in the locality	Low - removal of broadly suitable habitat
Bird	<i>Numenius madagascariensi</i>	Eastern Curlew	NL	CE	EPBC PMST	Occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond	Low - Limited suitable habitat on site and no records	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
	s					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.	in the locality	
Bird	<i>Pandion haliaetus</i>	Osprey	V	M	EPBC PMST	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.	Low - Limited suitable habitat on site and no records in the locality. Outside normal range.	Low - unlikely to occur
Bird	<i>Petroica boodang</i>	Scarlet Robin	V	NL	Bionet (8 Records)	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.	High - Suitable woodland habitat present within locality and the proposal site with 8 records in the locality.	Low - unlikely to occur
Bird	<i>Petroica phoenicea</i>	Flame Robin	V	M	Bionet (1 Record)	Breeds in upland areas in NSW and moves to the inland slopes and plains in winter. Likely two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands, often	Moderate - Suitable woodland habitat present within locality and the proposal site but with only 1 record in	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						on ridges and slopes. Prefers clearings or areas with open understoreys.	the locality	
Bird	<i>Pycnoptilus floccosus</i>	Pilotbird	E	V	Bionet (1 Record) and EPBC PMST	Endemic to south-east Australia. Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the ACT, and in the Snowy Mountains in NSW and north-east Victoria. Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne. Habitat critical to the survival of the Pilotbird includes: wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth, and dry sclerophyll forests and woodlands occupying dry slopes and ridges.	Moderate - Suitable woodland habitat present within locality and the proposal site but with only 1 record in the locality	Low - removal of broadly suitable habitat
Bird	<i>Rhipidura rufifrons</i>	Rufous Fantail	V	M	EPBC PMST	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.	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Rostratula australis</i>	Australian Painted Snipe	E	E	EPBC PMST	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 mudflats and in shallow water.	Low - No suitable habitat present in The proposal site and limited habitat in the locality. No records in the locality	Low - unlikely to occur
Bird	<i>Stagonopleura guttata</i>	Diamond Firetail	V	V	Bionet (5 Records) and EPBC PMST	Widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and	Low - Suitable woodland habitat within locality but not at The proposal site. Locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. Scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities, and often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	mostly outside known distribution. five records in the locality.	
Bird	<i>Sternula nereis nereis</i>	Australian Fairy Tern	NL	V	EPBC PMST	Found on isolated sandy inlets and along the coast from Dampier Archipelago, Western Australia, southward to Tasmania and Victoria, and is only vagrant to the east coast. It is most common in Western Australia and rare in New South Wales. Found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons. It favours both fresh and saline wetlands and near-coastal terrestrial wetlands, including lakes and salt-ponds.	Low - No suitable habitat present in The proposal site and limited habitat in the locality. No records in the locality	Low - unlikely to occur
Bird	<i>Symposiachrus trivirgatus</i>	Spectacled Monarch	NL	M	EPBC PMST	Found in coastal north-eastern and eastern Australia, including coastal islands, from Cape York to Port Stephens. It is much less common in the south. Prefers thick understorey in rainforest, wet gullies and waterside vegetation as well as mangroves.	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur
Bird	<i>Tringa nebularia</i>	Common Greenshank	NL	M	EPBC PMST	Common throughout Australia in the summer and recorded in most coastal regions in NSW. 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	Low - No suitable habitat present in The proposal site and limited habitat in the locality. No records in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.		
Bird	<i>Tyto novaehollandiae</i>	Masked Owl	V	NL	Bionet (2 Records)	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. Lives in dry eucalypt forests and woodlands from sea level to 1100 m and often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Moderate - Suitable woodland habitat present within locality and The proposal site with 2 records in the locality	Low - removal of broadly suitable habitat
Fish	<i>Maccullochella peelii</i>	Murray Cod	NL	V	EPBC PMST	Endemic to river systems of the Murray–Darling Basin in south-eastern Australia. Once widespread throughout the Murray-Darling system, it is now uncommon in much of its range and restricted to the lower Murray-Darling. Found in a variety of habitats ranging from clear, rocky streams to slow flowing turbid rivers, lakes and billabongs and are more common in waterways with large rocks, snags and undercut banks with overhanging vegetation.	Low - Limited suitable habitat on site and no records in the locality	Low - unlikely to occur
Fish	<i>Macquaria australasica</i>	Macquarie Perch	E	E	EPBC PMST	Known only from scattered localities in the cool upper reaches of the Murray-Darling system of NSW, including the Hawkesbury-Nepean and Shoalhaven catchments, Victoria and ACT. Also found in man-made lakes on the NSW coast and in lakes and reservoirs, where adults aggregate in small shoals during the spawning season. Inhabits cool, clear freshwaters of rivers with deep holes and shallow riffles.	Moderate - Suitable habitat located in Cataract River adjacent to site but with no records in the locality	Low - limited impact to the adjacent river
Frog	<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	V	EPBC PMST	Distributed in south eastern NSW as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far	Moderate - Suitable woodland habitat with sandstone ridges present	Low - removal of broadly suitable habitat. No breeding habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	within locality and The proposal site but with no records in the locality	to be impacted
Frog	<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	EPBC PMST	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.	Low - No suitable habitat present in The proposal site and limited habitat in the locality. No records in the locality	Low - unlikely to occur
Frog	<i>Litoria littlejohni</i>	Littlejohn's Tree Frog	E	E	Bionet (50 Records) and EPBC PMST	Distribution includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 km north of Sydney) and south to Buchan in Victoria. Most records are within the Sydney Basin Bioregion with only scattered records south to the Victorian border. Records are isolated and tend to be at high altitude. Breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation.	Moderate - Suitable habitat present within locality and The proposal site with 50 records in the locality	Low - removal of broadly suitable habitat
Frog	<i>Litoria watsoni</i>	Watson's Tree Frog	E	E	EPBC PMST	Distributed from the Budderoo NP in south-eastern NSW to the eastern side of the Snowy River NP in the East Gippsland region of Victoria. Found at elevations from near sea-level to 1100 m. Patchy	Moderate - Suitable habitat present within locality and The proposal site but with no records	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						distribution throughout the species range with very few records. Most records are from the Shoalhaven River catchment at the northern extent of the distribution. Forest-dependent species, recorded from wet and dry forest, woodland, bushland, and heathland at low to high elevations. Prefers moister areas with most records from wet forest, followed by damp forest, and warm temperate rainforest. Long lasting pools that allow tadpoles to reach metamorphosis is the most important variable determining the presence of the species. Surrounding habitat consists of leaf litter and low native vegetation on mostly sandy soils. Mostly found in moist, sunny, and relatively flat areas but has also been found sheltering under rocks on high exposed ridges during summer.	in the locality	
Frog	<i>Mixophyes balbus</i>	Stuttering Frog	E	V	EPBC PMST	Occurs along the east coast of Australia from southern Queensland to north-eastern Victoria. Stronghold in the Dorrigo 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 season adults live in deep leaf litter and thick understorey vegetation on the forest floor. BreedS in streams during summer after heavy rain.	Low - Suitable rhabitat present in locality but none within The proposal site . No records in the locality	Low - unlikely to occur
Frog	<i>Pseudophryne australis</i>	Red-crowned Toadlet	V	NL	Bionet (3 Records)	Restricted distribution, confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains. Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation	Moderate - Suitable habitat present within locality and The proposal site with 3 records in the locality	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						or thick piles of leaf litter.		
Gastropod	<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E	NL	Bionet (25 Records)	Lives in small areas on the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. Primarily inhabits Cumberland Plain Woodland which is a grassy, open woodland with occasional dense patches of shrubs. It is also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest, which are also listed communities. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish.	High - Suitable habitat present in locality and The proposal site with 25 records in the locality and within 200 metres of The proposal site .	Low - removal of broadly suitable habitat
Insect	<i>Austrocordulia leonardi</i>	Sydney Hawk Dragonfly	NL	E	EPBC PMST	Very restricted distribution. Known distribution includes three locations in a small area south of Sydney, from Audley to Picton. Known from the Hawkesbury-Nepean, Georges River, Port Hacking and Karuah drainages. Has specific habitat requirements, and has only ever been collected from deep and shady riverine pools with cooler water. Larvae are found under rocks where they co-exist with <i>Austrocordulia refracta</i> .	Moderate - Suitable habitat present in locality and The proposal site but with no records in the locality	Low - removal of broadly suitable habitat
Insects	<i>Petalura gigantea</i>	Giant Dragonfly	E	NL	Bionet (1 Record)	Found along the east coast of NSW from the Victorian border to northern NSW, not found west of the Great Dividing Range. Known occurrences in the Blue Mountains and Southern Highlands, in the Clarence River catchment, and on a few coastal swamps from north of Coffs Harbour to Nadgee in the south. Lives in permanent swamps and bogs with some free water and open vegetation. Adults emerge from late October and are short-lived, surviving for one summer after emergence. Adults spend	Low - Suitable habitat in the locality but not at The proposal site with 1 record in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						most of their time settled on low vegetation on or adjacent to swamps.		
Mammal	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	NL	Bionet (2 Records)	Distribution extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes in NSW. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes and is an important pollinator of heathland plants such as banksias.	Low - Suitable woodland habitat within locality but limited habitat in The proposal site . Two records in the locality	Low - removal of broadly suitable habitat
Mammal	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Bionet (6 Records) and EPBC PMST	Found mainly in areas with extensive cliffs and caves, from Rockhampton 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.	High - Suitable foraging and roosting habitat present within locality and The proposal site with 6 records in the locality	Moderate - impacts to suitable escarpment habitat
Mammal	<i>Dasyurus maculatus</i>	Spot-tailed Quoll	V	E	EPBC PMST	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	Moderate - Suitable woodland habitat within locality and The proposal site . However, habitat in The proposal site comprises potential habitat but there are no records in the	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						500 to over 4000 hectares. Known to traverse their home ranges along densely vegetated creek lines.	locality	
Mammal	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	NL	Bionet (5 Records)	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 also found under loose bark on trees or in buildings.	Moderate - Suitable foraging and roosting habitat within locality and The proposal site . 5 records in the locality.	Low - removal of broadly suitable habitat
Mammal	<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	E	E	EPBC PMST	Patchy distribution, found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River. Generally only found in heath or open forest with a heathy understorey on sandy or friable soils. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material.	Moderate - Suitable habitat in the locality and The proposal site but with no records in the locality	Low - removal of broadly suitable habitat
Mammal	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	NL	Bionet (12 Records)	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.	Moderate - Suitable foraging and roosting habitat within locality and The proposal site . However, habitat in The proposal site comprises a very small amount of potential habitat. 12 records in the locality	Moderate - impacts to suitable escarpment habitat
Mammal	<i>Miniopterus australis</i>	Little Bent-winged Bat	V	NL	Bionet (5 Records)	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, stormwater drains,	High - Suitable foraging and roosting habitat present within locality and The proposal site and 5 records in the locality	Moderate - impacts to suitable escarpment habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						culverts, bridges and sometimes buildings during the day. Forages for small insects beneath the canopy of densely vegetated habitats.		
Mammal	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	NL	Bionet (8 Records)	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.	High - Suitable foraging and roosting habitat present within locality and The proposal site with 8 records in the locality	Moderate - impacts to suitable escarpment habitat
Mammal	<i>Myotis macropus</i>	Southern Myotis	V	NL	Bionet (13 Records)	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.	High - Suitable foraging and roosting habitat present within locality and suitable roosting habitat present within The proposal site with 13 records in the locality.	Moderate - impacts to suitable escarpment habitat
Mammal	<i>Notamacropus parma</i>	Parma Wallaby	V	V	EPBC PMST	Range confined to the coast and ranges of central and northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino. Prefers moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest.	Low - Suitable woodland habitat within locality but limited habitat in The proposal site . No records in the locality	Low - removal of broadly suitable habitat
Mammal	<i>Miniopterus australis</i>	Little Bent-winged Bat	V	NL	Bionet (5 Records)	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,	High - Suitable foraging and roosting habitat present within locality and The proposal site and 5 records in the locality	Moderate - impacts to suitable escarpment habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day. Forages for small insects beneath the canopy of densely vegetated habitats.		
Mammal	<i>Petauroides volans</i>	Greater Glider (southern and central)	E	E	EPBC PMST	Occurs in eastern Australia, in eucalypt forests and woodlands, where it has a broad distribution from around Proserpine in Queensland, south through NSW and the Australian Capital Territory into Victoria. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha.	Low - Suitable woodland habitat within locality but limited habitat in The proposal site . No records in the locality	Low - removal of broadly suitable habitat
Mammal	<i>Petauroides volans</i>	Southern Greater Glider	E	E	Bionet (5 Records)	Occurs in eastern Australia, in eucalypt forests and woodlands, where it has a broad distribution from around Proserpine in Queensland, south through NSW and the Australian Capital Territory into Victoria. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha.	Moderate - Suitable woodland habitat within locality and The proposal site . However, habitat in The proposal site comprises a very small amount of potential habitat. 5 records in the locality	Low - removal of broadly suitable habitat
Mammal	<i>Petaurus australis</i>	Yellow-bellied Glider (south-eastern)	V	V	EPBC PMST	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. Forest type 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.	Low - Suitable woodland habitat within locality but limited habitat in The proposal site . No records in the locality	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
Mammal	<i>Phascolarctos cinereus</i>	Koala	E	E	Bionet (523 Records) and EPBC PMST	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 70 eucalypt species and 30 non-eucalypt species, but will select preferred browse species in any one area.	Moderate - Suitable woodland habitat within locality and The proposal site . However, habitat in The proposal site is steep and comprises a very small amount of potential habitat only. There are 523 records in the locality.	Low - removal of broadly suitable habitat
Mammal	<i>Potorous tridactylus</i>	Long-nosed Potoroo	V	V	EPBC PMST	Generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Low - Suitable woodland habitat within locality but limited habitat in The proposal site . No records in the locality	Low - removal of broadly suitable habitat
Mammal	<i>Pseudomys novaehollandiae</i>	New Holland Mouse	NL	V	EPBC PMST	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.	Low - Suitable habitat present within locality and The proposal site but is outside known distribution. No records in the locality	Low - unlikely to occur
Mammal	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Bionet (13 Records) and EPBC PMST	Generally found within 200 km of the eastern coast of Australia, from Rockhampton to Adelaide. May be found in unusual locations in times of natural	Moderate - Suitable foraging and roosting habitat within locality and	Moderate - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						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.	The proposal site . However, habitat in The proposal site comprises a very small amount of potential habitat. 13 records in the locality.	
Mammal	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	NL	Bionet (4 Records)	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 wide range, with and without trees.	Moderate - Suitable foraging and roosting habitat within locality and The proposal site . However, habitat in The proposal site comprises a very small amount of potential habitat. 4 records in the locality.	Moderate - removal of broadly suitable habitat
Mammal	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	NL	Bionet (7 Records)	Found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. 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 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.	Moderate - Suitable habitat within locality and The proposal site and with 7 records within locality	Low - removal of broadly suitable habitat
Reptile	<i>Delma impar</i>	Striped Legless Lizard	V	V	EPBC PMST	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	Low - Potentially suitable open forest habitat within locality but associated soil types not present in The proposal site .	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland.	No records within locality	
Reptile	<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E	V	Bionet (13 Records)	Largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	High - Suitable habitat within locality and the proposal site and with 19 records within locality	Low - removal of broadly suitable habitat
Reptile	<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E	V	EPBC PMST	Largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Moderate - Suitable habitat within locality and the proposal site but with no records within locality	Low - removal of broadly suitable habitat
Flora	<i>Acacia bynoeana</i>	Bynoe's Wattle	E	V	Bionet (36 Records) and EPBC PMST	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.	High - Suitable habitat within locality and the proposal site and with 87 records within locality.	Moderate-removal of broadly suitable habitat
Flora	<i>Allocasuarina glareicola</i>	null	E	E	EPBC PMST	Primarily found in Richmond district; although outlier populations exist in Voyager Point, Liverpool. Found in open castlereagh woodland on lateritic soil. The species is associated with the following species: Parramatta Red Gum, Red Ironbark, Narrow-leaved Apple, Hard-leaved Scribbly Gum and Melaleuca decora. Common associated understorey species include Prickly-leaved Paperbark, Finger	Moderate - Suitable habitat within locality and the proposal site but with no records within locality.	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						Hakea, Needlebush, Dillwynia tenuifolia, Micromyrtus minutiflora, Swamp Wattle, Acacia brownei, Themeda australis and Xanthorrhoea minor.		
Flora	<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid	E	V	EPBC PMST	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.	Low - Potentially suitable open forest habitat within locality but associated soil types not present in The proposal site . No records within locality	Low - unlikely to occur
Flora	<i>Calochilus pulchellus</i>	Pretty Beard Orchid	E	E	EPBC PMST	Calochilus pulchellus is known from the Sydney Basin Bioregion, where a total of less than 30 adult plants have been recorded in three sites over a range of 40 km on the South Coast of NSW, at altitudes from 20-560 m above sea level. All currently known sites are within the Shoalhaven Local Government Area. The cryptic nature of the species, with a single leaf above ground for only a few months and a flowering stem lasting a few days or a week, makes detection difficult for most of the year. It is likely that additional scattered individuals and small colonies exist within the area of occurrence.	Low - Potentially suitable open forest habitat within locality but associated soil types not present in The proposal site . No records within locality	Low - unlikely to occur
Flora	<i>Commersonia prostrata</i>	Dwarf Kerrawang	E	E	EPBC PMST	Occurs on the Southern Highlands and Southern Tablelands (one plant at Penrose State Forest, one plant at Tallong, a small population near the Corang and about 2000 plants at Rowes Lagoon), a larger population in the Thirlmere Lakes area, and on the North Coast (less than 100 plants at the Tomago sandbeds north of Newcastle). Occurs on sandy, sometimes peaty soils in a wide variety of habitats: Snow Gum (<i>Eucalyptus pauciflora</i>) Woodland and Ephemeral Wetland floor at Rowes Lagoon;	Low - Potentially suitable open forest habitat within locality but associated soil types not present in The proposal site . No records within locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						Blue leaved Stringybark (<i>E. agglomerata</i>) Open Forest at Tallong; and in Brittle Gum (<i>E. mannifera</i>) Low Open Woodland at Penrose; Scribbly Gum (<i>E. haemostoma</i>)/ Swamp Mahogany (<i>E. robusta</i>) Ecotonal Forest at Tomago. Appears to respond positively to some forms of disturbance.		
Flora	<i>Cynanchum elegans</i>	White-flowered Wax Flora	E	E	EPBC PMST	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.	Low - Potentially suitable open forest habitat within locality but only a small amount occurs within The proposal site . The proposal site mostly comprises rocky, sloping, escarpment habitat less suitable for species. No records within locality	Low - unlikely to occur
Flora	<i>Epacris purpurascens</i> var. <i>purpurascens</i>		V	NL	Bionet (172 Records)	Occurs from Gosford in the north, Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Grows in a range of sclerophyll forest, scrubs and swamps, most of which have a strong shale soil influence.	High - Suitable habitat within locality and The proposal site and with 172 records within locality	Moderate-removal of broadly suitable habitat
Flora	<i>Eucalyptus benthamii</i>	Camden White Gum	V	V	EPBC PMST	Occurs on the alluvial flats of the Nepean River and its tributaries. Known distribution from The Oaks (south) to Grose Wold (north) and Kedumba Valley (west). Two major subpopulations in Kedumba Valley and Bents Basin State Recreation Area. Occurs in wet open forest on alluvial flats, in well drained alluvial sands and gravels to 1 m deep. Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment.	Low - Potentially suitable open forest habitat within locality but associated soil types not present in The proposal site . No records within locality	Low - unlikely to occur
Flora	<i>Eucalyptus</i>	Narrow-leaved	V	V	Bionet (1	Naturally occurs only in New England	Low - outside are of	Low - unlikely to

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
	<i>nicholii</i>	Black Peppermint			Record)	Tablelands from Nundle to north of Tenterfield. Widely planted as urban street tree well outside it's range. Grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock.	normal distribution and no habitat in The proposal site . 1 record in the locality	occur
Flora	<i>Genoplesium baueri</i>	Yellow Gnat-orchid	E	E	EPBC PMST	Occurs from Ulladulla to Port Stephens, with only 13 known extant populations. Grows in sparse sclerophyll forest and moss gardens over sandstone. Flowers from February to March.	Low - Suitable open forest on sandstone rocky ridges/escarpment habitat present within locality and The proposal site . However, there are no records of these are within locality	Low - unlikely to occur. Removal of broadly suitable habitat
Flora	<i>Grevillea parviflora subsp. parviflora</i>	Small-flower Grevillea	V	V	Bionet (87 Records) and EPBC PMST	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.	High - Suitable habitat within locality and The proposal site and with 87 records within locality	Moderate-removal of broadly suitable habitat
Flora	<i>Grevillea raybrownii</i>	null	V	V	EPBC PMST	Generally occurs on ridgetops and, less often, slopes and benches of Hawkesbury Sandstone and Mittagong Formation. It occurs in Eucalyptus open forest and woodland with a shrubby understorey on sandy, gravelly loam soils derived from sandstone that are low in nutrients. Recruitment appears to be promoted by fire or other disturbances.	Moderate - Suitable habitat within locality and The proposal site but with no records within locality	Low - removal of broadly suitable habitat
Flora	<i>Haloragis exalata subsp. exalata</i>	Wingless Raspwort	V	V	EPBC PMST	Occurs in 4 widely scattered localities in eastern NSW, disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Requires protected and shaded damp situations in riparian habitats.	Moderate - Suitable habitat present in locality and The proposal site but with no records in the locality	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
Flora	<i>Leucopogon exolasius</i>	Woronora Beard-heath	V	V	Bionet (8 Records) and EPBC PMST	Occurs along the upper Georges River and in Heathcote NP, Royal NP and is also known from the Blue Mountains along the Grose River. Grows in woodland on sandstone and prefers rocky hillsides along creek banks up to 100 m altitude. Associated species include Sydney Peppermint and Silvertop Ash and Graceful Bush-pea, Flaky-barked Tea-tree and Dillwynia retorta.	Moderate - Suitable habitat within locality and The proposal site and with 8 records within locality	Low - removal of broadly suitable habitat
Flora	<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	V	EPBC PMST	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.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur
Flora	<i>Melaleuca deanei</i>	Deane's Paperbark	V	V	Bionet (40 Records) and EPBC PMST	Occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas. Isolated occurrences at Springwood (Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Mostly grows on broad flat ridgetops, dry ridges and slopes and strongly associated with low nutrient sandy loam soils, sometimes with ironstone. Occurs in heath- open forest, often in sandstone ridgetop woodland communities.	Moderate - Suitable habitat within locality and The proposal site and with 40 records within locality	Low- removal of potentially suitable habitat, however it is not recorded on or near the proposal site.
Flora	<i>Persicaria elatior</i>	Knotweed	V	V	EPBC PMST	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.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur
Flora	<i>Persoonia bargoensis</i>	Bargo Geebung	E	V	Bionet (49 Records) and EPBC PMST	Restricted to the western edge of the Woronora Plateau and the northern edge of the Southern Highlands, bounded by Picton, Douglas Park, Yanderra and the Cataract River. Occurs in woodland or dry sclerophyll	Moderate - Suitable habitat within locality and The proposal site and with 49 records	Moderate-removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						forest on sandstone and clayey laterite on heavier, well drained, loamy, gravelly soils of Hawkesbury Sandstone and Wianamatta Shale. Tends to occur in disturbed areas e.g. roadsides and trail margins.	within locality	
Flora	<i>Persoonia hirsuta</i>	Hairy Geebung	E	E	Bionet (2 Records) and EPBC PMST	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 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.	Moderate - Suitable habitat within locality and The proposal site . 2 records within locality	Low - removal of broadly suitable habitat
Flora	<i>Persoonia nutans</i>	Nodding Geebung	E	E	EPBC PMST	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Grows only on aeolian and alluvial sediments in sclerophyll forest and woodland vegetation communities. Largest populations occur in Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur
Flora	<i>Pimelea curviflora</i> var. <i>curviflora</i>	null	V	V	EPBC PMST	Confined to the coastal area of the Sydney and Illawarra regions. Populations known between northern Sydney and Maroota in the north-west and at Croom Reserve near Albion Park in Shellharbour LGA. Grows on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges.	Moderate - Suitable habitat within locality and The proposal site but with no records within locality	Low - removal of broadly suitable habitat
Flora	<i>Pimelea spicata</i>	Spiked Rice-flower	E	E	EPBC PMST	Disjunct populations within the Cumberland Plain ((Marayong and Prospect Reservoir south to Narellan and Douglas Park) and	Moderate - Suitable habitat within locality and The	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
						Illawarra (Landsdowne to Shellharbour to northern Kiama). Found on well-structured clay soils in both the Cumberland Plain and Illawarra environments. Associated with Grey Box communities and in areas of ironbark on the Cumberland Plain sites. Occurs commonly in Coast Banksia open woodland in the coastal Illawarra.	proposal site but with no records within locality	
Flora	<i>Pomaderris brunnea</i>	Brown Pomaderris	E	V	Bionet (1 Record) and EPBC PMST	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.	Moderate - Suitable habitat within locality and The proposal site . 1 record within locality	Low - removal of broadly suitable habitat
Flora	<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	E	E	EPBC PMST	Disjunct distribution including the Nungatta area, Tumut, the Tantawangalo area, near Tallong, the Yerranderie area, the Canyonleigh area and Ettrema Gorge. Found in wide range of habitats, including forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.	Moderate - Suitable habitat within locality and The proposal site but with no records within locality	Low - removal of broadly suitable habitat
Flora	<i>Prasophyllum affine</i>	Jervis Bay Leek Orchid	E	E	EPBC PMST	Known from three areas south-east of Nowra, in Kinghorne Point, Wowly Gully near the town of Callala Bay, and near the township of Vincentia. Grows on poorly drained clay soils that support low heathland and sedgeland communities. Pollination is primarily by specialised wasp species.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur
Flora	<i>Pterostylis saxicola</i>	Sydney Plains Greenhood	E	E	EPBC PMST	Occurs in western Sydney between Picton and Freemans Reach. Grows in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. Associated vegetation above these rock shelves is sclerophyll forest or woodland on shale or shale/sandstone transition soils.	Moderate - Suitable habitat within locality and The proposal site but with no records within locality	Low - removal of broadly suitable habitat

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
Flora	<i>Pultenaea aristata</i>	null	V	V	EPBC PMST	Restricted to the Woronora Plateau, a small area between Helensburgh, south of Sydney, and Mt Kiera above Wollongong. Occurs in either dry sclerophyll woodland or wet heath on sandstone.	Moderate - Suitable habitat within locality and The proposal site but with no records within locality	Low - removal of broadly suitable habitat
Flora	<i>Rhizanthella slateri</i>	Eastern Underground Orchid	V	E	EPBC PMST	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.	Moderate - Suitable habitat within locality and The proposal site but with no records within locality	Low - removal of broadly suitable habitat
Flora	<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	CE	EPBC PMST	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.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur
Flora	<i>Thelymitra kangaloonica</i>	Kangaloon Sun Orchid	CE	CE	EPBC PMST	Only known to occur on the southern tablelands of NSW in the Moss Vale / Kangaloon / Fitzroy Falls area at 550-700 m above sea level. Known to occur at three swamps that are above the Kangaloon Aquifer. Found in swamps in sedgeland over grey silty grey loam soils.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur

Class	Scientific name	Common name	NSW status	EPBC status	Records	Description	Likelihood of occurrence	Likelihood of impact
Flora	<i>Thesium australe</i>	Austral Toadflax	V	V	EPBC PMST	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.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur
Flora	<i>Xerochrysum palustre</i>	Swamp Everlasting	NL	V	EPBC PMST	Found in Kosciuszko National Park and the eastern escarpment south of Badja. Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils.	Low - outside are of normal distribution and no habitat in The proposal site . No records in the locality	Low - unlikely to occur

Notes

NL	Not listed
M	Migratory
V	Vulnerable
E	Endangered
CE	Critically endangered

Appendix C

Flora species list

Table C.1 Flora species list

Family	Botanical name	Common name
Apiaceae	<i>Hydrocotyle spp*</i>	Pennywort
Asparagaceae	<i>Asparagus asparagoides*</i>	Bridal Creeper
Asteraceae	<i>Ageratina adenophora*</i>	Crofton Weed
Asteraceae	<i>Bidens pilosa*</i>	Cobbler's Pegs
Asteraceae	<i>Conyza bonariensis*</i>	Flax-leaf Fleabane
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black She-oak
Convolvulaceae	<i>Cuscuta spp.</i>	Dodder
Cunoniaceae	<i>Ceratopetalum gummiferum</i>	NSW Christmas Bush
Cyperaceae	<i>Cyathochaeta diandra</i>	Sheath Rush
Cyperaceae	<i>Schoenus ericetorum</i>	Heath Bog-rush
Davalliaceae	<i>Nephrolepis cordifolia</i>	Fish-bone Fern
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken
Eleocarpaceae	<i>Elaeocarpus reticulatus</i>	Blueberry Ash
Fabaceae/faboideae	<i>Hardenbergia violacea</i>	False Sarsparilla
Lomandraceae	<i>Lomandra longifolia</i>	Spiky-headed Mat-rush
Malvaceae	<i>Sida rhombifolia*</i>	Paddy's Lucerne
Myrtaceae	<i>Angophora bakeri</i>	Narrow-leaved Apple
Myrtaceae	<i>Eucalyptus agglomerata</i>	Blue-leaved Stringybark
Myrtaceae	<i>Eucalyptus oblonga</i>	Stringybark
Myrtaceae	<i>Eucalyptus punctata subsp. punctata</i>	Grey gum
Myrtaceae	<i>Eucalyptus resinifera</i>	Red Mahogany
Myrtaceae	<i>Leptospermum trinervium</i>	Slender Tea-tree
Phormiaceae	<i>Dianella caerulea</i>	Blue Flax-lily
Phormiaceae	<i>Dianella revoluta</i>	Blueberry Lily
Phyllanthaceae	<i>Glochidion ferdinandi var. ferdinandi</i>	Cheese Tree
Poaceae	<i>Microlaena stipoides</i>	Weeping Grass
Poaceae	<i>Pennisetum clandestinum*</i>	Kikuyu Grass
Poaceae	<i>Rytidosperma tenuius syn. Austrodanthonia tenuior</i>	Wallaby Grass
Poaceae	<i>Setaria spp.*</i>	Pigeon Grass
Proteaceae	<i>Persoonia linearis</i>	Narrow-leaved Geebung
Ranunculaceae	<i>Clematis aristata</i>	Old Man's Beard
Rhamnaceae	<i>Pomaderris sp.</i>	Pomaderris
Rosaceae	<i>Rubus fruticosus sp. agg.*</i>	Blackberry complex
Sapindaceae	<i>Dodonaea triquetra</i>	Hop-bush
Smilacaceae	<i>Smilax glycyphylla</i>	Sarsaparilla
Solanaceae	<i>Solanum spp.*</i>	Solanum

*Exotic

Appendix D

Assessment of Significance

Section 7.3 of the Biodiversity Conservation Act 2016 and Section 1.7 of the EP&A Act list five factors that must be taken into account in the determination of the significance of potential impacts of an activity on ‘threatened species’, populations or ecological communities (or their habitats) listed under the BC Act.

The ‘5-part test’ is used to determine whether an activity is ‘likely’ to impose ‘a significant effect’ on threatened biota and thus whether a species impact statement (SIS) is required. Should the 5-part test conclude that a significant effect is likely, an SIS or Biodiversity Development Assessment Report (BDAR) must be prepared.

Five part tests have been provided for threatened biota which were recorded or have a high or moderate likelihood of occurrence and could potentially be impacted by the proposal.

The following threatened biota and potential threatened biota, are included in these have been assessed:

- *Phascolarctos cinereus* (Koala)

Table D.1 5 part test - *Phascolarctos cinereus*

<i>Phascolarctos cinereus</i> (Koala) – Endangered under BC Act and EPBC Act	
a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;	<p>The Koala has not been recorded in the proposal site, however Koala use trees are present on site, there has been a recorded sighting approximately 120 m from the proposal site and 523 sightings of the Koala reported in the locality. Notwithstanding, it is considered that the proposal site generally comprises unsuitable habitat given its location along a steep escarpment. The Koala is an easily identifiable species and it has never been recorded on the rock face in question. Additionally, there are extensive areas of suitable habitat in adjoining areas and the broader locality that are on gentler topography and which would enable easier travel by Koalas throughout the locality.</p> <p>It is therefore considered that the proposed works would be unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</p>
b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	N/A to this threatened species
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;	N/A to this threatened species
c) In relation to the habitat of a threatened species or ecological community:	
(i) The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and	<p>The proposal will remove up to 16 trees from the proposal site, including the potential to remove feed trees the species prefers. This represents a very small percent of the total estimated extent of native vegetation in the locality. Removal of up to 16 trees from a very steep rock face represents a minor reduction in the extent of habitat for the species in the locality, particularly in the context of the long-term viability of the rock face should the proposed works not be completed.</p>
(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and	<p>Native vegetation on the proposal site is part of an extensive patch of mostly continuous native vegetation that extends throughout the locality. Any potential fragmentation resulting from the removal of up to 16 trees is considered highly unlikely to prevent the Koala from utilising habitat in the vicinity of the proposal site given its highly mobile nature. Connectivity would be maintained with adjoining habitat and there would not be complete isolation of any stands of habitat.</p> <p>Given the above, the proposal is unlikely to affect the connectivity of habitat to the extent that any habitat for the Koala would be isolated.</p>
(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,	<p>The proposal would result in the removal of up to 16 trees habitat for the Koala, containing eucalypt species known to be preferred feed trees for the species. The trees proposed to be removed represents a very small percent of the total estimated extent of native woodland in the locality.</p> <p>The species has never been recorded at the proposal site, and given the steep topography of the rock face, is unlikely to</p>

Phascolarctos cinereus (Koala) – Endangered under BC Act and EPBC Act

rely on vegetation growing on it to traverse the local area.

Taking the above into account, impacts to a small area of potential habitat within the proposal site is highly unlikely to be important to the long-term survival the species in the context of the extent of potential habitat in the proposal site, the surrounding area and the locality.

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

The proposal would not affect any habitat of outstanding biodiversity value.

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

The proposal would contribute to the operation of the following Key Threatening Processes (KTPs) of relevance to the Koala:

– Clearing of native vegetation

The proposal would directly contribute to the operation of this KTP through the removal of up to 16 native trees of native vegetation which may provide foraging habitat for the species as described above

As described 7.2 the proposal would remove or modify a very minor proportion of the habitat resources that may support a potential local population of this threatened species through the operation of this KTP.

Conclusion of the assessment of significance

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on any potential population of the Koala that may utilise the proposal site given:

- The proposal site comprises marginal habitat at best given that it is located along a steep escarpment that would be difficult to traverse for the Koala
- There are extensive areas of suitable habitat in adjoining areas and the broader locality.
- The small area of potential habitat within the proposal site is highly unlikely to be important to the long-term survival the species

Consequently, a species impact statement is not required for the Koala. Mitigation measures including measures to avoid mortality of Koalas that might be present on the proposal site are recommended.



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